

# 35

September 21, 2018 Letting

## Notice to Bidders, Specifications and Proposal



**Illinois Department  
of Transportation**

Springfield, Illinois 62764

**Contract No. 62F52  
Various Counties  
Section 2017-033-I  
Various Routes  
District 1 Construction Funds**

Prepared by

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Checked by

(Printed by authority of the State of Illinois)



## NOTICE TO BIDDERS

1. **TIME AND PLACE OF OPENING BIDS.** Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). All bids must be submitted to the iCX system prior to 10:00 a.m. September 21, 2018 prevailing time at which time the bids will be publicly opened from the iCX SecureVault.

2. **DESCRIPTION OF WORK.** The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

**Contract No. 62F52  
Various Counties  
Section 2017-033-I  
Various Routes  
District 1 Construction Funds**

3. **INSTRUCTIONS TO BIDDERS.** (a) This Notice, the invitation for bids, proposal and letter of award shall, together with all other documents in accordance with Article 101.09 of the Standard Specifications for Road and Bridge Construction, become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.

(b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.

4. **AWARD CRITERIA AND REJECTION OF BIDS.** This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.

By Order of the  
Illinois Department of Transportation

Randall S. Blankenhorn,  
Secretary

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FOR  
SUPPLEMENTAL SPECIFICATIONS  
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2018

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS and frequently used RECURRING SPECIAL PROVISIONS.

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 4-1-16) (Revised 1-1-18)

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## STATE OF ILLINOIS

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### SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction," adopted , the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways," and the "Manual of Test Procedures for Materials" in effect on the date of invitation for bids, and the Supplemental Specifications and Recurring Special Provisions indicated on the Check Sheet included herein which apply to and govern the construction of Various Routes, Section 2017-033-I, Various Counties, Contract No. 62F52, and in case of conflict with any part or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

**Various Routes  
Section 2017-033-I  
Various Counties  
Contract No. 62F52**

Annual maintenance and operations of 2713 traffic signal locations, 541 lighting systems locations, 1303 Surveillance locations, 46 Pump Stations and 138 Planned Maintenance Locations in District One; which include but are not limited to electrical systems, mechanical systems, communication systems, buildings and structures and equipment 256 REVLAC, 29 RACS, 41 ramp gates, 22 communication huts, fiber network, layer 2 and layer 3 network equipment, alarm monitoring systems, radio systems, 57 DMS signs, 29 maintenance yards, 1643 HMLT, 19,229 light poles, 51,347 fixtures, sign lighting, HAR, I-NET, EMCMS and including 7,250 ft. galvanized steel conduit; 7,500 ft electrical cable assembly; 16,000 ft. cable assemblies; 13,500 ft. fiber cable; 23 handholes; 36 inspections of standby generators; 6,000 ft. of unit duct; 50 breakaway devices; 1 lighting controllers; 100ft light pole foundation; 25 metal light pole foundations; 25 light pole kits; distribution panels, lighting, radio control equipment; 2 light towers; 3000 ft. light tower clean and paint; 60 fluorescent luminaires; wash walls at Hubbard's Cave, 16 pump rebuilds; 105 pump vibration testing and analysis; 500 sq. yds. wet pit cleaning; 50 hrs. wet pit power wash, 12 CCTV, 8 camera poles, 22 swing gates, 3,500 ft. detector loop; 2 steel mast arm assemblies and poles; 42 LED signal heads; 5 video detection systems; wireless interconnect systems; 10 single lane and 15 two lane traffic control.

## **SECTION 1**

### **ARTICLE 1.0 – BIDDERS INFORMATION AND SPECIAL PRE-QUALIFICATION SUBMITTALS**

#### **1.1 Description of Work**

This Contract is for annual maintenance of electrical systems including the Traffic Signal System, Lighting System, Pump Station System, Surveillance System and Other Electrical Systems, many subsystems and components, mechanical systems, communication systems, and included buildings, structures and grounds as located within District 1 or maintained by District 1 in surrounding counties, such as Kendall, Grundy and LaSalle, as specified herein.

#### **1.2 Schedule of Prices – Submittal (for Attached Bidding Sheets)**

1. The undersigned bidder submits herewith, in accordance with the rules and instructions, a schedule of prices for the items of work for which bids are sought.
2. The Contractor, for specified unit prices listed under the Schedule of Prices, shall conform to all requirements as specified herein these articles.
3. Each Pay Item shall have a unit price and a total price.
4. The unit prices bids are in U.S. dollars and cents.
5. The unit price shall govern if no total price is shown or if there is a discrepancy between the product of the unit price multiplied by the quantity.
6. If a unit price is omitted, the total price will be divided by the quantity in order to establish a unit price.
7. A bid will be declared unacceptable if neither unit price nor a total price is shown.
8. The Department is under no obligation to authorize non-routine pay item work. Non-routine work will be authorized based on preventative maintenance assessments, ongoing operational needs and system inspections.
9. The quantities appearing in the bid schedule are approximate and are provided for obtaining a gross sum for the comparison of bids.
10. Payment to the Contractor awarded the Contract will be made only for actual quantities of work performed and accepted or materials furnished according to the Contract. The scheduled quantities of work to be done and materials to be furnished may be increased, decreased or omitted.

The Contractor's unit prices are expected to be realistic and no additional compensation will be allowed due to a variance in quantities; however, the Engineer retains the right to seek a revised unit price when quantities exceed Department expected usage.

The Engineer also retains the right to use force account procedures or use other procurement means available to the Department where unit prices reflect pricing significantly higher than Department projected norms. The Contractor is cautioned against unbalanced bidding and is directed to Article 104.01 of the Standard Specifications.

**1.3 Examination of Plans, Specifications, Special Provisions, and Site of Work**

The prospective bidder shall, before submitting his bid, carefully examine the proposal form, plans, specifications, special provisions and form of contract and bond. All locations to be maintained under this Contract may be inspected in order for the prospective bidder to become familiar with all the local conditions affecting the Contract and the detailed requirements of maintenance.

The prospective bidder shall be responsible for any pre-existing maintenance deficiencies that may exist at the time this contract is awarded and his bid shall reflect these deficiencies. If this bid is accepted, he will be responsible for all errors in his proposal resulting from his failure or neglect to comply with these instructions. The Department will, in no case, be responsible for any change in anticipated profits resulting from such failure or neglect.

Numerous figures, charts, forms, or required contractor submittals, as mentioned herein, shall be furnished to all bidders at the Pre-Bid meeting.

**1.4 Proposal Guaranty**

Each proposal shall be accompanied by either a bid bond on the Department form, executed by a corporate surety company, satisfactory to the Department, or a bank cashier's check or a properly certified check for Seven Hundred Thousand Dollars (\$700,000) made payable to the Treasurer, State of Illinois. The proposal guaranty checks will be returned as prescribed in Section 103.03 of the Standard Specifications. Bid bonds will not be returned.

**1.5 Requirement of Contract Bond**

The successful bidder, at the time of execution of the Contract, shall deposit with the Department a surety bond in the amount of twenty million dollars (\$20,000,000). The form of the bond shall be acceptable to the Department.

**1.6 Insurance**

The Contractor shall comply with the provisions of Section 107 of the Standard Specifications for Road and Bridge Construction, legal relations and responsibility to the public. Insurance shall be in compliance with the requirements of Article 107.27 except for liability minimum amounts as modified herein.



The Contractor's insurance shall be written for not less than limits of liability as follows:

- A. Employers Liability
  - (1) Each Accident \$12,500,000
  
- B. Commercial General Liability
  - (1) General Aggregate Limit \$12,500,000
  - (2) Products-Completed Operations Aggregate Limit \$12,500,000
  - (3) Each Occurrence Limit \$12,500,000
  
- C. Commercial Automobile Liability
  - Bodily Injury & Property Damage Liability Limit Each Occurrence \$ 12,500,000
  
- D. Umbrella Liability Refer to Art.107.27

The Chicago Transit Authority and the Illinois Department of Transportation shall be named as additional insured's and furnished with certificates of insurance and a full copy the insurance policy.

The customary exclusion that negates coverage when working within 50 feet of a railroad track shall be eliminated from the Liability policy and the certificates submitted shall plainly state that coverage extends to work being done on or over track right-of-way. The Contractor shall carry a railroad protective insurance policy for the purpose of maintaining traffic signal facilities and appurtenances on railroad right-of-way (R.O.W.).

The policy shall cover the Contractor's crews performing normal routine maintenance on traffic signal heads and other traffic signal related items attached directly to the railroad's truss or structure containing the railroad's warning devices. (This coverage is required for all existing locations with traffic signal heads attached directly to railroad structures, or with existing railroad interconnects.)

The Contractor shall obtain railroad protective liability insurance coverage, to perform non-routine work relating to the installation of new traffic signal facilities on railroad R.O.W. where the Department has no existing appurtenances, e.g., railroad interconnect, railroad structure mounted traffic devices, etc.

The Contractor shall provide insurance coverage for all Contractor Spare Parts Inventory in the possession of the Contractor or in the Contract Spare Parts Warehouse, for losses due to fire, theft or vandalism. Estimated value of current stock on hand is approximately \$500,000.

The Contractor shall provide full insurance coverage as described in the above items until all routine and authorized non-routine work has been completed in accordance with the terms of this Contract.

The Contractor shall submit original and duplicate copies of all insurance policies when requested by the Engineer. The complete policies, with all riders, etc., shall be submitted.

**1.7 Indemnification**

The Contractor shall abide to the requirements of 107.26 Indemnification, per the Standard Specifications for Road and Bridge Construction.

**1.8 Qualifications to Bid**

It is the intent of this Contract that it be performed only by a contractor having the size, special expertise and organizational capabilities necessary to accomplish its wide-ranging scope of work. The prospective bidder should familiarize himself with all aspects of the Contract prior to bidding.

All bidders must be pre-approved, by the IDOT Central Bureau of Operations, prior to bidding upon the District 1 Electrical Maintenance Contract. In addition, a Special Qualification submittal is required of all bidders at the mandatory Pre-Bid Meeting.

**1.9 Mandatory Pre-Bid Meeting**

A mandatory pre-bid meeting will be conducted for bidders to receive additional charts and data to assist in the bidding process and to submit the Bidder's Special Qualifications requirements.

The Pre-Bid Meeting will be held at 10:30AM, Thursday, August 30, 2018

Illinois Department of Transportation  
Lower level class room  
201 West Center Court  
Schaumburg, IL 60196-1096

The Pre-Bid Meeting attendance is mandatory for all prospective bidders.

**1.10 Bidders' Special Qualifications Submittal**

All prospective bidders shall present the Special Bidder's Qualifications Submittal to the Engineer by the end of the Mandatory Pre-bid meeting. The requested information is listed in points 1 through 11, as applicable to Contract article specifications herein. If the bidder's Special Qualifications submittal, as presented to the Engineer, does not meet Contract 62F52 requirements as listed herein, the bidder will not be qualified to bid on the EMC 2019.

The Special Qualifications submittal shall include:

1. Name of the bidding company and its owners and/or officers
2. An organizational chart that illustrates the structure of the organization, and relationship to the Contract, including proposed work units, divisions, and departments, with named Electrical Maintenance Contract positions and/or roles and the responsibilities of each in order to administer and perform the work as required herein. Resumes of each individual shall be provided to support their position qualifications.

3. Location and description, including square footage of:
  - Bidder's Current Headquarters
  - Proposed EMC Office
  - Proposed EMC Dispatch Center
  - Proposed Shop Facilities
4. The name of the proposed Fleet Management software for this Contract and details of its operations to meet the Contract requirements herein.
5. A report which provides the number, type, year of manufacture of vehicles in use in the bidder's current operations, and the number of any additional vehicles to be purchased or leased for work on this Contract.
6. A report which summarizes the number and types of maintenance/construction equipment currently owned or leased by the bidder and quantity and name of additional equipment to be purchased or leased for work on this Contract.
7. A report which details the bidder's in-house familiarity and capability in installing and maintaining CCTV and video distribution systems.
8. A report which describes the bidder's in-house familiarity with Allen-Bradley PLC equipment and troubleshooting of ladder logic used in the REVLAC and RACS systems. (Section 1, Article 9.0)
9. A report which describes the bidder's in-house work on fiber optic systems. (Section 1, Article 9.0)
10. A statement signed by the bidder that:
  - He/she has read the EMC 2019 and accepts the methods of payment for work as described herein
  - The Special Qualification information submitted is accurate and truthful

The Special Bidder's Qualifications Submittal must be presented to:

Mr. Naser Gholeh, P.E., Resident Engineer  
Illinois Department of Transportation  
Bureau of Traffic, Electrical Maintenance Section  
445 Harrison Street, Oak Park, IL 60304

by the conclusion of the mandatory Pre-Bid Meeting.

Bidders will be furnished with a receipt which states that the Special Bidder Qualifications submittal was received within the required time deadline. The submitted information will be analyzed and, if requested by the Engineer, the prospective bidder shall facilitate an inspection of its facilities and/or equipment. The Engineer shall determine the aggregate suitability and acceptability of the qualification information submitted. If it is determined that the prospective bidder is qualified to perform the work then the Department will notify the bidder through the Illinois Department of Transportation website stating they are approved to bid on the Electrical Maintenance Contract 62F52.

**1.11 Site Inspections**

Pre-Bid Site Inspection locations, itinerary and program schedules will be finalized and distributed at the Pre-Bid Meeting. Bidders are expected to be familiar with the type and extent of systems covered under the Contract. Certain items will be made available for detailed inspection during the Pre-Bid Site Inspection. Bidders are encouraged to request inspection items at the Pre-Bid Meeting. The Department reserves the right to limit the inspections.

**ARTICLE 2.0 – SCHEDULE OF PRICES**

**QUANTITIES OF EQUIPMENT TO BE MAINTAINED:**

<b>System Code</b>	<b>System</b>	<b>Number of Locations</b>
L	Lighting	541
P	Pump Stations	46
S	Surveillance	1062
T	Traffic Signals	2713
Planned Maintenance Location		138

Total Number of Locations: 4500

Fixed Monthly Routine Maintenance Payment: \$ \_\_\_\_\_

**ROUTINE MAINTENANCE LUMP SUM BID PRICE TO MAINTAIN EQUIPMENT AT LOCATIONS LISTED HEREIN:**

<b>LUMP SUM PER MONTH</b>		<b>YEARLY AMOUNT</b>
\$	X 12 months/year	\$

\* Additional locations which will be maintained by the Contractor during this Contract. Refer to Section 3 for list of REVLAC and Planned Maintenance Locations. Refer to Section 2 for Pay items RML1 and RMR1.

Item	Item Description	Units	Quantity	Unit Cost	Extension
<b>GAC 1</b>	Aerial Cable, with Messenger Wire, 4-1/C up to No. 2	Ft	1,500	\$	\$
<b>GC01</b>	Conduit, Galvanized Steel, Attached to Struct. 3/4 to 1 1/4"	Ft	2,000	\$	\$
<b>GC02</b>	Conduit, Galvanized Steel, Attached to Struct. 1 1/2" to 2 1/2"	Ft	1,000	\$	\$
<b>GC03</b>	Conduit, Galvanized Steel, Attached to Struct. 3" to 5"	Ft	300	\$	\$
<b>GC04</b>	Conduit, Galv. Steel, PVC Coated Attached to Struct. 3/4 to 1 1/4"	Ft	1500	\$	\$
<b>GC05</b>	Conduit, Galv. Steel, PVC Coated Attached to Struct. 1 1/2" to 2 1/2"	Ft	500	\$	\$
<b>GC06</b>	Conduit, Galv. Steel, PVC Coated Attached to Struct. 3" to 5"	Ft	100	\$	\$
<b>GC07</b>	Conduit, Galvanized Steel, Encased in Concrete, 3/4 to 2 1/2"	Ft	250	\$	\$
<b>GC08</b>	Conduit, Galvanized Steel, Encased in Concrete, 3" to 5"	Ft	300	\$	\$
<b>GC09</b>	Conduit, Galvanized Steel, in Ground, 3/4 to 2 1/2"	Ft	1,000	\$	\$
<b>GC10</b>	Conduit, Galvanized Steel, In Ground, 3" to 5"	Ft	300	\$	\$
<b>GC11</b>	Conduit, Non-Metallic, Coillable, in Ground, 1 1/4"	Ft	2,500	\$	\$
<b>GC13</b>	Conduit, PVC, for Buildings, 1", Schedule 40	Ft	300	\$	\$
<b>GC14</b>	Conduit, Removal	Ft	1,500	\$	\$
<b>GCC 1</b>	Controller, Calcium Chloride Pump	Ea	2	\$	\$
<b>GCE 1</b>	Outside Plant CAT 5e Ethernet Cable	Ft	2500		
<b>GE01</b>	Electric Cable Assembly, XLP, 3/C No. 2, 1/C No. 6 Green	Ft	1,000	\$	\$
<b>GE02</b>	Electric Cable Assembly, XLP, 3/C No. 4, 1/C No. 6 Green	Ft	1,500	\$	\$
<b>GE03</b>	Electric Cable, XLP, 1/C up to No. 6	Ft	5,000	\$	\$
<b>GE04</b>	Electric Cable, XLP, 1/C No. 4 to No. 1	Ft	4,000	\$	\$
<b>GE05</b>	Electric Cable, XLP, 1/C No. 1/0 to No. 2/0	Ft	2,000	\$	\$
<b>GE06</b>	Electric Cable, XLP, 1/c No. 3/0 to No. 4/0	Ft	1,000	\$	\$
<b>GE07</b>	Electric Cable, XLP, 1/C 250 MCM to 500 MCM	Ft	600	\$	\$

<b>GE08</b>	Electric Cable, Pull or Remove	Ft	5,000	\$	\$
<b>GE09</b>	Electric Cable, THWN, 1/C from No.14 to No.10	Ft	5,000	\$	\$
<b>GF01</b>	Fiber Optic Trunk/distribution Lateral Cable up to 96 SM	Ft	11,000	\$	\$
<b>GF03</b>	Fiber Optic Cable, Hybrid, 12 MM & 24 SM	Ft	2,500	\$	\$
<b>GF04</b>	Fiber Optic Termination Panel 12F or 24F	Ea	5	\$	\$
<b>GF05</b>	Fiber Optic Patch Panel 96 SM	Ea	5	\$	\$
<b>GF06</b>	Fiber Optic Splice Enclosure	Ea	5	\$	\$
<b>GF07</b>	Fiber Optic Innerduct, up to 1 1/2"	Ft	11,000	\$	\$
<b>GF08</b>	Fiber Optic Cable, Install Only	Ft	11,000	\$	\$
<b>GFC1</b>	Foundation, Concrete, Type I	Ft	20	\$	\$
<b>GFR1</b>	Foundation Removal	Ea	15	\$	\$
<b>GGR1</b>	Ground Rod	Ea	20	\$	\$
<b>GH01</b>	Handhole	Ea	10	\$	\$
<b>GH02</b>	Handhole, Fiber Optic	Ea	5	\$	\$
<b>GH03</b>	Handhole, Heavy-Duty	Ea	4	\$	\$
<b>GH04</b>	Handhole, Heavy-Duty, Double	Ea	2	\$	\$
<b>GH05</b>	Handhole, Heavy-Duty, Special	Ea	2	\$	\$
<b>GH06</b>	Handhole, Remove	Ea	10	\$	\$
<b>GH07</b>	Handhole, Re-build	Ea	5	\$	\$
<b>GH08</b>	Handhole, Re-build Existing to Heavy-Duty Type	Ea	5	\$	\$
<b>GIG1</b>	Inspection, Standby Generator	Ea	36	\$	\$
<b>GIT1</b>	Inspection, Thermo Graphic	Ea	2	\$	\$
<b>GJ01</b>	Junction Box, and all Appurtenances, Remove	Ea	10	\$	\$
<b>GJ02</b>	Junction Box, Stainless Steel, up to 6" Depth	Ea	10	\$	\$

<b>GJ03</b>	Junction Box, Stainless Steel, 8" Depth	Ea	5	\$	\$
<b>GLH1</b>	Certified Electrician/Journeyman	Hr	750	\$	\$
<b>GLH2</b>	IT Support	Hr	750	\$	\$
<b>GLH3</b>	Maintenance Helper	Hr	500	\$	\$
<b>GLH4</b>	Foreman	Hr	500		
<b>GLH5</b>	Electrician Helper	Hr	750		
<b>GPC 1</b>	Pump, Calcium Chloride	Ea	5	\$	\$
<b>GPV1</b>	Pavement Sealcoating	SY	1,000	\$	\$
<b>GRB 1</b>	Radio Tower Beacon Relamp	Ea	10	\$	\$
<b>GRT1</b>	Radio Tower, Inspection and Report	Ea	6	\$	\$
<b>GSD 1</b>	Sidewalk, Remove and Replace	SF	300	\$	\$
<b>GSO 1</b>	Sodding	SF	500	\$	\$
<b>GTC1</b>	Single Lane, Traffic Control	Ea	10	\$	\$
<b>GTC2</b>	Two Lane, Traffic Control	Ea	15	\$	\$
<b>GU01</b>	Uniduct, XLP, 3/c No. 6 & 1/c No. 8 Green, 1"	Ft	2,500	\$	\$
<b>GU02</b>	Uniduct, XLP, 3/c No. 4 & 1/c No. 6 Green, 1 1/4"	Ft	2,500	\$	\$
<b>GU03</b>	Uniduct, XLP, 3/c No. 2 & 1/c No. 6 Green, 1 1/2"	Ft	1,000	\$	\$
<b>GU04</b>	Uniduct, Install Only	Ft	1,000	\$	\$
<b>GWR 1</b>	Welding Receptacle, 3 Pole, 30 Amp, Furnish and Install	Ea	2	\$	\$
<b>GWR 2</b>	Welding Receptacle, 3 Pole, 60 Amp, Furnish and Install	Ea	2	\$	\$
<b>LA01</b>	Arm or Twin Arm with Luminaire, Install Only	Ea	10	\$	\$
<b>LB01</b>	Breakaway Device, T-Base	Ea	50	\$	\$
<b>LBB1</b>	Breaker, Branch, 20A to 70A	Ea	20	\$	\$
<b>LBB2</b>	Breaker, Main, 60A to 100A	Ea	3	\$	\$

<b>LBB3</b>	Breaker, Main, 125A to 250A	Ea	2	\$	\$
<b>LBT1</b>	Buck Boost Transformer	Ea	2	\$	\$
<b>LC01</b>	Controller, Duplex Console, with Radio	Ea	2	\$	\$
<b>LC02</b>	Controller, Duplex Console, Without Radio	Ea	1	\$	\$
<b>LC03</b>	Controller, Lighting, Install only	Ea	4	\$	\$
<b>LC04</b>	Controller, Lighting, Remove & Salvage	Ea	3	\$	\$
<b>LC05</b>	Controller, Single Door Console, Without Radio	Ea	2	\$	\$
<b>LC06</b>	Controller, Combination Lighting	Ea	2	\$	\$
<b>LCL1</b>	Clock, Digital Astronomical	Ea	10	\$	\$
<b>LCN1</b>	Contactor, 125A to 250A	Ea	2	\$	\$
<b>LCN2</b>	Contactor, 30A to 100A	Ea	3	\$	\$
<b>LD01</b>	Decal Set, Lighting Unit, Pole	Ea	200	\$	\$
<b>LD02</b>	Decal Set, Lighting Unit, Tower	Ea	200	\$	\$
<b>LD03</b>	Decal Set, Lighting Unit, Tunnel or Underpass with Bracket	Ea	200	\$	\$
<b>LD04</b>	Decal Set, Lighting Unit, Tower with Camera	Ea	200	\$	\$
<b>LDS1</b>	Disconnect Switch	Ea	5	\$	\$
<b>LDS2</b>	ON/OFF Switch	Ea	20	\$	\$
<b>LDS3</b>	Motion Sensor	Ea	15	\$	\$
<b>LE01</b>	Electrical Outlet, GFCI Type	Ea	30	\$	\$
<b>LE02</b>	Convenience Receptacle, 20 Amp	Ea	20	\$	\$
<b>LF01</b>	Foundation, Light Pole	L. Ft	100	\$	\$
<b>LF02</b>	Foundation, Light Pole, Metal	Ea	25	\$	\$
<b>LF03</b>	Foundation, Light Tower, up to 54" Dia.	L. Ft	60	\$	\$
<b>LF04</b>	Foundation, Lighting Controller	Ea	5	\$	\$



<b>LP01</b>	Light Pole, Kit	Ea	25	\$	\$
<b>LP02</b>	Light Pole Unit, Install only	Ea	50	\$	\$
<b>LP03</b>	Light Pole Unit, Removal & Salvage	Ea	50	\$	\$
<b>LP04</b>	Wood Pole Unit, Install only	Ea	25	\$	\$
<b>LP05</b>	Wood Pole, Removal & Salvage	Ea	30	\$	\$
<b>LPN1</b>	Panel, Distribution	Ea	2	\$	\$
<b>LT01</b>	Light Tower, 110' or less	Ea	1	\$	\$
<b>LT02</b>	Light Tower, 111' or more	Ea	1	\$	\$
<b>LT03</b>	Light Tower, in Place, Clean and Paint	Ft	3000	\$	\$
<b>LT04</b>	Light Tower, Remove and Re-erect	Ea	3	\$	\$
<b>LT05</b>	Light tower, Install only	Ea	3	\$	\$
<b>LU01</b>	Luminaire, Fluorescent Eight (8) Ft.	Ea	10	\$	\$
<b>LU02</b>	Luminaire, Fluorescent Four (4) Ft.	Ea	10	\$	\$
<b>LU03</b>	Luminaire, Fluorescent, HighBay	Ea	10	\$	\$
<b>LU04</b>	Luminaire, Fluorescent, for Wet Locations	Ea	10	\$	\$
<b>LU05</b>	Luminaire, HPS, for Building Roof	Ea	4	\$	\$
<b>LU06</b>	Luminaire, HPS, for Building Wall	Ea	16	\$	\$
<b>LU07</b>	Luminaire, Keeper	Ea	50	\$	\$
<b>LU08</b>	Luminaire, Navigation LED	Ea	5	\$	\$
<b>LU09</b>	Luminaire, Removal & Salvage	Ea	50	\$	\$
<b>LU10</b>	Luminaire, Pole, Install Only	Ea	15	\$	\$
<b>LU11</b>	Luminaire Shield, Tower	Ea	10	\$	\$
<b>LU12</b>	Luminaire, Tower, Install only	Ea	15	\$	\$
<b>LU13</b>	Luminaire, Two Lamp Fluorescent, Install only	Ea	15	\$	\$

<b>LU14</b>	Luminaire, Wall, Underpass or Tunnel, Install only	Ea	15	\$	\$
<b>LU15</b>	Luminaire, HPS, Pole	Ea	20	\$	\$
<b>LU16</b>	Luminaire, HPS, Tower	Ea	10	\$	\$
<b>LU17</b>	Luminaire, Metal Halide	Ea	3	\$	\$
<b>LU18</b>	Emergency/Exit Light Fixture	Ea	10	\$	\$
<b>LW01</b>	Wash Hubbard's Cave Tiled Tunnels Walls	Ea	2	\$	\$
<b>LW02</b>	Wash & Relamp Hubbard's Cave Luminaires	Ea	1177	\$	\$
<b>LWR 2</b>	Wash & Relamp, LPS Lamps	Ea	1050	\$	\$
<b>PA01</b>	Alarm, Intrusion Override Key Switch	Ea	48	\$	\$
<b>PC02</b>	Coating, Concrete Surface	SF	5,000	\$	\$
<b>PC03</b>	Coating, Steel Surface	SF	1,000	\$	\$
<b>PD01</b>	Detection System, Fire	Ea	3	\$	\$
<b>PG01</b>	Gas Sensor, Remove and Replace	Ea	15	\$	\$
<b>PI01</b>	Inspection, Automatic Bus Transfer System	Ea	4	\$	\$
<b>PI02</b>	Inspection, Auto Transfer Switch	Ea	24	\$	\$
<b>PI03</b>	Inspection, Gas Detector System	Ea	47	\$	\$
<b>PI04</b>	Inspection, Switchgear System	Ea	1	\$	\$
<b>PI05</b>	Inspection, Motor Starter, Soft Start Type	Ea	5	\$	\$
<b>PI08</b>	Inspection, Backflow Preventer	Ea	8	\$	\$
<b>PI09</b>	Inspection, Pump	Ea	25	\$	\$
<b>PM01</b>	Pump Motor Balancing	Ea	6	\$	\$
<b>PRB1</b>	Pump Rebuild, Type 1	Ea	1	\$	\$
<b>PRB2</b>	Pump Rebuild, Type 2	Ea	4	\$	\$
<b>PRB3</b>	Pump Rebuild, Type 3	Ea	1	\$	\$

<b>PRB4</b>	Pump Rebuild, Type 4	Ea	8	\$	\$	
<b>PRB5</b>	Pump Rebuild, Type 5	Ea	1	\$	\$	
<b>PRB6</b>	Pump Rebuild, Type 6	Ea	1	\$	\$	
<b>PS03</b>	Pump, Vibration Testing and Analysis	Ea	105	\$	\$	
<b>PV01</b>	Vendor Budgetary Allowance for Pump Repair Services & Replacement	LS	1	\$250,000.00	\$250,000.00	*
<b>PW01</b>	Wet Pit, Cleaning	SY	500	\$	\$	
<b>PW02</b>	Wet Pit, Power Wash	Hr	50	\$	\$	
<b>RMA1</b>	Routine Maintenance Allowance	LS	1	\$480,000.00	\$480,000.00	*
<b>RML1</b>	Routine Maintenance Location	Ea	600	\$	\$	
<b>RMR1</b>	Routine Maintenance, REVLAC	Ea	1566	\$	\$	
<b>SAI1</b>	Surveillance Ramp Metering Inspection & Cleaning	Ea	118	\$	\$	
<b>SC03</b>	Cabinet, Type 3, for Surveillance	Ea	3	\$	\$	
<b>SCC1</b>	CCTV Dome Video Camera, High Definition	Ea	12	\$	\$	
<b>SCC2</b>	Camera and Cabinet Control Maintenance	Ea	350	\$	\$	
<b>SCC3</b>	Camera Lowering Device	Ea	4	\$	\$	
<b>SCC4</b>	CCTV Camera Pole	Ea	8	\$	\$	
<b>SD03</b>	Detector Loop, Round, Square or Rectangular	Ft	1000	\$	\$	
<b>SD04</b>	DMS inverter and batteries, Skyline DMS	Ea	3	\$	\$	
<b>SD05</b>	Inductive Loop Detector amp 2-channel rack mount	Ea	50	\$	\$	
<b>SE02</b>	Electrical Cable in Conduit, 4/c No. 18, Shielded Loop Detector	Ft	2,500	\$	\$	
<b>SE03</b>	Ethernet Media Converter	Ea	24	\$	\$	
<b>SE04</b>	Ethernet Managed Switch	Ea	3	\$	\$	
<b>SI01</b>	Inspection, Automatic Suppression System	Ea	2	\$	\$	
<b>SRR1</b>	Restraining Barrier Tape Cartridge, New	Ea	2	\$	\$	

<b>SRR2</b>	Restraining Barrier Dragnet Assembly, Furnish Only	Ea	2	\$	\$
<b>SS02</b>	Signaling Load Relay, Mechanical	Ea	88	\$	\$
<b>SSG1</b>	Swing Gate Arm, 2' to 4', Furnish Only	Ea	2	\$	\$
<b>SSG2</b>	Swing Gate Arm, 5' to 8', Furnish Only	Ea	4	\$	\$
<b>SSG3</b>	Swing Gate Arm, 9' to 12', Furnish Only	Ea	4	\$	\$
<b>SSG4</b>	Swing Gate Arm, 13' to 16', Furnish Only	Ea	4	\$	\$
<b>SSG5</b>	Swing Gate Arm, 17' to 20', Furnish Only	Ea	4	\$	\$
<b>SSG6</b>	Swing Gate Arm, 21' to 23', Furnish Only	Ea	4	\$	\$
<b>ST02</b>	Telecommunication Cable, Inline Connectors & Termination	Ea	45	\$	\$
<b>ST03</b>	Telecommunication Cable, No. 19/ 6 Pair	Ft	1,500	\$	\$
<b>SU01</b>	UPS System, Inspection	Ea	1	\$	\$
<b>SVB1</b>	Budgetary Allowance For Ramp Gates	LS	1	\$ 70,000.00	\$ 70,000.00
<b>SWD 1</b>	Wireless Vehicle Detection System	Ea	10		
<b>SWD 2</b>	Wireless Vehicle Detection Solar Repeater	Ea	3		
<b>SWD 3</b>	Wireless in Pavement Detector	Ea	60		
<b>TC01</b>	Full-Actuated Controller in Type IV Cabinet	Ea	3	\$	\$
<b>TC02</b>	Full-Actuated Controller in Type V Cabinet	Ea	1	\$	\$
<b>TC03</b>	Full-Actuated Controller in Type IV or V Cabinet W/RR Equipment	Ea	1	\$	\$
<b>TC04</b>	Full-Actuated Controller	Ea	5	\$	\$
<b>TC05</b>	Install Traffic Signal Controller from Contract Spare Parts	Ea	5	\$	\$
<b>TC06</b>	Install Traffic Signal Controller and Cabinet from Contract Spare Parts	Ea	5	\$	\$
<b>TC07</b>	Controller and Cabinet Modification	Ea	15	\$	\$
<b>TC08</b>	Traffic Signal Master Controller	Ea	1		
<b>TC09</b>	Install Telephone Line and Modem	Ea	2	\$	\$

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<b>TC10</b>	Install Updated Software or PROM Set at Existing Local or Master Controller	Ea	3	\$	\$
<b>TC11</b>	UPS System	Ea	1	\$	\$
<b>TD01</b>	Drill Existing Handhole	Ea	25	\$	\$
<b>TE01</b>	Electric Cable No. 14 2/C	Ft	2,000	\$	\$
<b>TE02</b>	Electric Cable No. 14 3/C	Ft	1,000	\$	\$
<b>TE03</b>	Electric Cable No. 14 5/C	Ft	1,500	\$	\$
<b>TE04</b>	Electric Cable No. 14 7/C	Ft	1,500	\$	\$
<b>TE05</b>	Electric Cable No. 14 2/C, Twisted Shielded	Ft	1,500	\$	\$
<b>TEC1</b>	Electric Cable in Conduit, Tracer No. 14 1/C	Ft	1,000	\$	\$
<b>TEC2</b>	Electric Cable No. 14 3/C Railroad	Ft	500	\$	\$
<b>TF01</b>	Concrete Foundation, Type A	Ft	36	\$	\$
<b>TF02</b>	Concrete Foundation, Type D	Ft	8	\$	\$
<b>TF03</b>	Concrete Foundation, Type C	Ft	8	\$	\$
<b>TF04</b>	Concrete Foundation, Type E, 30" Diameter	Ft	60	\$	\$
<b>TF05</b>	Concrete Foundation, Type E, 36" Diameter	Ft	60	\$	\$
<b>TF06</b>	Concrete Foundation, Type E, 42" Diameter	Ft	60	\$	\$
<b>TF07</b>	Concrete Foundation, Rebuild/Modify, Type D	Ea	1	\$	\$
<b>TFB1</b>	Flashing Beacon, Post Mount, 1 Face	Ea	2	\$	\$
<b>TFB2</b>	Flashing Beacon, Solar, Post Mount, 1 Face	Ea	15	\$	\$
<b>TGS1</b>	Traffic Signal Additional Grounding & Electric Service Upgrade	Ea	5	\$	\$
<b>TGS2</b>	Electric Service Relocation	Ea	10	\$	\$
<b>TGS3</b>	Electric Service Installation, Ground Mounted	Ea	10	\$	\$
<b>TL01</b>	Inductive Loop Detector	Ea	50	\$	\$
<b>TL02</b>	Detector Loop	Ft	2,000	\$	\$
<b>TMA 1</b>	Steel Mast Arm Assembly and Pole, 28' to 40'	Ea	1	\$	\$

<b>TMA 2</b>	Steel Mast Arm Assembly and Pole, 42' to 55'	Ea	1	\$	\$
<b>TMA 3</b>	Relocate or Install Existing Mast Arm Assembly and Pole from Contract Spare Parts	Ea	1	\$	\$
<b>TPP1</b>	Pedestrian Pushbutton Post, Galvanized Steel	Ea	10	\$	\$
<b>TPP2</b>	Pedestrian Pushbutton Latching and Non-Latching	Ea	20	\$	\$
<b>TPP3</b>	Relocate Existing Pedestrian Pushbutton	Ea	50	\$	\$
<b>TSB1</b>	Traffic Signal Backplate, Reflective	Ea	50	\$	\$
<b>TSD1</b>	LED Signal Display	Ea	15	\$	\$
<b>TSL1</b>	LED Signal Head 3 Section	Ea	15	\$	\$
<b>TSL2</b>	LED Signal Head, 4 Section	Ea	5	\$	\$
<b>TSL3</b>	LED Signal Head, 5 Section	Ea	5	\$	\$
<b>TSL4</b>	LED Signal Head, Optically Programmed, 3 Section	Ea	2	\$	\$
<b>TSL5</b>	LED Signal Head, Optically Programmed, 5 Section	Ea	2	\$	\$
<b>TSL8</b>	LED Pedestrian Signal Head	Ea	8	\$	\$
<b>TSL9</b>	LED Pedestrian Signal Head, Countdown	Ea	10	\$	\$
<b>TSR1</b>	Remove Signal Section or Head	Ea	5	\$	\$
<b>TSR2</b>	Relocate or Install Existing Signal Head	Ea	10	\$	\$
<b>TT01</b>	Span Wire Traffic Signal Installation with Electric Service and UPS	Ea	1	\$	\$
<b>TTP1</b>	Traffic Signal Post, 10' to 18'	Ea	5	\$	\$
<b>TTP2</b>	Remove Traffic Signal Post	Ea	2	\$	\$
<b>TTP3</b>	Remove Mast Arm Assembly and Pole	Ea	2	\$	\$
<b>TTP4</b>	Relocate Existing Traffic Signal Post, 10 ft to 18 ft	Ea	5	\$	\$
<b>TVD1</b>	Video Detection System, Complete Intersection	Ea	1	\$	\$
<b>TVD2</b>	Video Detection System, Single Intersection Approach	Ea	4	\$	\$

<b>TWD 1</b>	Radar Detection System, Single Approach, Stop Bar Detection	Ea	6	\$	\$
<b>TWD 2</b>	Radar Detection System, Single Approach, Stop Bar and Advanced Detection	Ea	2	\$	\$
<b>TWI1</b>	Wireless Interconnect System	Ea	1	\$	\$

Sub-Total Non-Routine:	\$
Routine Maintenance/YR (RM/YR) =	\$
Total Contract Bid Price (Routine + Non-Routine):	\$

**\* Non-biddable Pay Items**

**ARTICLE 3.0 -- GENERAL CONTRACT REQUIREMENTS**

**3.1 BASIC CONTRACT PROVISIONS**

Unless noted herein, all requirements as listed in Article 3.0 General Requirements shall be paid through, are part of, and are included in routine maintenance. The personnel as described herein, and the equipment and materials to perform all routine and non-routine maintenance are a minimum requirement of this Contract. The Contractor shall provide additional labor, equipment and materials based on the need to meet specific Contract requirements. Delays in response, repair completions, routine maintenance and/or preventive work and inspections thereof will not be accepted and will result in liquidated damages and cancellation of this Contract as specified in Article 3.1.4. It is also the Contractor's responsibility to assure Contract compliance with all systems requirements listed herein.

Once the Contract is executed and the pre-construction submittals have been approved, the Contractor shall begin preparations to assume routine and non-routine maintenance responsibilities as specified herein. Preparatory work, such as transfer of contract spare parts inventory, purchase of materials for routine equipment repairs as specified herein, transfer of SCADA equipment, alarm receivers and EMCMS to Contractor dispatch room and training administrative and dispatch personnel on the EMCMS must be completed in advance of the start of the Contract. The Contractor must be prepared to service and maintain all electrical systems as specified in this Contract starting January 1, 2019.

The list of locations and description of items provided herein in each System and in Section 3 are for bidding purposes only. Actual quantities and material to be maintained is the responsibility of the Contractor as of January 1, 2019. The Contractor will be provided with a hard copy list of current locations to be maintained as of January 1, 2019.

The Contractor shall inspect all locations to assure continued maintenance and operation of all systems specified in this Contract. The Contractor shall be given access to all locations for inspection after the letting, as arranged with the engineer, prior to the pre-construction meeting, and shall provide a punch list of all items found prior to January 1, 2019.

**3.1.1 Term of Contract**

The Contract shall be valid for operations from 12:00 a.m. on January 1, 2019 to 11:59 p.m. (midnight) on December 31, 2019, subject to renewals and/or cancellation provisions specified herein. All authorized routine and non-routine contract work shall be completed within each year.

If the Contract is renewed, the Department shall make the effort, if circumstances allow, to re-authorize in the renewal year, any work items cancelled from the prior contract year. The Department will withhold the December routine monthly payment at the end of the contract termination year until all routine and non-routine work is completed and documentation submitted.

**3.1.2 Renewal**

The Department has the sole discretion to renew this contract for two (2) additional terms. The Contract shall be terminated and closed if not renewed at the end of each contract year. The first renewal would extend the Contract for one additional term from 12:00 a.m. January 1, 2020, to 11:59 p.m. (midnight) December 31, 2020, per all revisions or amendments as defined. The second renewal would extend the Contract for one final term from 12:00 a.m. January 1, 2021, to 11:59 p.m. (midnight) December 31, 2021, per all revisions or amendments as defined.

The Contract shall be terminated and closed December 31, 2021 without extensions or renewal.

The Contractor shall accept the renewal of the Contract if offered by the Department. Upon notification of the contract renewal by IDOT, the Contractor shall complete and submit IDOT's contract renewal form within fifteen (15) days of notification, together with documentation of the contract bond extension and copies of the required insurance policies for the renewal year as well as any other documentation required by the Department.

The original contract term and the renewal term shall be considered independent with respect to completion of work, payment, and withholding of payment as well as all associated work documentation.



No later than one month prior to the start of the renewal year, the Contractor shall provide the Department the following for approval:

- Written acknowledgement of the renewal acceptance
- Documentation of the contract bond extension
- Copies of required insurance policies covering the renewal year
- Submittal of contract vehicle assignments, vehicle models and current mileage
- Requests for Sub-Contractor Approval, form BC260-A for each desired new sub-contractor to be utilized in the renewal year
- A current list of all proposed sub-contractors with contact information
- A new Disadvantaged Business Utilization Plan for the renewal year on Department form SBE 2026, and DBE Participation Commitment Statement on Department form SBE 2025 (which must be approved by the Department prior to the start of the renewal year work). The original copy shall be sent directly to the EEO office and a copy to the Engineer.
- Submittals for any new equipment or materials not submitted and approved in the prior contract term, but anticipated for use in the renewal year

### **3.1.3 Completion of Annual Work**

The Contractor shall complete routine maintenance work by the end of the Contract term and the Contractor shall complete non-routine work by the agreed due dates which shall not exceed the contract end date. Incomplete routine or non-routine work without an approved delayed completion date per the Standard Specification for Road and Bridge Construction shall cause the application of liquidated damages or retainage of the routine maintenance payment.

Key items for completion of work under a calendar year include:

- All routine and non-routine work complete, with all documentation, as approved
- Accurate EMCMS entry data as approved
- Confirmation of maintenance status of all IDOT owned locations
- Completion of MCHD processing for the year
- All certified payroll and systems work reports submitted and accepted
- All DBE/EEO submittals complete and accepted and approved

### **3.1.4 Cancellation of Work**

Only the Department may cancel the contract. The Contractor shall be given 30 days advance notice of cancellation of this Contract. In the event of cancellation, the Contractor shall be entitled to receive payment for services and work performed and materials or equipment furnished under the terms of the Contract prior to the effective date of cancellation, but shall not be entitled to receive any damages on account of such cancellation or any further payment whatsoever. There shall be no payment for incomplete work.

The Department may take possession of the incomplete work and all materials purchased under this contract, for any reason which the Engineer deems to be in the public interest and this decision shall be final. Upon the receipt of a notice of cancellation, the Contractor shall immediately provide the Engineer with a list of all Contract Spare Parts inventory in his possession as of that date.

## **3.2 SUBCONTRACTING OF WORK**

### **3.2.1 General Requirements**

The Contractor shall obtain approval from the Engineer for employment of all subcontractors performing work on this Contract, prior to the commencement of work. Except as modified herein, subcontracting of the contract work shall be in conformance with the requirements of the Standard Specifications and Supplements and Recurring Special Provisions.

The Contractor shall submit to the Engineer, prior to the start of work, and at the Pre-Construction Meeting:

- A request for Approval of Subcontractor, form BC260A for each subcontractor to be employed for work under this Contract
- A certification stating that the required Federal and State provisions will be inserted in the final contract with the subcontractor  
(Inclusion of the required contract provisions will be monitored by the Bureau of Small Business Enterprises, as part of its compliance review.)
- A written subcontract agreement for each proposed subcontractor which sets forth the scope of services to be subcontracted, the lump sum or unit price for such services and the signatures of the subcontracting parties
- A copy of the Disadvantaged Business Utilization Plan on Department forms SBE 2026, and DBE Participation Commitment Statement on Department forms SBE 2025, all required EEO submittals.

The complete package shall be sent directly to the EEO office and a copy to the EMC Engineer.

New requests for Approval of Subcontractor, form BC260A, after the start of the Contract shall be immediately sent to the Engineer.

### **Monthly DBE Report**

The Contractor shall submit to the Engineer with the monthly routine work submittals on FTP site, the Monthly DBE Report and DBE invoices. The report shall consist of an Excel spreadsheet listing the invoiced service work (or material purchases) by each sub-contractor by month. The information provided shall include, but is not limited to:

- Date invoice received
- Invoice number
- Date invoice paid
- Invoice amount
- System
- Routine or non-routine work
- Dates of routine work (starting and ending)
- Non-routine authorization number
- Applicable non-routine pay items used
- A copy of any new requests for Approval of Subcontractor, form BC260A
- A copy of the vendor catalog/printout associated with equipment furnished in detail with vendor information, part #, product #, serial number and description

The Contractor shall provide copies of all DBE invoices. The Contractor shall label all items on each invoice by type of EMC work; a ticket number or maintenance program article number for routine work, or the authorization number for pay item or agreed price work. Invoices \$5,000 and above shall have location of the work performed and/or equipment installation location.

All material purchased shall have catalog cuts submitted for IDOT approval before use on this contract.

### **3.2.2 Subcontracting Limitations**

In addition to the limitations imposed by the Standard Specifications, there shall not be wholesale subcontracting of the herein defined electrical systems. The Contractor shall perform not less than 51% of the maintenance of each electrical system with his own forces. Work that depends on a dispersed workforce and timely response activities shall not be subcontracted.

There shall be no geographically-based subcontracting of the work, e.g., by north Cook or by south Cook, etc. Furthermore, the Contractor's daily management and supervision for each system and all administrative functions and dispatching, shall be done with his own forces.

Work which is subcontracted shall not include work which is in turn subcontracted to an additional party. Subcontracted work shall be limited to work performed by the subcontractors' own forces.

### **3.2.3 Subcontractor Billing**

For non-routine agreed price work (not pay items) performed by an approved subcontractor as named on the authorization for work and on the contractor invoice, in accordance with Article 109.04 (b)(7) of the Standard Specifications for Road and Bridge Construction, when work is performed by an approved subcontractor, the Contractor shall be allowed administrative costs of an amount equal to five (5) percent of the total approved costs on an individual work authorization, with the minimum being \$100.

Specialty service work as authorized and originated by the Department shall be considered as work by the Contractor, and not subcontracted work for purposes of billing.

## **3.3 CONTRACT START-UP**

### **3.3.1 Basic Requirements**

It is the obligation of the Contractor to make every effort to provide a smooth transition from the prior contract to this contract. This may involve adjustments in ongoing operations to adjust to revised contract provisions or it may involve a startup of operations and the assumption of maintenance responsibility if there is a change in

Contractor. In either case, full professional cooperation by the Contractor is expected by the Department to assure that the District's electrical systems remain continuously monitored and maintained.

The Contractor shall assure the Department that at 12:01 a.m. on January 1, 2019 the maintenance transfer is complete and transparent to the public, that the District's electrical systems remain continuously monitored, maintained and fully operational.

### **3.3.2 Electrical Systems Survey**

Following the award of the Contract the Contractor may submit to the Engineer a schedule for inspections of all electrical systems to determine any outstanding maintenance issues. The inspections shall be completed by December 1, 2018. The Contractor shall submit all outstanding items to the Engineer within 72 hours of the inspection.

### **3.3.3 Contract Spare Parts Transfer**

During the last half of December 2018, the Contractor shall prepare facility storage areas as specified herein for delivery of miscellaneous contract spare parts not stored in the contract spare parts warehouse for storage as specified herein. The Engineer shall provide the Contractor a list of the contract spare parts prior to delivery. Review Article 3.6.5 Storage Facilities.

### **3.3.4 Contractor Owned Spare Parts Procurement**

After execution of the Contract, the Contractor shall procure spare parts as necessary for system equipment as listed in Article 4.15 such that at the time routine maintenance activities begin, the Contractor has adequate spare parts, as approved by the Engineer, available for immediate use.

### **3.3.5 Locks and Keys**

At the Pre-Construction Meeting the Engineer shall provide the Contractor a list of equipment; doors, cabinets, hatches, gates, and other items within the electrical systems, which will need to have locks replaced or modified by January 31, 2019. Refer to System Articles, herein, for quantities required. The padlock shall meet the specifications of the weather resistant padlock as specified by the Engineer, equal or better than Master Lock 6125KA. The key number shall be approved by the Engineer prior to the purchase/install. If the equipment is currently locked with a Master Lock 6125KA model the Contractor may replace the cylinder and new key (for Master Lock 6125KA) instead of replacing the entire lock.

The Contractor shall provide and install two wall mounted 18 gauge locking key boxes which holds 125 keys with a book index and labelled key tags equal or better than Tel-Kee Key box. The Contractor shall install and maintain the locking boxes, one at a central facility for Contractor use and the second shall be located at TSC. The Contractor shall provide a full set of all electrical systems keys which shall be properly labelled and provide an index book that identifies each key.

Selected locations of the Eisenhower (I-290) Expressway have a special anti-theft locking device on handhole covers and junction boxes at power centers to prevent cable theft. It is the Contractor's responsibility to monitor the special coded, keyed nut drivers required for these junction boxes. If a coded key is lost, it shall be the Contractor's responsibility to furnish and replace a new coded fastener nut at all locations with these anti-thefts locking devices, and replace the coded, keyed nut drivers, all at the Contractor's expense.

Homeland security ramp gate locks will not be replaced and the Department will furnish ramp gate keys to the Contractor. The Contractor will keep a key assignment list by name and it shall be emailed to the Engineer whenever updated and at the end of each contract year.

### **3.4 END OF CONTRACT TRANSITION**

It is the obligation of the Contractor to cooperate fully to facilitate the transition from this contract to any subsequent contract, providing timely completion of authorized work, and other transfers as noted herein.

#### **3.4.1 Contract Spare Parts Inventory Return**

The Contractor shall provide the Engineer on December 1, 2019 (or December 1 of renewal year if this contract is renewed) a list of all contract spare parts inventory and its applicable location that is in his possession on that day. All contract spare parts inventory and/or other equipment or materials owned by IDOT in the possession of the Contractor shall be moved to state owned locations or locations as designated by the Engineer, by a date to be specified by the Engineer but prior to December 15th. The Contractor shall use his own spare parts for contract work for the remaining days of the term of the Contract. The Contractor shall replace missing contract spare parts in kind due to loss, theft, burglary, or damage caused by his workforce.

### **3.4.2 Lock and Key Turnover**

On the last day of the contract termination year the Contractor shall make arrangements to submit to the Engineer all keys to IDOT System equipment, including alarm keys and keys to traffic signal cabinets, railroad cabinets, lighting cabinets, high mast towers, pump station gates, doors and hatches, base station fences and doors, navigational lighting equipment (including I-55 & Harlem Avenue bridge) and IDOT Home Land Security (HLS) ramp keys, REVLAC, Communication towers, special anti-theft locking devices coded key nut drivers and huts Keys. All existing, replacement and/or new locks added to the electrical systems during the Contract become the property of the Department. The Contractor shall relinquish the specified and approved key boxes undamaged with all keys labeled with corresponding index book to IDOT.

## **3.5 CONTRACTOR PERFORMANCE**

### **3.5.1 Priority of Work**

For the Contractor's forces employed on this Contract, the work on this Contract shall take precedence over work performed for others, including other government agencies, except as expressly permitted by the Engineer or specified herein. This requirement applies to work activities on a daily basis. The Engineer reserves the authority to re-direct the Contractor's work priorities in response to emergency situations, potential hazards, contract coordination and incomplete or deficient work and the Contractor will be allowed no additional compensation for priorities so redirected.

### **3.5.2 Suspension of Work**

If in the option of the Engineer any work performed on this Contract may seriously jeopardize the welfare of the general motoring public, the Engineer has the authority to order the immediate suspension of the work task. Depending on the offense, the Engineer may assess liquidated damages.

### **3.5.3 Unsatisfactory Service**

Failure to perform all work and its documentation, in the manner specified herein or in the Standard Specifications, and within the time limit specified will result in the issuance of an Unsatisfactory Service notification. The Engineer will advise the Contractor via e-mail or written transmittal regarding the nature of the unsatisfactory service. The Contractor shall take necessary action to correct the items listed and shall respond back to the Engineer within five (5) working days from the time of receipt of the notification, explaining the reasons for the improper service and the expected date of the resolution of the listed problems.

If after a written warning (email or formal correspondence) that a work item (routine or non-routine) is not in Contract compliance or work has not been completed per the agreed time frame, the Engineer will withhold all or a portion of the monthly routine maintenance payment due to the Contractor until the work meets Contract specifications and is completed and approved by the Engineer.

After 30 working days from initial notification of Unsatisfactory Work the Contractor cannot meet or perform routine or non-routine work per contract specifications, it will be the Engineer's option to authorize a new (3<sup>rd</sup> Party) vendor or contractor to complete or perform the work. The Engineer shall deduct from the Contractor monthly routine maintenance payment as liquidated damages a 3<sup>rd</sup> Party contractor/vendor quote to perform the work. Where unit prices of pay items are below actual cost of 3<sup>rd</sup> party work the authorization will be de-authorized and the remainder will be deducted from monthly routine maintenance payment.

#### **3.5.4 Withholding and Release of Funds**

The Engineer may withhold up to 100% of the total monthly routine maintenance payment for all systems for non-compliance of the Contract; the incomplete or otherwise unsatisfactory performance on any system, including but not limited to failure to respond to reported incidents in a timely manner, perform maintenance in compliance of contract requirements, complete work per the agreed time frame, or document all required items herein including dispatch or response work activities, proper EMCMS entries in the time and/or manner as specified in articles herein.

After the previously uncompleted or deficient work has been subsequently completed to the satisfaction of the Engineer, the Contractor shall advise the Engineer in writing, requesting the release of funds previously withheld. The Engineer shall approve the release of funds previously withheld from the Contractor through an authorization letter.

#### **3.5.5 Liquidated Damages**

The Engineer may assess liquidated damages, to be deducted from the Contractor monthly routine maintenance payment, for any items not in compliance of the Contract, unless the Contractor can demonstrate to the satisfaction of the Engineer, that his/her efforts were deterred by the Department, or by other contractors employed by the Department or by unforeseeable causes beyond his control and without the fault or negligence of the Contractor.

It shall be the decision of the Engineer whether the liquidated damages per day or a one-time charge per incident will be assessed, and whether one or multiple liquidated damages can be assessed for one incident

**Liquidated Damage Assessment**

<b>PER DAY</b>	<b>PER INCIDENT</b>	<b>PER CONTRACT SPECIFICATIONS:</b>
\$500.00	\$1,000.00	IMPROPER/DEFICIENT TRAFFIC CONTROL
NA	\$ 1,000.00	FAILURE TO RESPOND, PER TICKET OR PER ENGINEER DIRECTION
\$ 200.00	\$ 500.00	FAILURE TO RESPOND PER TIME SPECIFICATIONS (refer to System Articles herein)
\$ 200.00	\$ 500.00	FAILURE TO PROVIDE TIMELY ROUTINE REPAIRS AND/OR MEET NON-ROUTINE WORK DUE DATES
\$ 200.00	\$ 1,000.00	FAILURE TO PROVIDE DOCUMENTATION (QUOTES, BREAKDOWN OF WORK PERFORMED, VENDOR PAID INVOICE, TICKET INFORMATION, REPORTS, SUBMITTALS FOR ROUTINE OR NON-ROUTINE WORK)
NA	\$1000.00	FAILURE TO ACCURATELY DOCUMENT MAINTENANCE STATUS OF IDOT OWNED LOCATIONS
NA	\$500.00	FAILURE TO PATROL ASSIGNED LOCATIONS
\$ 200.00	\$ 500.00	FAILURE TO SUPPLY REPLACEMENT PARTS
\$ 200.00	\$ 500.00	FAILURE TO PROVIDE PROPER SERVICE (PATROL, INSPECTION, ETC.)
\$ 200.00	\$ 500.00	FAILURE TO FOLLOW SPECIFIED PROCEDURES
\$ 200.00	\$ 500.00	FAILURE TO PROVIDE PROPER STAFFING OR EQUIPMENT
\$ 200.00	\$ 500.00	IMPROPER USE OF MATERIALS OR METHODS
\$ 500.00	\$ 1,000.00	FAILURE TO REPLACE CONTRACT SPARE PARTS
\$ 500.00	\$ 3,000.00	FAILURE TO RETURN CONTRACT SPARE PARTS AT END OF CONTRACT

**3.6 CONTRACTOR FACILITY REQUIREMENTS**

**3.6.1 General Requirements**

At the time of bidding the Contractor shall have an established business presence in the District to assure the timeliness of the assumption of the contract work on the first day of the Contract.

The Contractor shall have and maintain in District 1 adequate facilities at all times for the timely completion of work under this contract. These facilities shall include an EMC Office and 24-hour Dispatch Center and other permanent facilities, which may be strategically located, geographically, to support the Contractor's work force. The size and type of facility may vary depending on the location, type, and quantity of electrical equipment to be serviced within that area.

All Contractor's facilities shall be complete and ready for operation no later than December 14, 2018, ready for a demonstration inspection by the Engineer, except that dial-up phone numbers which are transferred from the outgoing contractor need not be established by the Contractor until a mutually acceptable date is arranged with the Engineer.



### **3.6.2 EMC Office**

The Contractor shall establish, for the duration of this Contract, a contractor's office in-District, (in the six-county area covered by this Contract) for management of all contractor work under this Contract. This EMC office may be a satellite office remote from the Contractor's headquarters or it may be a singular and clearly-defined section within the Contractor's in-District headquarters. In order to facilitate communication and shared interest in contract matters, the contract management and technical/administrative functions as defined herein and represented in the Contractor's organization chart shall not be dispersed throughout various areas of the Contractor's operations but shall be established here as an identifiable group with dedicated physical space. All EMC personnel shall have access to the EMCMS for daily work entries and review and shall have access to printers at their workstation/desk.

One desk shall be dedicated for use by IDOT personnel only and this space shall have a chair, working telephone, EMCMS service ability, laser printer capable of printing from IDOT personnel laptops and from the EMCMS, four (4) drawer file cabinet with padlock and six (6) keys furnished to the Engineer for Department personnel use only.

### **3.6.3 EMC Dispatch Center**

Unless another location is approved by the Engineer, the Contractor's in-District headquarters or in-District EMC office shall have an established 24/7 hour operations of the EMC Dispatch Center, which may be used for other Contractor dispatch functions, but shall be adequately equipped and staffed to service the EMC on a first-priority basis. (The dispatching function cannot be sub-contracted, and voice-mail or answering services will not be accepted.) The dispatch center shall be in full operation and fully staffed as specified herein at the start of contract January 1, 2019.

The EMC Dispatch Center shall contain a minimum of four (4) desks and chairs for dispatch personnel, shall be equipped by the Contractor with adequate lighting, voice and data communications lines and equipment necessary to perform contract monitoring functions, system alarms, and the like, including, but not limited to equipment for the emergency call-out database, the EMCMS, the lighting system SCADA, the dial-up pump station alarm system (AEGIS), and the pump station SCADA telemetry system, and the CLMS for traffic signal alarms for all brands of signal systems in use throughout the contract.

The space shall be suitably equipped to protect system electronic equipment. The designated space shall have a HVAC system, air cleaner, emergency lighting, fire detection and smoke detection systems. An on-line (true) UPS system is required to provide clean power and back-up electrical power for all dispatch electronic equipment for a minimum of eight (8) hours.

A back-up communications system shall also be in place for emergency, provide back-up communications provisions for a minimum of eight (8) hours. Proper rack(s) for all computer equipment shall be furnished, which shall be a minimum of eighteen (18) inches above floor level. The space shall be kept at a temperature optimum for proper performance of the required electronic equipment, and free of dust and/or other contaminants.

In addition to the Lighting System SCADA, Pump Station SCADA, AEGIS alarm monitoring, and Traffic Signal CLMS monitoring, equipment for REVLAC, RACS, SolarWinds, 360VDS monitoring will be placed by the Contractor in the EMC Dispatch Center for Contractor Dispatch personnel to monitor the above equipment alarms and CCTV operation, and dispatch response personnel as necessary.

#### **3.6.4 Equipment Service Shop**

Unless another location is approved by the Engineer, the headquarters shall incorporate facilities for the testing and repair of traffic signal controllers under this contract. These facilities shall be adequately equipped with instruments, test rigs and tools necessary for the work.

The traffic signal portion of the facility shall be able to handle a minimum of, but not limited to, 100 controllers, 1230 MMU and auxiliary failures a year, which includes electrical-mechanical, solid-state analog, solid state digital, and microprocessor equipment.

#### **3.6.5 Storage Facilities**

##### **3.6.5.1 Contract Spare Parts Warehouse Storage Facility**

To facilitate security and inventory control of Department owned large equipment, many contract spare parts are currently housed at a commercial bonded warehouse at Combined Warehouse Co., 5000 South Central, Chicago, Illinois, 60638 (hereafter referred to as the contract spare parts storage facility). The Contractor shall obtain a minimum of 7,000 square feet of rental storage space at Combined Warehouse Co., or an Engineer approved contract spare parts storage facility. Once accepted as the official contract spare parts storage facility for this Contract any change in the facility or its requirements shall require approval of the Engineer.

The contract spare parts warehouse storage facility shall be centrally located to the District's major concentration of systems, and located within the boundaries of Devon Avenue on the north, 63rd Street on the south, Cicero Avenue on the east, and I-355 on the west.

The storage arrangements must also include 7-day, 24 hour security, an hourly rate for necessary on-site equipment and labor to access any stored item, all warehouse material handling fees, and a mechanism for formal check-in and checkout of materials. The inventory management shall include computerized record keeping of all inventory and all transactions, including regular monthly reports and occasional reports, on demand by the Engineer. The Contractor shall also complete Disposition Logs, Transactions Summaries, and official monthly EMC Inventory documentation of contract spare parts warehouse materials. All costs for the contract spare parts warehouse storage facility and reporting shall be included in routine maintenance.

If the Engineer requests additional warehouse storage space, the Contractor shall be reimbursed through non-routine maintenance at the same rate per sq. ft. as the approved contract spare parts warehouse storage facility.

The Contractor shall have the option of retaining storage at the existing contract spare parts warehouse or providing an alternate commercial bonded warehouse which is suitable for storage of materials of the type used for the District's electrical maintenance, and meets the space and facility requirements of the current contract spare parts warehouse.

All costs associated with any transfer of contract spare parts inventory from the existing contract spare parts warehouse to an approved alternate warehouse shall be borne by the Contractor, and no additional compensation will be allowed.

### **3.6.5.2 Contractor Storage Facilities**

In addition to the designated warehouse, the Contractor shall have and furnish sufficient and adequate types of material storage areas, both indoor and outdoor. The Contractor shall obtain Engineer approval for all contract spare parts storage locations and facilities. Department owned contract spare parts shall be kept screened or fenced, with locked access. All contract spare parts inventory shall be clearly identified as Department owned and shall be physically separated from the storage of Contractor-owned materials and equipment.

Equipment and parts to be used on system equipment including controllers and traffic signal heads and anything which comes boxed or which could deteriorate or be damaged by exposure to the weather shall be stored indoors.

In one designated area of the Contractor facility, the Department owned spare parts indoor storage shall have a locked cage with sturdy racks and/or shelving sufficient in number to shelve and house materials and equipment for use on this Contract. A minimum of 250 sq. ft. of the indoor caged, locked and secured storage with shelving/racks of Department owned materials shall be environmentally controlled, a clean environment suitable for storage of network switches, CCTV, and other electronic equipment items needing special regulated temperatures.

### **3.6.5.3 Special Handling of Wood Light Poles**

All wood poles which are contract spare parts shall be stored outside in fenced, locked areas. With the approval of the Engineer designated Department yard facilities are allowed for storage. All poles shall be laid flat, on top of a platform/bed made from the most deteriorated wood poles. They shall be off ground, and organized into groups by length. Each pole shall be tagged with two (2) stainless steel asset tags, 4" by 2", with two holes for attachment to the pole with 3" stainless steel, ring shank nails or screws. One tag shall be nailed to the bottom and one tag at the twenty (20) foot height of the pole from the bottom. The tags shall be laser engraved/punched with the length of the pole in feet. This special handling requirement of wood light poles applies to all wood poles in contract spare parts stored locations as of January 1, 2019. All materials, labor and equipment necessary for this contract requirement are incidental to routine maintenance.

All IDOT wood poles including Contract spare parts shall be inspected and tested. The inspection shall include visual, sounding, boring and when necessary Electronic Inspection devices to check hardness and identify anomalies. An excel spreadsheet of all wood pole results documenting test results and condition shall be provided with a summary of critical findings for immediate action. Each wood pole shall have a unique test number engraved on a stainless-steel band or equivalent installed on the wood pole. The location of the Stainless-steel band as follows 10%+8 feet from the bottom of the pole. This work shall be performed through routine maintenance

#### **3.6.5.4 Insurance and Inspections**

The Contractor shall provide insurance coverage for losses due to fire, theft or vandalism for all Department owned contract spare parts inventory in the possession of the Contractor, in the contract spare parts warehouse, and at any other approved locations as listed in Contract spare parts inventory report. Estimated value of current contract spare parts on hand is approximately \$500,000.

The Contractor shall comply with the instructions given by the Engineer relating to the care, storage, and labeling of contract spare parts inventory for identification purposes. The Engineer shall be allowed access to inspect the contract spare parts inventory at the Contractor's designated locations or the official contract spare parts warehouse at any time.

#### **3.6.5.5 Inventory Requirements**

The Contractor shall use contract spare parts only when directed and approved by the Engineer. The Department is not obligated to furnish specific materials, parts or equipment in the Department's inventory of contract spare parts for Contractor use.

The Contractor is responsible, under routine maintenance, for the storage and inventory reporting of the Department owned contract spare parts; stock of materials, parts, and equipment.

The Contractor is responsible for timely, safe transportation and handling to deliver designated Department contract spare parts inventory from any stock warehouse, Contractor storage facilities, shops or sites, or other approved state work sites within District 1, to Engineer approved Contractor or other work sites or State facilities within District 1. The Contractor shall also provide all labor and equipment as necessary to relocate any IDOT equipment from a contract location (facility) to new facilities as directed by the Engineer.

The Contractor shall designate one individual to be responsible for all disposition, salvage, and monthly reporting of Department owned spare parts. This individual shall be named at the Pre-Construction Meeting.

#### **3.6.5.6 Spare Parts Quality Control**

In order to assure that only materials in good working order and/or condition shall be placed in the contract spare parts warehouse or other storage location as approved by the Engineer, the Contractor shall provide sufficient trained personnel to inspect the materials, separate salvage materials, and/or box/wrap/categorize the various in-coming materials, and provide shelf storage as applicable.

If the Engineer directs the Contractor to receive materials into the contract spare parts warehouse from Construction Contracts, or if Construction contractor arranged for pickup of parts/equipment from EMC stock the Contractor shall be paid through routine maintenance

With Engineer approval the Contractor is allowed to take receipt of materials at the Contractors facilities, but the materials/parts/equipment must be moved, at Contractor expense, to the Engineer approved storage location within five working days of the receipt of materials. The Spare Parts Disposition Log shall report all transactions.

### **3.6.5.7 Spare Parts Disposition Log**

The Contractor shall use the most current issue of the Contract Spare Parts Disposition Log for all transactions involving Department owned materials, parts, and equipment, transferred in or out of a spare parts storage location or field installation. The form shall be issued to the Contractor at the Pre-Construction Meeting. Information required on the Disposition Log includes, as applicable:

- EMCMS Location Number
- Main Route and Cross Street
- Cabinet Number
- Ticket Number
- Authorization Number
- Construction Contractor Name
- Construction Project
- Construction Contract Number or Permit Number
- Construction Location
- Designation of "Return to IDOT", "Pick-Up", or "Reserve of Materials"
- Spare Parts Transfer Code
- Electrical System
- Electrical System Item Sort Code
- Item Description per Inventory name
- Item Manufacturer, Model #, and Serial Number
- Quantity Transferred In or Out
- Designation of "New" or "Used" item
- Designation of Routine or Non-Routine Work
- Name of EMC Representative present at Transaction Completion

The Contractor shall email the Department Area Engineer/Technician a Spare Parts Disposition Log requesting the use of contract spare parts. The Contractor may not complete the transfer of Department owned items until the signed, approved Disposition Log is received from the Engineer or Engineer assigned Department representative. When new materials as purchased by the Department are received by the Contractor a Disposition Log shall be completed to indicate the materials were received and placed in an approved contract spare parts storage location.

All Disposition Logs for the month shall be sorted by electrical system and transmitted with the monthly Transactions Summary, by the 5<sup>th</sup> work day of each month, in the monthly routine work submittal on the FTP site.

### **3.6.5.8 Spare Parts Use/Replacement By the Contractor**

If the Contractor receives Engineer approval to use Department owned contract spare parts the original Spare Parts Disposition Log shall reflect the Ticket number for routine work or the authorization letter number for non-routine work. The Ticket shall remain open until the contractor replaces the contract spare parts items. Replaced contract spare parts items require a submittal of the original (usage) Disposition Log, the replacement Disposition Log with the item(s) invoice and shipping receipt(s) Disposition Log or the Contractor shall be assessed liquidated damages of the purchase and replacement of the used contract spare parts items. All documentation shall be transmitted to the Engineer by the 5<sup>th</sup> work day of the month in the monthly routine maintenance work submittal on the FTP site.

### **3.6.5.9 Disposal of Scrap**

The Engineer shall have the sole determination as to whether material (equipment) is reusable as system equipment. All removed items remain property of the state. The Contractor may not dispose (scrap) any materials without receiving prior approval from the Engineer in writing, (normally on the Disposition Log).

The Disposition Log must state the item name/model/type, condition, and location where item was located. If after inspection the materials are determined to be scrap, the Engineer shall sign the Disposition Log and convey ownership of the scrap materials to the Contractor.

All costs for disposal of scrap as ordered by the Engineer are incidental to routine maintenance. Upon receiving the transfer of ownership, the Contractor shall be responsible, at his expense, for the proper, legal disposal of all scrap items; materials, parts, equipment, etc. The estimated salvage value of scrap materials shall be reflected in the routine maintenance bid price.

All lamps removed as part of re-lamping operation, outage repairs or other authorized work shall become property of the Contractor and shall be disposed of in full compliance with Environmental Protection Agency (EPA) regulations. The EPA Rule 40 CFR, part 273, finalized in May 1995 established a guideline for the recycling of lamps and the mercury from scrapped lamps. Fluorescent, high-intensity, low pressure sodium, and other lamps bearing mercury may be classified as a potential hazardous waste.

The Contractor shall recycle removed lamps to the maximum extent possible and shall submit to the Engineer, for approval, the name and background of a qualified lamp recycling specialty service which shall be used for lamp recycling under this Contract. Over the course of the Contract, the Contractor shall provide documentation of all lamp recycling activity to the satisfaction of the Engineer. The Contractor shall provide the names of qualified facilities certified to dispose of used lamps at the pre-construction meeting.

### **3.6.5.10 Contract Spare Parts Audit**

The Contractor shall conduct an audit of all contract spare parts inventory by January 10th, 2019. After approval signature of the principal of the company and the Engineer, the Contractor shall have full responsibility for the Department owned contract spare parts inventory for the duration of the contract, including all documentation; Disposition Logs, Transactions Reports, and Inventory reports for each system.

The Contractor shall conduct an inventory audit quarterly of the spare parts inventory and verify the material and documentation to be accurate. The audit shall be signed by all system managers concurring its accuracy and notarized.

### **3.6.5.11 Contract Spare Parts Documentation**

#### **Transaction Summary Report**

Each month the Contractor shall record the information from the Disposition Logs on an Excel spreadsheet. Each transaction shall be listed by:

- Date
- System
- Transfer Code
- Location item was taken from
- Current Location of item
- Item Sort Code
- Item Code
- Item Name, Model and/or Serial number
- Ticket and/or Authorization number
- Quantity In or Out
- Quantity New or Used
- Quantity Reserved
- Quantity Out for Repair
- Quantity of Newly Purchased Items
- Quantity of Items Scrapped

The monthly Transaction Summary Report shall be approved by the Contractor's appointed supervisor/manager for the applicable system and then transmitted to the Department by the 5<sup>th</sup> work day of the month, in the monthly routine work submittal on the FTP site. The Transaction Summary Report shall be reviewed at the monthly System meetings.

### **Official Inventory Reports**

Once the Transaction Summary Reports have been approved by the Engineer the Contractor shall enter the data in the official Contract Reporting System. Currently this system consists of Excel spreadsheets for each system with the following information:

- Current Location
- System
- Warehouse Code if applicable
- Sort Code
- Item Number
- Item Description
- Type/Style/Material
- Manufacturer
- Model #
- Serial #
- Quantity Available Prior Month (New/Used/Total)
- Transactions from Past Month (Plus or Minus)
- Quantity Available in Current Month (New/Used/Total)
- Criteria Unique to a particular System (Where Used, Reserved Quantity, etc.)

The official Inventory requires significant time to complete as each item with its model number and serial number must have the transaction correctly recorded; since accuracy is vital. Each month the Contractor project manager shall sign and approve the official Contract Spare Parts Inventory to certify its accuracy prior to its transmittal by the 5<sup>th</sup> work day of the month, in the monthly routine work submittal on the FTP site.

### **Inventory Accuracy**

It is highly suggested that the project manager put into place key individuals to review the official inventory reports before his sign-off approval, since the inventory will be used as the official record of available contract spare parts. If any discrepancies are found in the official inventory and/or if the spare part is listed as available but cannot be found, the Contractor will be required to take another full physical review of each system inventory item on the official Inventory within fourteen (14) days and replace any items not found, at no cost to the Department. Any personnel assigned to the re-counting shall not take the place of any personnel assigned to other scheduled work, scheduled preventive maintenance program, or scheduled patrol.

The Contractor shall also reconcile the monthly inventory as issued by the leased warehouse to the official Department Inventory Reports and shall notify the Engineer of any discrepancies.

The Contractor is required to retain all inventory records for a period of seven (7) years following the completion of the Contract.



### **Inventory Software**

The Contractor must have by March 1, 2019, for Engineer approval, Windows based packaged inventory software with a web based application, a Contractor owned or contracted service but available for viewing by Department personnel 24/7, to replace the Excel spreadsheets currently in use. The Engineer will review proposed packages and approve the software that meets the current specifications of the reports now in place.

The Contractor shall provide the manpower to program, configure, modify and perform data entry to assure its full operation. A user-friendly screen shall be used for entry, search, modifications and deletion of all fields on the inventory screen. Each of the systems Traffic, Lighting, Surveillance and Pump Stations will have its own screen and inventory spreadsheet. The Contractor shall include under routine maintenance 250 programming hours for furnishing, creating/developing the inventory software and importing data for a fully operational system. Additional hours shall be paid through non-routine authorization.

## **3.7 CONTRACT ADMINISTRATION AND CORRESPONDENCE**

### **3.7.1 Daily Contract Administration**

The EMC will be administered by the IDOT District 1 Bureau of Traffic Operations. The Resident Engineer, Mr. Naser Gholeh, will be responsible for the control of the work. The Contractor Project Manager shall communicate with the IDOT Resident Engineer on all formal contract matters. Contractor Supervisors/Foremen and Administrative personnel shall normally communicate with the IDOT System Engineers and Technicians. All e-mail correspondence from IDOT EMC personnel shall be promptly answered by EMC personnel.

The Contractor shall address all matters of Contract interpretation or dispute at the lowest possible level. Issues which are not addressed to the Contractor's satisfaction at the Engineer/Technician level may be raised first to the IDOT Resident Engineer level and if not resolved may be raised to the level of Bureau Chief of Traffic Operations., Ms. Lisa Heaven-Baum.

It is of utmost importance that the Contract Project Manager conveys to the IDOT Resident Engineer any concerns regarding work authorizations received from the Department. Whether it is routine or non-routine maintenance work, if the Contractor has questions about the location of the work, the work completion dates, quantities of estimated materials, etc., these concerns must be voiced immediately upon the receipt of the project, so the work may start as soon as possible.

### **3.7.2 Formal Correspondence**

All formal correspondence to IDOT regarding contractual matters shall only be submitted by the Principal or Project Manager and shall be addressed as follows:

Mr. Anthony Quigley, P.E.  
Deputy Director of Highways,  
Regional One Engineer  
Illinois Department of Transportation, District 1  
Attn: Ms. Lisa Heaven-Baum, P.E.  
Acting Bureau Chief of Traffic Operations  
201 W. Center Court  
Schaumburg, Illinois 60196-1096  
cc: Mr. Naser M. Gholeh, P.E. Resident Engineer

### **3.7.3 Informal Correspondence**

Informal correspondence related to day-to-day maintenance matters shall be made by means of email and may be made directly to the parties involved. EMC personnel as requested by the Engineer shall have an email address and access to scan email documents to the Department. The email service used by the Contractor shall not be a service that attaches advertising to email. The Contractor shall also have and maintain plain paper facsimile (fax) equipment at the headquarters, EMC Office, and EMC Dispatch Center, for the purpose of rapid dissemination of written information not in email form.

The Contractor shall furnish and install an FTP server to transmit and receive files to IDOT Engineer(s) through a secure access, and it shall be available 24/7. All documentation shall be converted to electronic files in a format approved by the Engineer. The files shall be accessible and in a format that allows modification on Excel, Word or as approved by the Engineer. The FTP site shall have the Engineer approved filling system. A copy of the requested filling system will be provided at the pre-construction meeting. The Contractor shall store and maintain all EMC reports, spreadsheets, pictures, authorizations, quotes, DBE and sub-contractor reports, Contractor and vendor invoices with backup documentation such as GB sheets and GPS reports, and approved Catalog cuts, submittals and documentation. A copy of the drive with all documentation shall be provide to the IDOT Engineer at the end of each contract year, and all information shall be accessible to the IDOT Engineer.

### **3.7.4 WORK SYSTEM STATUS MEETINGS**

Work System status meetings may be requested by the Engineer or the Contractor. These meetings shall be held at a minimum once per month for each system, normally the week of the Pay Meeting, but may be held weekly if necessary. The Contractor Project Manager and other System personnel as requested by the Engineer shall attend System status meetings, when requested by the Engineer. The Contractor shall provide a status of system equipment and operation, outstanding authorizations, tickets, contract advisory and routine maintenance work. The Contractor shall take minutes of the meeting and submit to the IDOT Engineer for review and acceptance within five working days. Upon acceptance the Contractor shall distribute an IDOT approved meeting minutes to all parties. Final approved copies shall be available on the FTP site.

### **3.7.5 MONTHLY PAY MEETING**

Beginning on February 17, 2019, pay meetings shall be scheduled monthly by the Engineer, on the 3<sup>rd</sup> Thursday of the month at the IDOT District 1 Field Office currently residing at the Traffic System Center in Oak Park. There may be situations which require the meeting to be postponed for a few days, or the meeting location changed to the IDOT Schaumburg headquarters. The Contractor shall coordinate and accommodate Departments requests. These situations include conflict with a state holidays, inclement weather and emergency related issues. The Project Manager and other Contractor personnel, as requested by the Engineer, shall meet with Department personnel to present the Routine Maintenance invoice for payment.

The Contractor shall provide a brief overview of routine and non-routine work status, as well as a written report on the DBE goal progress. Work planned for the future months and ticket response/repairs may also be discussed. The Contractor shall take minutes of the meeting and submit for Engineer approval. The minutes must be finalized, approved, and distributed to attendees within five working days.

### **3.8 CONTRACT PERSONNEL**

#### **3.8.1 General Responsibilities**

The Contractor shall at all times follow Article 108.06 Labor, Methods, and Equipment, as stated in the Standard Specifications of Road and Bridge Construction. The Contractor shall provide 24/7 a force of qualified personnel, approved by the Engineer, sufficient in number to simultaneously perform the routine maintenance work, non-routine work and any specialized work operations required and described herein, and/or emergency operations at all times of the day and night. The Contractor shall meet all response and repair requirements including work schedules.

All personnel working on IDOT systems and equipment shall have the proper training associated with their working environment, and shall use safety practices in accordance with OSHA rules and regulations such as those associated with confined space, fall protection, and lock-out-tag-out.

Except as otherwise restricted, the Contractor may utilize the workforce employed on this contract to serve the maintenance needs of other parties, however, this Contract requires that the Department of Transportation's work shall take precedence over other work. The Engineer may grant the Contractor authorization to postpone IDOT work to address emergency situations of others, but the shortage of workforce shall otherwise be insufficient grounds for the Contractor's failure to perform routine or other non-routine work within the prescribed time constraints.

The Engineer retains the right to reject the Contractor's structure for management of the contract if the specific requirements defined herein are not addressed or if the proposed structure or staffing is such that the effective execution of contract performance is compromised. If work performance is not acceptable to the Engineer, the Contractor shall have thirty days, after written notification is received, to comply with a personnel position change, as approved by the Engineer, or liquidated damages shall be assessed.

The Contractor shall remain responsible for any and all union agreements applicable to his workforce on the Contract. Union jurisdictions and other union contract requirements shall not become grounds for failure to perform the contract work.

The Contractor shall provide the Engineer detailed resumes listing all certifications and training, and photo card identification for each individual working on the Electrical Maintenance Contract at the Pre-Construction Meeting.

The Contractor shall maintain a current official EMC personnel list (including sub-contracting personnel) on a spreadsheet, alphabetical by last name, with union designation and class, EMC job title, applicable call numbers and/or cell numbers, fleet management vehicle assignment/fob id number, email address, and office desk numbers if applicable. The personnel list shall be initially furnished to the Engineer at the Pre-Construction meeting. An updated list shall be provided immediately by email to the Engineer at any time there is a change in personnel for anyone working on IDOT equipment in the field.

The Contractor shall transmit the official EMC personnel list each month in the routine work submittal on FTP site. Changes in personnel, their vehicles, and FOB # assignments from the prior month shall be highlighted. Any new personnel from the prior month shall have a resume submitted with a copy of the Contractor's identification card with photo.

### **3.8.2 CERTIFIED PAYROLL REPORTING SUBMITTALS**

The Contractor shall submit weekly certified payroll reports for all employees working on the Contract, including subcontractor's personnel. The printed time records of labor worked on IDOT Electrical Maintenance Contract shall be submitted to the Illinois Department of Transportation, EEO/Labor Compliance, District 1, Schaumburg and an Excel spreadsheet format copy to the IDOT Engineer. The reports shall list the contract personnel in alphabetical order, by last name first, and shall show hours worked by straight time and overtime.

The following weekly reports shall be submitted:

- Certified Weekly Payroll Reports, SBE 348
- A Weekly Workforce Report, SBE 956

When union apprentices are working on this Contract, local union certification or federal approval must be submitted prior to submitting certified payroll reports.

### **Systems Work Report**

The Contractor shall also transmit to the Engineer, in the monthly routine work submittal on the FTP site, a Systems Work report, an Excel spreadsheet listing work performed monthly by:

- Name of employee performing work, in alphabetical order by employee last name
- Weekly hours worked by the employee, by system, for routine and non-routine EMC work, and total hours
- For Subcontractor work a separate spreadsheet, identifying same as above
- Employees union/non-union classification, title, pay grade and hourly rate monthly
- Assigned vehicles

The Department will provide the spreadsheet format at the pre-construction meeting.

### **3.8.3 General Workforce Responsibilities**

The Contractor's workforce shall possess the skills and knowledge necessary to perform all work consistent with the best practices of the trade. The workforce shall include personnel having certain special expertise, including, but not limited to the following:

- Materials Management
- General Electrical Power
- Building Wiring (Indoor Electrician)
- Motor Controls and Control Systems
- Various Types of Pump Rebuild
- Various Types of Mechanical Work
- Low Voltage Power Distribution Systems
- Roadway Electrical (Outdoor Lineman)
- Telemetry/Telecommunications
- IT Network layer 2 and 3
- Traffic Signal Closed Loop Monitoring System
- Fiber Optic Cable Installation and Repairs
- Hardware/Software Troubleshooting
- Dynamic Message Sign Technology
- Programmable Logic Controller Installation and Maintenance
- Lighting SCADA Trouble-shooting
- Pump Station SCADA Trouble-shooting
- Office Administration

#### **3.8.4 Organizational Documentation**

The Contractor shall produce an organization chart to document the chain of command and demonstrate compliance with the work requirements defined by the contract, including reporting relationships of all personnel. The chart shall provide the name of individuals assigned to all positions with roles and responsibilities named. This document shall be submitted with the pre-bid qualifications, re-submitted at the Pre-Construction Meeting with any proposed revisions, and submitted to the Engineer at any time there is a change in personnel or the chain of command.

The Engineer may also reject the assignment of specific personnel to certain functions if the Contractor fails to demonstrate the qualifications matching personnel to defined work responsibilities.

#### **3.8.5 Organization for Work Performance**

The Contractor shall at all times follow Article 108.06 Labor, Methods, and Equipment, as stated in the Standard Specifications of Road and Bridge Construction. For this Contract the Contractor is allowed to structure his workforce to best fulfill the requirements herein; however, the workforce must have the education, skills, and experience to accomplish quality work, at timely rates of progress.

#### **3.8.6 Principal (Owner) or Project Manager Responsibilities**

Experience has shown that personal involvement of a Principal, an officer of the company with signature authority, is inevitable in all major or overall contract matters under the Contract. The Principal may, however, establish a Project Manager to be responsible for performance of the contract, and have the authority to fully represent the Principal in all matters on this Contract. The requirements for attendance at monthly pay meetings, signing of documents and meeting with Department representatives, and other overall-contract duties, may also be delegated to the Project Manager.

Any Project Manager so established shall have supervisory authority over all personnel working on this Contract. The individual appointed to this position shall be approved by the Engineer prior to the start of the contract.

If at any time, the Engineer determines that a Project Manager has insufficient authority and flexibility to effectively manage the work under the contract, the Engineer retains the right to demand the Principal be in charge of the contract, with appropriate attendance at meetings, etc.

To assure 24-hour continuity of a person in responsible charge of the Contract, the Contractor shall establish a prioritized list of staff who are to act, with full authority to speak definitively for the Principal, relative to this contract, in the event of illness, vacation, or other similar lack of availability of the Principal and, if established, the Project Manager. The Engineer shall be notified as far in advance as possible whenever a substitute Principal officer or Project Manager is necessary. The Principal or Project Manager may appoint an individual who may act in a temporary substitute capacity for the Principal or Project Manager, while retaining their day-to-day responsibilities, however, the Engineer must be notified of the substitution.

### **3.8.7 OFFICE MANAGEMENT (normally not in field)**

#### **All Systems**

Work requirements and knowledge acquired as such that individuals have:

- Authority to commit workforce and other resources at all times and/or as directed by the Engineer on a 24 hour basis, seven days a week
- Authority to make assignments for daily work agenda
- Daily review of work Tickets
- Daily review and timely distribution of all maintenance repair and modification work documentation including daily agenda, tickets, and miscellaneous reports
- Oversee maintenance transfers and new installation inspections
- Submit lane closure requests and implement approved traffic control plans
- Coordinate emergency operations
- Prioritize the emergency response
- Supervise all routine and non-routine work
- Ability to manage staff of twenty (20) or more
- Ability to communicate effectively
- Proficient in the use of PC and MS Office Suite
- Possess knowledge of electrical codes such as NEC 2014 and work related safety practices (OSHA)
- Valid Electrician's card
- Ability to meet the 24/7, one (1) hour in-district response requirements

#### **Traffic Signal System Expertise**

Work requirements and knowledge acquired as such that individuals have:

- A BS or BA degree from an U.S. Department of Education accredited technical institute, engineering college or business college
- Advance training in NEC and MUTCD guidelines and methods in the last 3 years
- Attendance in advance IMSA seminars in the last 3 years
- Have IMSA level III certification by July 1, 2016
- Trained in the operation of Aries, Tactics, Centracs, and TransSuite traffic signal management software
- Trained in the operation and programming of Econolite and Eagle/Siemens controllers, including those interconnected to railroad warning devices
- Trained in the operation and management of District 1 closed loop traffic signal systems
- Trained in the District 1's Traffic Control and Protection measures and procedures
- Managed a government maintenance contract in the last 5 years with a technical staff of twenty five (25) or more
- Have a minimum of ten (10) years experience in construction, maintenance, and operation of all traffic signals and traffic signals systems currently being used in District 1
- Hands-on experience in solving trouble calls for any traffic signal cabinet or communications failure

Other:

- Maintain a current driver's license
- Maintain equipment and Work Zone safety certification
- Be able to communicate effectively

**Surveillance System Expertise**

Work performance requirements dictate that individual(s) have:

- Knowledge equivalent to electrical engineering or technical school certification
- Proficiency in technological networks
- Advance training in NEC and MUTCD guidelines and methods in the last 3 years.
- Ability to troubleshoot Allen Bradley programmable logic controllers, PLC 5, and RS Logics 5000 controllers
- Knowledge of RSVIEW 32 Project Development, Control Logix 5000 and Liq. V programming
- Knowledge of advanced computer skills
- Knowledge of NTCIP protocols in particular 1203, 1207, and 1209
- Suitable work experience in electrical construction and maintenance with a minimum of eight (8) years experience.
- Ability to operate and calibrate a variety of electrical test equipment
- Ability to troubleshoot technological equipment
- Ability to troubleshoot CCTV systems and fiber optic transceivers
- Familiarity with fiber optic and LED DMS
- Ability to oversee the maintenance and operation of REVLAC and RACS system, VDS, CCTV, camera system, Sonet and switched Ethernet network, Ramp metering, Detector cabinets, and Dynamic Message signs..
- Familiarity with ladder logic GUI programming and/or traffic signal programming
- Familiarity with telephone data line troubleshooting Familiarity with various Traffic detector technologies. Induction loop, Radar, magnetometers, ultrasonic, and video.
- Familiarity with dynamic data exchange communications
- Familiarity with open database architecture
- Familiarity with basic electronics and electronic components
- Familiarity with large scale FSK tone telemetry systems
- Familiarity with various types of telecommunication systems
- Familiarity with SM fiber optic installations and equipment
- Familiarity with OSHA Safety Standards
- Familiarity with IDOT Traffic Control Standards



### **Lighting System Expertise**

Work performance requirements dictate that individual(s) have:

- Minimum of ten (10) years' experience in construction, maintenance, and operation of all Lighting system and extra systems. electrical and mechanical maintenance experience as an electrical tradesperson with local electrical contractor companies working on the construction and maintenance of various types of highway lighting
- Experience in the operation of IDOT electrical control circuits
- Ability to interpret contract drawing and wiring diagrams
- Familiarity with diesel engine power generators and related transfer switches for back-up power
- Familiarity with fiber optic cable, signs and CCTV
- Extensive experience in supervising multiple crews skilled and unskilled to oversee troubleshooting and repair of electrical equipment and systems,
- Familiarity with electrical system, weigh stations, maintenance yards, rest areas, moveable bridges, high mast light towers, light poles, Sign lighting, underpass lighting, navigation signals, lighting cabinets and its controls, 120/240 volt and 240/480 volt service and equipment, breakaways, fuses, bonding and grounding.
- Familiarity with cable underground work
- Familiarity with OSHA Safety Standards
- Familiarity with IDOT Traffic Control Standards
- Familiar with all wiring, conduits, luminaires, lamps, LED, above ground wiring, splices, underground cable splices, Handholes there operation and different methods of installation.
- Ability to manage and coordinate lighting outages, knockdowns and cable trouble.
- Responsible for planning electrical projects, including material procurement, allocation of manpower and scheduling of work to maintain a minimum of 20,000 poles, 1650 Towers, 600 lighting cabinets, 29 maintenance yards, 6 moveable bridges, and other various locations and equipment.
- General knowledge of computers and their operation, including MS Office suite software.

### **Pump Station System Expertise**

Work performance requirements dictate that individuals have:

- Technical Institute certificate or Electrical Engineering diploma
- Extensive construction experience in mechanical and electrical of pump station or commercial and industrial work with a minimum of eight (8) years' experience
- Basic fundamental skills, knowledge and understanding of power distribution 4160 volt.
- Electrical and mechanical maintenance experience, working on all types of storm water pumping station equipment a minimum of 48 pump station with pumps that are rated at 4160/480/240 volt and capacity that range from 300 GPM to 30,000 GPM
- Knowledge of implementation and preventive maintenance of vertical and submersible pumps
- Experience, training and skills to troubleshoot and repair pumps and other mechanical equipment at pump stations.

- Experience with low voltage motor-control centers for 3-phase (240/480) systems
- Experience with relay logic controls, SCADA systems, PLC program controls and responsible for its design, installation, testing and acceptance.
- Experience in the maintenance and operation of switch-gear and, MCC, circuit protection equipment, motor controls, fire and gas alarm system.
- Experience in acceptance inspection and testing of pumping stations
- Familiarity with engine power generators and related transfer switch equipment
- Familiarity with Hazardous materials operations (refer to Article 3.11)
- Familiarity with OSHA Safety Standards
- Familiarity with IDOT Traffic Control Standards

### **3.8.8 Field Supervisors/Technicians**

#### **Traffic Signal Expertise (Patrolmen)**

Work performance requirements dictate that individuals have:

- IMSA Traffic Signal Field Technician level II certificate with a minimum of eight (8) years' experience.
- Ability to respond to callout tickets, trouble calls and emergencies 24/7 and shall meet the one (1) hour in-district response requirements
- Ability to maintain the integrity of all traffic signal timing, parameter programming information, traffic responsive and time of day signal systems
- Substantial experience with NEMA traffic signal closed loop systems operating in the traffic responsive mode
- Extensive experience in troubleshooting equipment malfunctions including all closed loop signal system malfunctions
- Ability to troubleshoot low voltage equipment malfunctions
- Ability to maintain fiber flip disk, LED DMS, and DMS MOSYS
- Ability to perform communication equipment repairs
- Knowledge and familiarity with single mode fiber optic cable installations
- Knowledge and familiarity with troubleshooting electronic equipment
- Knowledge and familiarity with OSHA safety requirements
- Knowledge and familiarity with IDOT Traffic Control standards
- Valid electrician's card

### **3.8.9 Work Crew(s)**

#### **All Work Crews**

Work performance requirements for all work crews to perform specified tasks, PM inspections, and motorist caused damage, outages, cable locate, repair and other work specified herein and its installation performance requirements dictate that individuals have:

- Minimum of five (5) years hands-on experience working with 120/240 volt and 240/480V service. Work experience as an electrical trades person with local electrical contractor companies
- Valid electricians card
- Ability to meet the 24/7, one (1) hour in-district response requirements
- Experience interpreting contract drawings and wiring diagrams
- Experience using and reading current and voltage meter, Meggers and other test instruments, extensive experience reading and troubleshooting control ladder logic
- Knowledge and familiarity with OSHA safety requirements and its application.
- Knowledge and familiarity with IDOT Traffic Control standards
- Experience in troubleshooting, special maintenance problems, cable repairs, outage repairs, underground cable repair, cabinet replacement, temporary repairs, inspections, knockdown replacement, and other maintenance work as specified herein.
- Extensive experience in clearing motorist caused damage for safety
- In depth knowledge of Safe work practices, applicable codes, laws and ordinances, circuit diagrams and industrial controls.
- Experience using computers and their operation, maintenance, software programs and application needs.

#### **Lighting System Crew(s)**

Work crews as specified dictate that individuals have:

- Skills in all typical highway system general work, construction, and repair
- Ability to perform repairs of navigation lighting, interior lighting, power distribution, and other equipment as listed herein
- Experience in troubleshooting, special maintenance problems repair, cable repairs, lighting outage repairs, underground cable repair, lighting cabinet replacement, temporary repairs, tower inspections, HMLT and light pole knockdown replacement, under pass inspections and other maintenance work as specified herein.
- Extensive understanding of Highway lighting maintenance, lamp and luminaire components, electrical services, poles and highmast components, lighting applications, testing, investigation in the roadway lighting field.

### **Surveillance Crew(s)**

Work crews as specified dictate that individuals have:

- Traffic Signal Field Technician IMSA level II certification
- Ability to perform repairs of surveillance equipment, cameras, dynamic message signs, ramp metering equipment/cabinets, loops, cable, and other equipment as listed herein
- Experience in splicing, termination and testing of fiber optic cable
- Extensive experience in the repair of REVLAC and RACS Equipment
- Extensive experience in the operation and maintenance of the REVLAC and RACS system
- Extensive experience in the VDS network digital and analog
- Experience with FSK tone telemetry system
- Experience with telephone data line troubleshooting
- Experience in DMS MOSYS, fiber flip disk and LED DMS maintenance
- Familiarity with dynamic data exchange communications
- Familiarity with basic electronics and electronic components
- Familiarity with large scale FSK tone telemetry systems
- Familiarity with various types of telecommunication systems
- Familiarity with single mode fiber optic cable installations

### **Pump Station Crew**

Work performance requirements dictate that individuals have:

- Minimum of five (5) years hands-on experience working with 240/480V 3 phase motors and pump controls
- Knowledge and ability to work on (4160 volt) electrical equipment
- Extensive experience with troubleshooting and repair of pumps, motor controls, sensors, piping, fittings, valves, monitoring systems, alarm systems, MCC, switchgear, HVAC and other electrical and mechanical equipment as specified herein
- Knowledge of pump station maintenance and operation procedures
- Extensive experience in SCADA systems, such as Alan Bradley ControlLogix 5000 and Liq V TESCO, RSView 32 HMI and Workbench
- Extensive experience with pump removal, installation, breakdown and re-builds, valves, actuators, trash racks and other mechanical equipment as specified herein
- Familiarity Experience with the removal and installation of submersible/column pumps
- Knowledge and familiarity training in the implementation of with OSHA safety requirements
- Valid electrician's card

### **Traffic Signal Systems/Railroad expertise**

Work performance requirements dictate that individuals have:

- A degree from an U.S. Department of Education accredited technical institute, engineering college or Business College
- Advance training in NEC and MUTCD guidelines and methods in the last 3 years
- Attendance in advance IMSA seminars in the last 3 years
- Have IMSA level III certification
- Experienced in the operation, testing and trouble-shooting of District 1's traffic signals that are interconnected to railroad warning devices. Has working knowledge of ICC procedures and practices for traffic signals interconnected to railroad warning devices.
- Trained in the operation of Aries, Tactics, Centracs, and TransSuite traffic signal management software.
- Trained in the operation and programming of Econolite and Eagle/Siemens controllers, including those interconnected to railroad warning devices.
- Trained in the operation and management of District 1 closed loop traffic signal systems.
- Trained in the District 1's Traffic Control and Protection measures and procedures.
- Have a minimum of ten (10) years' experience in construction, maintenance, and operation of traffic signals and traffic signals systems currently being used in District 1.
- Experienced in solving trouble calls for any traffic signal cabinet or communications failure.

Other:

- Maintain a current driver's license.
- Maintain an electrician's card.
- Maintain equipment and Work Zone safety certification.
- Be able to communicate effectively.

### **3.8.10 Contract Administration**

Work performance requirements dictate that individuals have:

- Experience with contractor work administration
- Experience with contract purchasing
- Experience with construction billing and collection
- Excellent verbal and written communication skills
- Excellent data entry and proof-reading skills
- Advance level skills with Windows and Excel spreadsheets
- Ability to calculate percentages and perform mathematical calculations
- Organization skills for contract work documentation
- Ability to work in stressful situations with time deadlines

### **3.8.11 Contract Dispatchers**

Work performance requirements dictate that individuals have:

- Substantial dispatching experience
- Experience with alarm monitoring
- Advance level skills with Windows
- Familiarity with construction terms, preferable to be electrical based
- Excellent written communication skills; good spelling
- Clear and distinct voice for telephone communications
- Excellent data entry skills
- Ability to work in stressful situations, (in facility taking up to 10,000 calls per year)
- Ability to respond to the facility within one (1) hour during storm situations

### **3.8.12 Network/System Administrator Expertise**

See Article 9.10.3 for work location, requirements and scope of work.

#### **Network Administrator Requirements and Qualifications**

- Extensive experience in system and network creation and development
- Solid understanding of information processing fundamentals and best practices
- Exceptional analytical, conceptual and troubleshooting abilities
- Excellent written and verbal communication skills
- Experience conducting technology, trends, standards and products research
- Solid track record in prioritizing and executing tasks when under pressure
- Experience providing guidance and leadership to systems engineers.
- Proven experience identifying, analyzing and resolving system problems
- Proven project planning and management experience
- Good knowledge of applicable data privacy practices and laws
- Excellent architecture and technical support skills
- Excellent documentation skills
- Strong interpersonal and consultative skills
- Ability to present ideas in a user-friendly language
- Experience working in a team-oriented, collaborative environment
- Proficient with Open Systems Interconnection, OSI, Seven layers
- Must be proficient in layer 1 (Physical layer), layer 2 (MAC address), layer 3 (network) Protocols, Layer 4 Transport Layer, Layer 5 Session layer, Presentation Layer, and Layer 7 User interface
- Proficient with TCP/IP Stack, Network Access, Internet, Transport, Application layers
- Proficient in Calculating Network address, subnet mask, broadcast address, and host IP address range. IPv4 and IPv6

#### **Formal Education and Certification**

- College diploma or University degree in the field of computer science/engineering or information systems and 10 years related work experience, or associates degree and 12 years related experience, or 15 years related experience
- Cisco Certified Network Professional (CCNP) Switching and Routing certification
- Cisco Certified Network Professional (CCNP) Security certification
- CISSP – Certified Information Systems Security Professional

### **3.9 SAFETY PROGRAMS AND REQUIREMENTS**

#### **3.9.1 General Requirements**

The Contractor shall establish a formal safety program to assure overall safety of EMC personnel, operations and the electrical systems maintained as they affect the safety of the motoring public and the public at large. The Contractor shall furnish an overall description of this program at the Pre-Construction Meeting, and furnish the name of the Safety Coordinator or Manager. The training specified below shall be performed each year and shall be offered up to 12 IDOT engineers and technicians to attend the training at a Department approved location. The training shall be covered under routine maintenance monthly payment.

As part of the safety program, the Contractor shall initiate a procedure that states: "When a circuit is de-energized, the Contractor shall meter the downstream circuits with an instrument to assure that they are de-energized and safe for working conditions." The Contractor shall be fully responsible for compliance with all OSHA requirements. Particular attention is directed to the lock-out/tag-out requirements to assure that systems undergoing maintenance work cannot be inadvertently energized, causing harm to maintenance person.

The Contractor shall assure that all personnel be trained in, and have knowledge of, approved equipment grounding methods for all work under this contract. The Contractor shall be fully responsible for compliance with all NEC requirements. The Contractor shall be responsible for the maintenance of all existing system and equipment grounding under routine maintenance.

Should locations be identified for which system or equipment grounding is missing or otherwise not in compliance with NEC requirements, the Contractor is obligated to report such locations to the Engineer.

The Contractor shall keep all systems free of hazards to the work force and the public, all in conformance with Article 107 of the Standard Specifications. Special care shall be taken to assure that electrical systems are not left in an exposed or otherwise hazardous condition. All electrical boxes, cabinets, pole handholes, etc., which contain wiring, either energized or non-energized, shall be closed or shall have their covers in place and shall be locked when configured for locking, except when work is being done at the location at the moment. If the worksite is left, enclosures shall be closed and no potentially hazardous electrical situation shall be left unattended.

#### **3.9.2 Confined Space Entry and Training**

The Contractor shall submit at the Pre-Construction Meeting, a copy of the Contractor's confined space entry and training policy which shall be in full compliance with all OSHA requirements for the duration of this Contract.

Employees shall be required to:

- Follow all general safety rules and regulations
- Abide by confined space regulations
- Wear proper safety equipment at all times
- Report unsafe conditions to supervisory personnel and IDOT Engineer
- Report any injuries sustained within a confined space

The Contractor shall train at a Department approved location and provide safety equipment to all field personnel that are involved with work within a space, as defined as confined space within the training policy. A listing of personnel who are trained or who will be trained for entry into confined spaces shall be included in the Pre-Construction Meeting submittal.

### **3.9.3 OSHA and Other Safety Training**

The Contractor shall establish training for all personnel in applicable OSHA requirements and other safety-related topics, to include but not be limited to; lock-out/tag-out, confined space, safety, hazmat training, respirator training (as applicable), use of safety harnesses for work on signs and other structures and basic first aid.

### **3.9.4 National Electrical Code/Grounding/Lightning Protection**

The Contractor shall establish a training program(s) not less than one (1) day in duration per contract year on NFPA 70E in 2019, and in 2020 grounding and lightning protection of electrical systems and NFPA 72 or equivalent in 2021. The program shall be taught by a professional trainer regularly engaged on this topic, and the training shall specifically address applications to typical IDOT systems such as electrical installation and maintenance, traffic signals, highway lighting and pump stations. This training shall be provided for all appropriate technical personnel, including all personnel engaged in electrical wiring work.

### **3.9.5 EMCMS System Training**

The Contractor shall provide in-house or local training sessions for dispatchers, managers, patrolman, repair crew, supervisors individuals who would be using and entering information in the office and in the field on this Contract. The training shall not be less than 7.5 hours in length and shall go over all aspects of ticketing, MCHD, LEM, authorizations, quotes and reports with special attention for specific procedures which are unique to this Contract. The Engineer shall work with the Contractor to identify this specific EMCMS training necessary.



### **3.9.6 Traffic Signal System**

The Contractor shall provide training within the first quarter of the year. A scheduled date and time shall be provided at the pre-construction meeting. The training shall be on traffic signal controller operations, from the controller manufacturers, for all patrolmen, traffic signal/surveillance specialists, and twelve IDOT personnel, for each of the types of controllers in use by the Traffic Signal System in District 1, or as approved by the Engineer, including but not limited to:

- NEMA TS-1 cabinets
- NEMA TS-2 cabinets
- Econolite System controllers
- Eagle System controllers
- Peek System controllers
- Video Detection – Iteris, Autoscope, FLIR
- Conflict Monitors – EDI
- MMU – EDI, Reno, Econolite
- BIU – Eagle, Econolite
- Traffic Signal troubleshooting
- Traffic Signal System timings
- Fiber Optic troubleshooting and testing
- Radio interconnect troubleshooting
- System and intersection controller software uploading and downloading
- Detector amplifiers
- Grounding troubleshooting
- UPS systems
- Wireless Magnetic and Radar Vehicle Detection

### **3.9.7 Lighting System**

Personnel working on the Lighting System shall have basic training on the following items:  
Cabinet Control:

- Clock programming
- Control wiring
- SCADA MOSCAD alarm response
- Lock out – tag out
- Lighting SCADA training

The Contractor shall schedule formal advanced training from an approved trainer on the Lighting SCADA radio (ACE3600) system for the SCADA specialists and applicable patrolmen. The training shall be performed within the first quarter of the year. A scheduled date and time shall be provided at the pre-construction meeting.

### **3.9.8 Pump Station System**

The Contractor SCADA specialists, patrolmen, PS specialists and work crew, repair crew personnel or any Contractor personnel conducting any routine and/or non-routine work on the Pump Station System shall have introductory training on the following items:

- Ladder logic
- Mechanical training
- Emergency response training for water-on-pavement
- Emergency response training for hazardous material situation
- Lock out – tag out
- PS SCADA maintenance and troubleshooting

The Contractor shall schedule advanced training on the SCADA system for applicable employees and the IDOT PS Engineer. The Contractor shall provide a schedule at the pre-construction meeting. Training shall include how to make changes or updates to show old and new equipment on the existing system, and removing or adding a pump station from the system, communication and pump station network. The Contractor shall develop and submit a manual to explain the SCADA system change procedures for the equipment at the pump stations, the ComCenter, and Contractor locations, by April 1 of every contract year.

### **3.10 PERSONNEL TRAINING**

The four-day training session shall be for up to eight Department personnel and shall incorporate practical applications and calculations. The training provider shall be certified and specialized in the field. The Contractor shall submit for approval to the Engineer a list of instructors with their certifications and experience for approval. Contractor shall also provide an outline for each course being provided to the Department for approval 30 days before training begins. All training shall be provided at the Traffic Systems Center or as directed by the Engineer. The training shall be hands on and equivalent to TPC trainco outline/topics.

**2019 - PLC four day workshop Introduction and Advanced application;** on how they work, terminology, and the hardware and software elements of a PLC. learning a systematic approach to troubleshooting, how to set-up and configure local, remote, hierarchical and distributive control systems, how to configure Input/Output modules, how to understand program and data table file organization, number systems and processor information flow, basic relay type instructions, timers and counters, data manipulation, instructions to be used to achieve PLC solutions, how to modify and write common PLC programs, and edit or create new PLC for solutions specific work applications.

**2020 –Generator and Emergency backup power; two days training** how to select, install, operate, and maintain generators, as well as how to isolate and repair generator problems to avoid the disastrous consequences of power failure and ensure that facilities continue running.

**Electrical Ladder Drawings, Schematics and Diagrams; two days training** to understand electrical drawings and schematics for servicing and troubleshooting facility and industrial electrical systems.

**2021 – Variable frequency drives workshop; four days training** to introduce variable frequency drives and their applications in industrial plants and commercial buildings and perform hands-on activities with a real-life variable frequency drive by inputting motor data, set parameters for speed control and overcurrent protection, and checking fault codes. Completing the training will help in understanding of VFD operation, thus alleviating the need for hiring costly outside service contractors, all while establishing a culture of safe work practices among employees. Training will also include power quality, remote drive control, advanced communication between multiple drives, compensating for slip, the negative impact on the general duty motor, boosting torque, and how to determine when to skip frequency.

### **3.11 HAZARDOUS MATERIALS OPERATIONS**

All activity with contaminated waste shall conform to the Department's Standard Specifications for Road and Bridge Construction Article 669. The Contractor shall employ for emergency hazmat response the services of, or have a full-service Subcontractor designated as the EMC hazardous waste contractor, familiar with and capable of complying with all federal, state, or local regulatory requirements/regulations pertaining to RCRA hazardous and special non-RCRA waste management, and shall be responsible for ensuring the implementation of these requirements.

The hazardous waste contractor shall have a 24-hour emergency call number and shall be capable of responding to a pump station within one (1) hour of notification. No additional compensation will be allowed for these services.

The Pump Station Manager shall direct the hazardous waste contractor and other Contractor personnel as necessary to remove and properly dispose of oil, gasoline or other pollutants from the pump station wet pit, or other area as directed. Removal shall be by means other than pumping pollutants into the normal station discharge sewer or receiving open water channel. (The Contractor may store suitable absorbent battens in a drum at each pump station which discharges to a waterway.)

The Contractor shall provide a list of proposed full-service contractors, for Engineer approval, at the Pre-Construction Meeting.

The EMC hazardous waste contractor shall:

- Coordinate with all pertinent regulatory agencies to secure all necessary permits and approvals and shall be responsible for coordinating all permits with the IEPA
- Submit to the Engineer, for approval, a copy of all federal, state, or local required licensing documents to perform this work
- Select a hazardous/special waste landfill/disposal facility, verifying that selected landfill/disposal facility is in compliance with applicable standards for hazardous and special waste and whether the disposal facility is presently, has previously been, or has never been, on the U.S. EPA's National Priorities List or the RCRA List of Violating Facilities

- Obtain written approval of the selected landfill/disposal facility from the Engineer, who, reserves the right to review and to accept or reject the selection
- Perform all tests required and make all necessary arrangements for waste disposal approval with the selected landfill/disposal facility
- Be responsible for transporting and disposing all material classified as a “non-special waste”, “special waste” or hazardous waste” from the job site to the approved landfill/disposal facility, assuring that the transporter and vehicles comply with all federal, state, and local regulations governing the transportation of non-special, special or hazardous wastes.
- Shall prepare a technical report within 30 days of the conclusion of the project, describing the activities conducted during the life of the project and submit two (2) copies to the Engineer

If the state police or a municipal agency has declared a hazardous material spill which affects system equipment and the IDOT Claims Department collects repair costs through the Motorist Caused Damage Repair fund, the Department shall make separate payment to the Contractor of the repair costs collected, minus any payments of non-routine pay items or contract spare parts/material used, following submittal of complete documentation of material purchases and labor repair costs. The Department reserves the right to use Pay Item prices, where applicable, for materials and equipment. The IDOT Claims Department has the final determination as to the amount of the repair cost recovery.

### **3.12 Traffic Control**

#### **3.12.1 Traffic Control and Safety**

When a project is located in close proximity to a railroad grade crossing, regardless of whether it is interconnected to the crossing, the contractor should be aware of the construction-related conditions that may cause traffic to back up onto the railroad tracks. When such queuing is likely, the Contractor should consider additional maintenance of traffic measures or other procedures to satisfy the requirements of the current edition of the MUTCD for the work zone conditions and railroad-highway grade crossing.

#### **3.12.2 Traffic Control Plan**

The Contractor shall provide bound copies of their Traffic Control Plan for the Electrical Maintenance Contract operations, for all patrol vehicles, work crew vehicles, and supervisory vehicles.

The Contractor shall provide two copies of their Traffic Control Plan, one shall be submitted to the IDOT Expressway/Traffic Operations Engineer for review and one provided to the Engineer prior to or at the Pre-Construction Meeting. The Contractor shall submit the names of the subcontractors for traffic control installation and maintenance at the Pre-Construction Meeting.

### **3.12.3 Keeping the Expressway Open to Traffic**

Whenever work is in progress on or adjacent to an expressway, the Contractor shall provide the necessary traffic control devices to warn the public and to delineate the work zone as required in these Special Provisions, the Standard Specifications, the State Standards and the District Freeway details. All Contractors' personnel shall be limited to these barricaded work zones and shall not cross the expressway.

The governing factor in the execution and staging of work is to provide the motoring public with the safest possible travel conditions on the expressway through the work zone. The Contractor shall arrange his operations to keep the closing of lanes and/or ramps to a minimum.

The Contractor shall request and gain approval from the Illinois Department of Transportation's Expressway Traffic Operations Engineer at [www.idotlcs.com](http://www.idotlcs.com) twenty-four (24) hours in advance of all daily lane, ramp and shoulder closures and 7 days in advance of all permanent and weekend closures on all Freeways and/or Expressways in District One. This advance notification is calculated based on workweek of Monday through Friday and shall not include weekends or Holidays.

Shoulder closures or partial ramp closures will not be permitted on weekdays (Monday thru Friday) from 5:00 a.m. to 9:00 a.m. and from 3:00 p.m. to 7:00 p.m.

The approval for emergency closures or emergency moving operations shall be requested from the ComCenter, (847-705-4612) as soon as the need is determined, prior to the Contractor's arrival on the expressway.

All daily lane closures shall be removed during adverse weather conditions such as rain, snow, and/or fog and as determined by the Engineer. Also, the contractor shall promptly remove their lane closures when Maintenance forces are out for snow and ice removal.

Additional lane closure hour restrictions may have to be imposed to facilitate the flow of traffic to and from major sporting events and/or other events.

Private vehicles shall not be parked in the work zone. Contractor's equipment and/or vehicles shall not be parked on the shoulders or in the median during non-working hours. The parking of equipment and/or vehicles on State right-of-way will only be permitted at the locations approved by the Engineer.

Lane closure hours will be determined by the Expressway Traffic Operations Engineer, and will be made a part of the Traffic Control Plan. The Contractor shall perform work specified herein within the Allowable Expressway Lane Closures Hours.

### **3.12.4 Traffic Control Deficiencies**

Upon notification from the Engineer or Department Expressway/Traffic Operations personnel, the Contractor shall dispatch qualified personnel immediately to make needed corrections of deficiencies that constitute an immediate safety hazard and/or the blocking of traffic lanes or ramps. If the Contractor fails to correct the deficiency within the specified time, a daily monetary deduction will be imposed, in accordance with Article 105.03 (b) of the Standard Specifications. This time period will begin with the time of notification to the Contractor and end with the Resident Engineer's acceptance of the corrections.

Should the Contractor fail to completely open and keep open all the traffic lanes to traffic in accordance with the limitations specified under the Special Provisions for "Keeping the Expressway Open to Traffic", the Contractor shall be liable to the Department for the amount of:

One lane or ramp blocked = \$2,000.00/15 min  
Two lanes blocked = \$5,000.00/15 min

Not as a penalty but as liquidated and ascertained damages for each and every 15 minute interval or a portion thereof that a lane is blocked outside the allowable time limitations. Such damages may be deducted by the Department from any monies due the Contractor. These damages shall apply during the contract time and during any extensions of the contract time.

### **3.13 VEHICLES**

#### **3.13.1 General Requirements**

The Contractor shall provide at all times sufficient vehicles and construction equipment to perform the routine and non-routine work and specialized operations required and described herein. The Contractor is expected to be familiar with the extent of systems to be maintained under this contract and the equipment necessary to provide the specified work response. Failure to have adequate equipment to perform the work shall not be sufficient grounds for the delay of routine or other authorized work. The equipment shall be owned or under long-term lease to the Contractor, and available at all times for the Contractor's use.

Each Contractor vehicle shall carry a copy of the Contract or applicable sections herein, and all vehicles shall carry Article 4.9.5 Motorist Caused Highway Damage and Article 4.17.4 Tickets.

#### **Fleet Management System**

All vehicles used on Electrical Maintenance Contract work shall be equipped with an in-vehicle GPS device that sends information via wireless or satellite communication to a remote data center over a secure network. The Contractor shall provide each driver/employee working on the EMC (including sub-contractors) an identification code and a key fob. Review Fleet Management service requirements in Article 9.0.

The Contractor's vehicles, including but not limited to the minimum special equipment listed herein, shall be in good working condition and physical appearance (no rust) to be suitable for providing timely response for systems' maintenance and to represent a quality product to the motoring public. All vehicles and equipment used by the Contractor shall conform to all applicable laws and the Department safety and traffic control requirements. The Contractor is strongly urged to have six (6) attenuators in his fleet for the safety of repair crews.

Prior to the start of the contract period, the Contractor shall have all vehicles and equipment staged at TSC and available for inspection by the Engineer. The Engineer shall provide not less than five (5) calendar days advance notice to the Contractor of the desired inspection date. Vehicles will be inspected by group.

All Contractor vehicles and equipment shall be clearly identified by a decal with the Contractor's name, location, and telephone number. The decal shall be readily visible on the exterior sides and rear of each vehicle. Removable magnetic signs or similar non-permanent identification is not permitted at any time. Sub-Contractor vehicles shall be held to similar requirements.

### **3.13.2 Equipment for Each Vehicle Performing Traffic Signal Work**

- Digital camera or camera phone with a minimum 10 MP and flash capabilities
- Lap-Top PC that shall include: Carrying case, power cords to run in vehicle, and capable of operating all applications/software as required for the Traffic Signal systems
- EDI Malfunction Management Unit (MMU 16E or better)
- EDI Conflict Monitor
- Quantity of 3 - TS2 Bus Interface Unit
- Cell-Phone Interface for PC (Systems Trucks)
- 3-Point Ground Tester
- Amp-Volt Meter
- Loop Analyzer Model ILA-550
- Conduit-Cable Locator
- Light Source for Fiber Cable
- Audible tester for Fiber Cable (System trucks)
- Emergency Pre-emption Emitter
- Fish Tape – 100 ft.
- 10 foot ladder
- Measuring Wheel
- ASC/2 Controller
- ASC/3 Controller
- EPAC TS2 M40 Series Controller
- EPAC TS1 M40 Series Controller
- Eagle M50 Series Controller
- Load Switch
- Electric Drill – ½ chuck
- Shovel
- Quantity of 8 Stop Signs
- Quantity of 8 Traffic Cones
- Quantity of 2 Lane Closure Signing
- Strobe warning lights, spot lights, and directional bar that meets or exceeds current standards

Equipment for Supervisory TS and specialists Vehicle: (in addition to the above)

- Portable PROM Programmer Dataman 54 or equivalent
- O.T.D.R., Siecor Model 340 or equal with necessary modules capable of testing both single-mode and multi-mode fiber cable
- CD Writer which transcribes 3 ½ disk onto blank CD
- Lap-top fully functioning capable of operating all applications software required for the traffic signal system

Equipment as Necessary:

- Mapping Grade Handheld GPS (when mapping equipment as described herein)
- Loop Amplifiers (shelf & rack)
- Loop Splicing Equipment
- Cabinet Keys & Locks
- Relays, Fuses, Circuit Breakers
- Work Lights
- Signal Heads
- Pedestrian Heads
- Pedestrian Pushbuttons
- Service Door Covers
- Visors
- Backplates
- Bulbs
- Cabinet Logos
- Bolt Cutters
- Graffiti Removal Solvent
- Extension Cord, 100 ft.
- Set of Tools
- Handhole Cover
- Cable, Uniduct
- Cabinet Fan, Filter
- Cabinet Thermostat
- Cabinet Silicone
- Caulk
- Duct Seal

**3.13.3 Equipment for Each Vehicle Performing Surveillance Work**

- AC generators capable of 40 amp output to power DMS sign
- Digital Camera with min.10 MP and flash capabilities
- Quantity of 8 Traffic Cones
- Quantity of 2 Lane Closure Signing
- Loop Analyzer Model ILA-550 or equal
- Lineman's test set, Harris Dracon TS-21x89 or equal
- Digital multimeter, true RMS multimeter, with case & test leads Fluke model 87V or equal
- Digital AC clamp on meter with case equal to or Exceeding Fluke Model 334 with test leads or latest
- Greenlee Gt-104 Comprehensive Signaling TIMS 2 &4 wire Freq/level noise measure. Li-Ion Battery, AC/DC adaptor charger, Cable kit Bantam-Bantam and Bantam- Alligator, soft carry case, rugged bumpers
- Cable and Pipe locator equal to or exceed RD8100 cable and pipe locator by Radio detection with Bluetooth and optional GPS integrated or approved equal for personnel performing cable locate
- Clamp on ground resistance meter equal to or exceeding Fluke 1630 Earth Ground



- Insulation Tester equal to or exceeding Megger MIT 230 Digital/Analog Insulation and Continuity tester.
- Tone and Probe Kit equal to or exceeding Greenlee standard (701K-G)
- AC/DC digital clamp current meter equal to or exceeding TECPEL model DCM-039
- Fiber optic power meter equal to or exceeding Fluke Simplifiber Pro Power meter model SFSINGLEMODESOURCE 1310/1550 with fixed SC port with ST and LC testing capabilities utilizing the hybrid test reference cord accessories
- Fiber optic cleaning kit with solvent dispenser, Solvent dispenser pen, wipes, and LC/ST/SC port cleaning swabs.
- Network Cable Tester equal to or exceeding Fluke Microscanner2 with BNC and Ethernet Adaptors
- Angle locator, digital protractor, min. 5 in length. (used to re-set the angle of the REVLAC gate)
- Laptop computer, Windows tablet, or Android tablet that is capable of running vendor software necessary for the maintenance of IDOT DMS, Ramp metering Controllers, VDS Controllers, or Detector software packages. IDOT currently has Daktronics, Intelligent Control, and Skyline DMS Maintenance software, latest remote radar sensor software by EIS and Wavetronix, Latest GTT Canoga micro loop software. Sensys Traffic Dot2 and Putty. Required Interfaces: Serial: D-sub 9 pin, USB: 4 pin, 10/100/1000 Ethernet RJ45. Each computer/tablet shall be equipped with the following cable/adaptor combination 50' DB 9 male to female serial extension cable, 6' DB9 male to female serial cable, DB 9 null modem adaptor male to female, DB 9 mini male to male gender changer, DB 9 mini female to female gender changer, 15' DB 9 female to DB 25 male modem cable
- Hand held video monitor, battery powered, BNC analog video input, RJ-45 ethernet jack for HD IP video viewing. ONVIF and other custom video protocols used in the IDOT VDS system.

#### **3.13.4 Equipment for Each Vehicle Performing SCADA Work**

- Lap-Top PC, Quad Core Processor or better, minimum 2.66GHz, LED Display, 4GB DDR, 1 TB Hard Drive DVD/CD Burner, Internal Wireless Card, Licensed copy of current Windows OS and Microsoft Office Suite including Access, Internal Mouse, Modem Network card (built in), Carry Bag, Modem configuration software (Telix/ Reflections), MOSCAD Toolbox firmware, MOSCAD System Tools Suite (STS) firmware, Tesco Workbench Firmware, Intrac MRTU Firmware, and power cords to run in vehicle
- One (1) Air Pressure Calibrator Meri-Cal EE33 with kit or equivalent

#### **3.13.5 Equipment for Each Vehicle Performing Pump Station Troubleshooting**

- Lap-Top PC, Quad Core Processor or better, minimum 2.66GHz, LED Display, 4GB DDR, 1 TB Hard Drive DVD/CD Burner, Internal Wireless Card, Licensed copy of current Windows OS and Microsoft Office Suite including Access, Internal Mouse, Modem Network card (built in), Carry Bag, Modem configuration software, Tesco Workbench Firmware, and power cords to run in vehicle
- Phase Rotation Indicator
- RPM Strobe
- Megger
- Multimeter

### 3.14 EQUIPMENT FOR MAINTENANCE OPERATIONS

The following is a list of equipment used by contractors on prior EMC contracts, which can be used as a guide for equipment as necessary on this Contract.

- Arrowboard
- Augur, Airhammer
- Boat, (for accessing navigational light outages)
- Cable Plow
- Compactor, Tamper
- Compactor, Air
- Crane (Under 20 Ton)
- Crane (20 Ton)
- Drill, Boring 125 HP
- Drill, Boring 50 HP
- Drill, Boring 37.5 HP
- Generator 6.5 HP (small)
- Generator 13 HP (large)
- Joint Sealer, Loop
- Pavement Breaker
- Pump, Water (gas) 2"
- Pump, Water (gas) 3"
- Pump, Water (diesel) 6"
- Saw, Concrete
- Tractor, Backhoe
- Tractor, Skid Loader
- Trailer, Cable Rack
- Trailer, Flat Bed
- Trencher 40 HP Wheelmounted
- Trencher 57 HP
- Truck, Aerial Bucket 30' For Traffic Signal work
- Truck, Aerial bucket 40' for DMS Surveillance work
- Truck, Aerial Bucket 55' for CCTV and Lighting work
- Truck, Aerial Bucket 70' for Lighting work
- Truck, W/Augur
- Truck, Cable
- Truck, W/Crash Attenuator
- Truck, Dump
- Truck, Fiber Optic Splice
- Truck, Loop w/Saw
- Truck, Pick-Up
- Truck, Semi
- Truck, Stakebody Flatbed
- Truck, PS Equipment, with 10,000 lb winch, generator 4500 watt continuous at 120 volts, combination welder, and ability to operate a hydraulic pump

### 3.15 CONSTRUCTION TEST EQUIPMENT

The Contractor shall own and maintain test equipment, available for specialized maintenance testing at all times by Contractor's work crews, and given two (2) hour notice, for the Engineer's use in inspecting the Contractor's work. All equipment shall be owned or under long-term lease to the Contractor.

The Contractor is expected to maintain all test equipment, in accordance with the manufacturer's specifications at all times, including certified calibration by a responsible test lab. The equipment shall have the test lab's most recent calibration ticket attached. The minimum quantities and types of required test equipment, as listed below, shall be ready for inspection by the Engineer by January 1, 2019.

At the Pre-Construction Meeting, the Contractor shall submit to the Engineer for approval an itemized list of all test equipment, a manufacturer's product data sheet for each item, and copies of each instrument certification calibration.

- Multimeters with Current Probe, and Thermal Probe.
- Hotspot Locator, Equal to Gen-Eye hotspot pipe locator GL185 with 5-Watt transmitter
- Cable and Pipe locator equal to or exceed RD8100 cable and pipe locator by Radio detection with Bluetooth and optional GPS integrated or approved equal
- Linesmans Test Set, Equal to Harris Dracon Model TS-21x89
- OTDR Fiber Optic Tester w/launch kit, equal to EXFO model FTB200
- Microwave frequency counter for 6 Ghz and 11 Ghz frequencies, HP/Agilent model 5350B
- Digital Multimeters, equal to Fluke latest model
- (3) Breakout Box with case, Equal to Black Box Model SAM232-6s
- (2) Pipe and Cable Locator, Equal to Pipehorn 800 series pipe and cable locator
- Digital Tachometer, Latest Model
- Survey Rods – Level, Round Fiberglass, 25' – 5 Section, D Electric Certified
- (11) 4 Channel Gas Detectors
- (2) Triaxial Gauss Meter, equal to Bell Technologies, Model 4080 or better
- Pushrod Video Inspection system equal to or exceed Radio detection Pearpoint P342 Flex Probe 1" or 2" camera with a 400-foot reel
- Microwave frequency counter and windows computer to run Harris Mega Star software.
- Coaxial Cable Tester, equal to TWA Communication Model #62-204
- Infrared thermometer, equal to Fluke 62 series or equivalent
- (2) Digital Low Resistance Ohmmeters, which meet the following requirements:
  - Ranges: 2, 20, 200, 2000, and 20000 Ohms
  - Resolution:  $0.5 \times 10^{-3} \times \text{range}$
  - Accuracy:  $\pm (0.2\% + 2)$
  - Power Source: Line Voltage/Battery
  - Accessories: Ground Test Kit
  - Make: AEMC Digital Ground Resistance Tester or approved equal

- (2) Digital Multimeters, which meet the following requirements:
  - Voltage AC: Maximum Voltage: 1,000 V
  - Basic Accuracy:  $\pm (1.0\% + 4)$
  - Resolution: 0.1mV X Range multiplier
  - Voltage DC: Maximum Voltage: 1,000 V
  - Resolution: 0.1 mV X Range Multiplier
  - Basic Accuracy:  $\pm (1.5\% + 3)$
  - Resistance: 600 Ohms – 50 M Ohms
  - Power Source: Rechargeable Battery
  - Make: Fluke 80 Series DMM or approved equal
  
- (2) Fall-Off-Potential Ground Resistance Tester, which meets the following requirements:
  - Ranges:  $2\Omega$  to  $20k\Omega$
  - Resolutions:  $0.5 \times 10^{-3}$  x range
  - Accuracy:  $\pm (2\% + 1)$  from 10% to 100% of range
  
- (4) Insulation Resistance Test Equipment, which meets the following requirements:
  - Resistance: 0 to 2,000 M Ohms
  - Voltage: 250, 500, 1000 V dc + 30 % Max.
  - Accuracy:  $\pm 1.25\%$  of full scale deflection on 2.8" arc length
  - Lo- $\Omega$  resistance 0 to 5,000 Ohms@ 3 V  $\pm 0.2$  V
  - Voltage: 0 to 600 Volts
  - Accuracy:  $\pm 3\%$  of reading
  - Power Source: Hand Crank/Line/Battery
  - Make: Megger or approved equal
  
- (2) Amprobes, which meet the following requirements:
  - Current AC
  - Range: 1 A - 600 A, AC      1 A - 1,000 A, DC
  - Lowest: 0.5 A
  - Accuracy:  $2\% + 0.5$  A
  - Useable Frequency: DC – 10 KHz
  - Output Levels: 1 mV/A
  - Power Source: Rechargeable Battery
  - Make: Fluke 80-i1010 or approved equal
  - Fiber Optic Light Source and Detector for testing both SM and MM fiber optic cables, Noyes Model SMLP 5-5 or equal

- (3) Clamp-On Ground Resistance Meters, which meet the following requirements:

Range	0.1Ω to 1.00Ω	1.0Ω to 50Ω	50Ω to 100Ω	100Ω to 200Ω	200Ω to 400Ω	400Ω to 600Ω	600Ω to 1200Ω
Resolution	0.01Ω	0.1Ω	0.5Ω	1Ω	5Ω	10Ω	50Ω
Accuracy	±(2%+2)	±(1.5%+1)	±(2%+1)	±(3%+1)	±(6%+2)	±(10%+1)	±(25%+1)

Current Measurement: Range: 300 mA, 3A, 30A Resolution: 1 mA, 0.001 A, 0.01A Accuracy: ± (2.5% + 2) Make: AEMC 3700 Clamp-ON Ground Resistance Meter or approved latest equal model

Auto-Ranging  
1mA to 30.00 Arms

**ARTICLE 4.0 – ROUTINE MAINTENANCE REQUIREMENTS**

**4.1 CONTROL OF WORK**

Except as notified in writing by the Engineer, the Contractor is automatically authorized and required to perform routine maintenance work, which includes response, scheduled work and preventative maintenance actions on all state maintained electrical systems in a manner prescribed in this Contract. All labor, vehicles, materials and construction equipment necessary for the routine maintenance work described herein shall be included in the routine maintenance bid.

On January 1st, 2019 a list of all maintained locations shall be provided to the Contractor via the EMCMS. The Contractors EMCMS workstations are to be operational January 1, 2019 at 12:01 AM. A printed copy of maintenance locations can also be provided to the Contractor after award, prior to the maintenance transfer.

Unless certain work is specifically described herein to be non-routine work, all work required by the Contract shall be incidental to the requirements of routine maintenance. Specific items of routine maintenance work are described under the description of work for each respective system. General requirements of routine maintenance are included in, but not limited to this article. Maintenance of Department owned equipment, devices, systems and appurtenances at EMC maintained locations shall be covered under routine maintenance unless specifically stated otherwise herein.

The Engineer appointed for this Contract will be responsible for the control of the work in conformance with Section 105 of the Standard Specifications for Road and Bridge Construction, and contract Special Provisions.

The Contractor shall continuously watch for system elements that are malfunctioning or in need of replacement. Malfunctioning equipment shall be repaired or replaced as part of routine maintenance. The Contractor shall, however, submit a Contractor Advisory, per Article 4.17.1, for items which are a safety risk or prone to imminent failure, and receive non-routine payment for the material portion of the repair.

The Contractor shall document to the Engineer that the various items of equipment at all locations perform properly, that maintenance operations for the respective installations and systems prescribed by this contract are not to be interrupted, that maintenance completion dates as specified or agreed are met, and that repair work as performed on system equipment meets all applicable codes and IDOT requirements.

The Contractor is responsible to perform maintenance under this Contract which prevents operational problems, minimizes trouble calls, safeguards electrical safety, promotes operational safety and which prolongs the operations life of installed systems. Some of these maintenance activities will be initiated by the Engineer, some will be jointly developed between the Contractor and the Engineer, and some are expected to be routine maintenance obligations of the Contractor. The Contractor shall perform and install equipment in accordance with the best practice of the trade, and equipment installed shall be in accordance with manufacturer's recommendations.

The Engineer may make frequent investigations of Contractor work and periodic inspections of the respective systems and installations to determine if all maintenance operations are being performed satisfactorily and in the manner specified in the Contract. The Contractor shall provide safe access to any part of the systems for IDOT inspectors.

Equipment for operational needs installed during the contract year at a maintained location shall become part of the maintained location and covered under routine maintenance. When the Contractor performs routine and or non-routine maintenance work any moving lane closures shall be paid through under routine maintenance bid items.

The Contractor shall keep current a list of equipment, by location number and/or unit or cabinet number which is under warranty to the Department. If malfunctions occur on this warrantied equipment it is the responsibility of the Contractor to contact the applicable Construction Contractor, Vendor and or manufacturer to resolve the problem(s) and make the necessary repair or replacement. The contractor shall keep documentation of all warrantee related problem(s) and shall make enter the information on the associated ticket.

#### **4.2 PRIORITY OF WORK**

The following top priorities of work, in the order listed, shall take precedence over work for others and other work on this contract, unless permitted, on a case-by-case basis, by the Engineer. The response times to these situations shall be as defined elsewhere herein.

- Railroad/Vehicle Conflict
- Railroad Interconnect Problem/Outage
- Traffic Control Conflict
- Traffic Obstruction
- Electrical Hazard
- Power Outage
- Water on Pavement
- Hazardous Materials on Highway
- Power Center Outage
- Other incidents as specifically alerted by the Engineer

#### **4.3 CONTRACTOR EMERGENCY RESPONSE**

When equipment failures do occur due to unforeseen events, motorist caused damage, or from any cause whatsoever, time is of the essence for Contractor personnel to arrive at the scene, shut-down or safely isolate any potentially hazardous electrical condition, clear the pavement of any equipment debris resulting from the damage and take corrective measures to assure the safety of the motoring public, and coordinate the efforts to restore normal traffic operations. The Contractor shall abide by the requirements of Article 4.9.1

The Contractor's response shall include not only reporting to the location of an incident or trouble, but also timely immediate action as prescribed for the various systems herein, or as required by the situation to mitigate immediate hazards and effect necessary temporary and/or permanent repairs and restoration of electrical systems.

It is an objective of this Contract to have the Contractor respond to trouble calls as quickly as possible after obtaining an acceptable amount of information. The Contractor shall dispatch patrol personnel for response after being provided at a minimum, the main route and a cross street.

Normal response time shall be one (1) hour, with temporary service restoration in four (4) hours, and permanent equipment repairs in seven (7) days. The systems articles herein discuss specific response time requirements. (Also refer to ticket documentation requirements herein.)

Certain equipment is critical to the EMC and requires immediate response and immediate corrective action, including failures of fiber optic equipment, servers, distribution equipment, or intrusion alarms, all non-scheduled power outages, and other equipment items as specified in systems articles herein.

All damaged equipment, determined by the Contractor not to be re-usable, shall be removed from the state highway right-of-way within twenty-four (24) hours from the time of the notification of the incident, exclusive of Saturdays, Sundays, and Holidays, and taken to the Contractor's shop area.

After inspection by the Engineer, ownership shall be conveyed to the Contractor of the non-re-usable equipment via a disposition log. (Review disposal of scrap herein.) Any damaged concrete poles, broken concrete or other such refuse and debris generated from motorist caused damage shall be disposed of by the Contractor.

All expressway, shoulder, or lane closures required for clearing and installing temporary or permanent repairs shall be in conformance with existing Departmental standards governing lane closures.

#### **4.4 EMERGENCY CALL-OUT POLICY**

The Contractor is required to have a Call Out policy that formalizes the 24/7 response necessary to provide continuous maintenance for systems covered under this Contract. The Contractor shall appoint managerial level personnel to be on-call (on a rotating basis) after the normal workday hours and on weekends, to serve as an Emergency Response Coordinator, to prioritize the emergency response for all electrical systems. In this capacity the Emergency Response Coordinator shall coordinate work with the EMC Dispatch Center Supervisor.

The Emergency Response Coordinator shall have the authority to call out additional personnel for dispatching or patrol duties. During storms or other emergency situations, the EMC Dispatch Center Supervisor and all EMC dispatchers shall be responsible to the Emergency Response Coordinator (or the Project Manager, if in attendance at the EMC Dispatch Center).

Under storm conditions, emergency situations or other special circumstances requiring the setting of priorities from among system needs requiring immediate corrective action, which go beyond the Contractor's immediate ability to respond, the assigned Emergency Coordinator shall set response priorities in such a manner as to minimize hazard and inconvenience to the public and otherwise optimize the effectiveness of the contractor's forces, but only, after first initiating the callout of additional forces in sufficient number to address the situation. The Contractor shall communicate and coordinate with the Engineer in such situations.

#### **4.5 SPECIAL RESPONSE SITUATIONS**

##### **State of Illinois Disaster Declarations**

The Governor may declare a State Disaster due to natural disaster or catastrophic failure. The Contractor shall provide the equipment and personal to promptly respond to equipment trouble calls due to severe storms causing extensive damage from flooding of roadways, massive snow accumulation, or extensive tornado damage, any of which is detrimental to the safety and traffic flow of the motoring public. The Contractor shall adhere to the rules and guidelines set forth by IEMA and FEMA for reimbursement. The Contractor shall accurately document all work performed through Tickets and clear photos of damaged equipment caused by the disaster. The documentation shall include all information required under the guidelines.

The Federal Highway Administration (FHWA) through their Emergency Transportation Operations aid the State DOT's when a non-recurring event either interrupts or overwhelms transportation operations. This funding allows the State to collect for repairs and allows the Department to pay the Contractor for emergency repair work, which is normally routine work covered through the EMC. The Contractor shall be able to collect labor, equipment, and repair material costs for eligible repair work during the declared disaster time period (usually no more than 48 hours) if proper documentation is provided to the Department.



The intent of the federal program is to provide aid for repairs to damaged equipment caused by a natural disaster or catastrophic failure, not repairs to equipment damaged as a result of preexisting and non-disaster related, i.e., inherent deficient conditions. In addition, the funding shall not relieve the Contractor of its maintenance responsibility simply because a storm of unusual character and extent causes serious damage.

The EMC Damage Repair Submittal form and FHWA summary submittal; the DDIR (Detailed Damage Inspection Report) must be completed within ten (10) working days of the end date of the declaration and submitted to the Engineer for approval before reimbursement is made to the Contractor.

### **Contractor Procedures for Potential Disaster Situations**

The Contractor shall follow procedures as established herein Article 4.3 Contractor Emergency Response and Article 4.4 Emergency Call-Out Policy. However, when weather situations dictate that there is the potential for a disaster situation such as major snow storm forecast or major flooding alert, the Contractor's appointed Emergency Coordinator shall contact the Engineer and provide a plan with additional staffing for electrical systems work and dispatch services.

### **Eligible Items of Repair Work for Additional Compensation**

1. All repair work must be categorized as 1) emergency repairs and 2) permanent repairs and be a minimum of \$ 5,000.00 per site:

Emergency Repairs are those repairs during and immediately following a disaster to restore essential traffic, to minimize the extent of damage, or to protect the remaining facilities. (Examples would be repair of damaged equipment from disaster weather events, not motorist caused damage, nor the removal of snow or ice on operating equipment.)

Permanent Repairs are those repairs undertaken (after emergency repairs are complete) to restore the highway to its pre-disaster condition (but completed within the declared disaster timeframe).

2. Repair or replacement of traffic control devices including traffic signal system, directional and informational signs, and railroad-highway crossing warning devices, if the damage and associated repair or replacement costs can be shown to exceed heavy maintenance\*.

“\*Heavy Maintenance” is defined by the FHWA as work to repair damage normally expected from seasonal and occasionally to unusual natural conditions or occurrences. It includes work at a site required as a direct result of a disaster that can reasonably be accommodated by a State or local road authority's maintenance, emergency, or contingency programs.

3. Work must be in the right-of-way limits of a Federal or State highway, unless local roads are included in the declaration by the Governor.

4. Only restoration work in kind is allowed, no new construction, correction of deficiencies, or improvements are acceptable.
5. Materials of an expendable nature are allowed, however, a supplier's invoice must be supplied and no tax or mark-up is allowed. A Contractor employee having knowledge that the supplies or materials have actually been incorporated into the repairs shall sign the supplier's invoice.
6. Labor and Equipment rates are acceptable as allowed herein the EMC.
7. Debris removal
8. Work necessary to minimize the extent of damage and/or to protect facilities from damage

#### **Ineligible Items of Repair Work**

1. Heavy Maintenance (see point 2 above)
2. Damage Estimate under \$ 5,000 per site  
Generally, a site is an individual location where damage has occurred. However, a site could include several adjoining locations where similar damage, related to the same cause, has occurred. As an example flooding water that runs along or crosses under a highway has caused damage at several locations within a reasonable distance of each other, so it would be acceptable to package these together as a single site. Another exception would be damage to traffic signals which has occurred at several locations on an area wide basis. Here it would be acceptable to group these locations on an area wide basis by route or jurisdiction, with the accumulated amount considered a site. But grouping damages to form a site based solely on subdivision, i.e., county or city boundaries will not be accepted
3. Snow or Ice Removal  
Snow and/or ice removal is viewed as a relatively short term event not causing physical damage to a highway
4. High wind damage, except in cases of declared storm disasters such as tornados

#### **4.5.1 Unauthorized Access or Tampering of IDOT Property**

If Contractor personnel see an unauthorized individual at a site they shall notify the EMC Dispatch Center to call for police assistance, before confronting an individual.

#### **4.5.2 Vandalism**

If the Contractor arrives on the scene of major vandalism to IDOT property, the Engineer shall be notified and shall be reported to the police. A copy of the police report shall be emailed to the Engineer and a copy scanned and stored on the FTP site with all documentation. Photos of major damage shall be taken by the Contractor and forwarded to the Engineer within 24 hours. Following incidents of tampering, vandalism, or theft, the Contractor shall notify the local police agency so they may more frequently monitor the area.

**4.5.3 Intrusion at Facilities and/or Theft of IDOT Property**

If an entry alarm is received, the EMC Dispatch Center shall dispatch a Patrolman to the scene. If a break-in is confirmed, the Patrolman shall notify the IDOT ComCenter who shall dispatch Police to the area, and notify the Engineer. The Patrolman shall wait for the IDOT representative to arrive on the scene and make thorough inspection of the facility to ascertain if anything is missing or damaged, before the Patrolman files an official police theft report.

The Patrolman shall take photos of the damage and relay all information to the EMC Dispatch Center so a Ticket may be created. The EMC Dispatch Center shall obtain a copy of the official police report. Copies of the patrolman's photos and the police report shall be submitted to the Engineer as soon as possible.

When damage or loss of system equipment is the result of extensive theft activity which affects continuity of service, the Engineer may authorize non-routine maintenance payment of all or a portion of the permanent repair work, using contract pay items wherever applicable. The potential for the permanent work authorization, however, shall in no way relieve the Contractor from the responsibility to promptly respond and perform repairs.

**4.6 LOCATING CABLE OR OTHER COMPONENTS OF IDOT SYSTEMS**

To prevent damage and facilitate work by others, the Contractor shall promptly respond to Department or 3<sup>rd</sup> party calls requesting a locate of state owned electrical systems, cables or components at all locations and/or facilities. The Contractor shall enter all required data for cable locates in the proper fields in the EMCMS screens and shall have all fields completed accurately and timely. The table below provides historical data of cable locate requests that have been performed.

As of May 1, 2018:	1137
2017:	3888
2016:	3792
2015:	3796
2014:	3465
2013:	2814

For each request for a cable locate, the Contractor shall give out a Cable Locate Ticket Number to Construction contractor(s), IDOT permit contractor and IDOT approved agencies, municipalities, utilities etc. The Contractor shall obtain the requestor's email address and shall notify them if there are questions about the Locate, and email the requestor if a change in the scheduled Locate Date is necessary. The Contractor shall use the LEM to report Labor, equipment and material used to perform the work and shall fill out all the fields in the cable locate form on the EMCMS.

The Contractor is required to perform a locate of state owned underground cables or any other components, one time for each system location, per project or contract, as requested by the general contractor of the construction project, before or after the transfer of maintenance responsibilities. Each request may involve multiple locations where separated electrical systems are involved. Markings shall be given with a horizontal tolerance of one foot to either side.

There are three (3) conduit duct banks located along I-355 and I-290 from Army Trail Road to I-90 and include one (1) empty conduit, one (1) conduit containing Department fibers, and one (1) conduit containing Department copper cable. The Illinois Tollway fibers will be installed into empty conduit between Army Trail Road and I-90.

The Department's fiber and copper duct package has been relocated from the median to the easterly side of I-290 ROW, and all fiber optic cable locates in the area will be performed jointly by the Contractor and the Illinois Tollway fiber maintenance teams. Future permits for work in the Department ROW shall require the permit holder to coordinate the fiber optic utility locates with both the Department and the Illinois Tollway. The Illinois Tollway's Fiber Optic Maintenance and Management Vendor will participate in J.U.L.I.E. for locates on the Department's right of way. Refer also to Article 9.10.4.

#### **4.7 PROVIDING SYSTEM SERVICES**

Upon request of the Engineer, the Contractor is required to provide trained personnel for the following miscellaneous routine maintenance work:

- Provide system access to utility workers or inspectors approved by the Department
- Provide system access for other contractors and consultants who have IDOT approved contracts to work on IDOT equipment
- Conduct an immediate System or component inspection upon notice of the Engineer
- Provide labor, transportation, and equipment, to assist IDOT inspectors in their inspection of any portion of a System(s)
- Provide additional special patrols, inspections, and tests to confirm proper system equipment operation
- Collect information to analyze the nature of repetitious or intermittent system malfunctions
- Travel to a designated location/installation to determine ownership, take photos of the requested area, and email photos and information back to the Department (response required within four (4) hours of request, unless directed otherwise).
- Travel to any system designated location/installation and take GPS coordinates reading per specifications as listed in Article 4.17.7
- Travel to the site of a hazmat spill to oversee proper pump station operations (response required within one hour of request)
- Provide Patrolman for monitoring (stand-by time) of hazardous or emergency situations

The Contractor shall enter Service Request Tickets (SR) in the EMCMS for each request.

#### **4.8 GENERAL MAINTENANCE WORK**

All maintenance activities, equipment repairs and/or replacements and all associated work as found necessary for the proper maintenance of the systems as described herein shall be considered as part of routine maintenance, except as otherwise noted. When the Contractor performs routine or non-routine maintenance work the moving lane closures shall be paid through routine maintenance bid items. All equipment shall be maintained in accordance with manufacturer specifications and recommendations.

Routine maintenance equipment service schedules and work shall be executed in accordance with equipment operations and maintenance (O & M) manuals unless otherwise stated herein.

Permanent repairs shall be started promptly following emergency temporary repairs, and shall be continued insofar as possible without interruption, until completion. If a permanent repair delay is due to "parts on order", the Contractor shall furnish the corresponding material requisition and purchase order for those parts or components of the system required to complete the repair.

The Department retains ownership of all damaged equipment until a scrap transfer Disposition Log is signed by the IDOT Inspector. (Refer to Article 3.6.5.9.)

All graffiti, including advertising decals, found on system equipment and or structures and buildings shall be removed within one (1) working day. Painting over the graffiti is not allowed.

Following repair work, the associated area restoration shall be equal to or better than the original area condition. For example, if the soil/sod has been disturbed during the course of his work, the Contractor shall re-grade the surface work area with black dirt, placing seed or sod.

At the request of the Engineer, the Contractor shall perform maintenance on equipment not State maintained at contract unit prices, or if approved by the Engineer, at an agreed price.

At the Engineer's request the Contractor shall inspect, investigate and provide a preliminary sketch and layout with measurements, dimensions and connections of equipment, components and material for work to be performed under routine and/or non-routine maintenance. The sketch shall be provided within five days of the Engineers request.

Maintenance of Department owned equipment, devices, systems and appurtenances at maintained locations shall be covered under routine maintenance unless specifically stated otherwise herein.

Most items of general maintenance work require EMCMS documentation on tickets. The Engineer retains the right to specify the format, layout and exact details of any documentation requirements and to have deficient reports corrected and resubmitted.

Preventive Maintenance programs, as required herein, require Contractor System Managers to assign tasks to crews and various individuals, and insure the monthly requirements are met and documented on the FTP site. Problems found on PM programs shall have Tickets created on the EMCMS and reported as specified herein.

#### **4.9 REPAIR OF DAMAGED OR MALFUNCTIONING SYSTEM EQUIPMENT**

##### **4.9.1 General Requirements**

The Contractor is required, under routine maintenance, to clear sites for safety, provide immediate corrective action, provide immediate temporary repairs, provide timely permanent repairs, and replace where necessary new parts or equipment for all state maintained system equipment found damaged or malfunctioning for any reason, regardless of the type of damage or who caused the damage, unless otherwise directed by the Engineer. Examples of damage include vehicular caused damage, third party damage, vandalism, natural causes, or incidental damage on or affecting system equipment as caused by the failure or the fault of utility company equipment.

Permanent repairs are also paid through routine maintenance, unless specified elsewhere herein, and shall be completed within seven (7) calendar days, or as specified in system articles herein. All responses and work on system equipment must be documented on an EMCMS Ticket.

Damaged equipment parts and materials shall be replaced with new equipment, previously approved by the Engineer, in equal quantities, which shall be identical to the original elements except as otherwise specified herein, or permitted by the Engineer. When an item cannot be replaced in kind, the Contractor shall provide components equal or better than the failed devices or equipment for repairs or replacement work. The Engineer shall approve all Catalog cuts and replacement material which is different from the original installation.

Materials, repair methods and/or equipment replacements shall be suitable for the intended use per Specifications and Standards, and as listed in contract requirements herein. In some cases, failed equipment under warranty will need to be shipped back to the manufacturer.

The Contractor shall provide new components equal or better than any failed devices or equipment for repairs or replacement work. The Contractor shall submit all orders in the monthly routine work submittal on the FTP site

All expressway and arterial lane closures services or traffic control equipment, manpower and devices required for the response and repair of damaged system equipment is routine maintenance work and shall be in conformance with existing Departmental standards governing lane closures. (Review Article 3.12 for Traffic Control information.)

Whenever the Contractor replaces, installs, or modifies equipment or material under this Contract through routine or non-routine maintenance work the moving lane closures shall be paid through routine maintenance bid items.

The Contractor shall modify or red line record drawing(s) to reflect all changes and shall be transmitted monthly in the routine work submittal on FTP site.

#### **4.9.2 Repairs to Equipment Damaged by Department Personnel**

The Contractor shall abide by requirements of Article 4.9.1, however, when damage to system equipment has been caused by Department personnel in the performance of their assigned duties, the Contractor shall receive payment for temporary and permanent repair work necessary through non-routine maintenance where unit price items are applicable.

Upon finding damage to state property caused by IDOT personnel, the Contractor shall take a date stamped, digital photo of the damage and email to the Engineer or designated IDOT inspector.

Within twenty-four hours of the found damage, the Contractor shall contact the Engineer to establish a mutually agreed date for a field inspection to ascertain the materials and/or parts necessary for the repair. The Department reserves the right to furnish any or all of the materials or parts for any non-routine work. Materials or parts furnished by the Department may be from the Department's contract spare parts inventory or from other sources available to the Department.

The Contractor shall transmit to the Engineer the list of applicable pay items and quantities to be used so an authorization letter can be issued. Repairs shall be completed within seven (7) days, or as specified in system articles herein.

#### **4.9.3 Damage Caused by Construction (3<sup>RD</sup> Party Damage)**

The Contractor shall abide by the requirements of Article 4.9.1 specified herein for repairs to system equipment at locations maintained under routine maintenance, which has been damaged by a 3<sup>rd</sup> party. Examples of third parties include contractors working under contract with IDOT, contractors working on a construction project under permit issued by the District's Traffic Permits Section or the District's Design Utility Section, or municipal and county agency workers and their contractors. Temporary repairs to make the equipment operational and safe for motoring public shall be immediately completed as specified in system articles herein.

The Contractor is allowed to invoice the offending third party for clearing the site for safety and providing immediate corrective action and temporary repairs to system equipment. The Contractor may complete the permanent repairs if the offending 3<sup>rd</sup> party agrees in writing or the offending 3<sup>rd</sup> party does not respond to certified letters sent by the Contractor (see below procedures). It is the Contractors responsibility to locate the offending party.

The Contractor shall assign the duties of corresponding with 3<sup>rd</sup> Parties to one individual and this individual shall be the sole point of contact for all 3<sup>rd</sup> Party billing documentation.

##### **3<sup>rd</sup> Party Damage Repair Documentation**

Upon finding 3<sup>rd</sup> party damage to state property (not caused by Department personnel), the first Contractor patrolman responding to the scene shall obtain the following information for the Ticket:

- A date stamped, digital photo of the damage
- The name of the contractor at the scene, address, contract, or permit number and contact name and phone numbers

The Contractor assigned individual shall immediately initiate communications, by certified mail to the offending 3<sup>rd</sup> party/contractor (and email copies to the IDOT Engineer, Construction Resident Engineer or Permit Engineer). Attached shall be copies of photos showing the extent of the damage to state property, a full explanation of the damage, and an estimate of temporary repairs which will be completed by the Contractor. The letter will also state that an estimate of the cost of permanent repairs will follow, but that it will be the offending parties' choice as to whether the EMC or a contractor selected by the offending party will complete the permanent repairs, to the standards of the State of Illinois, and within the next thirty (30) days. The Contractor shall ask for a written response from the offending party within ten (10) days as to the choice of contractor for the permanent repairs.

Upon completion of the temporary repairs, and ten (10) days after the date of the 3<sup>rd</sup> party damage, the Contractor shall send a 2<sup>nd</sup> letter by certified mail to the offending 3<sup>rd</sup> party with the invoice for the temporary repairs and the cost estimate for the permanent repairs (with email copies to the Construction Resident Engineer or Permit Engineer). The Contractor shall state that if the permanent repairs are not completed within thirty days from the date of the 2<sup>nd</sup> letter that the Contractor (EMC) will complete the permanent repairs and the offending party shall be billed.

If there is a timely response from the offending party the Contractor shall email the response to the Construction Resident Engineer or Permit Engineer. The Contractor shall work with offending party as to the resolution of the permanent repairs. It is the Contractor's responsibility to assure that the 3<sup>rd</sup> party contractor adheres by the Electrical Maintenance Contract requirements specified herein. The Contractor shall inspect the equipment and its operation prior to final acceptance.

If thirty days have passed and there is no response from the offending party the Contractor shall email the Engineer the complete packet of information regarding the 3<sup>rd</sup> party damage and Contractor work to date, including the date of the scheduled permanent repairs and their estimated cost. The Engineer will confirm if the Contractor should complete the permanent repairs. The Contractor shall not send the 3<sup>rd</sup> party an invoice for permanent repairs to IDOT without the Engineer's approval.

After receiving Engineer approval and the Contractor has completed the permanent repairs the 3<sup>rd</sup> certified letter shall be sent to the offending party with the invoice and entire amount due the Contractor (with email copies to the Construction Resident Engineer or Permit Engineer). All invoices shall provide a brief description of the cause of the damage and the repairs made, identifying the location by the EMCMS location number, route, county, city or village, and any applicable Ticket numbers.

#### **Unpaid Work by 3<sup>rd</sup> Party**

If the Contractor has identified the offending party and sent three (3) certified mail letters to the offending 3<sup>rd</sup> party and the offending 3<sup>rd</sup> party either does not admit to the damage or is not willing to pay for the repairs, The Contractor shall provide proof of the correspondence and documentation as sent to the 3<sup>rd</sup> party offender as specified in this article and submit to the Engineer. The Engineer shall review the submittal for Contractor compliance and if all requirements have been followed as stated herein, the Contractor shall receive payment for temporary and permanent repair work necessary through non-routine maintenance pay items where unit price items are applicable.



### **3<sup>rd</sup> Party Damage Repair Summary Report**

The Contractor shall transmit monthly, in the routine work submittal on FTP site, an Excel spreadsheet which provides all details regarding 3<sup>rd</sup> Party work and billing. The form will be provided at the Pre-construction meeting. The fields include; date of damage, offending party name, notification date of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> certified mail letters, temporary repair date, cost of temporary repairs, date of reply received, name of contractor for permanent repairs, permanent repair date, permanent repair costs, and date of payment to the Contractor.

#### **4.9.4 Work Request Made by 3<sup>rd</sup> Party**

The Contractor shall create an EMCMS Private Work Request (WR) ticket for third parties requesting legally permitted work within the IDOT right of way which is not related to the repair of system equipment damage, but for which the Contractor will receive direct payment from a third party. An example of a work request would be the relocation of a light pole for a developer. The Contractor shall obtain Engineer approval prior to the start of work.

#### **4.9.5 Damage Caused by Motorists**

The Contractor shall abide by routine maintenance damage repair requirements of Article 4.9.1 herein for temporary and permanent repairs. Most materials, equipment and labor for repairs are furnished by the Contractor and paid through routine maintenance. The Contractor may not use Department owned, contract spare parts for motorist caused damage repairs for the Traffic Signal or Lighting Systems, however, refer to Article 9.24 for items furnished by the Department for Surveillance System REVLAC and RACS damage repairs. Motorist caused damage repair work is paid through routine maintenance and the Contractor is not allowed to collect repair costs from motorists or insurance companies.

#### **Expressway Sand Barrels**

When the Contractor finds motorist caused damage to expressway ramp gate sand barrels the Contractor shall create a (DA) Damage Ticket, and the IDOT ComCenter shall be immediately notified. The ComCenter will in turn notify the IDOT District One Bureau of Maintenance personnel who will replace the barrels and sand.

#### **MCHD Ticket Documentation**

Upon notification of motorist caused highway damage (MCHD) to state property, the Contractor creates a Ticket and immediately dispatches a Patrolman. In some cases the property damage is FOP, (found on Patrol). A Ticket is created for both situations and the Ticket type shall be "MC" for Motorist Caused Damage.

The Contractor Dispatcher shall ask the initial caller for all information applicable for the Ticket. Especially important is the recording of the name of the citizen, Patrolman call #, or agency calling in the report, their telephone number, the police accident report number, the location reported and the pole, quad, unit number damaged. If the accident report number is not available at the time of the initial notification, the Dispatcher shall follow-up later, obtain the accident report number, and enter into the Ticket. If the damage is due to a "hit and run" incident, the Dispatcher shall enter HR in the Police Report # field. For Response requirements review Article 4.17.4.

**Photo Documentation of Motorist Caused Damage**

Upon arrival at the location of the motorist caused property damage the dispatched Patrolman or other Contractor personnel shall take a minimum of 3 digital photos of the overall damage; one for the damage with the street area showing, and two of the damaged equipment. Photos of repair work are not acceptable, only the damage to state property. Also close-up photos of pole or cabinet decals are not acceptable.

Clear, concise photos are required regardless of the hour of day or night, so the camera or camera phone used by the Contractor personnel shall be of good quality; a minimum of 8 megapixel, have excellent flash capability, and have email capability to send jpg photos of approximately 15KB to 30KB each to the Engineer. In addition, the Patrolman shall use a spotlight of 1,000,000 foot candle power during the night hours to illuminate the area for the photos. The Patrolman should check the photos for their clarity before leaving the site of the damage.

Missing photos and photos which do not show the damaged equipment as specified herein from any reason whatsoever shall have liquidated damages deducted from the monthly routine maintenance payment. The Engineer will approve the format, specific size, and conveyance of the photos when the Contractor's camera phone is selected.

The Contractor shall assign one person to have the responsibility to coordinate the photo receipt from the Patrolmen or other Contractor personnel to the Contractor files. This individual shall be responsible to assure that the photos are in compliance to contract requirements, compile all MC ticket photos by the month, and load in the FTP site with the Ticket # and IDOT Claim # as provided by the Department.

The digital photos shall be retained by the Contractor for the contract duration since the process for matching police accident reports to the Tickets can be a lengthy process. When requested by the Engineer, the Contractor may need to re-email photos from past months Tickets due to insurance company requests or other claims.

**MCHD Ticket Submittal Information**

The Contractor shall furnish all employee labor rates by classification for entry in the EMCMS. Changes to employee union classifications shall be submitted to the Department as they occur throughout the Contract.

The Contractor shall provide the applicable Blue Book Equipment Rental Rate sheet for each item of equipment to be used for contract repairs as of January 1<sup>st</sup> and July 1<sup>st</sup> of each year. No cost updates at other times during the year will be allowed. The list of equipment shall be submitted on an Excel spreadsheet with an assigned EMCMS vehicle code, model, year, and description of the item of equipment.

The Contractor shall submit a vendor invoice for each material item projected to be used for MCHD repairs by December 14, 2018 for year 2019. MCHD material costs may be re-submitted by December 14<sup>th</sup> in 2020 and 2021. No MCHD cost updates at other times during the year will be allowed. The list of materials shall be submitted on an Excel spreadsheet with an assigned code, name, and cost for each item.

The costs for labor, equipment, and materials (LEM) will be entered into the EMCMS by Department personnel so Contractor personnel can create MC Tickets, and provide proper information for the LEM screen and MCHD screen entries.

#### **MCHD Ticket Repair Package Submittal**

A Claim # shall be assigned to each MC Ticket to be processed by the IDOT Claims Department. These Claim numbers shall be furnished to the Contractor at various times during each month of the contract for the Contractor to provide motorist caused damage repair statements/invoices from the MC Tickets on the EMCMS. Any repair statement/invoice over \$ 5,000 requires submittal of the vendor material invoice. The System Manager or Working Foreman shall review each statement/invoice and applicable photos and sign his/her approval.

Within seven to ten days (depending upon number of statements/invoices requested by the Department) the Contractor shall provide a file folder labeled with each Claim # and it shall include the original signed and approved repair statement/invoice and two (2) copies. A flash drive containing the Claim # labeled applicable photos will also be submitted to the Department with the statements/invoices. These statements/invoices and photos are sent to insurance companies by the IDOT Claims Department. An example of the statement/invoice, as printed on the EMCMS, shall be furnished at the pre-construction meeting.

Even after the termination of a Contract year, the Contractor will be required to furnish MCHD Statements/Invoices for all Motorist Caused Damage (MC) Tickets which had repairs completed in the prior contract year, but a Claim # had not been assigned and therefore the documentation is still owed to the IDOT Claims Department.

Occasionally the Contractor may also be required to furnish to the Department information and/or letters for insurance company claim requests, such as additional information regarding labor or repair costs, cat cuts of repair items, material purchase orders, etc. This information shall be provided within one week of the Engineer request.

In cases where the Contractor would receive an accidental reimbursement from an insurance company, the check shall not be cashed, but returned to the insurance company. The insurance companies must pay IDOT directly.

Once or twice per year upon Engineer request the Contractor shall furnish plain No. 10 envelopes (9 1/2" x 4 1/8") self-sealing envelopes, (approximately 500 per year), ten (10) Brother TC-20 labeling tapes, and several boxes of manila file folders, inter-office memo folders, and expandable file folders for files and mailings to insurance companies.

#### **Claims Processing**

Prior to the monthly Pay Meeting the Contractor shall be provided with a list of MC Tickets processed by the IDOT Claims Department in the past month. The Contractor shall provide the Department an MCHD Summary Statement/Invoice of these processed claims, with the date of accident, Ticket #, Claim #, and repair cost on letter head, signed by the Project Manager.

As an accounting procedure, the dollar amount of the MCHD Summary Statement/Invoice shall be deducted from the District 1 EMC monthly routine work maintenance payment to the Contractor and shall be forwarded to IDOT Springfield and the Contractor shall be paid that amount from the State of Illinois Motorist Caused Highway Damage Fund.

**Special Payment for Damage Repairs**

Motorist caused damage repair work is paid through routine maintenance and the Contractor is not allowed to collect repair costs from motorists or insurance companies. In special situations where repair and/or replacement costs exceed \$ 25,000.00, for such incidents of wide-spread damage, and/or costly damage, including hazmat situations, the Department may make a special payment to the Contractor if:

- A. The Contractor provides the Engineer documentation that an item of state property has been damaged and the repair and/or replacement costs exceed \$ 25,000.00 by submitting:
    - Material purchase documentation (provide vendor invoice)
    - Labor repair costs per day, per job classification (General Billing Logs)
    - Equipment charges
    - List of Contract Spare Parts, if provided for Contractor use
    - Minimum of five (5) photos of the damaged equipment
    - Contractor notarized Invoice with detailed line item costs
- and
- B. The IDOT Claims Department obtains MCHD repair cost reimbursement.

To arrive at the special payment amount to the Contractor:

- 1. Start with the total dollar amount of the repair and/or replacement costs collected by the IDOT Claims Department (which may not equal the total dollar amount of the Contractor's repair invoice)
- 2. Subtract (from point 1):
  - \$ 25,000.00 (base)
  - Total dollar amount of any allowed non-routine authorized work, (for damage to light towers refer to Article 7.0 or damage to the fiber optic network refer to Article 6.0) as stated herein and paid by the Department
  - Total dollar amount of any credit for Contract spare parts usage
- 3. Dollar amount remaining shall be paid to the Contractor

## **4.10 PATROL INSPECTIONS**

### **4.10.1 Patrol of Systems**

Routine work requirements of this Contract require patrol inspections of systems. Refer to system articles herein for specific system requirements and patrolmen duties. The Contractor shall strictly adhere to the approved routes and schedules as entered in the Fleet Management system. The patrolling of a new location accepted for maintenance shall be instituted immediately.

The Contractor shall submit proposed system patrol routes, for Engineer approval, at the Pre-Construction Meeting. Proposed system patrol routes shall be submitted on an Excel spreadsheet with columns for Patrolman's number, Name, FOB number, Vehicle number, system, Location number, Main Route, Cross St., Cabinet number, State maintained (Yes/No), EMC maintenance status (ON, OFF, or Partial), Route Name, week and day and stop. The submittal shall show any Patrol stops which the Contractor performs for any other agency or municipality, if on the same day as an IDOT patrol.

Once approved by the Engineer, all patrol routes and identified patrolmen and vehicles shall be entered in the Fleet Management software program by December 14, 2018 and in the EMCMS by January 1, 2019. The Contractor is responsible for accurate patrol reporting. If there are any changes in patrol routes or assigned patrolmen the Engineer shall be provided an Excel spreadsheet report highlighting the changes at the monthly Pay meeting. The Excel spreadsheet with the new routes and/or patrolmen shall be transmitted monthly in the routine work submittal on the FTP site. The Fleet management software and EMCMS shall always be kept up to date with vehicle assignment and patrolmen identification.

During the Contract year Patrolmen may be requested to provide additional information regarding the equipment at their patrol route stops. Examples of work would be collection of GPS data, count of combo lighting, determination of equipment manufacturer or model, listing of red light running camera locations etc.

The Patrolmen responding to emergency calls shall be stationed so that their travel time to arrive at any designated point of trouble shall not exceed one hour during normal weather, 24/7. Response times for specific situations are located in system articles herein. All incidents of malfunctioning equipment or damaged shall have Tickets created, even if the repair was performed on patrol.

The EMCMS entry documentation for Patrol routes shall be completed by January 1, 2019.

### **4.10.2 Night Outage Patrol Survey**

The Contractor shall perform a night-time patrol of the Lighting system; highway lighting, sign illumination, navigational lighting, traffic signal locations with combination traffic signals and overhead lighting, and the Surveillance system dynamic message signs and tower beacons to assure safe, operational conditions of equipment and materials, and to assure that all installations are performing at the level of service for which they are designed. The patrol survey shall include installations for which maintenance responsibility has been temporarily transferred to a construction contractor or other third party. The Contractor shall follow all procedures for Patrol Routes as specified in Article 4.10.1.

In addition the Contractor shall conduct a special monthly inspection of the obstruction light mounted on top of light pole "HH26" on I/B I 290 @ Western Ave., Location L1335, Cabinet "H". The power for the obstruction light is fed from Surveillance Cabinet "G10".

Night outage patrols shall be arranged to inspect an approximate equal number of locations, during the first three full weeks of the month, (four or five nights per week). The proposed patrol outage survey shall be presented to the Engineer, for his approval, at the Pre-Construction meeting. The Contractor shall not deviate from the schedule, unless approved in advance by the Engineer.

At the request of the Engineer the Contractor shall provide the transportation for a joint inspection of the lighting system during the night time patrol. The joint inspection shall be performed a minimum twice per year as directed by the Engineer.

The patrolman shall be provided a hand free voice activated tape recorder to record each outage found, by noting the unit number (or cabinet designation and the pole or sign's proximity to a cross-street or road). Each night the patrolman shall record his name, call number, route week, day and date and odometer reading at the beginning and end of the patrol outage survey. The patrolman shall also call the EMC Dispatch Center to create a ticket when multiple outages or tower outages, other malfunctions or damage are noted.

The Contractor shall email the Engineer an Excel spreadsheet report of the previous night's outage survey by 12 noon every workday, following a night time patrol. The listing shall include location numbers and names, unit numbers of outages, and ticket numbers of any special problems found. The report shall be divided in separate categories, by county, for:

- Highway lighting outages
- Sign lighting outages
- Navigation lighting outages
- Dynamic Message Signs
- Beacon lights on radio towers and base stations
- Other outages
- Off-maintenance location outages

This information shall also be loaded on the FTP site.

#### **24 Hour Outage Repairs**

Outage repairs for the tower beacon lights on towers, base stations, state police facilities, or the obstruction light on light pole HH26 on I/B I 290 @ Western Ave., Location L1335, Cabinet "H", shall be conducted within twenty-four (24) hours of notification or discovery. It is expected that a sub-contractor will be employed to do this relamping. This work as specified herein is paid through non-routine maintenance pay item GRB1, which shall be payment in full for all required materials, labor and equipment. The Contractor shall track on a spreadsheet cumulative contract year data of the relamping date of each tower, and each beacon light on a light tower. The spreadsheet shall be transmitted in the monthly routine work submittal on the FTP site.

### **7 Day Outage Repairs**

Unless specified in system articles herein, the Contractor has one week, seven (7) calendar days to repair normal outages found on the nightly outage survey. The Contractor shall repair all outages found, both those found on the patrol and those found when the cabinet is energized. In some cases this may substantially increase the number of outage repairs on a particular date. For those outages that require special lane closures, special parts, etc., the Contractor shall create a ticket and obtain Engineer's approval of any repair delay.

### **Documentation**

The Department shall furnish the Contractor the form for the daily, and summarized weekly and final outage repair reports at the Pre-Construction Meeting. The submittal shall show county, location, and category of work performed including:

- Number of patrol survey outages found and repaired by category
- Number of repair crew outages found and repaired
- Equipment repairs made by work crew (ballast change, lamp, etc.)
- Ticket numbers for locations where repair work was not completed

Each weekly repair report shall be emailed to the Engineer within 7 days of the completion of the weekly night survey and the final report shall be received by the end of the first week of the following month. A hard copy of the weekly and final reports for each system shall be signed by the supervisor for the crew performing the outage repairs, stating that the repair quantity is correct and that the relamp was completed in accordance with contract specifications, and shall be transmitted in the monthly routine work submittal on the FTP site.

In addition to the summarized weekly and monthly outage reports the Contractor shall provide a Repeat Outage Report, an Excel spreadsheet and/or EMCMS report, a monthly and cumulative listing by database location number, location address (main route and cross street), cabinet number, and pole/unit number; which has experienced a repeated outage during the Contract year on the FTP site.

Due to the detailed and extensive reporting required for the Repeat Outage Report it is suggested that the Contractor use the EMCMS to develop a form for his outage reporting. No additional payment will be provided to the Contractor for the EMCMS program development or reporting. The Repeat Outage Report shall be transmitted monthly to the Engineer in the routine work submittal.

#### **4.10.3 Jet Blast Cleaning**

When Patrolmen find, or are informed of locations where paint, corrosion, grime, and remnants of rodent/insect infestations are not easily removed by hand or with common cleaners, a ticket shall be created. The Contractor shall clean this equipment with a dry ice blasting machine equal to or better than the Cold Jet SDI Select 60 with cold jet accessories (hoses, applicators, nozzles, and cables). For most situations an after cooler will be needed if a diesel air compressor is used. The after cooler shall be equal to or exceed Cold Jet aftercooler 2M0023-G1 equipped with all the necessary accessories to operate in conjunction with a Cold Jet SDI Select 60 machine or equivalent.

Applications include Pump Stations, REVLAC buildings, communication shelters, control cabinets, light towers, transmission cabinets, switch gears, printed circuit boards, display modules, etc.

The dry ice blasting machine shall use dry ice blocks or pellet media. It can clean from as low as 50 PSI up to 250 PSI and shall include an internal pressure regulator. For proper use of the unit it shall come equipped with blast hoses rated up to 300 PSI, applicator with light, 1" blast swath, clamp style nozzle handle, hose management system, static bond cable, after cooler (if using diesel air compressor), air hose, fittings, variable fragmenting MERN nozzle, 3" medium flow blast swath, and accessories. The unit shall be gentle enough to remove dirt and corrosion from a printed circuit board and not harm cabinet terminals or wiring but aggressive enough to remove paint from a brick wall without damaging the bricks or mortar.

#### **4.11 COORDINATION WITH ELECTRICAL UTILITY COMPANIES, CONTRACTORS AND OTHERS**

The Contractor shall keep incoming power service in proper condition at all times. The Engineer shall be promptly notified by email for cases such as the planned disruption of service power to System equipment.

The Contractor shall monitor the condition of electric service wiring and equipment, telephone service wiring and equipment, natural gas service lines and accessories and water service piping and appurtenances for all systems and facilities maintained under this contract. The Contractor shall maintain contacts with the respective utilities or providers for these services and shall coordinate with the utility and the Department to assure that services are installed in a timely manner, in compliance with requirements established for the service.

The Contractor shall fully coordinate access as required for utility company or contractor inspection, modification work as applicable, repair work as necessary and other matters as necessary to assure continuity of services and proper revisions when needed.

The Engineer may require the Contractor to inspect related non-system equipment, such as Com Ed power lines, that may interfere with the functioning and/or maintenance of systems as covered in the contract.

The Contractor shall assist the Engineer with the inspection of work completed by others such as the construction and/or replacement of intermittent median walls by a construction contractor (the non-EMC) and the necessary inspection of the required electrical ducts by the Contractor.



#### **4.12 TRANSFER OF MAINTENANCE RESPONSIBILITY**

##### **General Responsibilities**

The Contractor shall cooperate with the Engineer and Construction Contractor(s) with respect to transfers of maintenance on system elements and inspection of completed construction work for Department acceptance. The Contractor shall provide the technical expertise to assist the Electrical Maintenance Engineer and/or IDOT Construction Engineer/Inspectors to make equipment inspections of installations to be added or removed from routine maintenance to ascertain that the equipment and/or workmanship is in proper working order and verify equipment inventory quantities. The Engineer may request the Contractor provide new locks for system equipment at the maintenance transfer meeting. The Contractor representative shall call in a maintenance transfer ticket (MT) when transfer is scheduled and approved and shall provide the dispatchers with information required on the EMCMS.

There will be official transfer inspection site meetings in the field. The Contractor shall attend these official joint transfer site meetings and shall fill out and sign any required maintenance transfer forms or equipment inventory forms and immediately report transfer information to the EMC Dispatch Center. The Contractor shall provide the Engineer, a minimum of 24-hours in advance of the maintenance transfer meeting, the names of the Contract personnel who shall be attending the meeting.

When construction activity is complete the Contractor has the responsibility to document any new items of equipment (including New ComEd Accounts, meter numbers, transformer and lock and key numbers) or the removal/installation of equipment, by system, on an Excel spreadsheet which is transmitted to the Engineer monthly in the routine work submittal on the FTP site.

##### **New or Existing Maintenance Transfer of System Location(s)**

The Contractor shall provide a qualified representative(s) to perform the inspection and transfer of each system location. The qualified representative shall inspect any new or existing Traffic signal, lighting, pump station and surveillance installation to be added to the Contract or the transfer of an existing lighting, pump station and surveillance installation of this Contract to another agency or contractor.

To perform the transfer of maintenance the Contractor representative shall:

- Assure all fiber/copper cable test results meets or exceeds the Standard Specifications for Road and Bridge Construction and manufacturer's Specifications
- Inspect and test all equipment, devices and its operation including but not limited to traffic signal, lighting system, pump station and surveillance equipment such as induction loop, CCTV, controller cabinet, circuits, wiring, controls, MCC's electrical services, backup generators, pumps and material and appurtenances insuring that it conforms to the Standard Specifications for Road and Bridge Construction and as specified herein
- Inspect and verify the controller, PLC's, switches, routers, network programs provided by Construction, Integrators, programmers and/or manufacturers to insure that it meets Department standards
- Inspect each location to determine the completion of construction punch lists as directed by the Engineer. The punch lists shall be prepared and provided by the Engineer and the Contractor shall return written verification of punch list completion or non-completion

#### **Transfer of Location Maintenance Responsibility to EMC**

The Contractor shall inspect construction work, permit work or other State of Illinois facilities for acceptance by the Department. The Contractor shall notify the Engineer with respect to the completeness, workmanship, safety and maintainability of the installation and the Engineer will make the final determination regarding acceptance. The Contractor shall take maintenance responsibility for system work accepted by the Engineer.

The Contractor shall take GPS recording of cabinets, light poles, towers, JB, splices, MH, and cameras locations and submit to the Engineer on an Excel spreadsheet as specified in Article 4.17.7 for GPS documentation. This work shall be applicable to all systems and its components.

At the time of the maintenance transfer, if the installing Contractor is providing GPS recordings (in the format as specified herein) of cabinets, light poles, towers, junction boxes, splices, manholes, and cameras, it will be acceptable to the Department, otherwise the EMC Contractor shall provide this information as specified herein.

#### **Transfer of Location Maintenance Responsibility from EMC**

The Contractor shall conduct a site meeting inspection with the third-party contractor. A corrective work list shall be prepared by the Contractor and ticket shall be entered into the EMCMS system. The Contractor shall be required to correct any outstanding deficiencies though routine maintenance as approved by the Engineer.

The Contractor shall perform a physical inspection while video recording all equipment in detail, to document its condition. The video recording shall show the existing condition of light poles, towers, foundations, luminaire operation, cabinets and electrical components, wiring and conduits wherever applicable, including but not limited to junction boxes, mounting brackets, lowering devices etc. and shall test all equipment and its operation. The tests shall include Megger testing, continuity testing, voltage, current draw of each circuit, ground resistance, neutral current etc. This work shall be applicable to all systems and its components.

The Engineer shall determine which electrical systems are videotaped at transfers. Traffic Signal transfers area not normally video-taped. On the day of the official transfer the Contractor shall provide a record of the corrective work list and repairs and test results on flash drives and the video recording on DVD's and deliver to:

- IDOT Engineer
- Third party contractor(s)
- Construction R.E.

#### **4.13 EMCMS MAINTENANCE TRANSFER DOCUMENTATION**

Immediately upon acceptance of routine maintenance responsibilities or transfer of maintenance responsibilities to another entity, the Contractor representative shall notify the EMC Dispatch Center so an EMCMS Maintenance Ticket and EMCMS Location Locate screen can be updated. A copy of the EMCMS entry screens with the required fields will be provided at the Pre-bid Meeting.

By noon on each applicable work day the EMC Dispatch Center staff shall email a copy of the prior day's Maintenance Transfer Locations/Location Locate screen report to the Engineer, System Managers, and assigned IDOT Inspectors.

Note the Department is responsible to enter any new state maintained locations not previously entered in the EMCMS.

If errors are found in any EMCMS entry, it is the responsibility of the Contractor to immediately notify the Engineer by email with specific details. Correct data in the EMCMS Location Locate screen is the responsibility of the Contractor.

#### **4.14 MATERIAL AND EQUIPMENT**

##### **4.14.1 Use of Approved Materials**

The Contractor shall clearly understand that no equipment or material shall be installed prior to approval by the Engineer and that any equipment or material installed without the approval of the Engineer is subject to removal from the right-of-way solely at the Contractor's expense.

If the Contractor changes the supplier of any approved materials for the contract, a new submittal for that item must be made for review and approval by the Engineer. The Contractor shall provide free access to the Bureau of Materials personnel for inspection to ensure that the approved materials are used.

The Contractor (including all supervising personnel) is expected to familiarize themselves with all requirements with respect to proper materials, methods and procedures and failure to do so will not be justifiable grounds for lack of compliance with the contract requirements.

#### **4.14.2 Submittals for Approval**

Within 60 days after contract execution, the Contractor shall submit three copies to the Engineer for approval, complete, approvable manufacturer's product data (for standard products and components) and detailed shop drawings (for fabricated equipment) of materials and project equipment (products) proposed for use on this Contract for both routine and non-routine maintenance. The Engineer may grant permission to delay certain submittals until the applicable work is authorized, but the 60-day requirement shall apply to all commonly used and general items. The Contractor shall document and track the status of the submittals on an excel spreadsheet, a copy of the spreadsheet and all approved Catalog cuts shall be available on the FTP site.

Due to the highly specialized nature of Surveillance System equipment, certain items must be manufactured by the original equipment manufacturer, unless written approval is given by the Engineer. The Engineer may waive the requirements for shop drawings for certain original-manufactured fabricated equipment as long as original shop drawings on file remain valid for the equipment. It is the Contractor's responsibility to coordinate accordingly.

Submittals need not include all project equipment and materials in one submittal; however, the submittals for the equipment and materials for each individual pay item shall be complete in every respect. The Contractor may request, in writing, permission to make a partial submittal. The Engineer will evaluate the circumstances of the request and may agree to review such a partial submittal.

Prior to submittal, the Contractor shall review the submittal material and shall affix his stamp of approval, with comments as applicable, signed by a responsible representative, to each appropriate submittal item. In the case of subcontractors' submittals, both the subcontractor and the general Contractor shall review and stamp approval of the submittal.

The receipt of submittal information from the Contractor will be construed as the Contractor's assurance that he has reviewed the submittal information and attests to the submittal's accuracy and conformance to the requirements of the contract documents. Unless otherwise indicated, manufacturer's guarantees shall be included with the submittal information.

Exceptions to and deviations from the requirements of the Contract Documents will not be allowed. It is the Contractor's responsibility to note any deviations from Contract requirements at the time of the submittal and to make any requests for deviations in writing to the Engineer. In general, substitutions will be not be acceptable. Requests for substitutions must demonstrate that the proposed substitution is superior to the material or equipment required by the Contract Documents. No exceptions, deviations, or substitutions will be permitted.

#### **4.14.3 Forms**

The Department shall furnish the multi-part IDOT submittal record and transmittal form that is required with each submittal. The Contractor and any subcontractor as applicable shall sign the submittal form. Submittal forms shall contain items for only one (1) electrical system. Forms which contain multiple systems, or submittals made without the official form, and/or incomplete forms, will be returned to the Contractor without review.

#### **4.14.4 Certification Requirements**

Where certifications are specified, the information submitted for approval shall incorporate certification information. When a certification is available prior to equipment manufacture, the certification shall be included with the submittal information. When a certification is available only after equipment manufacture, the submittal shall include a statement of intent to furnish the certification after equipment approval and manufacture. Certifications involving inspections and/or tests of equipment shall be complete with all test data, dates and times.

#### **4.14.5 Samples**

The Engineer may request from the Contractor a sample of a specific item of a submittal for review and evaluation. The sample shall remain property of the Contractor and shall be returned after the review and evaluation with comments as applicable.

#### **4.14.6 New Materials Inspection Requirements**

The Contractor shall comply with the applicable requirements of Section 106 and 1000 of the Standard Specifications for Road and Bridge Construction. No uninspected equipment/material is to be delivered to the job site. When underground materials are furnished, the Contractor shall notify the State of Illinois, Department of Transportation, Bureau of Materials personnel to provide proper inspection for the approval of the materials, prior to delivery to the job site.

#### **4.15 CONTRACTOR MATERIAL STARTING QUANTITIES**

The Contractor shall be responsible, under routine maintenance for providing spare equipment for emergency and routine service and for overhauling equipment, to meet the response and maintenance requirements as stated herein. The materials furnished by the Contractor shall be approved by the Engineer, in equal quantities, which shall be identical to the original elements except as otherwise specified herein, or permitted by the Engineer.

The Contractor and the Engineer shall meet by December 1, 2018 to agree on the minimum quantity of materials which the Contractor shall have in his possession at the start of this Contract.

Following an inventory related failure to meet the routine maintenance performance requirements of the Contract, the Engineer may direct the Contractor to maintain a minimum quantity of specific materials. The additional cost of purchasing and storing the required parts inventory shall be borne solely by the Contractor.

A shortage of any materials, parts, or equipment causing delays in the implementation of replacements of materials or repairs shall be sufficient cause to assess liquidated damages. The Contractor shall submit anticipated schedule(s) for ordered replacement items when requested by the Engineer. The Engineer may inspect the Contractor's spare parts inventory at any time as deemed necessary.

The following charts provide a suggested list of Contractor owned spare parts starting quantities of materials effective for January 1, 2019.

<b>QTY</b>	<b>LIGHTING SYSTEM – SUGGESTED STARTING QUANTITIES</b>
3	Luminaire, HPS, 230 Volt, 200 W
3	Luminaire, HPS, 230 Volt, 310 W
10	Luminaire, HPS, 230 Volt, 400 W
3	Luminaire, HPS, 240 Volt, 1000 W
10	Luminaire, LPS, 230 Volt, 55 W
2	Cabinet, 240 Volt, 200 Amp, with MOSCAD Radio
3000 ft	Wire, #4 Quadraplex
2	Aluminum Light Pole, 11.5" BC, 32 Ft, 8 x 4.5", .250 Wall
5	Aluminum Light Pole, 15.0" BC, 39 Ft, 10 x 6", .250 Wall
10	Aluminum Light Pole, 15.0" BC, 45 Ft, 10 x 6", .250 Wall
2	Aluminum Light Pole, 15.0" BC, 55 Ft, 10 x 6", .250 Wall
2	Davit Pole, 15.0" BC, 31 Ft
2	Davit Pole, 15.0" BC, 39 Ft
2	Truss Arm, 8 Ft, 4", 34" Rise
5	Truss Arm, 10 Ft, 4", 34" Rise
5	Truss Arm, 12 Ft, 4", 34" Rise
5	Truss Arm, 15 Ft, 4", 34" Rise
5	Truss Arm, 8 Ft, 6", 34" Rise
2	Truss Arm, 8 Ft, 6", 48" Rise
5	Truss Arm, 12 Ft, 6", 34" Rise
2	Truss Arm, 12 Ft, 6", 48" Rise
5	Truss Arm, 15 Ft, 6", 34" Rise
5	Truss Arm, 15 Ft, 6", 48" Rise
2	Truss Arm, 15 Ft, 6", 72" Rise
2	Davit Arm, Twin, 8 Ft
2	Davit Arm, 8 Ft
5	T-Base, 13-15" Top, 15-17" Bottom
5	T-Base, 11.5" Top, 15" Bottom
5	T-Base, 11.5" Top, 11.5" Bottom
5	T-Base, 15" Top, 15" Bottom
25	Fiberglass Shroud, 15.0"
5	Fiberglass Shroud, 15.0"
25	Aluminum Skirt, 11.5"
25	Aluminum Skirt, 15.0"

<b>QTY</b>	<b>PUMP STATION SYSTEM – SUGGESTED STARTING QUANTITIES</b>
6	AEGIS EPROM Chips
3	Pump, 4" to de-water the PS, 480/240 volts
1	Pump, 3" to de-water the PS, 480/240 volts
3	Compressors (gas)
3	Solenoids
1	Power Supply, 12 V
6	Relays, 120 V
6	Relays, 12 V
2	Level Transducers

<b>QTY</b>	<b>SURVEILLANCE SYSTEM – SUGGESTED STARTING QUANTITIES</b>
5	Traffic Signal Bases
10	Traffic Signal Posts of Various Sizes
20	Signal Head, 8" Section
10	Signal Head, LED 8" Section
3	Wood Posts for Flasher, 6" x 6" x 10 Ft

<b>QTY</b>	<b>TRAFFIC SIGNAL SYSTEM – SUGGESTED STARTING QUANTITIES</b>
5	Cabinets and Econolite Controller Assemblies, TS-2, Type 1, 16 Phase
2	Cabinets and Eagle/Siemens Controller Assemblies, TS 2, Type 1, 16 Phase
10	Controllers, TS 2, Type 1
2	Econolite Master Controllers
2	Eagle/Siemens Master Controllers
10	Mast Arm Pole Assemblies of Various Lengths with Foundation Bolts
3	Electrical Service Disconnects
15	Conflict Monitors and Malfunction Management Units (MMUs)
40	Detector Amplifiers – Rack and Shelf
10	BIU's
50	Traffic Signal Posts of Various Sizes
30	Signal Heads, 12-inch, with LED Modules of various numbers of sections
20	Signal Head Mounting Hardware – Mast Arm Mounted
50	Signal Head Mounting Hardware – Post Mounted
2	Controller and Cabinet Assemblies with Railroad Security Software (one each Econolite and Eagle/Siemens), TS 2, Type 1 or Type 2

**4.16 OUTDOOR SITE MAINTENANCE**

The Contractor shall employ the services of a grounds maintenance service crew(s), which does not need to be in an electrical union. The crew shall be responsible for completing work on time and to a high level of quality as specified herein and directed by the Engineer. The work shall include, but is not limited to, mowing, trimming, mulching, weeding, leaf removal and cutting down tree limbs, picking-up trash and debris, and in the winter removing snow and ice by shoveling, plowing of sidewalks, parking areas and driveways, and salting walkways and driveways. Refer to systems articles herein for specific work items. The Engineer shall provide the Contractor a priority list of locations for spring/summer and fall/winter maintenance.

- The grass shall be cut to a minimum of 3" and shall not exceed 6".
- Snow and ice removal shall be performed on sidewalks, walkways and stairways any time snow and ice is present
- Snow plowing shall be performed on driveways and parking areas whenever there is more than a 2" snowfall

Qualifications shall be:

- Minimum of 3 years landscaping experience (not just cutting grass) and snow and ice removal operations
- Excellent time management skills
- Have experience with commercial mowing equipment
- Have experience with power tools and equipment used in grounds maintenance
- Knowledge of health and safety regulations, and traffic control
- Have the knowledge and training to work at or near electrical equipment

The Contractor shall submit a monthly report of all Outdoor Site Maintenance on the FTP Site and all work shall be shown on the Daily agenda.

#### **4.17 DOCUMENTATION SUBMITTALS**

##### **4.17.1 Contractor Advisory**

The Contractor shall identify system elements which have become prone to recurring or imminent failure, and/or pose a significant liability or a safety risk, and recommend replacement or repair by submitting an advisory inspection report in the monthly routine work submittal book.

The Engineer shall review and respond to the Contractor in regards to the advisory inspection, and reserves the right to determine a course of action to rectify any identified condition. When the Engineer concurs with the Contractor's basic recommendations, a non-routine authorization will be issued for the material portion of the repair and this will reduce the Contractor's routine maintenance obligation to the labor necessary to replace the deteriorated system element. Should the Engineer determine, however, that a deteriorated condition is due to neglectful maintenance on the part of this Contractor; all remedial work shall be performed as routine maintenance.

Repair of damage from weather-related failures of electric utility systems, broken aerial electrical lines, or damage from deteriorated electric utility systems which have been observed and reported by the Contractor to the utility and the Engineer prior to the occurrence of damage, may also be eligible for payment subject to approval of the Engineer. Engineer approval of the work will be based on adequate contractor repair response, proper advisory inspection report documentation, and the substantiated link to weather-related failure or previously reported deteriorated utility systems as noted above.

In the absence of an advisory inspection report received and acknowledged by the Engineer, if system elements fail or are observed by the Engineer to be causing recurring failures or imminent safety hazards, then the Contractor is obligated for the full cost of replacement or repair under routine maintenance. Such obligation is not limited only to individual components but may extend to the multiples of components at a location(s).



#### **4.17.2 Daily Work Agenda and Vehicle Assignments**

The scheduling of daily work shall be a responsibility of the Contractor, but governed by established schedules and/or authorized work completion dates. The Contractor is required to email the Engineer, each IDOT System Engineer/Inspector, and the IDOT ComCenter, a daily agenda which shall account for all scheduled work to be performed on system equipment. The daily agenda shall be received by 8:30 a.m. on the specified workday or by 2:30 p.m. on Fridays when weekend work is scheduled by the Contractor. If work assignments change, a revision of the daily agenda shall be issued.

The Department will provide the Contractor the format for the daily agenda at the Pre-Construction Meeting. The daily agenda shall list all personnel by last name first, call #, fleet management vehicle assignment number and identification code and vehicle number, cell phone number, description of work assignment(s) both routine and non-routine for all systems, including Maintenance Transfer meetings, the location number, and ticket number or authorization number if applicable.

When work is not completed which was listed on the Daily Agenda, it shall be re-listed on the next day's Daily Agenda with an asterisk and an explanation for the delay.

The Contractor shall provide daily by 8:30 AM a report of each employee by call number and name with their assigned vehicles numbers. The reports shall be for personnel working on EMC routine and non-routine work. The reports shall not report personnel who do not work on the EMC.

By end of each month the Contractor shall compile a monthly cumulative report of all the daily agendas by System, by date, and transmit in the monthly routine work submittal/FTP site. On a daily basis the agenda shall be available on the FTP site. The Engineer will furnish a sample monthly cumulative Agenda Report at the Pre-Construction meeting.

If the Contractor's work/testing, as specified herein, requires the presence of a IDOT Engineer/Inspector, the Contractor shall give a minimum 24 hour notice to the appropriate IDOT Engineer/Inspector when that work is to be scheduled on the daily agenda. If the Contractor proceeds with the work without this pre-notification, the Contractor shall, by the decision of the Engineer, be required to either re-perform the work/test or shall be assessed liquidated damages.

When a special project and/or system modification warrants, the Engineer may direct the Contractor to create a separate special project agenda. The same issuance requirements apply for the special project agenda as for the daily agenda.

#### **Vehicle Assignments**

The Contractor shall provide daily by 8:30 AM each work day, a report of each employee by call number and name, with their assigned vehicle numbers and Key Fob for the day on the daily agenda. The report shall include all personnel working on the EMC, for routine and non-routine work. All reports and documentation must be stored on the FTP site as specified herein.

#### **4.17.3 Dispatch and Call-Out Schedule**

On Thursday of each week, the Contractor shall provide the Engineer and each IDOT System Engineer/Inspector an email or fax of the next week's EMC Dispatch Center personnel work schedule, Patrolmen night work schedule, Patrolmen weekend on-call schedule for each system, and the scheduled Emergency Response Coordinator for the week. Names, telephone numbers, call numbers, hours to be worked, or hours on-call shall be noted on this schedule.

#### **4.17.4 Tickets**

The use of Tickets for the documentation of Contractor response and work on system equipment is integral to the Contract. The Contractor shall have access to EMCMS software as described herein to fulfill reporting and dispatching requirements of the Contract. Refer to Article 6.0 for software requirements. The data and reports shall be available to Department personnel for viewing at any time 24/7.

The Contractor shall provide staffing to assemble the EMCMS data to provide customized reports immediately upon the request of the Engineer. At the end of the Contract term the Contractor shall provide the Department a copy of all data entered and reports provided.

The EMCMS system shall be maintained and all user licensing and fees for the complete system shall be paid under routine maintenance. The EMCMS shall be operational and ready on or before December 14, 2018.

The EMCMS entry screens and current reports may be viewed at the Pre-Bid Meeting. The amount of entry information is extensive. In addition to Location Locate, Cable Locate, Authorizations and Invoicing screens there are eight (8) entry screens for Tickets; the Dispatch Entry, the Field Response Entry, Follow-Up #1, Follow-Up #2, Follow-Up #3, the MCHD (Motorist Caused Highway Damage) Entry, the WOP (Water on Pavement) Entry, and the LEM (Labor, Equipment, and Material) Entry, each of which has over twenty (20) entry fields required.

The average number of Tickets created by the Contractor in the past five years is about 10,000 (review Ticket charts herein). The Contract Dispatch Center personnel shall be familiar with electrical and/or EMC terminology in order to provide acceptable service to the Department.

Only Trained Contractor Dispatch Center personnel shall create Tickets on the EMCMS. A separate database or numbering system will not be allowed. The Contract number and year will automatically be generated and Ticket numbers will be sequentially assigned. One Ticket number will be used for all work activities related to the original work assignment. The Contractor shall use the EMCMS for location information.

The Contractor is responsible for all Ticket entries; however, the Contractor shall allow the Department privilege for entry and/or correction of Motorist Caused Damage information for the state's Claims Department processing. Examples would be entry of Claims processing number and date, or correction of ComCenter incident report information or police accident number entries.

### **Ticket Entry and Response**

The Contractor shall have sufficient dispatch personnel to create the EMCMS Tickets and dispatch Contractor personnel within fifteen (15) minutes upon the notification (from IDOT, Contractor, Agency, or Citizen, etc.) of a malfunction, incident or request at a state-owned location. In storm or other emergency situations the Contractor shall call-in additional dispatch personnel to handle the call load.

Contract staffing shall be sufficient so that Patrolmen are dispatched immediately and can respond to the specified location within the one (1) hour requirement herein.

Upon clearing the Ticket and before departing the Ticket location the Patrolman shall telephone the Dispatch Center or enter on his/her tablet the field response information, the L.E.M. information, and the MCHD or WOP screens as applicable, in the EMCMS.

For follow-Up (#1, #2, or #3) screens the repair personnel, upon completion of their work before departing the Ticket location, shall telephone the Dispatch Center or enter on his/her tablet the Follow-Up work and L.E.M. information.

Contractor System Managers and the EMC Dispatch Supervisor shall review the Ticket entries and coding on a daily basis to assure all required fields are entered, correct information is entered, and any duplicate Tickets are voided. IDOT inspectors also monitor the ticket coding and ticket information input and shall require the Contractor to make corrections as necessary.

The EMCMS software is designed so that Contractor personnel directly type Ticket entries while callers are on the telephone. With the required Fleet Management software (refer to Article 9.0) Contractor personnel in field who are near the location of the incident received can be dispatched and provided the Ticket information via a tablet or smart-phone through a broadband connection.

### **Communication with the IDOT ComCenter**

When an IDOT ComCenter notifies the EMC Dispatch of an incident the Contractor must notify the IDOT ComCenter when the incident has been cleared by the Patrolman or other Contractor personnel. It is not necessary to provide the ComCenter with repair dates and/or information regarding the repairs.

The EMC Dispatch personnel shall be provided with EMCMS location numbers when the ComCenter workload allows, but it is the responsibility of the EMC Dispatch personnel to have a thorough knowledge of the location look-up feature of the EMCMS.

It is also the responsibility of the Contractor to address telephone calls from the ComCenter as to ownership, and/or maintainer/contractor information, of a particular location, if known.

During certain emergency situations it may be necessary that the Contractor Dispatch personnel provide periodical updates on estimated time of arrival when requested by the ComCenter.

### **Request to ComCenter for Emergency Lane Closure**

After office hours request for approval of emergency lane closures shall be made to the ComCenter, (847-705-4612) as soon as the need is determined, prior to the Contractor's arrival on the expressway.

### **Incidents at Non-State Maintained Locations**

When a third party, Department personnel, or the Contractor's work force notify the Contractor Dispatch Center of a problem with an IDOT system location which has been temporarily taken off of routine maintenance due to construction or modification, the Contractor shall create a ticket, but shall notify the proper maintainer and/or contractor and enter this information in the ticket.

When a third party, or Department personnel, notify the EMC Dispatch Center of a problem with a location which is maintained by a municipality or is owned by a private party, the Contractor shall notify the proper maintainer and/or contractor.

### **Transmitting Ticket Summary Information**

The Contractor shall transmit the EMCMS ticket summary report by email to the Bureau of Traffic Operations and Maintenance Sections by 8:30 A.M., Monday through Friday. This report shall account for all tickets created from 7 a.m. the prior day to 7 a.m. the current day. The Monday ticket summary shall account for the time period from Friday 7 a.m. through Monday at 7 a.m.

### **Ticket Documentation for Declared Disasters**

Although the dispatching and immediate response of Contractor personnel is the priority of any Declared Disaster (or potential Declared Disaster), properly documented Ticket information is necessary for the Damage Repair Submittal form and Detailed Damage Inspection Report, requirements for possible additional payment to the Contractor when there is a Declared Disaster. Refer to Article 4.5 Special Response Situations herein.

#### **4.17.5 Maintenance Track PM Program**

The Maintenance Track Program is a monthly schedule for all systems future PM work. The start and completion of PM program work is important for the effectiveness of the overall system reliability. Every month, the Contractor shall submit the PM program for the following (next) month in the monthly routine work submittal. Note all PM program work shall be scheduled on the Daily Agenda which shall list the specific type of inspection being performed (example: 9.18.6 Roof Inspection)

Following the monthly completion of the preventive maintenance work the Maintenance Track form and all required forms/spreadsheets shall be entered on the FTP site. All PM work shall be completed as scheduled unless extensions are approved by the Engineer. Follow-up work shall be noted with the applicable Ticket number for each item found broken, damaged, or malfunctioning which requires repair or replacement. For repairs delayed due to parts on order, a work order number and supplier information shall be provided.

**4.17.6 Monthly Routine Work Submittal**

On the fifth business day of each month the Contractor shall submit to the Engineer on the FTP site the required documentation of the various items of work as specified herein, for the prior month. Included shall be a month specific spreadsheet that shows the work required and completed for each system; the count of location completions for preventive maintenance programs, the status and date of completion for each program, and a list of all uncompleted tickets, authorizations, and other required submittals. The Contractor shall identify items, by ticket number or authorization number, which require follow-up. The monthly submittal form shall be provided at the Pre-Bid Meeting.

**4.17.7 GPS Documentation**

Datum to be used shall be North American 1983.

Data shall be provided electronically and in print form. The electronic format shall be compatible with MS Excel. Latitude and Longitude shall be in decimal degrees with a minimum of 6 decimal places. Each coordinate shall have the following information:

1. Description of item
2. Designation or approximate station if the item is not designated
3. Latitude, Longitude (decimal degrees)

Examples:

<b>Description</b>	<b>Designation</b>	<b>Latitude</b>	<b>Longitude</b>
PTZ Camera	PTZ42 or County designation	41.580493	-87.793378
Handhole	HH at STA 234+35	41.765532	-87.543571
Flasher	FS100-TS2341	41.700034	-87.693509
Electric Service	Elec Srv-TS2341	41.602248	-87.794053
Traffic Signal Controller	TS 2341	41.651848	-87.762053

Prior to the collection of data, the Contractor shall provide a sample data collection of at least six data points of known locations to be reviewed and verified by the Engineer to be accurate within 15 feet. Upon verification, data collection can begin. Data collection can be made as construction progresses, or can be collected after all items are installed. If the data is unacceptable the contractor shall make corrections to the data collection equipment and or process and submit the data for review and approval as specified.

A handheld mapping grade GPS device shall be used for the data collection. The receiver shall support differential correction and data shall have minimum 2-5 meter accuracy after post processing. The device may also utilize Differential GPS to obtain the specified accuracy.

GPS receivers integrated into cellular communication devices, recreational and automotive GPS devices are not acceptable. The GPS shall be the product of an established major GPS manufacturer having been in the business for a minimum of six (6) years. The manufacturer and model of the GPS device shall be identified as well as any software used on the device and in post processing.

The Contractor shall maintain the existing IDOT database and provide data entry to the EMCMS of GPS latitude and longitude readings for all existing locations, and for any new locations for Lighting, Pump Stations, Traffic Signals, and Surveillance Systems, also fiber and equipment located under this Contract or for locations provided by the Engineer. The Contractor shall provide the Engineer a schedule for this entry information at the January 2019 pay meeting.

The Contractor shall survey all flasher and provide GPS location, photo and verify location on a spreadsheet and submit on the FTP site by March 2019.

## **ARTICLE 5.0 -- MONTHLY ROUTINE MAINTENANCE AND ADDITIONAL NON-ROUTINE PAYMENT**

### **5.1 ROUTINE MAINTENANCE BID**

The Section 3 of Contract lists quantities of locations by System, which are either ON-maintenance (currently maintained by the state's maintenance contractor), or Planned Maintenance locations (locations not currently maintained by the state's maintenance contractor or locations under construction or locations projected by the Department to go under construction), at the time of this Contract preparation, as of May 1, 2018.

In Article 2.0, the Schedule of Prices, the Contractor is provided a bid list of locations; locations shown by electrical system which are ON-maintenance (4500) and planned maintenance locations (138). The Contractor shall provide a lump sum bid price, per month, multiplied by the total location number shown (ON-maintenance and Planned Maintenance locations) to arrive at the yearly Routine Maintenance Bid Amount. Each monthly pay period shall be a calendar month.

Although the Department cannot predict which of the planned maintenance locations as listed in Section 3 (or other new locations) will be maintained (ON-maintenance) at the start of this Contract on January 1, 2019; the (138) is the allowed bid number. The Contractor will be furnished with the list of locations to be maintained through routine maintenance on January 1, 2019 (the Contract List of Locations).

At the end of each month, after the reconciling of location status, the Contractor and the Engineer shall agree on the total of locations maintained for the month (on-maintenance as of the last calendar day of the month). If the number of locations maintained for the month is less than 4500 the Contractor will be paid the monthly bid lump sum amount for maintenance. If the number of locations maintained for the month is more than 4500 the Contractor will be paid an additional non-routine payment per each location.

### **5.2 ADDITIONAL NON-ROUTINE PAYMENT FOR ADDITIONAL LOCATIONS**

In addition to the lump sum monthly routine maintenance payment the Contractor shall be paid per (each) location maintained per month over the total of 4500 a non-routine bid price, pay item RML1 and RMR1 in Section 2.

REVLAC system shall be maintained effective Jan 1<sup>st</sup> 2019 and paid through pay item RMR1 until transfer to construction Contract 60T46.

When the Department adds equipment, as an example cameras or combo lighting, to an existing location (any system) there will not be any additional routine or non-routine maintenance payment. Locations which have items of equipment which are included in the routine maintenance payment of a location at the time this Contract was written are listed in Section 3 herein.

### **5.3 MAINTENANCE TRANSFER DOCUMENTATION**

The Contractor's assigned personnel shall review the Maintenance Transfer Logs and MT tickets to compile a transfer list at the end of the month in order to easily complete and reconcile the required monthly Quantity Report. The transfer list shall be available on the FTP site. .

### **5.4 SYSTEM LOCATION MONTHLY QUANTITIES REPORT**

The Contractor shall prepare a Quantity Report by the 5th workday of each month.

To create the Quantity Report:

- Print each System's "MT" Tickets for the month in the Ticket Summary Report and compare with the maintenance Transfer List
- View or Print the EMCMS Reconcile Report by System, Pay Item Code, County and Transfer Date ON and (separately) Transfer Date OFF and (separately) Transfer of PARTIAL locations
- Confirm each Reconcile Report location entry for the past month has an MT ticket (if not, contact EMC Dispatch to enter a Ticket)
- Confirm all MT Tickets have the transfer date of the location shown on the Reconcile Report (if not, contact IDOT EMCMS Administrator to complete the entry)
- Edit the prior month's Quantity Report (Excel spreadsheet) for each system and list the locations which either came ON maintenance or went OFF maintenance for the month, or went ON or OFF Partially, or have included equipment
- The completed Quantity Report totals by Equipment Pay Item code must match the quantity totals in the Reconcile Report on the EMCMS.

The Contractor shall email the Quantity Report to the appropriate IDOT System Manager/Technician and the EMCMS Administrator for approval by the 5<sup>th</sup> working day of each month. The Department approved Quantity Report shall be transmitted to the Contractor Administrative Manager to distribute to the Contractor System Managers for their approval. Once the Quantity Report is complete, approved and signed, it shall be loaded on the FTP site.

**5.5 CONTRACT LIST OF LOCATIONS AND ADDITIONAL LOCATIONS REPORT**

It is the responsibility of the Contractor to keep the maintenance status of IDOT maintained locations, IDOT owned locations which have maintenance temporarily relinquished to others, and IDOT owned but privately maintained locations accurate at all times, in the EMCMS. Samples of EMCMS entry screens will be available at the Pre-Bid Meeting.

**5.6 ROUTINE MAINTENANCE AUTHORIZATION FOR PAYMENT**

When the Engineer has determined that all monthly routine work submittals are complete, a monthly routine maintenance authorization letter shall be transmitted to the Contractor, which authorizes payment of:

- Prior month's routine maintenance work, (the monthly lump sum bid dollar amount)
- Additional NEW routine maintained locations (non-routine one-time bid item amounts)
- Credits and debits:
- Withholding of RM Maintenance for incomplete work, missing submittals or documentation
- Liquidated damages
- Total of motorist caused damage statements for the month (paid through IDOT Springfield, refer to Article 4.9.5)

The Contractor shall create the monthly routine maintenance invoice from the monthly routine maintenance authorization, and bring to the monthly pay meeting.

When routine maintenance work completion is severely delayed or deficient or the routine maintenance work submittal documentation has not been received on time, the Engineer, at his option, may delay the pay meeting, thus delaying the routine maintenance payment to the Contractor.

Accuracy of the information is of the utmost importance; lack of due diligence and inaccurate information will delay the monthly routine payment



## **ARTICLE 6.0 – NON-ROUTINE MAINTENANCE WORK AND PAYMENT**

### **6.1 CONTROL OF WORK**

Non-routine work under this Contract is specifically authorized work, not covered under the requirements of routine maintenance, for materials and work on the systems that tends to be irregular, event driven, or otherwise based on the selective direction of the Engineer in response to system needs. Non-routine work shall include unit-priced (PAY ITEM) work, agreed price work, force-account work, and non-routine specialty service work.

An EMCMS authorization letter shall be received by the Contractor prior to the start of all non-routine work. Any non-routine maintenance work undertaken by the Contractor prior to receiving an approved authorization is done at the Contractor's own risk. The Department is under no obligation to pay for unauthorized work or work which is not in compliance with this Contract.

The Department is under no obligation to authorize any non-routine work. The Department shall authorize unit price work wherever possible, as meets the system needs, or unit price work in addition to agreed price or force account work for the same project/location, if in the best interest of the Department.

At the Engineer's request the Contractor shall inspect, investigate and provide preliminary sketch and layout with measurements, dimensions and connections of equipment, components and material for work to be performed under routine and/or non-routine maintenance. The sketch shall be provided within five days of the Engineers request.

The Department reserves the right to furnish any or all of the materials or parts for non-routine work, in which case no charge for items so furnished, shall be made by the Contractor. Materials or parts furnished by the Department may be from the contract spare parts inventory or from other vendor sources available to the Department.

Quote work or force account work shall be performed using first shift labor rates for straight time unless Engineer approval is given to use first shift overtime or double-time rates.

At the request of the Engineer, the Contractor shall be required to perform routine and/or non-routine work at locations not maintained by the Contractor and/or not listed herein, at contract unit prices. This work can be at locations under construction, locations off maintenance, at State of Illinois facilities, or on equipment in District 1, or maintained by District 1 in surrounding counties, such as Grundy and LaSalle.

Payment to the Contractor will be made only for actual quantities of work performed and accepted, materials furnished as specified, and new record drawings submitted as requested.

The Contractor shall obtain and modify the applicable plan sheets to reflect routine or non-routine work performed, or 3<sup>rd</sup> party work requested and approved. The Contractor shall also provide vendor invoices and time records of labor, material and equipment (EMCMS L.E.M) used on the job for documentation of the work. All EMCMS invoices, including vendor invoices, must separate the material costs, labor costs, and equipment costs. A lump sum invoice is not allowed.

**6.2 EQUIPMENT RATE SUBMITTALS (OWNED, LEASED OR RENTED)**

By January 1, 2019 and prior to the start of any non-routine agreed price or force account work, the Contractor shall provide the Engineer a list of all field use vehicles and construction equipment to be utilized on the Contract noting purchase or lease year, model number, size, operating volume, etc., and the applicable matching pages from the Equipment Watch Rental Rate Blue Book. The equipment operating rates will be averaged for each equipment year of purchase, per model/function, (backhoe, scissors-lift, state of operation, etc.); to arrive at an hourly operating price which will be entered into the EMCMS for non-routine agreed price and force account work for the first half of 2019.

There shall be no changes in prices until July 1<sup>st</sup>, when the Contractor shall re-submit the applicable equipment pages from the most recent Equipment Watch Rental Rate Blue Book and yearly revised labor rates and both will be updated in the EMCMS for use in the second half of 2019. A separate standby time hourly rate for equipment will not be paid. If this contract is renewed the same January 1<sup>st</sup> and July 1<sup>st</sup> dates will apply for Equipment Watch Rental Rate Blue Book.

Although it is not encouraged, it is permissible for the Contractor to rent equipment for non-routine (or MCHD repair) Contract work, however, the payment by the Department will be on the basis of the Blue Book Rental Rates, not the vendor rental invoice. In order to be paid for vendor rented equipment the Contractor must submit a confirmation statement from the vendor with the name of the manufacturer, and model number of the rented vendor equipment and the applicable sheet from the Equipment Watch Rental Rate Blue Book with the other required documentation for the authorization for payment.

**6.3 COMPLETION OF WORK**

The Contractor has ninety (90) days to complete non-routine work, unless other terms are agreed with the Engineer. If work is not completed in the agreed timeframe the Contractor may be subject to the terms of Unsatisfactory Work per Article 3.5.3 and/or liquidated damages per Article 3.5.5.

The Contractor shall provide time records of labor, material and equipment used on the job including vendor invoices breakdown and catalog cuts with each non-routine work authorization completed for payment.

**6.4 UNIT PRICE AUTHORIZATIONS**

Unit-priced (PAY ITEM), non-routine work shall consist of work which has been authorized based upon the unit prices (PAY ITEMS herein) bid on this contract for the various non-routine work items.

The Engineer shall issue a Non-Routine authorization letter on the EMCMS for unit price work, prior to the start of work. In some cases, quantities may be estimated and will be based upon the initial scope of work. The quantities may be revised following the Engineer's inspection of the work, before the Contractor may invoice the work. Refer to Article 4.8 for Contractor requirements to assist the Engineer in determining scope of work; providing measurements, sketches, etc.

## **6.5 AGREED-PRICE AUTHORIZATIONS**

Agreed-price, non-routine work shall consist of work for which bid unit prices are not applicable.

Upon receiving a quote work request from the Engineer, the Contractor shall create an EMCMS quote for the work and transmit to the Engineer within five (5) working days from the initial request. Quote cost breakdown shall be provided with vendors catalog cuts and any additional paperwork to explain details or provide justification of the labor or material costs. In some cases, at the request of the Engineer, the Contractor shall provide three (3) quotes from different vendors.

Upon Engineer's quote approval, the Contractor shall accept the work in the EMCMS. When the agreed price work requires materials to be furnished and installed, the Contractor quote may include a fifteen percent mark-up per Article 109.04(b)(3) of the Standard Specifications.

Once the quoted work is accepted the Contractor cannot make revisions unless approved at the field work inspection by the Department Engineers/Technicians. The quote submitted to the Department should take into account the expected completion date of the work.

Once the work starts the Contractor shall immediately notify the Engineer of any unforeseen problems discovered. Upon completion of the work the Contractor shall furnish the Engineer documentation as specified herein Requirements for Final Payment of Non-Routine Work.

The labor price for EMC agreed-price or force account work will be updated by the Department upon submittal of revised union class rates. The beginning labor rates for January 1, 2019 shall be submitted to the Department by December 1, 2018. The form shall be provided at the pre-construction meeting.

A general foreman's time shall not be quoted for work unless there are more than five (5) additional crew workers employed at any one time, place and job.

### **Agreed-Price Work by a Sub-Contractor**

For non-routine agreed price work (not pay items) performed by an approved subcontractor as named on the authorization for work and on the contractor invoice, in accordance with Article 109.04 (b)(7) of the Standard Specifications for Road and Bridge Construction, when work is performed by an approved subcontractor, the Contractor shall be allowed administrative costs of an amount equal to five (5) percent of the total approved costs on a individual work authorization, with the minimum being \$100. An additional material mark-up of fifteen percent per Article 109.04(b) (3) of the Standard Specifications is not allowed.

**Agreed-Price Work by a Specialty Vendor or requested by the Department**

When specialty service work (work by vendors not approved as subcontractors) is approved and authorized by the Department through agreed price work the Contractor shall be paid administrative costs of an amount equal to five (5) percent of the first \$10,000, with a minimum of \$ 100.00, and the Department shall allow an additional one (1) percent of any amount over \$10,000 of the total approved costs, for an individual work authorization. This work includes Department furnishing materials for the Contract Spare Parts Inventory.

If the Contractor is furnishing an invoice for materials not supplied by the vendor for specialty service work, the quote may include an appropriate mark-up per Article 109.04(b)(3) of the Standard Specifications. In no case shall specialty service work, in its entirety be considered "materials" when a quote for specialty service work is submitted to the Department, or shall Article 109.05 of the Standard Specifications be applicable.

**6.6 Force Account Authorizations**

Force Account Work shall consist of work for which an agreed price cannot be established between the Engineer and the Contractor. The Engineer may direct the Contractor to perform any non-routine work as force account work which shall be measured and paid as described in Article 109.04(b) of the Standard Specifications.

A daily time/work accounting, with the name of each individual, shall be kept on the daily general billing log, which shall be signed by the Contractor's field supervisor and submitted to the Engineer at the completion of each work day for the authorized work.

A summary of all daily general billing logs, as well as full documentation of materials furnished with accompanying purchase invoices from the vendor, shall be submitted to the Engineer within seven (7) working days following the completion of work. The General Billing Log form shall be provided to the Contractor at the pre-construction meeting.

A mark-up of fifteen (15) percent is allowed for material costs, which shall include any shipping and handling fees.

A general foreman's time or any overtime and/or prime time billing for any personnel will not be billable on authorized force account work unless prior, written approval is received from the Engineer. A general foreman's time will not be billable on force account work unless there are more than five (5) additional crew workers employed at any one time, place and job and then only with the prior approval of the Engineer. Only one Foreman on a crew of 4 or less workers employed at one time on a job will be billable. Equipment costs are applicable for Force Account Work as specified herein Article 6.2.

**6.7 EXPENSES INCURRED BY THE DEPARTMENT**

In accordance with Article 109.05 of the Standard Specifications for Road and Bridge construction, upon written request of the Engineer, the Contractor shall pay the bills for specialty service work and/or expenses incurred by the Department. The Contractor shall be paid administrative costs of an amount equal to five (5) percent of the first \$10,000, with a minimum of \$ 100.00, and the Department shall allow an additional one (1) percent of any amount over \$10,000 of the total approved costs, for an individual work authorization.

**6.8 ACCEPTANCE OF NON-ROUTINE WORK ASSIGNMENTS**

It is the Contractor's responsibility to review daily, on the EMCMS, the list of authorizations which have been transmitted to the Contractor, and subsequently view and print the non-routine work authorization letters. The Contractor shall communicate with the Engineer regarding any questions about the work assignment and the due date of the work completion. The Contractor may contact the Engineer to request a later work completion date than the normal ninety (90) days, or the Engineer may request an earlier date from the Contractor. If the Contractor fails to seek a change in completion date, the work completion time will remain as initiated by the Engineer.

Unless an email from the Contractor Project Manager is received by the Engineer within five (5) working days from the authorization transmittal date, which states the points of disagreement to the transmitted work assignment or due date, the authorization shall be accepted by the Contractor and logged as received. Any non-routine authorization letters which have been transmitted, but not entered as received by the Contractor in the EMCMS within five (5) working days shall be subject to the assessment of liquidated damages.

**6.9 NON-ROUTINE WORK COMPLETION REQUIREMENTS**

When the work is complete the Contractor shall enter in the EMCMS the work completion date, the transmittal date for the authorization and required documentation (modified record drawings, catalog cuts, time records (general billing logs or LEM) for labor and equipment, material, photos, paid vendor invoice if applicable, and GPS report specific to the project for agreed price work) and transmit all via email to the Department Supervisors/Engineers for review of items and quantity, field inspection, and approval to invoice. The email should be titled COMPLETED WORK AUTH # \_-\_-\_-.

If the Department Supervisors/Engineers find errors in the authorization they will email the authorization with changes noted so the Contractor may correct the EMCMS and re-transmit by email.

The complete documentation for all authorizations which include pictures, GPS report, vendor paid invoice, a breakdown of labor, material and equipment shall be scanned and stored on the FTP site. Each system will be grouped separately in authorization number order.

**6.10 AUTHORIZED WORK INSPECTION APPROVAL**

The Contractor shall notify the Engineer via e-mail, one day, (24 hours), prior to the Contractor's work completion of the authorized work in order that a joint EMC/IDOT inspection of the work shall be held.

When all required documentation of work has been received, the Engineer shall review the submittal and may request the Contractor to assist at a final field inspection. Once the Engineer has approved the work the final EMCMS non-routine work authorization shall be transmitted to the Contractor so an invoice may be prepared. The Department is under no obligation to approve any non-routine work without receiving scanned documentation.

The Engineer may waive the physical field inspection of any work if he believes the completion to be reasonably demonstrated by performance of the system, electronic monitoring, or other means. In such cases, the Engineer reserves the right to follow-up and/or selective spot inspections, and if evidence of prior incomplete or incorrect work is found, the Contractor shall remain responsible for corrective action and open to liquidated damages and/or payment withholding as provided elsewhere herein.

**6.11 EMCMS AUTHORIZATION CORRECTIVE WORK LIST**

The Engineer will email the Contractor a corrective work list (CWL) for any deficiencies found during IDOT inspections of the Contractor's work. When the Contractor has completed the work deficiencies the Contractor shall notify the Engineer by email that the work is ready for re-inspection. The Contractor will be required to change the completion date in the EMCMS.

**6.12 EMCMS FINAL AUTHORIZATION LETTER**

The Contractor shall review daily, on the EMCMS, the list of authorizations which have had the final transmittal to the Contractor, and subsequently view and print the final non-routine work authorization letter. The final authorization letter shall be signed by the System Foreman completing the work, and shall accompany the Contractor's invoice.

**6.13 EMCMS NON-ROUTINE WORK INVOICE**

The Contractor shall prepare an EMCMS invoice for each Final Authorization letter. Each EMCMS invoice shall carry the same number as the authorization letter and shall be signed by a Principal of the Company, attesting that the work, as invoiced, has been completed and inspected in accordance with the provisions of the Contract and all applicable specifications. The invoice shall also show a notarized certification by an officer of the Company.

The Contractor's invoice shall conform to the EMCMS form requirements. The invoice number is required to be the same as the non-routine work authorization number as issued by the Department. The Engineer, prior to the start of the Contract, shall review and approve the style and format of the Contractor's invoice.

All work billed for payment shall be complete, no billing for partially-completed work will be allowed. An original signed invoice with two copies and an original signed final authorization letter with two copies shall be submitted to the Department no later than 30 days following work completion approval by the Engineer. Normal processing time for non-routine work payment to the Contractor, once it is processed by the IDOT Financial Department is 8 to 12 weeks.

**6.14 PAYMENT TO SPECIALTY VENDORS**

Refer to Article 6.7 for a definition of non-routine work authorization for Expenses Incurred by the Department. Within seven (7) days following the EMCMS entry of the date the work was scheduled for payment, the Contractor shall pay the specialty vendor invoice, and scan via e-mail a confirmation of the payment with check number to the Engineer.

#### **6.15 MONTHLY NON-ROUTINE WORK STATUS**

The Contractor shall submit a schedule/chart in the monthly routine work submittal book on the FTP site which includes the status of all open tickets and open non-routine work authorizations. For all outstanding work and authorizations which have materials on order the Contractor shall submit the Vendor name, purchase order, date it was issued and expected delivery date(s).

### **ARTICLE 7.0 -- LIGHTING SYSTEM**

#### **7.1 System Description and Maintenance Responsibilities**

All items listed in the Lighting System specified herein shall be maintained under routine maintenance. The Contractor shall maintain the building structure, grounds, utilities, and equipment, Electrical and Mechanical. Equipment malfunctions and/or equipment found during inspection (routine and/or non-routine) which needs repair or replacement shall be covered under this article. All moving lane closures as specified under traffic control work required for routine and non-routine work shall be covered and paid through routine maintenance bid items. Also refer to response and maintenance requirements as listed in Article 4.0.

The Lighting System consists of highway lighting, sign illumination, underpass/ tunnel lighting, and navigational lighting, potentially 575 independently controlled installations on the expressways, primary highways, navigation channels in District 1, and other specific electrical items at facilities throughout District 1. An inventory will be provided at the pre-bid meeting.

The lighting installations include various types of lighting fixtures and lamps, lenses, reflectors, shields, poles, mast arms, high mast towers with associated equipment and cameras with associated power and communication equipment and devices including all associated hardware and software, mounting devices, supporting unistrut (U-channels), step-down or buck-boost transformers, electrical service equipment, devices, ballasts, T-bases, decals, mile markers, cables, cable brackets, foundations, conduit, control devices, radios, lighting cabinets, fenced enclosures, access gates including locks, above ground cable splice boxes, exposed conduit, uniduct, facility outdoor lighting equipment, fixtures mounted on fixed bridges, piers and abutment walls, lighting SCADA equipment, and other lighting appurtenances.

Specific Electrical Equipment to be maintained, at facilities specified herein:

#### **Emergency Traffic Patrol Office (ETP)**

Outdoor and indoor lighting system and service entrance equipment, emergency/exit lighting, switches, outlets and other electrical equipment.

**Maintenance Yards, Sign Shops, Storage Areas**

Indoor and outdoor lighting and its control equipment, emergency/exit lights, light switches, GFCI outlets, salt dome & storage lighting, and proper electrical operations of lift motors and pumps, asphalt heating tanks, calcium chloride/brine spray pumps and controllers, electrical equipment, pressure washer pumps, exhaust fans, and other items as listed in the Special Use Equipment Article 7.4.13.

**Materials Labs**

Indoor and outdoor lighting and its control equipment, emergency/exit lights, light switches, GFCI outlets, and power to test ovens, and other electrical testing equipment.

**Rest Areas**

Exterior and interior lighting, lighting inside public washrooms, emergency/exit light and all panels, controls, HVAC units, exhaust fans, outlets and well pumps.

**State Police Elgin Facility**

Outdoor Lighting only

**Weigh Stations**

(Electronically operated traffic control devices, traffic control flashers, height detector equipment and truck waiting warning devices, traffic signal heads, traffic signal posts, height detector poles, loop detectors, handholes, vehicle amplifiers, overheight detectors, foundations, cable, conduit, CCTV cameras, fiber optic transceiver, monitors, inside and outside lighting system including lamp, cable, conduit and panel, lenses, reflectors, shields, poles, mast arms, ballasts, decals, control devices, radios, lighting cabinets, fenced enclosures, access gates, above ground cable splice boxes, exposed conduit, unit duct, breakaway devices, sump pump in wet pit area and appurtenances, weigh station "open/closed" sign equipment (fiber optic message signs, interconnecting cables, controllers, including INTRAC radio, and power sources all located on various expressways) Excluded from routine maintenance are weigh scales and repair of circuit boards, relays, or cabinets associated with the weigh scales.

All items as listed in the system description herein shall be maintained under routine maintenance, unless stated otherwise herein. Also refer to Article 4.0 for other maintenance responsibilities.

**Rodenburg Maintenance Yard**

The Rodenburg Maintenance Yard has base station equipment to be maintained under routine maintenance by the Contractor; refer to Article 9.0. Generators shall be maintained as specified in Article 8.0.

**Woodstock Maintenance Yard**

Woodstock Maintenance yard has a tower with Beacon lights that shall be maintained as specified herein.

**Cameras**

Surveillance traffic monitoring cameras as listed in Article 7.7 and the cameras and associated equipment at the Joliet Moveable Bridge locations, (inspections in Article 7.5.4) are paid through routine maintenance of the Lighting System but are maintained as specified in Article 9.0 Surveillance System.



### **Tube Lights**

There are 26 HPS and 14 MH Tube light lamps which shall be cleaned and relamped in 2019 and 2021. Notify the Engineer prior to performing the work.

## **7.2 Lighting System Routine Maintenance SYSTEM EQUIPMENT TYPES**

The routine maintenance system equipment types for the lighting system are as follows:

- On-Expressway: Lighting system locations on Interstate Highways and their extensions leading in to State and/or US Routes
- Arterials: Lighting systems at off-expressway locations, where the number of luminaires at the location are greater than 12
- Small/Arterial & Navigational Lighting: Lighting system locations on State maintained routes, where the number of luminaires at the location are less than or equal to 12, or navigational lighting
- Specific Electrical Equipment at facilities (refer to Article 7.1)

## **7.3 Response and Repair Time Requirements**

Article 4.0 discusses general response requirements of routine maintenance. The following chart lists routine maintenance maximum response time, service restoration, and permanent repair times specifically allowed.

- **Service Response Time** -- amount of time from the initial notification to the Contractor until a patrolman physically arrives at the location
- **Service Restoration Time** – amount of time from the initial notification to the Contractor until the time the system is fully operational again (In cases of motorist caused damage, the undamaged portions of the system are operational.)

- **Permanent Repair Time** – amount of time from initial notification to the Contractor until the time permanent repairs are made if the Contractor was required to make temporary repairs to meet the service restoration requirement

<b>Incident or Problem</b>	<b>Service Response Time</b>	<b>Service Restoration Time</b>	<b>Permanent Repair Time</b>
Control cabinet out	1 hour	4 hours	7 Calendar days
Hanging mast arm, head or open luminaire	1 hour to clear	N/A	7 Calendar days
Radio problem	1 hour	4 hours	7 Calendar days
Motorist caused damage or leaning light pole 10 degrees or more	1 hour to clear	4 hours	7 Calendar days
Circuit out – breaker	1 hour	4 hours	7 Calendar days
Circuit out – Cable trouble	1 hour	24 hours	21 Calendar days
Outage of 3 or more successive lights	1 hour	4 hours	N/A
Outage of 75% of lights on one tower	1 hour	4 hours	7 Calendar days
Outage of light nearest RR crossing approach, islands, or gores	1 hour	4 hours	N/A
Navigation light outage, single	N/A	1 day	7 calendar days
Single Outage on Pole, Tower, In Underpass or on Sign (includes those found by Night Patrol)	N/A	N/A	7 calendar days
Weigh Stations/Rest Areas/State Police Facilities	1 hour	4 hours	7 calendar days
Emergency Traffic Patrol or Other Department Facility Office outages	1 hour	4 hours	7 calendar days

## **7.4 Routine Maintenance Responsibilities**

### **7.4.1 Utility Service Outage**

Upon notification of power outages/utility problems, the Contractor shall dispatch a patrolman to inspect and address equipment and/or service failure, report findings on an EMCMS ticket. In cases of long-term power outages the Contractor shall be required to provide a generator, under routine maintenance, to power the lights as requested by the Engineer.

### **7.4.2 Controller/Cabinet**

The lighting controller has several components that require special training to understand the operation and its maintenance. The Contractor must follow a procedure that implements those items covered with specialized training classes to enable the patrolman to troubleshoot systematically and identify the faulty component whenever there is a problem with the controller.

#### **Log Sheets**

The Contractor shall maintain service log sheets in each lighting cabinet. New log sheets for 2019 shall be placed in the cabinet (in protective plastic) in January 2019 and the logs from years 2016, 2017 and 2018 shall be removed and submitted to the Engineer at the January 2019 System meeting.

After responding to a lighting controller/cabinet trouble call the patrolman must record the problem found and action taken for service restoration on the cabinet log sheet in addition to calling in the information for the Ticket.

#### **Cabinet Components**

When there is more than one service call due to the same component failure within a month, the Contractor shall replace that component with a new one instead of making temporary repairs. All replacement work requires a Ticket and spare parts disposition log for the new equipment.

Receipt of three (3) or more independent lighting tickets where the problem is caused by the same component(s) during any two (2) month period indicating the existence of a recurring problem will be considered unsatisfactory service.

Repeated controller malfunctions due to an incorrect time of the day setting on the controllers' time clock which results in not energizing lighting at sunset and not de-energizing the lighting installation at sunrise shall be considered unsatisfactory service.

The Contractor shall repair as necessary, lighting cabinet doors, hinges, meter box, etc., to keep the cabinet functioning effectively and shall have all conduits and opening sealed as specified herein.

### **Radio**

When the Contractor removes a lighting cabinet radio for repair, it must be immediately replaced with a spare radio from the Contractor's owned, spare parts stock. The Contractor is required to have two (2) working, SCADA radios available at all times. The Contractor shall repair the defective radio within seven (7) calendar days, or shall replace with a new radio similar in kind or current version. The ticket shall document this repair and a Contract Spare Parts Disposition Log shall be used for the equipment exchange.

### **SCADA Alarms**

Receipt of three (3) alarms during one (1) month period, indicating the existence of a recurring problem, shall be investigated and promptly repaired to eliminate the reported alarms. The Contractor shall report all work on a ticket.

### **Pad and Bumper Post**

If the cabinet pad and/or bumper post are found to be missing, damaged or have shifted due to the ground condition, then the Contractor shall repair or replace to the original condition.

### **Warning Decal**

If the cabinet "High voltage warning" decal (as approved by the Engineer) is found to be missing or damaged, the Contractor shall immediately apply an identical replacement.

### **State of Illinois Decal**

If the cabinet "State of Illinois" decal (as approved by the Engineer) is found to be missing or damaged, the Contractor shall immediately apply an identical replacement.

## **7.4.3 Light Pole Unit**

All light poles, standard, davit, round-tapered, conventional, combination, or decorative/painted shall conform with approved submittal requirements, but may be from a different manufacturer than the originally installed light pole, and shall meet IDOT specifications and UL requirements.

Standard or davit light pole mast arms shall be replaced with the same color, length, rise, diameter, and shape as the original installation. The davit arm shall be horizontal to the X-axis and 90 degrees to the shaft.

All resets/installation of light poles shall use a short transformer base (T-base) and the Contractor shall install a luminaire keeper. The Contractor shall not use a breakaway coupling.

If the existing ground tap/lug is damaged or not functional, the pole shall be drilled and the ground wire lugged on and not wrapped.

Uniduct must be visible inside the pole. Below the foundation grade or flush is not acceptable. Where uniduct is below grade or flush, a split 12" uniduct extension shall be installed in place (excluding existing direct buried cable).

### **Anti-Theft Locking Devices**

Selected locations of the Eisenhower (I-290) Expressway have a special anti-theft locking device on handhole covers and junction boxes at power centers to prevent cable theft. It is the Contractor's responsibility to monitor the special coded, keyed nut drivers required for these junction boxes. If a coded key is lost, it shall be the Contractor's responsibility to furnish and replace a new coded fastener nut at all locations with these anti-thefts locking devices, and replace the coded, keyed nut drivers, all at the Contractor's expense.

#### **7.4.4 Light Pole Foundation**

It is the Contractor's responsibility to be knowledgeable of requirements for light pole foundation construction and current approved height limitations for base extensions above the adjacent grade. Refer to Department standards.

Minor repairs to concrete foundations shall be completed within seven (7) calendar days from the date of discovery/issuance of a ticket, or within twenty-one (21) days if the rebuilding or complete replacement of a concrete foundation is required.

#### **7.4.5 Light Tower**

High Mast Light Towers (HMLT) can reach up to 160 feet in height, the towers have lowering ring for mounting luminaires and for service at ground level. The lowering ring can be raised or lowered using a portable drive unit or built in drive with a remote control for safety. The towers are identified by decals and based on design and photometric requirements determine the size and number of luminaires and the height of the tower. The make, model etc. varies. For additional information see the lighting asset inventory which will be provided at the pre-bid meeting.

When performing tower work and/or inspection that require lowering the ring, the Contractor shall relamp and clean the inside and outside of all luminaires, and shall perform preventive maintenance light tower inspections as specified in Article 7.5.10.

The Contractor shall maintain the light tower retaining wall blocks and concrete service pad and if found to be damaged, they shall be repaired. The Contractor shall also maintain in proper working order all external portable drive units in the Contract Spare Parts Inventory, which are used to lower and raise the tower ring.

Motorist caused structural damage to a light tower or if the Contractor or Department inspectors determine that a tower is unsafe for the motoring public, the Engineer shall be immediately notified in order to approve the immediate removal of the light tower.

The Contractor shall be paid for work through Non-Routine Maintenance Unit Prices for:

- Light Tower (Remove and Re-Erect)
- New Foundation (if required, removal and replacement)
- Temporary Lighting (installation and removal)
- Furnish Replacement Light Tower, if not available in Contract Spare Parts Inventory
- Labor and equipment to clear Site for Safety

The Contractor shall be paid for work through Non-Routine Maintenance Agreed Prices for:

- Handling of contaminated soil (if found)
- Special equipment not covered in this contract, necessary for light tower removal and replacement.

The Department reserves the right to use Contract Spare Parts for all material replacements as necessary.

The Contractor shall install temporary lighting to restore the lighting service and shall provide the Engineer catalog cuts submittal for the tower replacement for IDOT approval within ten (10) days of the light tower removal. After receiving the Engineer's approval of the catalog cuts, and a non-routine authorization for tower work, the Contractor shall order the material and complete the reinstallation of the light tower within a three (3) month period.

#### **Tower Inspections**

There is barrier wall adjacent to the light tower foundations on I-290 (Eisenhower Expressway) near Wolf Road, I-90/94 Ryan Expressway at Maxwell St, I-80/90 Kingery Expressway and I-394. In order to perform required inspections and outage repairs on these towers a lane closure, as paid through routine maintenance is required, as are attenuators and a bucket truck to meet traffic control requirement as specified herein.

If unable to lower the tower ring the Contractor shall provide a boom lift equipment necessary to perform the outage repair within the specified response time in Article 4.0.

#### **7.4.6 Luminaires**

Certain requirements apply when lighting units are replaced or repaired in place under routine maintenance. Luminaire ballasts shall match the system voltage and be of the same type and characteristic as the original design and installation being replaced, unless otherwise authorized by the Engineer.

Ballasts in luminaires, with an incoming voltage on other than the District's standard voltage of 240 volts single phase, may be of a multi-tap type, as approved by the Engineer.

Luminaires installed as replacements at an installation location, installed within six (6) years of the current year, shall be of the same manufacturer, and have the same photometric performance specification as the originally installed luminaire, except as otherwise indicated or authorized by the Engineer

Luminaires replacing drop-lens (reflector-type) shall be replaced with flat-glass cut-off type units of a distribution type and photometric performance approved by the Engineer. The Contractor shall submit proposed variant replacements to the Engineer for approval.

### **Lamp**

When a replacement luminaire is installed it shall be equipped with a new lamp, and when there is a lamp that is out it shall be replaced with a new lamp which are provided by the Contractor through routine maintenance. The HPS lamp shall be rated for a minimum of 80,000 hours; Sylvania LUMALUX PLUS XL ECO non-cycling or better, as approved by the Engineer.

### **LED**

The replacement fixture and/or any components shall be of the same kind as originally installed and approved by the Engineer to match the photometric.

### **Fuse and Fuse Kit**

Standard fuse holders shall be used on non-frangible (non-breakaway) light pole installations and quick-disconnect fuse holders shall be used on frangible (breakaway) light pole installations. Wires shall be carefully stripped only as far as needed for connection to the device. Over-stripping shall be avoided. An oxide inhibiting lubricant shall be applied to the wire for minimum connection resistance before the terminals are crimped-on. Crimping shall be performed in accordance with the fuse holder manufacturer's recommendations. The exposed metal connecting portion of the assembly shall be taped with two half-lapped wraps of electrical tape and then covered by the specified insulating boot. The fuse holder shall be installed such that the fuse side is connected to the pole wire (load side) and the receptacle side of the holder is connected to the line side.

### **Shields (Light Towers or Light Pole luminaires)**

The luminaire shield, if found to be torn or ineffective, or missing, shall be replaced with the same kind or better.

### **Luminaire Keeper**

The luminaire keeper, if found to be torn, broken, ineffective, missing or uninstalled shall be replaced and installed. Replacement is also required at the time of any damage to a luminaire.

#### **7.4.7 Cable**

The Contractor shall repair or replace all cable and associated equipment, grounding cable or integral cable-in-duct combination, which becomes damaged, displaced, defective or missing from any cause whatsoever.

When cable deficiencies become suspected or known, the Contractor shall take immediate corrective action to make temporary repairs.

Cable used to repair or replace faulty cable runs under routine maintenance shall be new, and shall be copper conductor EPR-insulated cable. All new cable runs shall include a separate green ground wire sized in accordance with codes, even if it did not exist before the malfunction.

When temporary cable is installed, all splices shall be as good as splices for permanent repairs and proper grounding shall be observed. Permanent repairs shall follow as soon as possible and shall be completed within 21 calendar days. Temporary ground laid cable or attachment to the metal structures is not allowed.

### **Aerial Cable**

The Department only allows aerial cable to be used for temporary repairs and the Engineer shall give prior approval of all Contractor installations of aerial cable. If aerial cable is approved it shall be installed so that its lowest point is at least twenty-five (25) feet above ground level.

By May 1st, 2019 the Contractor shall provide the Engineer a Monthly Aerial Cable report; an Excel spreadsheet list of all EMCMS location numbers, main route, cross street and cabinet designations where aerial cable has been installed and shall provide measurement of length of cable. The Contractor shall continually document on tickets new cases where temporary aerial cable was found installed and report on the monthly aerial cable report. The monthly report shall also provide the date of permanent repairs and shall be entered on the FTP site.

### **Allowable Cable Permanent Repair Delays**

From December 1st to May 1st, when permanent cable repairs are not possible due to frozen ground, the Contractor is allowed to keep the tickets open and wait until May to complete the permanent work.

In all cases where temporary repairs are made during the winter months, permanent repairs shall be completed by May 31st.

### **Cable in Duct or Conduit**

Where damaged cable is in duct or conduit, the faulty wiring shall be removed and replaced with the approved new cable and the duct or conduit shall be repaired. The rigid galvanized conduit or PVC Schedule 80 shall be used under roadways and driveways to push the uniduct unless otherwise approved by the Engineer.

### **Cable Run/Grounding Conductor**

The new cable run shall include a green equipment ground conductor sized in accordance with the National Electrical Code and as specified in the Standard Specification for Road and Bridge Construction in Illinois. All cable used shall be new copper conductor, EPR-insulated as specified. If the uniduct cannot accommodate the green insulated ground wire, then the bare ground wire continuity shall be tested/measured. All pertinent information shall be documented and communicated to the Engineer by email. If the existing installation is without an equipment ground wire, the Contractor shall also note this information in the email to the Engineer.

### **Ground Well/Rod**

The ground well/rod for lighting cabinet, HMLT (high mast lighting tower) and pole shall be inspected for exothermic weld and continuity, if defective shall be repaired or replaced.



### **Cable Repair (Direct Buried)**

The Contractor shall remove and replace any section of faulty direct buried cable plus a minimum of three (3) feet on each side of the fault including all of the undamaged adjacent cables. If the fault is six (6) feet or less from a pole, splicing handhole, or a control cabinet, the six (6) foot section shall be removed and replaced. The Engineer shall approve the cable to be used and the type of splices. The Contractor shall notify the Engineer by email prior to replacing the complete span. At the Engineers direction the Contractor shall install a green ground conductor that shall be paid under non-routine work. Estimated costs shall be submitted by e-mail to the Engineer prior to the start of work.

### **7.4.8 Decal Replacement**

The Contractor shall keep an Excel spreadsheet of reported or observed locations where, light pole, underpass, sign, camera, and light tower identification decals, or accident reference (mile marker) decals are worn-out, missing, damaged, covered up or placed so they are illegible to police and emergency personnel. The Damaged Decal list, sorted by decal type, shall be transmitted monthly in the routine work submittal in the FTP site.

Light poles that are damaged and replaced due to motorist caused damage shall have new decals, including accident reference numbers, replaced by the Contractor at the time of the repair, if weather is suitable. Those decals which were not replaced shall have their location and pole/unit number entered on the Damaged Decal List.

The Department shall review the damaged decal list and shall provide a list of the locations and equipment to be re-decaled once or twice a year.

### **7.4.9 Sign**

When a sign structure is being repaired or replaced, the Contractor shall disconnect and/or reconnect the sign structure as requested by Department personnel. The Contractor shall replace the disconnect switch if it is rusted and/or inoperable to isolate sign lighting fixtures. The sign lighting fixtures and associated conduit, wiring, and disconnect shall be removed if a new reflective sign board for night visibility is installed by the Department.

### **7.4.10 Lighting SCADA System**

The lighting SCADA system enables the remote control of the lighting at the cabinets equipped with radios along the expressway system on certain arterial highways within District 1. The lighting at such locations is automatically turned on after sunset and turned off before sunrise by the photocell control at the D-1 ComCenter.

Manual remote-control features are also available at the IDOT ComCenter, the Traffic Operations Field Office, and the EMC Dispatch Center. The Contractor shall assume responsibility for all manually-initiated commands of the system, such as that required for day time inspection of selected lighting system installations. (In no case, shall the Contractor substitute this partial control of the system for the required lock-out/tag-out procedures necessary for safe work practices.) The Contractor shall note, however, that unless there are specific arrangements with the Engineer to the contrary, all normal automatic features shall remain operational at all times.

The Department retains the right to suspend or terminate the Contractor's privilege to use the system for misuse of the system or any other reason. Only trained and qualified Contractor personnel shall be allowed to operate the lighting SCADA system.

#### **7.4.11 Grounds Maintenance**

The Contractor shall keep a 10-ft area surrounding the controller/cabinet, all towers, and at facility/building locations as requested by the Engineer, clear of all vegetation, bushes and trees. Refer to Grounds Maintenance in Article 4.0.

#### **7.4.12 Outages**

The Contractor shall provide the labor, equipment and material to meet the response requirements for all outages and repairs and this work shall be included as part of routine maintenance. The Contractor shall wash all the luminaires on the tower, pole, underpass, navigation, tube lighting and sign lighting during an outage repair. The Contractor shall provide manpower, equipment and material required for a moving lane closure needed to perform the repair. Refer to Article 4.0 to review outage documentation requirements.

#### **7.4.13 Electrical Equipment at Lighting locations, Maintenance Yards, Sign Shops, Weigh Stations & Rest Areas**

The Contractor shall maintain under routine maintenance the following equipment but not limited to:

##### **General Items**

- Cables/unduct
- Calcium chloride pump, including connect/dis-connect service as specified herein
- Conduits/raceways, handholes
- Control boxes/lighting power centers
- Controllers/Radios/clocks
- Emergency exit lighting and signs
- Relays, Contactors, breakers, electrical devices, Fittings and appurtenances
- Foundations, anchor rods, grounding,
- GFCI outlets, indoor and outdoor
- Junction boxes, fuses, disconnects,
- Light poles, aluminum, steel or wood, mast
- Light towers, ring lowering system, luminaires
- Lighting fixtures, luminaires indoor and outdoor and control equipment
- Electrical Service, Main distribution panel and sub-panels
- Motion sensors
- Outlets
- Power controls
- Roof and ceiling fixtures
- Salt dome and cold storage lighting
- Service/work pads
- Switches
- Wall packs (outdoor)
- Wiring and associated equipment

**Special Use Items**

- Air compressors
- Calcium chloride and brine spray pumps
- Conveyor for salt dome
- Exhaust fans
- Garage door openers
- Hot asphalt box
- HVAC systems
- Lift motors/hoist system,
- Motors and pumps for asphalt heating tanks
- Ovens at Material Labs
- Pressure washer pumps
- Test equipment
- Wastewater lift stations pumps
- Welders
- Any other electromechanical equipment

The routine maintenance for special use equipment as listed above includes response and investigation and repair of trouble calls/tickets, deficiencies and malfunctions, making the equipment operational and safe for use. Replacement of special use items listed above are not covered under routine maintenance.

The Contractor shall fully explain on the ticket why the replacement is needed instead of repair for the special use items listed above. The Contractor shall provide the Engineer a quote for the replacement materials and installation, but shall not proceed with the work unless approval is given by the Engineer.

The Department may purchase the replacement materials on this Contract or from other sources, for the Contractor to install through non-routine maintenance pay items. Review Non-Routine Pay Items in Section 2 herein.

**7.5 Preventive Maintenance Programs**

**7.5.1 General Information**

The Contractor shall review General Maintenance Requirements in Article 4.0. The required PM programs are listed below:

<b>Art. No.</b>	<b>Program</b>	<b>No. of Locations</b>	<b>Frequency</b>
7.5.2	Daytime Tunnel Lighting Inspection	9	Monthly
7.5.3	Daytime Weigh Station Inspections	12	Monthly
7.5.4	OPEN/CLOSED Sign Relamp	12	March
7.5.5	Maintenance Yard/Sign Shop/Facility Inspection/Pump Service	36	Mid Apr-May & Mid Sep-Oct
7.5.6	Lighting Clock Inspection	All	March & Nov
7.5.7	Clock Battery (yearly) and SCADA Battery Replacement all locations (2020 only)	1/3 of All Loc.	Sept-Nov.
7.5.8	Control Cabinet Full Inspection	1/3 of All Loc.	15/month
7.5.9	Poles & Underpasses Inspection	1/3 of All Loc.	15/month
7.5.10	Light Tower Safety Inspection	550	50/month
7.5.11	Navigation Lighting Inspection	All	June
7.5.11	Navigation Lighting Re-Lamp	All	April, 2021
7.5.12	Maintenance Yard & Facility Wash & Relamp	9	Complete by Mid-Oct
7.5.13	Yearly Photo-Cell Calibration	1	June 21st

**7.5.2 Monthly Daytime Tunnel Lighting Inspections**

The Contractor shall provide Lighting System personnel, to inspect monthly the operational condition of daytime tunnel lighting equipment to assure that systems are performing at the level of service for which they are designed. The equipment required for both day and night circuit operation shall be inspected. The scheduled inspection date for each location shall be listed on the Daily Agenda.

The Contractor shall call-in all lighting outages and other deficiencies to the Dispatch Center for ticket entry. Outage repairs for all tunnels are to be completed within seven (7) calendar days of the monthly daytime inspection.

**Locations for tunnel inspections:**

Loc. # L0115 Stewart's Cave Tunnel  
Loc. # L0137 I-55 @ Pulaski Road  
Loc. # L0873 Erie Street Tunnel  
Loc. # L0883 Hubbard's Cave Tunnel  
Loc. # L0905 Dan Ryan @ 95<sup>th</sup> St.  
Loc. # L1315 I 290 @ Lower Wacker Exit Ramp  
Loc. #L 1320 I 290 @ Lower Wacker Entrance Ramp  
Loc. # L1325 I-290 @ Canal St. (under Post Office)  
Loc. # L1713 US 34 (Ogden Ave) @ 26<sup>th</sup> Street

**7.5.3 Monthly Daytime Weigh Station Inspections**

The scheduled inspection date for each monthly daytime weigh station location shall be listed on the Daily Agenda.

The Contractor shall provide Lighting System personnel, to inspect monthly each weigh station installation as follows:

- Replace all burned out lamps and damaged sockets
- Check lighting in scale pit
- Replace damaged, discolored, cracked or peeling signal lenses
- Repair or replace any damaged signal posts, foundations, signal heads, cable, conduit and over height vehicle detector posts from any cause whatsoever
- Check alignment of signal heads
- Check alignment of over height vehicle detectors
- Check operation and condition of loop detectors
- Align all signal posts
- Identify vehicle detector loops in need of replacement
- Create ticket for loop resealing if required
- Check proper operation of the CCTV System and monitors filing washer fluid for proper camera operation. The wiper system on the cameras at the WS800B Weigh Station, I-80 outbound, west of 80<sup>th</sup> Ave, require refilling.

**7.5.4 Sign Re-Lamp – March of Each Year**

The Contractor shall relamp all OPEN/CLOSED signs during the month of March, under routine maintenance. The scheduled relamp date for each location shall be listed on the Daily Agenda.

A spreadsheet shall be created with the date of relamp, location name, address, number of fixtures and number of lamps and transmitted in the monthly routine work submittal on the FTP site.

The Contractor shall call-in all problems found/repared and other follow-up work necessary to the Dispatch Center for ticket entry.

#### **7.5.5 Twice Yearly Maintenance Yard/Sign Shop/Facility Electrical Equipment Inspection/Pump Service**

The Contractor shall inspect the IDOT Maintenance Yards/ Sign Shops/Facility offices twice per year, once in mid-April to mid-May and again mid-September to mid-October. Items for inspection include indoor and outdoor lighting and its control equipment, emergency/exit lights, light switches, GFIC outlets, salt dome storage lighting, and proper electrical operations of lift motors and pumps, asphalt heating tanks, calcium chloride spray pumps its controllers, electrical equipment, pressure washer pumps, exhaust fans, and other items as listed in the Special Use Equipment Article 7.4.13.

The scheduled inspection date for each location shall be listed on the Daily Agenda. Contractor personnel shall check-in with the IDOT Maintenance Yard Technician before starting the inspection. The IDOT Technician may direct the Contractor personnel to electrical items which need attention.

During the spring inspection the Contractor shall disconnect the calcium chloride and/or brine pumps, drain fluids, clean and lubricate. During the October inspection the calcium chloride and/or brine pumps shall be re-connected, lubricated and checked for proper electrical and mechanical operation. The Contractor shall call-in all problems found/repared and other follow-up work necessary to the Dispatch Center for ticket entry.

#### **Service Entrance and Feeder Panel Inspection**

The Contractor shall divide the Maintenance Yard, Sign Shop, and other Department Facility locations into two (2) Groups, A and B. The Service Entrance and Feeder Panel Inspection shall be conducted at Group A locations in mid-April to mid-May and Group B locations in mid-September to mid-October. The scheduled inspection date for each location shall be listed on the Daily Agenda.

#### **Inspection procedure is as follows:**

- A. Clean enclosure and control equipment by blowing out with low air pressure or vacuuming
- B. Check and clean contacts, relays and timers and visually inspect for damage or out of adjustment parts. Remove all dust off of electrical devices and equipment.
- C. Circuit breaker maintenance:
  - Check connections
  - Exercise breaker
  - Check trip setting
- D. Inspect wiring/conductors for overheating and discoloration
- E. Check tightness of wire terminations and connections
- F. Check for proper labeling, provide and install missing labels
- G. Check wire tags/labels, provide and install missing tags or labels
- H. Check fuse disconnects for proper operations, keep fuse clips clean and tight
- I. Check fuses for proper size
- J. Test equipment ground system

The Contractor shall call-in all problems found/repared and other follow-up work necessary to the Dispatch Center for ticket entry.

#### **7.5.6 Lighting Clock Inspection**

The Contractor shall verify and adjust the time clocks twice per year at daylight savings time in March and November to assure proper operation. The scheduled inspection date for each location shall be listed on the Daily Agenda.

#### **7.5.7 Yearly Battery Replacement**

The Contractor shall replace the back-up battery for clocks once per year in September through November and check the radio code and turn-on/turn-off timing, adjusting as necessary.

Also in the September through November period of 2020 (if this Contract is renewed) the Contractor shall replace the SCADA backup battery for the radio, and the lithium battery in each CPU of the FIUs and the back-up battery pack in each FIU of the lighting SCADA system, for equipment located in the IDOT ComCenter and EMC Dispatch Center. The Contractor shall submit catalog cuts of the replacement battery packs for Engineer approval, prior to installation.

A spreadsheet shall be kept with the replacement date, location number, address, clock and/or radio manufacturer name, old battery model and serial number, and new battery model and serial number. The Contractor is also required to put a 2" x 4" sticker on the door of the clock and on the door of the radio indicating the date of installation for the new back-up battery.

The Contractor shall transmit in the monthly routine work submittal the spreadsheet for work completed in the prior month, and shall submit a cumulative yearly work spreadsheet in December.

The Contractor shall call-in all problems found/repared and other follow-up work necessary to the Dispatch Center for ticket entry.

The scheduled inspection date for each location shall be listed on the Daily Agenda.

#### **7.5.8 Yearly Control Cabinet Full Inspection (One Third of Lighting System Locations per Year)**

The Contractor shall divide the Lighting System locations into three (3) Groups by Highway and/or adjacent areas, Group A, Group B, and Group C. The scheduled inspections shall start with Group A in 2019, and if this contract is renewed, Group B in 2020 and Group C in 2021. The scheduled inspection date for each location shall be listed on the Daily Agenda.

The Contractor shall verify all luminaires are operating before making test measurements. All outages shall be repaired prior to starting the cabinet inspection or the Contractor shall not conduct the inspection.

A minimum of 15 lighting system locations shall be inspected monthly and all work shall be completed by the end of November each year. The Contractor and Engineer shall discuss the findings at the monthly System meeting.

The following information shall be collected and entered on an Excel spreadsheet for each location:

- Location number and address
- GPS of Cabinet
- Driving directions to locate the cabinet
- CE meter number
- CE supply voltage
- Transformer size
- Transformer number
- Conduit and cable types

Perform an Inspection:

- Identify any objectionable current flow from one ground connection to another (which occurs from multiple grounds on the same system equipment)
- Identify highly unbalanced loads
- Measure ground resistance
- Perform continuity test for all circuits
- Visually check SCADA CPU inputs/outputs for proper operation
- Check SCADA radio communications to and from cabinet
- Confirm calibration of analog input values
- Measure the current and voltage inputs by having the EMC Dispatch Center interrogate the power center. The interrogated values shall be equivalent to measured values. If the voltage is different by +/- 3 volts or if the amperage is different by +/- 2 amps, a Ticket shall be generated.

The Contractor shall call-in all problems found/repared and other follow-up work necessary to the Dispatch Center for ticket entry. If serious damage is found or other major problems found the Contractor shall attach photos to the tickets.

The Contractor shall transmit an excel spreadsheet using Log L-3 for field entry for the inspection work completed in the prior month in the monthly routine work submittal on the FTP site. A cumulative spreadsheet of the year's work with all the completed monthly spreadsheets shall be submitted in December on the FTP site. (The spreadsheet format shall be submitted to the Contractor by the Engineer.)

#### **7.5.9 Yearly Light Pole and Underpass Safety Inspection**

(1/3 of light poles and underpasses per year)

The Contractor shall divide the Lighting System locations into three (3) Groups by Highway and/or adjacent areas, Group A, Group B, and Group C. The scheduled inspections shall start with Group A in 2019, and if this contract is renewed, Group B in 2020 and Group C in 2021.

A minimum of 15 lighting system locations shall be inspected monthly and all work shall be completed by the end of November each year. The scheduled inspection date for each location shall be listed on the Daily Agenda.



The Contractor shall conduct a safety inspection of the light poles and underpass lighting by physically walking the entire power center. The Contractor shall insure that all lighting components are maintained in a safe and effective operating condition as originally designed or as subsequently modified by the Department.

The Contractor and Engineer shall discuss the findings at the monthly System meeting.

### **Inspection**

Check for damage to the following:

- Poles (check for cracks, loose nuts and bolts)
- Mast Arms (check for cracks, loose nuts and bolts)
- Underpass fixtures
- T-base
- Luminaires
- Luminaire keeper
- Shields
- Luminaire keeper
- Shroud or Skirts (lift and check for loose and/or worn nuts and washers)
- Break away couplings
- Handhole doors
- Hardware
- Junction boxes
- Wiring conduit hangers
- Decals, missing, damaged, or illegible
- Decal mounting brackets
- Mile markers

The Contractor shall call-in all problems found/repared and other follow-up work necessary to the Dispatch Center for ticket entry. If serious damage is found or other major problems found the Contractor shall attach photos to the tickets.

### **Survey**

The following information shall be collected for each location, entered on a spreadsheet and transmitted monthly in the routine maintenance submittal on the FTP site. The Contractor and Engineer shall discuss the findings at the monthly System meeting.

The Contractor shall identify by location and pole number/underpass fixture number:

1. GPS readings as specified in Article 4.17.7
2. Light pole bases which are too high and do not conform with the current approved height limitations for base extensions above the adjacent grade
3. Light poles leaning (more than 10 degrees)
4. Light poles - davit poles with open mast arm (not parallel to ground)
5. Mast arms fastened with riv-nuts
6. Lighting locations with temporary aerial cable

The Contractor shall call-in all problems found/repared and other follow-up work necessary to the Dispatch Center for ticket entry.

All equipment and materials required for repairs and replacements shall be furnished as part of routine maintenance.

The Contractor shall conduct any safety inspection of light poles or underpass fixtures when recommended by the manufacturer, upon request by the Engineer, which is in addition to the regular inspection as specified herein.

### **7.5.10 Yearly Light Tower Safety Inspection**

The Engineer shall provide the Contractor a list of 550 towers to be inspected, and luminaires washed by the Contractor in 2019, and if this Contract is renewed, 550 towers in year 2020 and in 2021. The Contractor shall insure that all light tower components are maintained in a safe and effective operating condition as originally designed or as subsequently modified by the Department. The Contractor shall perform the work, provide access and traffic control as necessary through routine maintenance and shall coordinate and perform the inspection in the presence of the Department Consultant on HMLT structural inspection. The Consultant is expected to perform the structural inspection and observe and examine the lowering system equipment, maintenance and operation by the EMC Contractor. The Contractor shall fill out Form L-5 (3-1-18) tower inspection form. The form will be provided at the pre-bid meeting.

The Contractor shall provide trained, skilled, qualified personnel with a certification in Inspection and Maintenance of Ancillary Highway Structures to perform the inspections. A Professional Engineer or Structural Engineer is not required to conduct the inspections. A minimum of 50 lighting system locations shall be inspected monthly and all work shall be completed by the end of November each year. The Contractor and Engineer shall discuss the findings at the monthly System meeting. The scheduled inspection date for each location shall be listed on the Daily Agenda.

The Contractor shall examine the HMLT with the Consultant for deterioration and perform necessary minor repairs to the below listed items at the time of the inspection. Major problems shall be called in to the EMC Dispatch Center for Tickets.

- Paint
- Metal parts (for corrosion and/or rust)
- Foundation
- Mounting bolts (tightened as necessary)
- Shaft
- Handhole doors and gasket
- Lowering device including motor support cables, & transition plate assembly
- Ring assembly electrical cable (check for faulty splices)
- Fuse kits and splices
- ESCO stainless steel swage sockets for cracks
- Retaining wall
- Decals and decal mounting brackets
- Wash the glass lens (inside/outside) of each luminaire
- Clean the outside of the camera dome as necessary and report any deterioration for lens replacement
- Cracks as found located in the first ten (10) feet shall be clearly identified and documented with pictures and measurements entered in the ticket information and sent to the Engineer.

#### **Rust Inspection (routine maintenance)**

The Contractor shall inspect rust on the outside of the shaft and at all slip joints during the tower inspection program. The location and magnitude of the rust spots shall be described in detail on the inspection report. At the time of the tower inspection program any rust spots, found within 20 feet from the ground shall be cleaned and touched up with primer and painted.

When rusting found within 20 feet is more than 25% of the bottom 20 foot section, painting must be performed in accordance with manufacturers recommendation and specification and shall be paid for under non-routine pay items.

#### **Survey**

The Contractor shall identify by location, address, and tower number:

- Number of towers and number of lamps per tower
- GPS readings of the location of each light tower per specifications as provided in Article 4.17.7
- Towers with CCTV

The Contractor shall call-in all problems found/repared and other follow-up work necessary to the Dispatch Center for ticket entry. If serious damage is found or other major problems found the Contractor shall attach photos to the tickets.

The Contractor shall transmit in the monthly routine work submittal on the FTP site, the spreadsheet in excel format for work completed in the prior month, and shall submit cumulative yearly work spreadsheets in December. The Engineer shall provide the format for the spreadsheets at the Pre-Construction Meeting.

#### **7.5.11 Yearly Navigation Lighting Inspection**

The Contractor shall conduct an inspection of all 178 navigational lighting luminaires by boat once per year in June. The scheduled inspection date shall be listed on the Daily Agenda.

The Contractor shall create an EMCMS ticket for L.E.D. modules which need replacement and/or repair and for any other problems found which need follow-up work. The Contractor shall relamp all luminaires with approved LED lamp in April of 2021.

#### **7.5.12 Yearly Maintenance Yard & Facility Wash & Relamp**

As part of routine maintenance work the Contractor shall wash and relamp the lighting fixtures inside the office buildings, storage rooms, various bays, cold storage buildings, salt domes and outside lighting on roof, wall, poles and HMLT. Nine (9) maintenance yards/facilities shall be completed each year, as selected by the Engineer. The quantities for each maintenance yard/facility including the type of fixtures and lamp will be available at the Pre Bid meeting. The scheduled wash and relamp for each location shall be listed on the Daily Agenda.

##### **In 2019**

The work shall be performed at the following locations: Rodenburg, Northside, District Bridge Office, Stevenson, Alsip, Joliet, Bishop Ford, Dan Ryan and Arlington Heights Yards.

##### **In 2020**

The work shall be performed at the following locations: Edens, Northbrook, I-57, Landscape, Naperville, Oakbrook, Grayslake, Lake Zurich yard and Northside sign shop.

##### **In 2021**

The work shall be performed at the following locations: Woodstock, Birds Bridge, I-55 Yard, New Lenox Yard and Sign Shop, Kennedy, Harvey, Hillside, St. Charles and Gurnee.

All work shall be completed by mid-October of each year. The Contractor may combine this yearly program with the Maintenance Yard Electrical Equipment Inspection in mid-April to mid-May and mid-September to mid-October, Article 7.5.5 herein.

The Contractor shall call-in all problems found/repared and other follow-up work necessary to the Dispatch Center for ticket entry.

### **7.5.13 Yearly Photo-Cell Calibration**

Each year, on the day of the summer solstice, normally June 21st, the Contractor shall test and adjust the Hubbard's Cave and Stewart's Cave, both Lower Wacker tunnels, and the Erie St tunnel consoles per manufacturer's operation manual. The Engineer shall attend this inspection and provide the luminance level specifications for Stewart's Cave (L0115) ), Hubbard's Cave (L0883), the 2 Lower Wacker tunnels (L1315 & L1320), and Erie St tunnel (L0873). Also on this day, the Contractor shall check and clean the IDOT HQ photo cell and adjust to 5 +/- 0.5 ft. cd., or as specified by the Engineer for proper lighting SCADA control operations.

### **7.6 EQUIPMENT/LOCATIONS INCLUDED IN LIGHTING ROUTINE MAINTENANCE**

Review Section 3

## **ARTICLE 8.0 – PUMP STATION SYSTEM**

### **8.1 PUMP STATION SYSTEM DESCRIPTION**

There are 48 State-owned pumping stations in District 1, used for pumping water collected from expressways and viaducts into sewers and area waterways. It is essential that these pump stations shall be available and ready to operate at their designed capacity at all times to keep the traffic moving and to ensure motorist safety. The type of equipment used varies from station to station. The equipment at the stations include several types of: electric motor driven pumps; multiple sources of utility power (up to 4160V service); emergency generators; electrical switchgear; motor control centers; transformers; transfer switches; control systems; electrical and flow instrumentation; alarm systems; gas detection systems; lighting systems; power wiring; SCADA RTUs; central, satellite and remote engineering processors of the PS SCADA system; SCADA repeater; radio transceivers, including antenna cables, antennas and antenna towers/poles; fuel and fuel tanks; purged air water level indicating systems; compressed air systems; lubrication systems; automatic trash racks and bar screens; water systems; heating and ventilation systems; steel fencing and gates, wrought iron fencing and gates, windows, doors, locks, highway advisory radio in certain stations, and all associated equipment, including building and structures, mechanical systems, hydraulic systems, electrical systems, communication systems and appurtenances owned by the State of Illinois and under the jurisdiction of the Department. CCTV & Lighting below shall be maintained in accordance with Article 6 and 7.

Surveillance Systems cameras as listed herein Section 3 at pump station locations shall be maintained and paid through Pump Station locations.

### **8.2 General Maintenance Responsibilities**

All items listed in the System Description herein shall be maintained under routine maintenance. The Contractor shall maintain the building structure, grounds, utilities, and equipment such that it can be effectively used for its intended purpose. Equipment found during any inspection (routine and non-routine) which needs repair or replacement is covered and paid for under routine maintenance bid item, unless otherwise stated herein. Unless specifically noted, all work required herein this Article shall be paid through routine maintenance. Also refer to response and maintenance requirements as listed in Article 4.0.

The Contractor shall create EMCMS routine work tickets for the storm checklist and other routine work as requested by the Engineer.

Pump Station 24 is a new station with medium voltage equipment and is expected to come on state maintenance in 2018. The Contractor shall use specialized services from vendors to inspect, test, and configure equipment such as solid state motor controls, vacuum circuit breakers, contactors, soft state starters, PLC automatic MTM or MM per manufacturers' recommendations. Service vendors shall be paid in accordance to Article 6.5 Agreed-Price Work by Specialty Vendors. All maintenance and operations, including labor and equipment to assist specialty vendors in the performance of their work at Pump Station 24 shall be covered through routine maintenance.

The Contractor shall provide the man power for installation, removal and operation of de-watering pumps and safety equipment to assure safe access to the wet pit for IDOT operations to clean wet pits. This work shall be included and paid under routine maintenance.

At the beginning of the Contract, the Contractor shall, under routine maintenance:

- Organize log books in each pump station as described herein,
- Replace approximately 200 locks at pump stations (refer to Article 3.3.5)

#### **Documentation**

The Contractor shall conduct a field survey to provide and maintain a Fiber Drawing of all pump station termination, connection and splice points for the SCADA system, which shall also show fiber color, number and assignment and submit quarterly on the FTP site.

### **8.3 Site Maintenance**

The Contractor shall provide general site maintenance at pump stations, including grass cutting, weed control, debris disposal, snow plowing and removal operations as required to provide safe access to facilities, and to maintain the sites in an aesthetically acceptable condition to the public.

Grass cutting, weed control, and debris disposal work shall be performed in the station areas, in the IDOT R.O.W., to a radius of fifty (50) feet surrounding the building, and within five (5) feet of the access driveway on each side. In addition, tree trimming shall be performed within five (5) feet of all pump station structures. This maintenance shall be performed a minimum of once per month in the months, April through September.

Snow removal operations shall be conducted as necessary to provide safe and reasonable access to each facility. All pump stations, that require access for patrol, construction or other scheduled EMC work, shall be attended to immediately following a snowfall of more than three (3) inches. The Contractor shall notify the Engineer of his snow removal plan after each significant snowfall.

The Contractor shall submit a spreadsheet, noting the station and date above-mentioned work was completed, in the monthly routine work submittal.

**For snowfalls of less than 3 inches:**

The Contractor shall provide reasonable access to each pump station via sidewalk, staircase, walkway, driveway, and parking areas by shoveling and salting within 48 hours.

**For snowfall of more than 3 inches:**

The Contractor shall provide snow plowing and salting of each station sidewalk, staircases, walkway, driveway, and parking areas, to commence within 24 hours, and shall be complete within 72 hours in the following order of priority:

Group #1: PS # 4, 7, 17, 28, 32, 37, 38, 40, 42 and 44.

Group #2: PS # 2, 3, 5, 9, 15, 20, 24-26, 30, 34, 46-48, 50 and 51.52

Group #3: PS # 10 - 14, 16, 18, 19, 21-23, 27, 29, 31, 33, 35, 36, 39, 41 and 43

**8.4 Response Maintenance for PS System**

**8.4.1 Contractor PS Call-Out Response**

Pump Stations shall remain in continuous operation during normal and emergency maintenance activities. It is imperative that the Contractor immediately address alarms, reports of water on pavement, reports of clogged inlets, hazmat spills, or other serious malfunctions or damage by dispatching trained personnel to check the pump station.

Although the availability/location of trained personnel dictates the call-out, during normal workday hours, the order of call-out response shall be:

1. Contractor personnel specialized in SCADA
2. Contractor personnel specialized in PS maintenance and operation
3. Pump station maintenance and operation personnel
4. Other Contractor Personnel Trained in PS Operations

The Contractor shall develop an appropriate emergency PS Call-Out plan to provide trained personnel on-call after normal workday hours for pump station emergencies. This PS Call-Out shall be sent to the Engineer on a weekly basis, with the EMC Dispatch Center and Call Out Schedule (Article 4.17.3).

OSHA safety regulations must be followed at all pump stations. Any Contractor personnel entering a pump station shall be properly trained and equipped for confined space entry.

When the Contractor is notified of any reports of possible hazardous materials in the pump station wet pits, the Contractor shall be responsible to immediately contract the services of an approved full service materials waste contractor to remove the hazardous material and dispose of properly off of state property. (Refer to Article 3.0)

The Contractor's responsibility is to provide the immediate hazmat response by an approved company and insure compliance in accordance with Article 3.0. The Department is responsible for payment to the approved hazmat company for their services only.

#### **8.4.2 Station Procedures and Response Documentation**

EMC personnel shall not manually operate the pumps with insufficient wet pit water elevation, for general maintenance operations, including pump inspection, wet pit cleaning, and all other wet pit work. The Contractor shall use his own pump equipment to de-water the wet pit.

Two log books are maintained in each pump station to document entry/inspection. The Contractor shall maintain the log books so that one book contains the current year information and the second log book contains information recorded in the previous years. In January of each year, the Contractor shall transfer the sheets from the current year log book to the previous year log book and place blank sheets in the current year log book. The Contractor shall furnish a new log book for newly rehabbed pump stations. The log book shall not be altered or removed from the station.

There are specific procedures, which are required of all personnel when entering or leaving any pump station. It is necessary to:

- Notify the EMC Dispatch Center of arrival (10-7)
- Complete log book chart I, with the date, time, person's name and reason for entry
- Upon completion of inspection, record the observations in the required charts in the log book.
- Notify the EMC Dispatch Center to issue a Ticket for any deficiencies, observed during the inspection. (Refer to Article 4.0 for Ticket requirements and procedures.) Record the ticket number and the deficiency in the log book
- Acknowledge any alarms before departure
- Check all pumps that are not tagged "Out of Service" and set in the auto position (H-O-A switch) immediately before departing the pump station
- Secure all station doors and hatches
- Turn alarm switch to ON position
- Notify the EMC Dispatch Center of departure (10-8)

#### **8.4.3 PS Alarm Response**

Upon receipt of an AEGIS and/or SCADA Pump Station alarm, the EMC Dispatch Center shall:

1. Create a ticket
2. For all alarms, except entry alarms, dispatch a patrolman to the station, to check the alarm. Arrival shall be within one hour of the receipt of the alarm. For entry alarms (Zone 1), notify the IDOT ComCenter and the respective police department for the station, for a police escort for the patrolman. The patrolman shall not enter the premises without having the pump station investigated by the police. (Refer to Article 4.0 for information on procedures for incidents of intrusion, vandalism or theft).



Upon arrival at the station, the patrolman shall:

1. Notify the EMC Dispatch Center of the arrival information, including a notation of all alarms flashing on the annunciator and SCADA panel.
2. Record all information about the incident in the log book
3. Perform all necessary repairs required to restore the pump station to its normal operating condition, if possible. (If follow-up repairs are needed in an emergency situation, notify the supervisor immediately to commence repairs.)
4. Notify the EMC Dispatch Center, as to status of problem, whether it was cleared or if follow-up work required before departing the pump station. (All response information shall be recorded on the ticket)
5. In the event of a power failure alarm (Zone 3), monitor the power outage status at regular intervals and notify the Emergency Coordinator and the IDOT ComCenter if a high water level is imminent. (Refer to Temporary Pumping Requirements as stated herein shall be applied.)

#### **8.4.4 Station Pre-Storm Condition Check**

Upon receiving a storm warning, code Red or Black, from the IDOT ComCenter or IDOT Engineer, the Contractor shall dispatch sufficient trained personnel to initiate these actions within one hour:

1. Check the operating status of each pump station
2. Check the condition of the trash on bar screen(s), clean if necessary
3. Check the status of the low point inlet and catch basins for the pump station, if found clogged notify IDOT Com Center immediately.
4. Enter all information found on EMCMS ticket.
5. Submit an EMCMS checklist (spreadsheet), indicating the time each pump station was checked, to the Engineer when completed.

#### **8.4.5 Water on Pavement (WOP) Situations**

The responding patrolman shall be equipped with the necessary measuring devices to trouble shoot and mark the water level with a reference point.

Upon observing Water on the Pavement (WOP) or extremely high water levels at the station, the Patrolman shall immediately notify the EMC Dispatch Center, who shall in turn notify the IDOT ComCenter.

Immediately after entering the station, the dispatched patrolman shall report the following information:

1. Pumps Running -- Yes or No.
2. Water Depth in Wet Well
3. Depth of Water on Pavement
4. Street Inlet Clogged -- Yes or No

The patrolman shall obtain a ticket number from the EMC Dispatch Center and complete the station log book, Chart W. All ticket information and WOP report information shall be relayed to the EMC Dispatch Center within one (1) hour of receipt of information from the field.

All WOP report tickets shall be marked for follow-up until the pump station system is back to normal operation and there is no water on the pavement. During storm events the Engineer shall be immediately notified by telephone/text of all WOP incidents. In addition to the Ticket report, all WOP reports shall be sent to the Engineer by 8 a.m. the next day following a storm.

When there is water on the pavement the Contractor shall retrieve the archived data from the pump station PLC and email to IDOT Engineer within 24 hours.

During high water level or WOP conditions, the patrolman shall remain at the station unless approved otherwise by the Emergency Coordinator.

#### **8.4.6 Station Post Storm Condition Check**

After each major rainstorm, the pump station crew shall:

- Clean the trash rack bin, bar screen, and the area between the automatic trash rack/bar screen and the inlet sewer to the bare concrete floor.
- Check WOP float and probe sensor for proper operation, and remove debris, and
- Check the inlet/catch basins. If clogged, notify IDOT ComCenter.
- In the event of high water levels the Contractor shall inspect, clean and dry all equipment submerged under water once the water level recedes to normal elevations.
- The Contractor shall check all equipment for proper operation.

#### **8.4.7 Temporary Pumping Requirements**

The Contractor shall provide and install temporary portable standby pumps to maintain adequate total station outflow capacity as described in Table P-1.

The Contractor shall submit a detailed temporary pumping operating plan, to the Engineer for approval, at the Pre-Construction meeting, for all maintenance activities which will directly affect normal inflow and outflow pumping operations. The Temporary Operating Plan submittal shall include a list of suppliers that, on an immediate on-call basis, can provide the Contractor with temporary pumps, or generators, to maintain the outflow capacity.

A back-up generator(s) shall be immediately mobilized to each pump station when the Contractor is notified of a high water level or alarm, or water on the pavement due to a power failure. Upon approval of the Engineer, the Contractor may utilize the two 200KW generators which are normally kept in EMC spare equipment. These generators may not be considered in the Contractor's temporary pumping operations plan.

## **8.5 Service Companies**

### **8.5.1 Submittals of Service Company Names**

The Contractor shall submit the following, for Engineer approval, at the Pre-Construction meeting:

- Names, addresses qualifications of at least six potential vertical/submersible services repair companies within the tri-state area of Illinois/Indiana/Wisconsin.
- Name(s) of lab facilities that are certified and equipped to test oil and other lubricant fluids.

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### **8.5.2 Service Company Work**

When the Contractor is unable to complete repairs to pump station equipment, the Contractor shall provide an IDOT approved Service Company to supplement his forces in order to meet contract requirements.

The Contractor shall provide all labor, equipment, and general services necessary to schedule and assist a specialty service company in conducting various comprehensive testing and inspections, including routine and non-routine work.

The Contractor shall coordinate the work with the service companies and provide qualified personnel to:

- Allow free and clear access to and from the pump station and all equipment
- Open and close all enclosures to provide access to the electrical equipment being inspected, replaced and/or repaired.
- Notify the power utility company to schedule all power outages required for the project.
- Perform all switching, de-energizing and re-energizing of electrical equipment
- Perform lock out tag out procedures
- Provide safe working conditions in accordance with OSHA requirements
- Assist in data collection when requested by the Engineer

## **8.6 Scheduled Daily Maintenance**

### **8.6.1 Daily SCADA Maintenance**

The Contractor shall be responsible for proper operation and maintenance of all SCADA System equipment described herein.

The Contractor personnel with the assigned specialized SCADA duties shall:

- On a daily basis, review the daily operations of the SCADA System. The SCADA System shall have its periodic maintenance activities/programs check and completed by SCADA specialized Contractor personnel. This work would include, but is not limited to system back-ups, central algorithms, Windows OS debugging, Tescode and/or RSView Programming, Liquitronic 5 Firmware, modem configuration, database and archive array configuration and collating.
- Keep back-ups of all system software/firmware. Any changes to the system shall be submitted to the Engineer for approval, before execution. System changes shall be documented on tickets for documentation.
- Troubleshoot any problems related to network configuration of the system, troubleshoot any Windows OS and/or RSView processing errors, modem configuration, and telecommunication line testing (including network high-speed lines, dedicated leaded lines and dial-up lines).
- Upload and download RTU software configuration and application files, archive array configuration data and review the status of the SCADA system and alarms. The Contractor shall complete all Tescode programming setpoint changes and remote configuration. An RTU programming on a Flash Drive shall be stored and updated by SCADA specialized Contractor personnel in each PS SCADA panel and stored in an appropriate sealed case.
- Shall perform updates to OS and GUI software when released by the manufacturer.
- Shall perform software revisions, program and screen modifications required to integrate additional PLC's or devices in the pump station system into the existing central (Schaumburg), TSC (Oak Park) and satellite (Contractor Dispatch Center) processors. Processor functionality and integrity shall be maintained with each added device. Any device furnished, installed, and terminated to pump station PLC or removed from monitoring, including but not limited to the gas detectors and fire alarm systems during the contract year shall be configured and interfaced with the station PLC and HMI unit screens. This work shall be included under routine maintenance of the pump stations system. IDOT engineer shall be notified prior to any changes and modifications to the SCADA system.
- Shall configure and provision new cellular modems for existing and new pump stations under construction for integration with SCADA system. See pump station tables for list of upcoming pump stations under construction. The Contractor shall coordinate with Construction contractor to assure connection and operation.

The Contractor shall add any pump station that will become under maintenance during contract year to the SCADA system in order to make a complete operational system and shall develop new screens at all processors. The Contractor shall provide the list of Tags, I/O's and alarms required from Construction to develop the new screens and alarms. The screens shall be identical to existing pump station screens, such as the pump station information screen, control screen, main pump station screen and status screen with all devices in the pump station properly monitored.

The Contractor shall maintain all SCADA Hardware and software this will include but not limited to RSVIEW 32, ControlLogix5000, RSLinx, Winbench, Liq V as required and all communication media to connect to remote pump stations. Contractor shall also maintain all remote SCADA hardware and software at the pump stations this will include but not limited to Control Logix PLC, HMI unit, Liq. V PLC. The contractor shall provide a yearly technical support as required for all pump station SCADA system software.

### **8.6.2 Daily AEGIS Maintenance**

The Contractor shall be responsible for proper operation and maintenance of all AEGIS System equipment. The Contractor shall maintain:

- One AEGIS Silent Knight 9500 pump station alarm receiver,
- One AEGIS Silent Knight 9000 backup unit receiver,
- One AEGIS receiver in the Contractor's EMC Dispatch Center, and
- All existing alarm transmitter units at each pump station including any new units added during the contract year and all associated equipment.

The Engineer shall provide the EMC Dispatch Center with an AEGIS Alarm Zone code list.

The Contractor shall assure that all AEGIS units are functioning for call out to the receivers and shall supply and program prom chips as required for each alarm transmitter unit. A 20-second time delay shall be programmed to prevent nuisance alarms due to contact bouncing.

The AEGIS system shall be configured to execute a 24-hour communication check. This daily check shall be monitored and documented by dispatchers at the EMC Dispatch Center; tickets shall be created for any problems. The weekly report of the communication checks shall be submitted to the Engineer.

The Contractor shall maintain one alarm center in Department's Bureau of Traffic Electrical Field Office for windows monitoring software for single user module, 250 account version, and provide a "one year office hours" support. The Contractor shall maintain the software and configure to make a complete operational system at all times.

### **8.6.3 Reporting of Daily Maintenance**

When problems or malfunctions are found, which need follow-up work, in addition to creating a ticket the Contractor shall inform the IDOT Engineer and respective specialized pump station Contractor Personnel by mail. When there are after hours emergencies a phone call shall also be made to notify the Engineer.

### **8.7 Monthly PS Quick Check – All Stations**

The Contractor shall perform a monthly PS quick check at all pump stations. This work shall be done 25 days from the monthly maintenance. The patrolman shall notify the EMC Dispatch Center to create a Ticket for all deficiencies or malfunctions found.

During the inspection, check the following:

1. Are inlets clear of debris?  
(If clogged on expressway stations, radio Com Center; for off expressway stations, create a ticket).
2. Is grass cutting required?
3. Is fence secure?
4. Is building roof free of leaks?
5. Are doors, windows, walls, and hatches secure and free of graffiti?
6. Dry pit condition OK?
7. Alarm panel OK? (No alarms holding)
8. Lighting fixtures outages?
9. MCC panel indicator lamps OK?
10. Water level meters at proper levels?
11. Ground detection indication lamps OK?
12. Is trash bin free of debris?
13. Does the bar screen need cleaning and free from debris build-up?
14. Is wet pit free of hazardous materials?
15. Pump On/Off operation OK? (Simulate a call)
16. Abnormal noise from pumps?
17. Is piping free of leaks?
18. Is pump free of abnormal noise or vibration?
19. Is oil level consumption OK?
20. Is grease operation OK?
21. Are grease and oil lines free of leaks?
22. Is thermostat set properly and heater operating properly?
23. Are dampers and exhaust system OK?
24. Verify gas detector calibration
25. Fire extinguisher OK?
26. Does floor need mopping ?

### **8.8 Monthly Preventive Maintenance Program**

The Contractor shall perform the following inspections and allow thirty (30) days between the inspections. A schedule/chart shall be submitted via USB flash drive that show the pump station, preventive maintenance programs (routine and non-routine) and date of completion for each program. Each preventive maintenance program shall have a monthly summary of item(s) that require follow-up and associated ticket number. The schedule/chart(s) shall also include the status of all open tickets that require follow-up and shall be submitted at the end of each month. A copy of all routine and non-routine maintenance reports shall be submitted to IDOT Engineer on the FTP site.

The Contractor shall update and maintain all P.S. tables to be true and accurate. The Contractor shall submit updates for a minimum of 6 pump stations per month starting in February and all must be completed by the end of October.

8.8.1	Pump Inspection	Chart A	Monthly
8.8.2	Pump Maintenance	Chart F	Monthly
8.8.3	Automatic Trash Rack Maintenance		Monthly
8.8.4	Bar Screen Maintenance		Monthly
8.8.5	Compressed Air Tank Inspection	Chart S	Monthly
8.8.6	Flow Meter Inspection	Chart A	Monthly
8.8.7	Generator Maintenance	Chart K, M/P-10	Monthly
8.8.8	Transfer Switch Operation Maintenance	Chart C	Monthly
8.8.9	Air Induction Inspection	Chart U	Monthly
8.8.10	AEGIS Inspection	Chart E	Monthly
8.8.11	EMC Spare Parts Inventory Maintenance		Monthly
8.8.12	Equipment Malfunction & Repair Tracking		Monthly
8.9.1	Dry Pit/Wet Pit Submersible Pump Insp.		June & Dec.
8.9.2	Automatic Trash Rack Maintenance		June & Dec.
8.9.3	Vertical Pump Motor Maintenance		June & Dec.
8.9.4	Actuators, Valves & Sluice Gate Oper.Insp.	Chart B	Min. 8 per Mo.
8.9.5	Side Volute Discharge Pump Maintenance		June & Dec.
8.10.1	Air Induction Heater & Space Heater Insp.		November
8.10.2	AEGIS Alarm System Inspection	Chart E	January
8.10.3	SCADA Inspection & Documentation	P-100	Min. 15 Jan-Mar
8.10.4	Wet Pit Inspection	P-9	Min. 6 Apr-Oct
8.10.5	Pump Control System Inspection	P-6	Min. 15 Jan-Mar
8.10.6	Pump Station Inspection and Maintenance	P-4	Min. 4 Jan-Nov
8.10.7	Roof Inspections and Maintenance		July to Aug
8.10.8	Pump Capacity, Motor Current, Voltage, Moisture, Megger Test	Chart Z & P-5	Min. 8 Jan-May
8.10.9	Impeller Adjustment	P-5	Min. 5 Jan-Feb
8.10.10	Submersible Pump Inspection	P-8	Min. 5 Jul-Oct
8.10.11	Oil Analysis		Min. 8 Jul-Nov

8.10.12	Main Circuit Breaker Testing Inspection	P-7	May 2019
8.10.13	Flow Meter Inspection		Min. 5 Jul-Oct
8.10.14	Fire System Inspection		Min. 3 Jul-Oct
8.10.15	Motor Control Center Inspection		Min. 4 Jan-Nov
8.10.17	Yeoman/KJI/Grundfos Pump Maintenance		June 2019
8.10.18	Generator Maintenance	P-10	October
8.10.19	Equipment Identification		August
8.11	PS Tables		Min 6 per Mo. Feb-Oct

**8.8.1 Monthly Pump Operation Inspection – All Stations**

The Contractor shall perform the following and record on Chart A:

- Operate each pump and check alternator or selector switch for proper sequence in accordance with recommended manufacturer’s procedures. Caution: Do not draw down the wet well level past the designated stop elevation under any circumstances.
- Set the selector switch on the pump with the least number of hours as the lead pump.
- Operate each unit noting the current draw and compare with the motor plate and note any deviation, and/or any abnormal operating sounds
- Record number of starts
- Take flow meter reading and record on log chart
- Record number of starts and hours run of each pump

The Contractor shall submit a copy of the chart A on a USB flash drive using spreadsheet software, as approved by the Engineer, once every three months, in the monthly routine work submittal.

**8.8.2 Monthly Pump Maintenance  
PS # 2, 3, 4, 14, 25, 29, 32, 33, 35, 50**

The Contractor shall inspect the oil lube system and greaser for proper lubrication and inspect both oil and grease lines for leakage or clogging. In addition, the Contractor shall inspect the automatic greaser and manual cap for proper operation, and maintain the proper oil/grease level. All information shall be entered on log chart F. The Contractor shall also grease all fittings such as flap valves, check valves, gate valves, flow meters, and pumps.

At PS # 32, and 50 with the side volute discharge pumps, the Contractor shall lubricate the pump bearings with oil/grease when required, (minimum twice per year), inspect packing glands for leakage, lubricate motor, and clean the motor. In addition, the air release valves/pipes shall be inspected (replace when required) and cleaned.



### **8.8.3 Monthly Automatic Trash Rack Maintenance**

**PS # 4, 5, 21, 22, 23, 24, 26, 28, 35, 46**

At pump stations with automatic trash racks, the Contractor shall:

- Inspect and insure the fingers on the trash rake assemble is fully engaged through the entire length of the barscreen. The Contractor shall make the necessary adjustment for proper operation of the trash rack.
- Grease the rake assembly and head shaft bearings with EP#2 waterproof grease, grease drum bores on rope drum,
- Grease teeth on bull gear and pinion,
- Lubricate chains where applicable, and grease slide block channels
- Check limit switches.

The Contractor shall use Bison #88 molybdenum grease or may substitute environmentally safe grease upon approval by the Engineer.

### **8.8.4 Monthly Bar Screen Maintenance**

**PS # 2, 3, 4, 5, 7, 9, 10, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 39, 40, 46, 47, 50, 51 and 52**

At pump stations with bar screens, the Contractor shall inspect the bar screen, rake and manually clean the bar screen and remove all debris and silt in the area between the sewer and the trash rack/bar screen. The trash rack itself shall be kept free of debris.

### **8.8.5 Monthly Air Compressor Inspection**

**PS # 4, 24, 25, 27, 29, 33, 40, 50, 51**

The Contractor shall check the compressor and air tank for proper operating pressure in the pump stations, and drain water from tanks. (The tanks are used for reserve air supply for the bubbler control systems.)

Record the inspection results and the date tank was inspected on chart S in the log book.

### **8.8.6 Monthly Flow Meter Inspection**

**PS # 4, 9, 10, 17, 21, 23, 24, 25, 28, 29, 30, 33, 34, 35, 39, 42, 46, 47, 50, 51**

The Contractor shall check the flow meters in each station for proper operation and record their readings on chart A in the log book. A grease fitting is furnished in the head plate and requires greasing once a month, to replace grease that has worked out in the operations. The Contractor is advised not to over-grease the meter, and to lubricate with Lubriplate grease, available from Sparling, Inc.

### **8.8.7 Monthly Generator Inspection**

**PS # 9, 11, 15, 18, 19, 24, 28, 34, 36, 39, 41, 42, 47, Three in EMC spare equipment,** Base Stations, Six Moveable Bridges, IDOT Schaumburg Headquarters, Traffic Systems Center, Rodenburg Maintenance Yard and 8 Communication Huts and back-up generators in EMC spare equipment shall be inspected.

The Contractor shall:

- Check control panel and transfer switch operation
- Check engine oil and coolant levels
- Check that block heater is working
- Check battery charging system
- Check for holes or leaks and loose connections in the air cleaner
- Check fuel level and fuel transfer pump operation
- Check for exhaust system leaks or restrictions
- Drain the condensation trap
- Check all meters, gauges, and indicator lamps
- Check generator fuel and note level.
- Check for fluid/fuel leaks.
- Check oil reservoir and battery acid level and maintain proper operating levels.
- Check the air filter monthly and change at specified intervals
- Exercise generator at full load for one (1) hour
- Check and note any rusting on the generator and its enclosure
- Prepare, prime, and paint rusting metal (to match existing paint)

The Generator check list, log P-10, shall be completed and transmitted to the Engineer in the routine maintenance monthly submittal. Tickets shall be created for any problems found.

Diesel fuel shall be filled to the proper level at all times, for the generator operation. If fuel level is less than  $\frac{3}{4}$  (75%) of full level, then a ticket shall be created to schedule the refill of the tank.

### **8.8.8 Monthly Transfer Switch Operation Inspection**

**PS # 2, 3, 4, 5, 7, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 42, 43, 44, 46, 47, 48, 50, 51 and 52**

The Contractor shall exercise the transfer switch monthly, to inspect for proper transfer and time delay to secondary power source and time delay from secondary to primary and the results shall be recorded in the chart C of the log book. This work shall apply for pump stations.

#### **8.8.9 Monthly Air Induction Inspection**

**PS# 4, 7, 8, 9, 10, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 34, 35, 40, 50, 51 and 52**

The Contractor shall change the air induction filter, clean the bird screens, and clean heating element insulators to maintain proper ventilation within the pump station. The date shall be noted on chart U in the log book. The Contractor shall supply and store the proper filters at each pump station.

#### **8.8.10 Monthly AEGIS Monthly Inspection – All Stations**

The Contractor shall check the AEGIS alarm system for each pump station which are not being monitored by the central SCADA system. This inspection will consist of transmitting all the possible alarm codes for that specific station. Note that each station has an individual listing for zone 2 alarms. When checking the alarm system, each item that is incorporated into a zone 2 alarm shall be checked. The low and high level alarms shall be checked by a continuity test or by using a jumper to override the relay. The Contractor shall not use the pumps to draw down to a low level. All results shall be entered in chart E in the log book for each station.

#### **8.8.11 Monthly Spare Parts/Equipment Inventory Maintenance**

The Contractor shall check the EMC spare equipment as follows:

- Rotate motor/pump shaft, few revolutions by hand
- Fill oil reservoir to the proper level
- Check bearings for proper lubrication
- Clean motor windings with air, to remove any dust accumulation
- After cleaning, provide protective covering for motors to prevent dirt, moisture and other contaminants

A spreadsheet noting each pump station name, inventory items, and work performed on inventory items in the prior month shall be transmitted in the monthly routine work submittal on the FTP site. All items added, removed or relocated from EMC spare parts shall have the proper forms completed and submitted per Article 3.6.

#### **8.8.12 Equipment Malfunction and Repair Tracking**

Malfunction and repair of Pump Station equipment shall be recorded by the Contractor on tickets and transmitted monthly to the Engineer in an excel spreadsheet on the FTP Site. Information shall include date of failure, date of repair or replacement, reason for failure (lightning, material defect, etc.), equipment type, model, manufacturer, location and any other pertinent information as directed by the Engineer. Equipment replacement information shall include model, manufacturer, and source. Reports shall include monthly and accumulative totals.

#### **8.9 Semi-Yearly Preventive Maintenance Programs**

To be completed by June and December of each year. A copy of all reports shall be submitted to IDOT Engineer on the FTP site.

**8.9.1 Semi-Yearly Dry Pit/Wet Pit Submersible Pump Maintenance**

**PS # 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 51, 52**

The Contractor shall visually inspect pump impeller for clogging, shall inspect oil reservoir for contaminants, shall check and clean air release pipes/valves, and shall flush the cooling system from debris. The wet pit submersible pumps shall be washed down with a pressure hose.

**8.9.2 Semi-Yearly Automatic Trash Rack Maintenance**

**PS # 4, 5, 21, 22, 23, 24, 26, 28, 35, 46**

The Contractor shall grease guides with Bison #88 molybdenum disulfide, and grease, lubricate, and perform an oil change on the worm reducer and coupling. The band brake assembly shall also be inspected and tightened evenly as required.

**8.9.3 Semi-Yearly Vertical Pump Motor Maintenance**

**PS # 2, 3, 4, 25, 29, 33, 35**

The Contractor shall check motor heaters and clean the motor inside and out, wiping off dirt, dust, oil and water from external surfaces of the motor. Any dust or debris from the ventilating air inlets shall be removed. The motors shall be cleaned internally by blowing with clean, dry compressed air.

**8.9.4 Semi-Yearly Actuators, Valves & Sluice Gate Operation – All Stations**

- A minimum of eight (8) stations are due per month from January through June and July through November and the inspections for each station shall be spaced six months apart throughout the term of the contract.

The Contractor shall operate the flap valves, check valves, gate valves and sluice gates at all the pump stations. All the valves and gates shall be lubricated with environmentally safe grease.

The Contractor shall check the actuators' lubrication consistency and level. If required, it shall be filled or replaced. All electrical connections shall be inspected and tightened. The Contractor shall also check for mechanical damage.

All results shall be entered into chart B in the log book for each station. Create tickets for any deficiencies found and enter the ticket numbers on chart B. When repairs are complete, chart B shall be submitted in the monthly routine work submittal.

**8.9.5 Semi-Yearly Side Volute Discharge Pump Maintenance**

**PS # 32, and 50**

The Contractor shall lubricate the pump bearings with oil/grease, inspect packing glands for leakage, lubricate motor, and clean the motor on the side volute discharge pumps. In addition, the air release valves/pipes shall be inspected (replace when required) and cleaned.

## **8.10 Yearly Preventive Maintenance Programs**

### **8.10.1 Yearly Air Induction Heater and Space Heater Inspection**

Before each heating season, the Contractor shall check the air induction heating elements and space heating elements at all pump stations. Replace defective heating elements, if any, check and lubricate, if necessary, fan motors and damper mechanisms, check thermostat and settings and clean the finned heating element and fan inlets.

### **8.10.2 Yearly AEGIS Alarm System Inspection - All Stations**

During January of each year, the Contractor shall test the AEGIS alarm system by transmitting all the possible alarm codes for each station. Note that each station has an individual listing for zone 2 alarms. Each item that is incorporated into a zone 2 alarm shall be checked. The low level alarm shall be checked by continuity test or by jumpering the relay. All results shall be entered in the log book for each station, in chart E. A copy of each log P-1 shall be included in January routine maintenance work documentation book for each year.

### **8.10.3 Yearly SCADA Inspection and Documentation – All Stations**

A minimum of fifteen (15) stations are due monthly in January, February, and March, with the program to be completed during April of each year. Each station shall be inspected in the same month in the second year of the Contract, if renewed.

The Contractor shall physically inspect all equipment and wiring, and record on log P-100 the digital inputs/outputs, and analog inputs for the SCADA system. Create tickets for any deficiencies found on this inspection and enter the numbers on the inspection report, log P-100. When repairs are complete, the log P-100 reports shall be included in the monthly routine work submittal.

The Contractor shall inspect the primary, and where applicable, the secondary water level monitoring systems in each station. The Engineer shall be present for each inspection. This work shall consist of physically measuring the water level in the wet pit and comparing that value with the primary and secondary reactive air system of the SCADA unit, the bubbler system implemented into the MCC, and the TLC water level monitoring system. The Contractor shall use the Meri-Cal air pressure calibration device with an associated hand pump, fittings, and valves required to calibrate the primary, secondary reactive air system and other bubbler systems. The Contractor shall use the calibration device any time calibration of the above equipment is required during the contract year.

This inspection shall also include the inspection of the trash rack and creek levels reactive air systems. Create tickets for any deviations over 1/2 foot and enter the numbers on the report log P-100. All work required on the SCADA system shall be coordinated with the Engineer and completed by SCADA specialized Contractor personnel.

After the inspection the Contractor shall download system control information (pull in a new image) and download the archive of the main pump starts and stops. The files shall be included with the monthly routine work submittal on a USB flash drive.

#### **8.10.4 Yearly Wet Pit Inspection – All Stations**

A minimum of six (6) stations are due per month from April through October with the program to be completed during November of each year. Each station shall be inspected in the same month in the second and third year of the Contract, if renewed.

The Contractor shall complete the wet pit inspection of all pump stations. The Contractor shall use his own portable pump to draw down the wet pit to a low level and maintain the existing inflow water in the wet pit. The Contractor shall:

- Inspect all grease lines to ascertain if any are broken, clogged, or not secured
- Inspect the integrity of all equipment attached to the structure such as the air bell, air line and the floats
- Inspect the floats for operational efficiency, and clear them of any debris
- Inspect the probes for operational efficiency, and clear them of any debris
- Take a photograph (8.0 Mega Pixel digital camera & flash) of any bowl assemblies that show any wear on the impeller and/or if the suction is clogged with debris. The photos shall be appropriately labeled and placed in a sheet album with the station report, log P-9
- Inspect the silt accumulation and document levels
- Visually inspect the inlet sewer from inside of the pump station
- Maintain existing wet pit lighting, clean lens and reflectors.

Each report, including photo album, shall be included with the monthly routine work submittal. The Contractor shall create tickets for any deviations found and enter the numbers on the report log P-9.

#### **8.10.5 Yearly Pump Control System Inspection – All Stations**

A minimum of fifteen (15) stations are due per month from January through March with the program to be completed during April of each year. Each station shall be inspected in the same month in the second year of the Contract, if renewed.

The Contractor shall inspect all pump control systems within all pump stations. The Engineer shall be present for each inspection. This work shall include inspection of a bubbler, electrode, and float systems, whichever secondary control system is utilized. The inspection shall consist of all starts, stops and alarm control elevations. Any control elevations which are different than the required elevations shall be noted and corrected, and shall record silt level in the wet pit in report.

The Contractor shall create tickets for any deficiencies found on this inspection including excessive silt build up and enter the numbers on the inspection report, log P-6. Each report shall be included with the monthly routine work submittal.

#### **8.10.6 Yearly Pump Station Inspection and Maintenance – All Stations**

A minimum of four (4) stations are due per month, January through November, with program to be completed during December of each year.

The Contractor shall conduct an annual comprehensive inspection of the electrical and mechanical equipment at each pump station using log P-4 and shall:

- dispose of any debris found on the grounds
- remove or paint over graffiti with comparable paint
- for stations with flat roofs drain any large recessed areas of standing water.
- remove any debris build up in gutters, drains or down spouts
- replace any glass blocks or broken windows
- patch or repair cracks found in concrete
- clean all cabinets, walls, motors and equipment by wiping with a damp cloth
- wash floors with a mop or a suitable floor cleaner
- lubricate exposed trolley drive pinion and wheel teeth
- repair all failed caulk around windows, lintels, doors, and ventilation components
- seal all gaps or openings between structures and concrete or blacktop with material in accordance to manufacturer specifications
- Check and note any rusting on the generator and its enclosure
- Prepare, prime, and paint rusting metal (to match existing paint)

The Contractor shall create tickets for any deficiencies found on this inspection and enter the numbers on the inspection report, log P-4. A re-inspection will be scheduled by the Engineer following completion of any necessary repair work. When repairs are complete the P-4 reports shall be included in the monthly routine work submittal. The stations shall be inspected in the same month in the second and third year of the Contract, if renewed.

#### **8.10.7 Yearly Pump Station Roof Inspection and Maintenance – All Stations**

Once per year, in July to August, the Contractor shall conduct annual roof inspections and maintenance. The Contractor shall remove all debris and conduct a roof inspection and perform preventive maintenance work including repair as requested by the Engineer.

The Contractor shall thoroughly clean the roof surface of dirt, debris, and contaminants and shall assure proper drainage and repair hole or cracks, loose or dry laps, loose fasteners, buckles, wrinkles, ridges, etc.

Tickets shall be created for any deficiencies found on this inspection and numbers entered on the inspection report, log P-4R. A re-inspection will be scheduled with the Engineer following completion of any necessary repair work. When repairs are complete the P-4R reports shall be included in the monthly routine work submittal.

The Contractor shall perform roof repairs as described below under routine maintenance:

##### **Small Holes and Cracks:**

Clean surface, apply mastic (roof cement) 1/8" to 1/4" thick into the hole or crack using a roofer's trowel or gloved hand, working the mastic into the opening and 2 to 4 inches beyond.

##### **Large Holes and Cracks:**

For damaged areas larger than ¼” repair, clean surface, use self-adhering SBS Modified Asphalt Membrane by peeling off the backing and pressing it onto the area to remove any entrapped air. A coating of mastic (roof cement) shall be applied over all repaired areas.

**Loose or Dry Laps, Fishmouths, Buckles, Wrinkles, Ridges:**

Cut defective material back to an adhered area. Repair area as needed with mastic and/or membrane and mastic as stated above.

**Loose Mechanical Attachment, Termination Bar:**

Remove loose fasteners. Re-secure base flashings (or new flashing material) through tin discs of a larger diameter or fastened to an adjacent location (new hole).

**8.10.8 Yearly Pump Capacity, Motor Current, Voltage, Moisture, Megger Test – All Stations**

A minimum of eight (8) stations are due per month, January through May, with program to be completed by June of each year.

The Contractor shall conduct a pump capacity, motor running current, voltage measurement, megger, and Yeoman submersible pump moisture tests. The Contractor shall also utilize the services of the specialty services subcontractor for this test. The Contractor shall be responsible for providing or storing water for testing, not to exceed high level elevations.

The Contractor shall provide all necessary equipment, tools, material and labor to set up the pumping stations for capacity testing using either the recirculation method, wet pit draw down method or the discharge chamber method with discharge sewer and recirculation gates closed, as applicable for the station.

Prior to testing, record all necessary name plate information for pump and motor. Pump testing will require the presence of at least two personnel equipped with radio communications and measuring tape and block.

A draw down test shall be done in all the pump stations. Record flow meter reading and measure accumulated pumped water in the discharge chamber where sluice gates are present to store water in the discharge chamber. The pumps shall be tested for at least for 1 minute duration. Record all readings, including full load current, RPM on vertical pumps, flow reading and water level change. The testing shall be performed with the Pump Station technician present.

The following data shall be recorded and submitted to the Engineer on log P-5:

- Water depth
- TDH
- Capacity
- Vibration
- Current
- Voltage
- Insulation resistance to ground
- Pressure



In addition, the Contractor shall megger all motor windings and feeder cables. Any reading below 1 M ohm will require the Contractor to determine the source or cause of the low reading and make prompt repairs as required. A copy of the log P-5 shall be kept in the log book. Create tickets for any deficiencies found on this inspection and enter the numbers on the inspection report, log P-5. A copy of the results of the capacity and megger test on log P-5 shall be submitted to the Engineer on a USB flash drive as part of the monthly routine work submittal. The stations shall be re-inspected in the same month in the second year of the Contract, if renewed.

The Contractor shall retrieve all archived data from the pump station PLC upon completion of the pump capacity test and shall submit the archived data on a USB flash drive to the IDOT Engineer.

Pumps testing below 80% shall be immediately re-tested and confirmed for low capacity. The Contractor shall submit a list of all low capacity pumps found with the test results at the end of the month.

**8.10.9 Yearly Impeller Adjustment of Vertical Axial Flow Pumps  
PS # 2, 3, 4, 25, 29, 33, 35**

This work must be done in January and February. This adjustment shall be done only when pumps do not perform according to their design.

The vertical axial flow pumps shall be checked for proper impeller settings in accordance with manufacturer's specifications. This work shall include dropping the suction bell to inspect the wear ring and impeller for wear. The Contractor shall record "as found" measurements, record the adjustment setting on log P-5 and include it in the monthly routine work submittal.

**8.10.10 Yearly Submersible Pump Inspection**

**PS # 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 51, 52**

A minimum of five (5) stations are due per month from July through October with the program to be completed during November of each year

The Contractor shall remove, inspect and service all submersible pumps, each contract year. Service work shall include an oil change, checking and recording the clearance between impeller and wear ring, and an inspection of cooling jacket passageways to assure no blockage would cause low water flow and high temperature. This work shall be done in accordance to manufacturers' specifications and instructions. Create tickets for any deficiencies found on this inspection and enter the numbers on the inspection report, log P-8.

#### **8.10.11 Yearly Oil Analysis - All Stations**

A minimum of twelve (12) stations are due per month, from July through October.

The Contractor shall obtain suitable test containers from an approved lab facility. The Contractor shall collect oil samples from the motor upper and lower bearing compartments, dry pit/wet pit submersible pumps and all generators. The oil shall be drawn from the equipment reservoir. The oil should drain for a few seconds before collecting the sample. A minimum of two (2) ounces of oil shall be used for analysis. Do not use the same container for different equipment or for different compartments of the same equipment.

Samples shall be taken after running the motor, pump or engine or within fifteen minutes after the equipment is turned off. This work shall be done along with the capacity and vibration test.

The Contractor shall provide the laboratory with the brand and type of oil, type of equipment from which the sample was taken, number of days since the last oil change, and any suspected abnormalities in the equipment. Each sample of oil shall be identified with the equipment and compartment from which the sample was taken. The Contractor shall ship the oil samples to the lab facility within one month of collection.

The lab facility shall conduct a wear particle analysis to determine:

- Wear metals
- Contaminants
- Additives elements
- Viscosity
- Solid percent volume
- Water percent volume
- Fuel where required
- Particle counting and direct reading ferrography

The Contractor shall create tickets for any deficiencies found from the lab testing and submit the lab reports to the Engineer on a USB flash drive with operating software that can utilize existing data for trending. A condition summary report shall be submitted on paper. Based upon the lab report, the Engineer may request additional analytical ferrography testing. The oil shall be changed if the lab results indicate that the oil is contaminated. All charges for lab work, shipping, and changing of oil etc., shall be covered under routine maintenance. A summary of the report shall be submitted to the Engineer via email at the end of the program.

#### **8.10.12 Yearly Main Circuit Breaker Testing Inspection**

**PS # 25, 28, 29, 32 and 41 to be inspected during May of 2019, and PS # 9, 50, 52, 31 and 44 to be inspected during May of 2020, and PS# 13, 16, 12, 7 and 36 to be inspected in 2021**

The Contractor shall obtain an approved engineering services company for testing the main circuit breakers, branch circuit breakers and motor starters in three (3) pump stations each year. The IDOT Engineer shall be notified at least twenty-four hours in advance to witness the tests. The Contractor shall coordinate with the electrical utility to turn power off and on where required. The Contractor shall furnish the test set and operator along with all necessary fittings, cables and connectors to connect the test set to the circuit breakers. Prior to testing, a general clean up of the buses and cabinets are required.

Testing shall consist of visual and electrical tests as shown on log P-7. Overcurrent relays and dash pots shall be inspected where present, and are to be set as directed by the Engineer. The inspection and testing shall also include the trip unit, contact resistance and insulation tests. Create tickets for any deficiencies found on this inspection, and enter the numbers on the inspection report, log P-7. The reports shall be submitted via email at the end of the program.

#### **8.10.13 Yearly Flow Meter Inspection**

**PS # 4, 5, 7, 9, 10, 17, 21, 22, 23, 24, 25, 28, 29, 30, 33, 34, 35, 39, 46, 47, 50**

A minimum of five (5) stations due per month from July through October with the remainder of the program to be completed during November of each year

The Contractor shall remove the meter heads out of the line and check the mechanism, note the condition of the pipe and straighten the vanes. The meter head shall be examined, cleaned, and parts replaced per manufacturer recommendations. Create tickets for any deficiencies found on this inspection.

The transmitter and receiver shall be tested and calibrated by a factory certified/approved representative.

#### **8.10.14 Yearly Fire Alarm Systems Inspection**

**PS # 2, 3, 5, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 39, 41, 42, 43, 44, 46, 47, 48, 50, and 52**

A minimum of nine (9) stations due per month from July through October with the remainder of the program to be completed during November of each year.

The Contractor shall furnish a factory trained service representative and shall use factory authorized testing equipment for all testing procedures, to complete a comprehensive fire alarm system inspection and maintenance in accordance with NFPA 72 Chapter 7 and as recommended by the manufacturer.

All fire extinguishers in the forty eight- (48) pump stations shall be hydrostatically tested in 2019 and inspected yearly in accordance with NFPA 10

Upon completion of the inspections, a written report shall be submitted to the Engineer. This report shall identify all devices that were tested as well as any corrective measures that are recommended. Create tickets for any deficiencies found on this inspection and enter the numbers on the inspection report.

#### **8.10.15 Yearly Motor Control Center Inspection – All Stations**

A minimum of four (4) stations due per month, January through November, with program to be completed during December of each year

The Contractor shall perform the following inspection:

- A. Clean enclosure and control equipment by blowing out with low air pressure or vacuuming
- B. Check and clean contacts, relays and timers and visually inspect for damage or out of adjustment parts. Remove all dust off of electrical devices and equipment.
- C. Check motor control center indicating lamps and all switches and push buttons
- D. Circuit breaker maintenance:
  - Check connections
  - Exercise breaker
  - Check trip setting
- E. Motor Starter Contact Maintenance:
  - Check contacts and burnish or replace, if necessary
  - Check coil and clean
  - Inspect arc chute for cracks or burns
  - Check contact pressure and measure contact resistance on all 3 phases
- F. Oil Dash Pots:
  - Check oil levels
  - Inspect settings
- G. Inspect wiring/conductors for overheating and discoloration
- H. Check sizing of motor overload heaters
- I. Check tightness of wire terminations and connections
- J. Check for proper labeling, provide and install missing labels
- K. Check wire tags/labels, provide and install missing tags or labels
- L. Check fans for proper operation and clean filters
- M. Check fuse disconnects for proper operations, keep fuse clips clean and tight
- N. Check fuses for proper size, and overheating
- O. Test equipment ground system of the station

Create tickets for any deficiencies found on this inspection and enter the numbers on the inspection report.

#### **8.10.16 Asset Inventory**

The Contractor shall update an Engineer supplied Asset Inventory by Location to an Excel Spreadsheet and submit in the Routine Maintenance November submittal (due by December 7, 2019). The Contractor shall keep current the Asset Inventory monthly during this Contract, update each time there is a change in equipment (recorded on a Disposition Log and Transaction Summary), and submit in the Routine Maintenance submittal.

**8.10.17 Yeoman/KJI/Grundfos Pump Maintenance - Year 2019 Only**

**PS # 5, 7, 21, 24, 27, 29, 30, 42, 48**

In June 2019, the low flow Pumps at PS 5, 21, 24, 27, 29 and 30 and all of PS 7, 42 and 48 the Contractor shall:

- Drain, flush and refill the seal chamber with new oil
- Inspect oil for water intrusion in the motor seal chamber
- Inspect the cable for any signs of abrasion or damage
- Inspect the impeller and casing wear ring
- Notify the Engineer in advance of this scheduled work
- Create tickets for any problems found during the inspection

**8.10.18 Yearly Generator Maintenance**

**PS # 9, 11, 15, 18, 19, 24, 28, 34, 36, 39, 41, 42, 47**

**Two in EMC spare equipment**

**Base Stations**

**Six Moveable Bridges**

**IDOT Schaumburg Headquarters**

**Traffic Systems Center**

**Rodenburg Maintenance Yard**

**9 Communication Huts**

The Contractor shall perform inspection and maintenance required for the standby generators in October of each year as follows:

- Change oil and oil filters
- Drain, flush, and replace coolant
- Replace cooling system hoses in 2019
- Replace thermostats in 2019
- Replace fan belts in 2019
- Check and adjust valves as necessary
- Conduct operational inspection to insure proper valve rotation
- Check fan hub
- Check pulley
- Check water pump
- Change the day tank breather
- Clean or replace the crankcase breather
- Change fuel filter
- Drain sediment from the fuel tank
- Clean accumulation of grease, oil and dirt on set
- Lubricate generator bearing
- Check vibration isolators for proper adjustment and conditions
- Check circuit breaker and transfer switch, and test equipment by simulating a power outage

- Check turbo pressure, adjust if necessary to manufacturer specifications
- Provide fuel system service to perform fuel polishing only in 2019.
- Record inspection on log P-10 in the log book and submit a copy of the report with the monthly routine work submittal
- Tickets shall be created for any problems found
- Check and note any rusting on the generator and its enclosure
- Prepare, prime, and paint rusting metal (to match existing paint)

**8.11 Pump Station Non-Routine MAINTENANCE**

The Contractor shall be advised that several routinely maintained items such as, but not limited to, the gas detector inspection, automatic transfer system service, adjustment of existing controls, removal and replacement of gas sensors, intrusion override key switch, motor balancing, SCADA equipment, motor inspection, pump re-building type 1-6, SCADA radio equipment inspection, pump station SCADA radio inspection, switchgear system inspection, pump repair and pump replacement, vibration testing and analysis, cleaning of wet pit, and wet pit power wash, are found in Section 2 Special Provisions and Programs.

**8.12 Logs and Forms**

A sample of logs and forms as required for this Contract will be available at the Pre-Construction Meeting.

**8.13 Tables**

The Contractor shall update and maintain all tables to be true and accurate. The Contractor shall submit updates of a minimum of 6 pump stations per month starting in February and all must be completed by the end of October.

**8.14 EQUIPMENT LOCATIONS INCLUDED IN LIGHTING ROUTINE MAINTENANCE**

Review Section 3

TABLE P-1 PUMP STATIONS									
PS#	CITY	MAIN ROUTE	CROSS ST	RAILROAD	WATERWAY				
GPM	CFS								
1	RESERVED FOR FUTURE								
2	NORTHFIELD	I 94 EDENS	WINNETKA RD	NONE	SKOKIE	68100	148		
3	CHICAGO	I 94 EDENS	CALDWELL/PETERSON	NONE	N. BR	88000	191		
4	FOREST PK	I 290	E. OF 1ST AVE	NONE	DES PLAINES	90000	201		
5	CHICAGO	I 290	DES PLAINES AVE	NONE	CHICAGO RV	38000	85		
6		Reserved for							
7	CHICAGO	I 290	WELLS ST PLAZA	NONE	CHICAGO RV	6000	13		
8	DES PLAINES	US 14	1/2 MILE E. OF IL RT 45	WIS.	WELLER	3000	7		
9	STONE PK	US 45	LAKE ST	NONE	ADDISON	24000	53		
10	NILES	US 14	MILWAUKEE AVE	NONE	SEWER	1200	3		
11	OAK FOREST	IL 50 CICERO	158TH STREET	NIRC	MIDLOTHIAN	5400	12		
12	MELROSE PK	IL 64 NORTH	W. OF 25TH AVE	BRC	27"SS SILVER	11000	25		
13	SKOKIE	US 41	SO. OF OAKTON AVE	SKOKIE	OAKTON	11000	25		
14	RIVERDALE	WOOD /	139TH STREET	IHB & BRC	LITTLE	11000	25		
15	CHICAGO	79TH ST	KEDZIE AVE	NS	SEWER ON	5500	12		
16	ROSEMONT	IL 72 HIGGINS	E. OF MANNHEIM RD	Wisconsin	WILLOW	5400	12		
17	DES PLAINES	IL 58 GOLF	E. OF DES PLAINES RV	Union Pacific	DES PLAINES	8775	19		
18	SO. HOLLAND	US 6 159TH	SOUTH PARK	U.P.	LITTLE	5800	13		
19	OAK FOREST	US 6 159TH	IL 50 (CICERO AVE)	NIRC	MIDLOTHIAN	7000	16		
20	HILLSIDE	I 290	W. OF WOLF RD	NONE	SEWER	7900	13		
21	CHICAGO	I 94 DAN	72ND ST	NONE	SEWER	32000	71		
22	CHICAGO	I 90 / 94	FULTON AVE	C & NW, SOO	SEWER	60000	134		
23	CHICAGO	I 90 / 94	ROSCOE ST	NONE	SEWER	72000	160		
24	ROSEMONT	I 190	E. OF MANNHEIM RD	WIS.	DES PLS RV	111000	247		
25	BRIDGEVIEW	US 12 / 20	IL 43 (HARLEM AVE)	BRC	STONE	37200	83		
26	CHICAGO	I 90 / 94 DAN	ROOSEVELT RD	NONE	SB CHICAGO	73200	159		
27	CHICAGO	I 94 CALUMET	110TH ST	NONE	LAKE	240000	535		
28	CICERO	IL 50 CICERO	US 34 (OGDEN AVE)	BURLINGTON	SEWER ON	31800	71		
29	CHICAGO	I 90 / 94 DAN	WALLACE ST	NONE	SO. BR	108000	241		
30	CHICAGO	I 55	HOMAN AVE	ATSP	SAN. SHIP	40000	89		
31	OAKLAWN	111TH ST.	CENTRAL	B&O RR		7400	16.5		
32	MELROSE PK	IL 64 NORTH	1ST AVE	SOO LINE	DES PLAINES	9600	21		
33	PROSPECT	PALATINE RD	MILWAUKEE AVE	NONE	DES PLAINES	64000	143		
34	ELMHURST	I 290	EMROY AVE	NONE	SEWER TO	11000	25		
35	BLUE ISLAND	I 57	127TH ST	NONE	CAL SAG	112500	251		
36	TINLEY PK	IL 43 HARLEM	176TH STREET	NIRC	DITCH	22500	50		
37	LAKE BLUFF	US 41	IL 176 (ROCKLAND RD)	NONE	SKOKIE RV	6000	13		
38	LAKE FOREST	US 41	DEERPATH AVE	NONE	SKOKIE RV	5000	11		
39	LAKE FOREST	IL 60	W. OF IL 41	SOO LINE	36" SS	6000	13		
40	MUNDELEIN	US 45 LAKE	N. OF IL 60	EJ & E	SEWER	2400	5		
41	KNOLLWOOD	US 41	N. OF IL 176	EJ & E	SKOKIE RV	6000	13		
42	HAMPSHIRE	IL 47	IL 72	SOO LINE	SEWER TO	3000	7		
43	GURNEE	US 41	N. OF IL 132	SOO LINE	DES PLAINES	6000	13		
44	ELMHURST	IL 83	SO. OF NORTH AVE	ICG & C & NW	SALT CREEK	5000	11		
45		Reserved for							
46	HIGHLAND PK	US 41	CLAVEY RD	NONE	E. SKOKIE DR	7600	17		
47	NAPERVILLE	IL 59	NORTH AURORA AVE	BURLINGTON	SEWER TO	10000	22		
48	WARRENVILLE	IL 56	W. OF IL 59	E J & E	FERRY	8950	19		
49		Reserved for							
50	HIGHLAND PK	IL 22 HALF	US 41	UNION	E. SKOKIE	4800	11		
51	ALSIP	127TH ST	E. OF CRAWFORD	CSX	STONY	6800	15		
52	PLAINFIELD	IL59	IL 126	E.J. & E. RR					

**TABLE P-2A PUMP STATION CONSTRUCTION HISTORY & REFERENCE NOTES**

PS #	INSTALL DATE	NOTE REF. NO.	STATION TYPE	SECONDARY SERVICE	PUMP CONTROL			ALARM TYPES		CAP MET
					PRIM	SEC(1)	TERTIARY	AEGIS	SCADA	
2	1951/72/95	3,5,8,9,23	WET PIT	2ES FAT	CL	FLOATS		AEGIS	SCADA	
3	1951/72/95	3,5,8,9,23	WET PIT	2ES FAT	CL	FLOATS		AEGIS	SCADA	
4	1951/71	2,3,7,8,10,22	WET PIT	2ES SBAT	CL	BUBBLER	PROBES	AEGIS	SCADA	YES
5	1965/2005	2,7,8,10,22	WET PIT	2ES SBAT	CL	FLOAT		AEGIS	SCADA	YES
7	2014	8,9	WET PIT	2ES FAT	CL5000	FLOAT		AEGIS	SCADA	YES
8	1928/87/88	22,25,13	WET PIT	-	LIQ. V	FLOAT		AEGIS	SCADA	
9	1977	1,3,7,11,23,24	DRY PIT	GEN(D)	CL5000	FLOAT		AEGIS	SCADA	YES
10	1990	3,5,9,23	DRY PIT	2ES FAT	CL5000	FLOAT		AEGIS	SCADA	YES
11	1934	5,11,24,25	DRY PIT	GEN (D)	CL5000	FLOAT		AEGIS	SCADA	
12	1934/72	9,20	DRY PIT	2ES FAT	CL	FLOAT		AEGIS	SCADA	
13	1934	5,9,24,25	DRY PIT	2ES FAT	CL	FLOAT		AEGIS	SCADA	
14	1934/72	20,22,25	DRY PIT	-	LIQ. V	FLOAT		AEGIS	SCADA	
15	1940	11(P),24	DRY PIT	GEN(D)	CL	FLOAT		AEGIS	SCADA	
16	1934	5,9,20	DRY PIT	2ES FAT(P)	CL	FLOAT		AEGIS	SCADA	
17	1931/91	3,5,9,23,24	WET PIT	2ES FAT	CL	FLOAT		AEGIS	SCADA	YES
18	1942	24,25	DRY PIT	GEN (D)	CL	FLOAT		AEGIS	SCADA	
19	1948	11(P),24,25	DRY PIT	GEN (D)	CL5000	FLOAT		AEGIS	SCADA	
20	1958/86	5,8,9,24	WET PIT	2ES FAT	CL	FLOAT		AEGIS	SCADA	
21	1960/2004	7,8,9,15,22,25	WET PIT	2ES FAT	CL5000	FLOAT		AEGIS	SCADA	
22	1970/96	2,3,5,8,12,23	WET PIT	2ES SBFAT	CL	FLOAT		AEGIS	SCADA	
23	1970/96	2,3,5,8,12,23	WET PIT	2ES SBFAT	CL	FLOAT		AEGIS	SCADA	YES
24	2014	3,7,8,19,22	WET PIT	GEN(D)	CL5000	FLOAT		AEGIS	SCADA	YES
25	1962	3,7,9	WET PIT	2ES FAT	LIQ. V	BUBBLER	PROBES	AEGIS	SCADA	YES
26	1962/72/2014	3,8,9,12,19	WET PIT	2ES SBFAT	CL5000	FLOATS		AEGIS	SCADA	YES
27	1961/2015	3,5,8,9,16,23	WET PIT	2ES FAT	CL	BUBBLER	PROBES	AEGIS	SCADA	YES
28	1961/2000	3,5,11,23	WET PIT	GEN(D)	CL	FLOATS		AEGIS	SCADA	YES
29	1962	7,8,10	WET PIT	2ES SBAT	CL	BUBBLER	PROBES	AEGIS	SCADA	YES
30	1963	3,5,8,9,16,22	WET PIT	2ES FAT	CL5000	FLOATS		AEGIS	SCADA	
31	1999	3,5,16,28	WET PIT	2ES FAT	CL	FLOATS		AEGIS	SCADA	YES
32	1963	9	DRY PIT	2ES FAT	CL	FLOATS		AEGIS	SCADA	
33	1975	3,9,33	WET PIT	2ES FAT	CL	BUBBLER	PROBES	AEGIS	SCADA	YES
34	1961/90	3,5,8,11,23,24	DRY PIT	GEN(D)	CL	FLOAT		AEGIS	SCADA	YES
35	1967	2,3,8,9,12	WET PIT	2ES FAT	CL5000	FLOATS		AEGIS	SCADA	YES
36	1972	1,18,23	DRY PIT	GEN(D)	CL	FLOATS		AEGIS	SCADA	
37	1937	9,22,24,25	DRY PIT	2ES FAT	LIQ. V	FLOAT		AEGIS	SCADA	
38	1937	24	DRY PIT	-	LIQ. V	FLOAT		AEGIS	SCADA	
39	1990	3,5,11,23,24	WET PIT	GEN(D)	CL	FLOAT		AEGIS	SCADA	YES
40	1985	3,9,23	WET PIT	2ES FAT	CL	FLOAT		AEGIS	SCADA	YES
41	1937	22,24,25	DRY PIT	GEN(D)	CL	FLOAT		AEGIS	SCADA	
42	1935/86/87/95	5,11,12,23	WET PIT	GEN(D)	CL	FLOAT		AEGIS	SCADA	YES
43	1936	3,5,9,15,23	DRY PIT	-	CL	FLOAT		AEGIS	SCADA	
44	1938/00	5,16,23,24	DRY PIT	2ES FAT	CL	FLOATS		AEGIS	SCADA	YES
45										
46	1993	2,3,5,9,23	WET PIT	2ES FAT	CL	FLOAT		AEGIS	SCADA	YES
47	2014	3,5,11,16,23	WET PIT	GEN(D)	CL5000	FLOAT		AEGIS	SCADA	
48	2014	3,5,11,23	DRY PIT	GEN(D)	CL	FLOAT		AEGIS	SCADA	YES
49				-						
50	1985	3,9,23	DRY PIT	2ES FAT	CL	BUBBLER	FLOAT	AEGIS	SCADA	YES
51	1984	3,9,23	DRY PIT	2ES FAT	CL	BUBBLER	FLOAT	AEGIS	SCADA	YES
52	2002	16,9	WET PIT	2ES FAT	CL	FLOAT		AEGIS	SCADA	



**Pumping Station Construction History & Reference Notes**

- 1 N/A
- 2 PS #4(2), 5,21,22,23,24,26,28, 35(2) & 46 HAVE AUTOMATIC TRASH RACKS
- 3 PUMPING STATIONS # 2, 3, 4, 5,7, 9, 10, 17, 21, 22, 23, 24, 25, 26, 27,28, 30, 31, 34, 35, 39, 40, 41, 43, 44, 46,47,48, 50 & 51 HAVE WATER RECIRCULATING SYSTEMS
- 4 ALL PUMPING STATIONS HAVE AEGIS ALARM TRANSMITTERS
- 5 INSTALLATION OF NEW PUMPS, ELECTRICAL CONTROLS AND BLDG RENOVATION# 2,3,5,7,9,10,11,13,15,16,17,18,20,21,22,23,24,26,27,28,31,34, 36,
- 6 N/A
- 7 PUMP STATIONS HAVING STAND-BY COMPRESSED AIR TANKS FOR BUBBLER CONTROL ARE:
- 8 EXPRESSWAY PUMPING STATIONS: TOTAL 18 I-55(30) I-57(35) I-290(4,5,7,20,34) BISHOP FORD(27) DAN RYAN(21,26,29) EDENS(2,3) KENNEDY(22,23,24)
- 9 TWO ELECTRIC SERVICES FULL AUTOMATIC TRANS. (2ES FAT) STATIONS ARE: 2,3,5,7,10,12,13,16,17,20,21,22,23,24,25,30,31,32,33,35,37,40,43,44,46,47,50,51,52
- 10 TWO ELECTRIC SERVICE SPLIT BUS AUTOMATIC TRANSFER (2ES SBAT) STATIONS ARE: 4,29
- 11 STAND-BY GENERATOR, D=DIESEL  
PUMP STATION NUMBERS: 9(D), 11(D),15(D), 18 (D), 19(D), 24(D),28(D), 34(D), 36(D), 39(D), 41(D), 42(D), 47(D),48(D) AND TWO (3) MOBILE GENERATORS 34(D), 36(D)
- 12 MAIN TIE MAIN SCHEME 22,23, 24, 26, 27 & 35
- 13 PS8: ACCESS IS LIMITED AND REQUIRES LANE CLOSURE FOR PREVENTIVE MAINTENANCE AND ROUTINE MAINTENANCE ITEMS.
- 14
- 15 PUMPING STATIONS PROGRAMMED FOR CONSTRUCTION 37, 38, 8, 25, 4, 33,12
- 16 PUMP STATIONS UNDER CONSTRUCTION PS 24, 14
- 17 PUMP STATION 2 AND 3 HAVE TWO ADDITIONAL LOW FLOW PUMPS EACH
- 18 PUMP STATIONS THAT HAVE INTERCHANGEABLE LOW FLOW PUMPS ARE PS 5 AND PS 21
- 19 WATER RECIRCULATION IS POSSIBLE, BUT CURRENTLY NOT USABLE AT PS 33
- 20 PS12 HAS COMMON DISCHARGE
- 21
- 22 THE FOLLOWING PUMPING STATIONS ARE UNDER IMPROVEMENT PROGRAM; 4,8,14,12
- 23 PUMP STATIONS THAT HAVE A STANDBY PUMP: 2,3,5,9,10,21,22,23,27,28,30,31,34,35,36,39,40,41,42,43,44,46,47,48,50, 51 & 52
- 24 PUMP STATIONS HAVE INTERCHANGEABLE PUMPS: 11,15,18,19,20,31,37,38,39,41,44,48, BUT DIFFERENT IMPELLER SIZES/VOLTAGE

**GENERAL ABBREVIATION CODES:**

**PUMP COMPANY ABBREVIATIONS**

AB ABS PUMP CO.  
AC ALLIS CHALMERS  
AV AURORA PUMP CO.  
CA CASCADE PUMP CO.  
CO CORNELL MFG. CO.  
CP CHICAGO PUMP  
CY CLOW YEOMANS, GRUNDFOS  
EB EBARA PUMP CO.  
FL FLYGT PUMP CO.  
FM FAIRBANKS MORSE CO.  
JP JOHNSTON PUMP CO.  
PA PATTERSON  
PE PEERLESS PUMP CO.  
SC SCAN PUMP CO.

**PUMP REBUILD HISTORY CODES**

N NEW PUMP  
R REBUILT PUMP  
O ORIGINAL  
RWK REWORK  
NS NEW SPARE BOWL  
J JUNK

**PUMP TYPE CODES**

VA VERTICAL AXIAL  
S SUBMERSIBLE  
SVD SIDE VOLUTE DISCHARGE  
DPS DRY PIT SUBMERSIBLE  
LF LOW FLOW PUMP  
ST SUBMERSIBLE TUBE TYPE PUMP

**TABLE P-3 PUMP SPECIFICATIONS**

MAIN PUMPS								LOW FLOW PUMPS						
PS	MAIN	STANDBY PUMP	PUMP	PUMP	DSC	MOTOR ENG	CURRENT FL	LOW FLOW		PUMP	PUMP	DSCH	MOTOR ENG	CURRENT FL
NO	(QTY)	(GPM)	TYPE	SIZE	SIZE	VLT/PHASE/RPM	AMPS/HP	QTY	GPM	TYPE	SIZE	SIZE	VLT/PHASE/RPM	AMPS/HP
2	4	13200	VA	24	24	460/3/892	181/150	1/2	9200/2650	VA/S	18	20/12	460/3/1188	152/125/41
3	4	17500	VA	30	30	460/3/709	273/200	1/2	9550/4000	VA/S	18	20/12	460/3/1188	120/100/60
4	9	10000	VA	20	24	480/3/1200	227/200	-	-					
5	5	7000	ST	20	16	480/3/1165	117/100	1	3000	S	12	12	480/3/875	79/60
7	3	3250	S	12	14	480/3/1165	70/25	1	-	S			480/3/	10/14
8	2	1500	S	8	8	240/3/890	50/20	-	-					
9	4	8000	DPS	16	18	480/3/700	224/175	1	3500	DPS	12	12	480/3/875	160/60
10	3	640	DPS	6	6	460/3/1750	20/14.8	2	290	DPS	4	4	480/3/1750	9/6.4
11	2	2700	DPS	12	12	230/3/860	80/30	-	-					
12	2	5500	DPS	14	14	230/3/875	159/60	-	-					
13	2	5500	DPS	12	14	230/3/890	160/60	-	-					
14	2	5500	SVD	14	14	230/3/875	98/20	-	-					
15	2	2750	SVD,DPS	10	12	230/3/860	54/20, 80/30	-	-					
16	2	2700	DPS	10	12	480/3/1170	-/25	-	-					
17	2	4200	S	14	16	460/3/875	60/60	1	375	S	4	4	480/3/	
18	2	2900	DPS	12	12	230/3/870	80/30	-	-					
19	2	3500	DPS	10	12	230/3/860	80/30	-	-					
20	2	3950	S	12	14	480/3/860	41/30	-	-					
21	4	10700	S	-	-	480/3/175	207/175	1	3000	S	10	12	460/3/880	82.5/60
22	5	15000	S	-	30	480/3/1175	230/189	2	2500	S	8	12	480/3/1160	437/54
23	6	14400	S	-	32	480/3/875	196/153	2	2500	S	10	12	480/3/1160	74/52
24	7	22200	S	24	30	480/3/710	300/315	2	6000	S	6	6	480/3/1160	117/100
25	6	6000	VA	20	24	480/3/1175	49.5/40	1	1200	S	6	10		-/15
26	7	10000	ST	20	20	480/3/1200	138.5/125	1	3200	S			480/3/1200	75/119
27	8	30000	ST	36	36	4160/3/708	550	2	2500	S	8	12	460/3/1160	77/60
28	4	8000	DPS		14	460/3/880	90	2	3000	S		12	460/3/1160	/30
29	6	18000	VA	36	30	480/3/705	422/350	2	2700	S	8	12	460/3/1160	92/75
30	3	13300	S	50	20	460/3/885	170	1	2800	S	8	12	460/3/1165	67/50
31	2	3050	S		12	460/3/1180	0/160	2	1300	S		8	460/3/1170	/35
32	2	4800	SVD	14	14	440/3/695	55/40	-	-					
33	6	9000	VA	18	20	480/3/1175	140/125	1	10000	VA			480/3/1180	144/125
34	3	5050	DPS	12	16	460/3/1150	81/60	-	2000	DPS	12	12	480/3/1180	34/25
35	5	22500	VA	30.5	36	480/3/700	345/300	1	17500	VA	30.5	36	480/3/700	345/300
36	4	7507	DPS	14	16	480/3/880	129/100	-	-					
37	2	3000	DPS	10	12	230/3/860	82/30	-	-					
38	2	2500	DPS	10	12	230/3/860	67/25, 82/30	-	-					
39	3	2900	S	12	12	460/3/860	41/30	1	840	S	6	6	460/3/1750	20/14.8
40	4	800	S	4	6	480/3/1750	16.1/12	-	-					
41	3	3400	DPS	12	12	460/3/860	40/30	-	-					
42	3	2500	S	6	6	460/3/1160	24.9/20	1	500	S	4	4	460/3/1160	11.5/7.5
43	3	3000	DPS	12	12	460/3/860	40/30	-	-					
44	3	2500	DPS	16	12	460/3/860	41/30	1	350	DPS	6	4	460/3/1800	/7.5
46	3	3800	S	14	14	460/3/885	39.7/30	2	1100	S	6	8	480/3/1750	-/15
47	3	2000	DPS	8	8	460/3/1200	37.5/20	1	100	DPS			460/3/1800	/15
48	3	2900	DPS	12	12	460/3/1850	35	1	100	DPS			460/3/1800	/11.5
50	3	2400	SVD	12	12	480/3/705	50/30	-	-					
51	3	3400	SVD	12	12	480/3/885	50.5/40	-	-					
52	3	2200	S	12	10	480/3/860	41/30	1	500	S	4	4	480/3/1750	13/10

TABLE P-4 PUMP REBUILD HISTORY										
PS	POSITION									
#	1	2	3	4	5	6	7	8	9	10
2	95(O)	95(O)	8/14	06(R)	06(R)	*02(O)*	*02(O)*			
3	95(O)	95(O)	95(O)	95(O)	*95(O)*	*02(O)*	*02(O)*			
4	7/04(P)	04/14	7/11	7/11	9/05(RW)	3/94(N)	10/03 RS	4/12	4/08(R)	
5	3/13	3/12	06-13	07/11	3/12	10/12				
6										
7	5/15	14 (N))	14 (N)	5/15						
8	09/12	9/12								
9	04(O)	04(O)	04(O)	04(O)	JUN-16					
10	93(O)	93(O)	7/11	12/10	02(R)					
11	1/94(N)	96(P)								
12	12/04 (P)	10/03 (O)								
13	5/01(R)	5/01(R)								
14	12/07 (R)	8/08 (N)								
15	12/06(N)	2/11								
16	01(N)	01(N)								
17	93(O)	93(O)	3/10(R)							
18	9/93(N)	7/04 (R)								
19	3/11	11/93(N)								
20	12/11	12/11								
21	6/04 (N)	6/04 (N)	6/04 (N)	6/04 (N)	11/13					
22	96(O)	96(O)	96(O)	96(O)	96(O)	*96(O)*	01/15	01/15 (R)		
23	96(O)	96(O)	96(O)	96(O)	96(O)	96(O)	12/16(N)	8/14		
24	2/02(NS)	02(R)	1-04(RW)	7/04(RW)	12/09(O)	60(O)	*12/93 (RS)*			
25	4/04 (RS)	3/27/52	2/95(RS)	5/93(R)	8/91(N)	5/94(R)	*8/01(R)*			
26	05/13N	05/13N	05/13N	05/13N	05/13N	05/13N	05/13N			
27	14(N)	14(N)	08/16	14(N)	14(N)	14(N)	14(N)	14(N)	14(N)	10/16 (R)
28	2/01 (N)	2/01 (N)	2/01 (N)	2/01 (N)	2/01 (N)	*2/01 (N)*	*2/01(N)*			
29	07/16(R)	5/99(N)	06(R)	5/99(N)	4/11	8/93(N)	10/16	07/09N		
30	6/15	4/11	12/11	7/11	12/13		3/11 MIXERS	04/14 MIX		
31	7/15	9/15	10/15	*7/04 (RW)*	7/04(RW)					
32	3/08(N)	96(N)								
33	06(N)	75(O)	75(O)	5/15	6/86(RS)	1/96(N)	3/06(N)			
34	7/10 (N)	6-16	2/11(N)	3/10(R)						
35	02(NS)	67(O)	8/11	3/82(S)	67(O)		5/02(NS)			
36	04 (O)	04 (O)	04 (O)	04 (O)						
37	10/99	4/92(R)								
38	17-FEB	5/92(N)								
39	91(O)	7/04 (RW)	91(O)	91(O)						
40	OCT-10	06(N)	3/12	11/09						
41	10/04 (N)	10/04 (N)	10/04 (N)							
42	7/15	10/15	15-NOV	15-DEC						
43	9/05 (N)	5/15	9/05 (N)							
44	11/02(N)	11/02(N)	11/02 (N)	*02 (N)*						
46	03/12	NOV-09	9/13	6/12(N)	9/13					
47	1/94(R)	2/09(R)								
48	3/10(R)	99(R)								
49										
50	85(O)	85 (O)	85(O)							
51	07(N)	06(N)	06(N)							
52	1/08 (RW)	02(O)	02(O)	*02(O)*						

TABLE P-5 SPARE PUMPS							
PS		MAIN PUMPS		LOW FLOW PUMPS			OIL-TUBE
#		NEW	REBUILT	NEW	REBUILT	IMPELLER	ASSEMBLY
1							
2				1	1		
3			1	1			
4			0				
5			1		1		
6							
7		1		1			
8							
9		1					
10		1					
11						1	
12							
13							
14							
15						1	
16		1					
17		1					
18						1	
19							
20							
21					1		
22			1				
23			1				
24		1					
25							
26							
27		1			1		
28				1			
29		1	2				2
30			1				
31					1		
32			1			1	
33			1		1	2	
34							
35			1				
36		1					
37						1	
38							
39			1				
40			1				
41							
42			1				
43						1	
44				1			
45							
46			1				
47							
48		1	1		1		
49							
50		1					
51						1	
52				1			

## **ARTICLE 9.0 SURVEILLANCE SYSTEM**

### **9.1 DESCRIPTION OF WORK**

The Surveillance System consists of locations and equipment specified in Section 3 including but not limited to buildings, huts, cabinets, electrical and mechanical equipment, devices , interconnecting cables, hardware, software, infrastructure and appurtenances which make up the Expressway REVLAC system, RACS system, Moveable Bridges, Fiber Optics Infrastructure, Network Switches, Dynamic Message Sign System (DMS), Detector Cabinets, Ramp Metering, Control Cabinets, Automatic Traffic Recorders, I-NET/ATMS, Video Distribution Network, Fleet Management System, Communication Towers , Electrical services and its equipment including hand holes, conduits, wire, Junction boxes, splice boxes, patch panels, connectors with all associated devices for a complete operational system.

### **9.2 ROUTINE MAINTENANCE**

The Contractor shall provide labor, equipment and materials as specified herein to maintain the operation and performance of all equipment as listed herein Article 9.0 and shall be paid under routine maintenance. Equipment malfunctions and/or equipment found during inspections (routine and/or non-routine) which needs repair or replacement shall be covered under this article. All moving lane closures as specified under Traffic Control Article 3.12 for (routine and non-routine) work shall be covered and paid for under routine maintenance bid items.

Cameras are considered additional equipment to an existing Surveillance System location which will be covered and paid through and part of routine maintenance bid item for system location. Review Section 3 for list of existing locations and planned locations with cameras covered under this article.

The Contractor shall furnish labor, equipment and material under routine maintenance to replace equipment and material in the Surveillance System found to be defective, malfunctioning, or non-operational, including software and materials which do not meet manufacturers' specifications.

The Contractor is responsible, through routine maintenance, for the equipment and labor necessary for transportation, removal, installation, or re-installation of all Non-Routine Furnish Only Pay Items listed herein).

A list of locations and applicable equipment groups are found in Section 3 and general contract requirements are specified in other articles herein. The Contractor shall comply with Article 4.9 Repair of Damaged or Malfunctioning System Equipment for maintenance/repair requirements of the Surveillance System.

New locations to be maintained by the Contractor will be added to the Surveillance System throughout the duration of the Contract including CCTV distribution systems, cameras, network expansion, nodal buildings and associated equipment. After transfer of maintenance and acceptance by the Department there is a minimum of six (6) months of warranty coverage from the construction contractor for defects in materials or workmanship. The Contractor shall work with the construction contractor/vendor to solve any problems covered under warranty.

The equipment specified herein gives a good overview of the items to be maintained, however, there may be other electrical items which require maintenance. The Contractor is urged to visit the sites to view all the electrical equipment to be maintained.

### **REVLAC Construction Contract 62F40 Support Services**

The Contractor in accordance with article 4.11 shall coordinate with the Construction Contractor to assure continued operation of the REVLAC system and shall enter into agreement to provide support services as specified in contract 62F40.

1. The Contractor shall meet with Department personnel and the Construction Contractor prior to the start of construction to define the work activities/Support Services.
2. The Contractor shall maintain the REVLAC system during the replacement of the PLC's.
3. The Engineer shall be immediately notified by phone if the Contractor finds any damage and/or disruption of operations caused to the REVLAC System by the construction contractor or any sub-contractors. Equipment (EQ) Tickets shall be created by the EMC Contractor
4. The contract is on a June 15, 2018 letting and completion is expected by November 30<sup>th</sup>, 2019.

### **-Keys and Locks**

The Contractor shall furnish and install new locks or change tumblers (approx. 400) on Surveillance System equipment as directed by the Engineer in 2019. The lock or tumbler shall be approved by the Engineer prior to purchase. As new equipment comes on maintenance during the Contract, new locks shall be installed at these locations. If this Contract is renewed, new locks shall be furnished and installed, or tumblers changed for proper maintenance or security as applicable. Refer also to Article 3.3.5.

### **Surveillance & DMS Asset Inventory**

Contractor shall maintain and update an Excel database for all Surveillance/DMS field installations and keep current at all times. The current Surveillance asset database is broken out by expressway and incorporates cab. #, EMCMS location #, cabinet type, service address, service type, phone circuit ID, copper cable pair, fiberoptic cable assignment, GPS coordinates, and lists equipment, such as signal heads, flashers, controllers, FSK telemetry by type and function and matches the field hardware to the in-house equipment for that location. The Contractor shall maintain the current inventory and record and incorporate any missing equipment or locations in the inventory and update every time there is a change in equipment, as agreed to by the Engineer.

### **9.3 SURVEILLANCE SYSTEM EQUIPMENT**

#### **S-1 Ramp Controls**

#### **S-2 Cabinets**

#### **S-3 Dynamic Message Signs - Expressways and Arterials**

#### **S-4 Traffic Management**

S4-A: Swing Gates

S4-B: Barrier

S4-C: Operations Cameras

S4-D: Roadside Panels

S4-E: Signs & Chevrons

S4-F: Message Signs

S4-G: Ramp Gates for Homeland Security

S4-RC: Roosevelt Ramp Access Control System (RACS)

#### **S-5 Traffic Monitoring Cameras**

S5-L: Cameras Included in the Lighting System locations

S5-LM: Cameras Included in the Maintenance Yards locations

S5-P: Cameras Included in the Pump Station System locations

S5-S: Cameras Included in the Surveillance System locations

S5-T: Cameras Included in the Traffic Signal System locations

#### **S-6 Building, Hut, Tower, Monopole, and System Equipment**

#### **S-6IN: Equipment & Cameras Included in S-6 Locations**

#### **S-7 Networks/Communications Network & Fiber Optic Network & Video Distribution Data Network**

#### **S-7IN: Equipment/Cabinets/Etc. Included in S-7 Locations**

#### **S-8RM Various Locations Maintained under Routine Maintenance**

Refer to Section 3, List of Locations

#### **S-9RM Solar Speed Signs Maintained under Routine Maintenance**

Refer to Section 3, List of Locations

#### **S-10 Joliet Moveable Bridges**

#### **S-11 Matteson Flood Warning System**

#### 9.4 RAMP CONTROLS (S-1)

The Contractor shall maintain all ramp meter equipment located at a District 1 expressway ramp metering system Location. A ramp metering location shall consist of all equipment centrally controlled and monitored by the District 1 I-NET/ATMS FSK telemetry, locally controlled by a 2070 Lite or equivalent Linux field ramp metering controller-and monitored by District 1 I-NET/ATMS including but not limited to the following:

- S-1A: FSK Ramp metering control cabinet Type III or IV, Type D foundation, load relay, telemetry mounting frame, FSK Transmitters, FSK Receivers, telemetry power supply, and all other appurtenances
- S-1B: 334 expressway ramp metering control cabinet mounted on Type I foundation, 2070 Lite or equivalent Linux field controller running TCIP (1207 & 1209) Ramp Metering Software. Ethernet manage switch, PDA, NEMA Flasher, load switches, detector input file, and all other appurtenances located or attached to the ramp meter cabinet Type 334 location
- S-1C: Wet pavement sensor, controller, cabling, firmware to interface wet pavement contact closure and NTCIP interface to ATMS at 71st St. and Dan Ryan

Items Incidental to S-1 equipment include:

- Eight inch LED traffic signal head, a traffic signal post of various lengths and Type A foundation. The traffic control LED signal head shall consist of one (1) face and two (2) signal sections.
- Low mounted 8-inch LED flashing warning beacon flasher module, and all appurtenances, mounted on a wood pole, traffic signal post and foundation, or mast arm assembly and foundation
- Induction loop either embedded in a sawed slot in the roadway pavement or embedded in the concrete pavement (pre-formed loops), magnetic detector, Blue Tooth or radar, a loop detector sensor unit, vehicle loop detector amplifier or active channel encased in a durable housing, card rack or detector input file
- Electrical service, Communication equipment, inverter, batteries and all associated devices for a complete operational system
- The Contractor shall be responsible for the troubleshooting, in-house wiring, and the repair/replacement of all in-house (TSC) FSK tone telemetry located at the Electrical Operations Field Office/Traffic Systems Center building, and the repair/replacement of roadside control cabinets. The telemetry equipment and device shall be inspected weekdays between 7:00 AM and 10:00 AM and shall address and repair equipment failure.



## 9.5 CABINETS (S-2)

Contractor shall maintain all control cabinet equipment located at a District 1 Surveillance Control Cabinet location on or off expressway location. A control cabinet location shall consist of all equipment used to transmit the raw data pulse, or monitor and collect volumes, occupancy, speed, length-based classifications and FHWA classifications collected by the I NET/ATMS or ATR systems. Surveillance control cabinets shall include but are not limited to the following:

- S-2A: FSK control cabinet, pedestal or pad mounted, foundation, telemetry mounting frame, telemetry transmitters and telemetry power supply
- S-2B: 334 Cabinet on Type 1 foundation, 2070 Lite or equivalent LINUX controller running NTCIP (1207 & 1209) ramp metering software. PDA, detector input file and all other appurtenances located in or attached to the surveillance cabinet Type 334
- S-2C: Radar Vehicle Detector, location Type III cabinet foundation, RVD pole/foundation, solar panels, solar panel pole (30') and foundation, Ethernet manage switch, and cabling between radar detector/cabinet and solar panel/cabinet
- S-2D: Bluetooth detector locations, solar powered 30' pole/helix foundation, with cellular modem/junction box. Contractor will have to provide traffic control to maintain this equipment. Refer to Art. 3.12.2 and 3.12.3 for days and hours lane closures will be allowed.
- S-2E: Bluetooth and Radar Vehicle detector locations with battery cabinet solar powered 30' pole/helix foundation, with cellular modem/junction box. Contractor will have to provide traffic control to maintain this equipment. Refer to Art. 3.12.2 and 3.12.3 for days and hours lane closures will be allowed.
- S-2F: Radar vehicle detector location, 30' pole/foundation, control cabinet, power cables, serial communications, and contact closure wiring/interconnect back FSK control cabinet (I-57)
- S-2G: Solar powered induction loop location, solar panels, 30' pole/foundation, control cabinet, Ethernet managed switch, and loop.amplifier
- S-2H: Red /Green LED display, mast arm, pole cabinet and wiring interconnect at 2 locations, S3015 and S3020 at Mannheim & I-190
- S-2I: ATR site solar powered or AC powered data collection with IRD/Pat Traffic TRS Data, recorder, 20W and 40W solar panel, Solar regulator, 12 volt batteries, and road sensors. At volume sites, one 6 x 6 loop per lane or at classification sites, two 6 x 8 loops per lane with a Class II Piezo detector per lane. Control cabinet, foundation, cabling, and service installation shall be included.

- S-2J: Standalone radar vehicle detector location, radar vehicle detector, solar panels, battery cabinet, cabling, 30 foot aluminum street light pole, and foundation
- S-2K: Expressway cross connect surveillance cabinet, including a cabinet shell, foundation, telemetry card racks, mounting frame, the telemetry power supply dual line amps, S-666B8-50 terminal blocks, and A.C. duplex outlets
- S-2L: Wet pavement sensor, controller, cabling, firmware to interface wet pavement contact closure and NTCIP interface to ATMS at Addison and JFK

Items Incidental to equipment S-2 includes:

- Induction loop, magnetic detectors, radar vehicle detectors, Bluetooth detectors along with their related amplifiers, microprocessors, access points, antennas, pole, foundation, relays, card racks, and detector input files
- The ATR (Automatic Traffic Recorder) network shall be maintained as part of the Surveillance System. The Department shall supply controllers, solar panels, batteries, solar regulators, cellular modem, and piezo materials. The Contractor shall be responsible for the loops, cabinet, foundation, and any other cabling local to the control cabinet for power and communications and labor to install/replace the deficient items through routine maintenance.
- Electrical service, Communication equipment, inverter, batteries and all associated devices for a complete operational system

## 9.6 DYNAMIC MESSAGE SIGNS (S-3)

The Dynamic Message Sign System consists of all devices and appurtenances which make up the DMS sign location. The DMS System is comprised of color LED and amber LED, located on expressways and major arterials located within District 1. The DMS System is controlled by a 360 Surveillance Cameleon/FLIR system.

The Contractor shall maintain all expressway and arterial DMS equipment located at a District 1 DMS location with associated communication equipment hardware and cellular/wireless. A DMS location shall consist of all equipment which is utilized to display traveler information on an electronic display attached to a sign support structure and communication equipment, located on the interstate expressway system or arterial roadway in District 1, and shall include but is not limited to the following:

- S-3A Two Portable DMS signs with cameras and communication equipment.
- S-3B Fourteen (14) Skyline, 18-inch, 2070 w/UPS backup, walk-in amber LED displays
- S-3C Three (3) Skyline, 2070 w/o UPS backup, walk-in amber LED displays
- S-3D Two (2) Skyline, 18-inch, 170 controllers w/UPS backup, walk-in amber LED displays
- S-3E Four (4) Skyline, 18-inch, 170 controller's w/o UPS backup, walk-in amber LED displays
- S-3F Thirteen (13) Daktronics, 18-inch, full matrix, front access color LED displays.
- S-3G One (1) Skyline, 18 inches, full matrix, front access, 34 mm color LED display
- S-3H Five (5) Adaptive Micro Systems (AMS), 8-inch, full matrix, front access amber LED displays.
- S-3I Two (2) AMS, 10-inch, full matrix, front access amber LED displays
- S-3J Seven (7) AMS, 12-inch, full matrix, front access amber LED displays
- S-3K One (1) Skyline, 18-inch, full matrix, front access 20 mm color LED display
- S-3L Six (6) Daktronics, 18-inch, full matrix, walk-in, 20 mm color LED displays

Items Incidental to equipment S-3 includes:

### **Expressway DMS**

- 170 controllers, 2070 Lite controllers with Skyline NTCIP 1203 V.I firmware, Daktronics Vanguard 3000 and VFC Series controllers with Daktronics NTCIP 1203 V.2 firmware
- Type IV control cabinets and Type D foundation, fans, heaters, and breaker assembly
- 334 cabinets, Type 1 foundation, PDA, fans, heaters controllers, and all other appurtenances associated with 334 cabinets
- Sign enclosures (walk-in and front access), load centers, display drivers, display modules, power supplies, heaters, photocells, fans, temperature sensors, humidity sensors, fans, interior lighting cabling (power and communications) TVSS devices
- UPS Battery backup, 332 control cabinet, inverter, alarm status feedback, cabling, and all other appurtenances associated with UPS battery backup cabinets
- DMS sign locations which have CCTV cameras to provide sign display status, and/or have co-located CCTV equipment which gets power and communication through the DMS location, shall be considered as part of the DMS location for payment
- Electrical service, Communication equipment, inverter, batteries and all associated devices for a complete operational system

### **Arterial DMS**

- Front access sign enclosures with IDI 1300 series controllers, firmware, display drivers, display modules, fans, heaters, power supplies, temperature sensors, humidity sensors, photocells, TVSS devices, interior lighting cabling (power and communications) and all other appurtenances associated with the sign enclosure
- Type III cabinets, Type D foundation, fans, heaters, door switches, and breaker sub- assemblies
- DMS queue detector system solar panels, 45' pole, foundation, control cabinet, wireless contact closure radio, and yagi antenna to provide contact closure for traffic queue to activate a warning message on the DMS located at 78th Place. and Grand Ave. S22050 in Elmwood Park. The Queue detection system shall be included in routine maintenance of the Grand Ave DMS.

The Contractor shall answer trouble calls and troubleshoot all types of communication equipment as necessary to insure complete and operational systems.

The Contractor shall also provide the manpower and equipment to transport portable DMS signs to a location directed by the Engineer as part of routine maintenance.

### **Traffic Control**

The Arterial DMS structures do not have catwalks and hand rails to utilize as a work platform. All work up in the DMS sign enclosure will be done from a bucket truck. The Sign enclosures are front access which may require 2 men to open the front access door safely. All Traffic Control is paid through routine maintenance bid items.

Required Traffic control as paid through routine maintenance is required, but not limited to locations listed below; Expressway DMS locations, CCTV on the Ryan, and REVLAC locations.

S5377 - DMS-08, NB Ryan @ Chicago River

Ramps from I-55 to Dan Ryan need to be partially closed for access to sign enclosure

S5052 - DMS-30, SB Ryan @ 83rd St.

Need partial ramp closure from SB 79th/83rd St. collector distributor for access to sign enclosure.

S3482 - DMS-13 - SEB JFK @ Augusta

Use reversible lanes or SEB Division entrance for access to sign enclosure

S5196 - DMS-31L and S5197 - DMS-31E, SB Ryan locals and express @ 55th St.

Use right shoulder and/or right lane to access UPS cabinets and access to sign enclosure

S5292 – DMS-32L – SB Ryan locals at 39<sup>th</sup> St

Requires SB 37<sup>th</sup> St entrance and right shoulder local lanes to be closed for servicing

S5140 – Cab.-48 – NB Ryan @ 65<sup>th</sup> (Skyway Ent.)

Requires partial NB Skyway entrance ramp closure

S5165 – Cab.-43 – SB Ryan @ 59<sup>th</sup> St.

Requires SB 59<sup>th</sup> St entrance closure

## **9.7 TRAFFIC MANAGEMENT (S-4)**

### **9.7.1 REVLAC – Reversible Lane Access Control System**

The REVLAC System operations control access at the six entry ramps to the Kennedy Expressway Reversible Lanes extends from approximately the Ohio Street interchange on the south to the Edens/Kennedy junction on the north, (a distance of approximately 7.5 miles).

The REVLAC System includes, but is not limited to; swing gates and their transmissions, barriers and barriers signs, changeable message signs, chevron signs, gore signs, auxiliary signs, roadside control panels, weather station warning signals, Cattrons, supervisory controls, operations cameras, and all interconnecting cable, Ethernet, telephone data, fiber, and microwave radio systems for communications.

The REVLAC System is a network of five sets of Allen Bradley PLC-5/60 and PLC-5/80 Programmable Logic Controllers (PLC), which will be replaced under contract 62F40 as specified herein. Each Remote Control Building and the ComCenter utilizes a redundant processor in their PLC system. Each system coordinates the communications and control of that specific location. Normally all five units work as an interconnected system (network) through the communications links; however, each system may operate as a stand-alone unit for its ramp or operate the entire system in the event of a loss of communication to/from Schaumburg.

The REVLAC and RACS systems are to be kept operational 24/7 in automatic mode or in manual mode when repairs are required. This may entail having personnel manually crank signs into position, manually crank swing gates, have sufficient personnel to both operate controls from a building if bypassing the PLC control or monitoring transition events, as well as manually cover malfunctioning signs, placing barrels or barricades for failed closure devices, staging Contractor owned vehicles in place of the barrier net and all such similar work as needed to produce essentially normal functionality of the REVLAC or RACS systems.

The REVLAC communications scheme is triple redundant. The three modes of communications are fiber, microwave radio and leased lines.

The primary communications are conducted on the fiber system, along two major highways, I-290 and I-90. If the fiber is interrupted from the IDOT ComCenter to the I-90 and I-290/IL 53 fiber cabinet the REVLAC data can be manually moved to the microwave path using the Harris MegaStar microwave radio and the Cisco 15454 ONS.

The secondary communications system is the microwave radio network from the ComCenter through the ISP repeater to Building E. The primary function of the microwave radio system is to provide reliable high-speed data transmission for REVLAC in the event of a fiber loss of connectivity between the ComCenter and Building E.

The third means of communications is currently a 4 wire leased modem system via telephone lines. Each nodal site has four 9600-baud smart modems interconnected between the sites. Currently each modem is dedicated and programmed to pick up fiber links between nodes so in the event of multiple fiber optic path failure, the modems shall interconnect and remain connected for the duration of path loss.

#### **Swing Gates S4-A**

The REVLAC system incorporates one hundred seventeen (117) swing gate systems that has mechanical and electrical equipment manufactured by B & B Electromatic of Norwood, Louisiana. These swing gates direct the traffic away from closed ramps. Swing gates can be operated remotely with Cattron units, locally, and with a manual hand crank.

#### **Restraining Barriers S4-B**

The system incorporates six (6) restraining barriers manufactured by the Entwistle Company of Hudson, Massachusetts. Each reversible entrance ramp has a barrier to prevent the entrance of vehicles when in the lowered (closed) position. Each barrier can be operated remotely, locally or by means of a built-in 12V DC motor which can be powered from a 12V DC truck battery.

#### **Operations Cameras S4-C**

Currently there are forty-one (40) operations cameras which provide an overview of the REVLAC operations to the dispatch operators at the IDOT Headquarters.

#### **Roadside Panels S4-D**

The sixteen (16) roadside panels are the local operation control devices which take control away from the PLC and transfer to local manual switches.

#### **Signs and Chevrons S4-E**

There are forty-seven (47) LED signs manufactured by the National Sign and Signal Co. of Battle Creek Michigan throughout the REVLAC System. They are operated remotely and automatically controlled by the PLC.

#### **Changeable Message Signs S4-F**

Currently there are fifteen (15) changeable message (dynamic full matrix) signs as manufactured by DaKtronics. Each changeable message sign can be operated remotely and locally.

#### **9.7.2 Expressway Ramp Gate System – S4-G**

Forty-two (42) expressway ramp gates units have been installed for access control on the Kennedy and Eisenhower expressways. The ramp gates, the gate arm assembly, the actuator operating mechanism at Addison & Kennedy, bollards, cabinets, locks, traffic control cones and signs shall be maintained under routine maintenance as specified herein.

#### **9.7.3 RACS – Roosevelt Ramp Access Control System – S4-RC**

The RACS System operates to control access at the single entry ramp from eastbound Roosevelt Road to eastbound I-290, with the ramp entry just east of York Road. The RACS System includes, but is not limited to swing gates and their transmissions, dynamic message signs, chevron signs, auxiliary signs, a traffic detector on the IL 38 ramp, roadside control panels, supervisory controls, alarm system, operations cameras, and all interconnecting cable, Ethernet, fiber and microwave radio systems for communications.

The RACS Control System is a network of Allen Bradley Control Logix 5000 series Programmable Logic Controllers (PLC). Each Building (Hut and Ramp) utilize a separate redundant CPU in its PLC system and the user interface software in the workstations in the IDOT ComCenter facilitate the remote control of the system. Each system coordinates the communications and control of that specific location. Normally all units work as an interconnected system (network) through the communications link; however, each system may operate as a stand-alone unit for its ramp or operate the entire system in the event of a loss of communication to/from the IDOT Headquarters in Schaumburg.

#### **Swing Gates**

The RACS System incorporates ten (10) swing gates manufactured by B & B Electromatic of Norwood, Louisiana. These swing gates direct the traffic away from closed ramps. Each swing gate can be operated remotely, locally, and with a manual hand crank.

#### **Dynamic Message Signs (LED)**

There are three (3) dynamic message signs, as manufactured by Daktronics. Each sign can be operated remotely, or locally.

#### **Signs and Chevrons**

There are eight (8) LED signs manufactured by the National Sign and Signal Co. of Battle Creek Michigan throughout the RACS System. They are operated remotely.

#### **Roadside Panels**

There is one (1) roadside panel mounted to the outside wall of the Hillside Ramp Bldg/Hut, a local operation control device which takes control away from the PLC and transfers to local manual switches.

#### **Operations Cameras**

There are eight (8) operations cameras which provide an overview of the RACS operations to the dispatch operators at the IDOT Headquarters.

### **9.8 TRAFFIC MONITORING CAMERAS S-5**

The CCTV System consists of two hundred and forty-one (241) cameras with pan-tilt-zoom (PTZ), fixed cameras, poles, brackets, and all associated hardware and appurtenances a list of camera locations are in volume 3, maintenance of the cameras shall include maintaining and changing the titler presets within the camera, cleaning and repairs as specified herein and directed by the Engineer. The cameras shall be inspected weekly for operation and communication, and it shall be performed every Monday at 8:00 AM and an excel report shall be submitted by 10:00 AM on same day on the FTP site. Each camera malfunction shall have a ticket, and ticket number included in the report.

Refer to Section 3 for the list of Surveillance Systems camera locations and camera maintenance which is included in other electrical Systems locations herein.



## **9.9 BUILDINGS, HUTS, TOWERS, MONOPOLES AND SYSTEM EQUIPMENT S-6**

### **General Maintenance**

The Contractor shall maintain the building/hut, electrical systems, control system, mechanical systems, communications systems, alarm monitoring system, backup systems, emergency systems, fiber optic systems, network systems, conduit, cable, wire, and devices including all associated equipment, software, hardware and appurtenances.

There are twenty-two (22) locations where the Contractor shall maintain buildings or huts which include generators, towers and monopoles, beacon, wave guides, antennas, antenna mounts, cameras, and brackets, supports, cables and camera lowering devices. Single line diagrams and a network drawing will be provided at the Pre-bid meeting.

Refer to Section 3 for a list of locations and types of specialized equipment, all of which is owned by the State of Illinois and under the jurisdiction of the Department. Due to the unique facilities and complexity of the systems to be maintained, the Contractor is urged to perform a site visit to the twenty-two (22) locations prior to bidding.

The Rodenburg Maintenance Yard tower/base station equipment and a back-up Department ComCenter have electrical and communications equipment maintained through the Surveillance System which requires general maintenance as specified herein. The Woodstock Maintenance Yard communication tower lighting is also maintained through the Surveillance System and requires general maintenance as specified herein.

When structural problems are found on towers or monopoles, including towers at the Rodenburg and Woodstock Maintenance Yard location, the Engineer shall be immediately notified. Structural problems or deficiencies are not the responsibility of the Contractor.

Inspection form will be provided at the pre-bid meeting to be filled out, completed and submitted in the FTP site during each inspection and maintenance work for the tower and buildings/huts.

### **IDOT Headquarters in Schaumburg:**

The Contractor shall respond to trouble calls/Tickets for the numerous items of equipment including the generator, video distribution system, switched network, SONET, DWDM, transceivers, coax cables, amplifiers, fiber patch panels, monitors, EMCMS system/servers, CAD stations, pump station SCADA system/servers, lighting SCADA system, back-up UPS, transfer switches, monitors, servers, REVLAC & RACS equipment, RWIS, and the ComCenter and Equipment room HVAC unit(s). An inventory of additional equipment will be provided at the Pre-Bid Meeting.

In cases of HVAC malfunctions the Contractor shall provide qualified personnel and/or a specialty vendor to immediately perform the repair work. The Engineer shall be immediately notified of all HVAC problems or malfunctions. The Contractor is required to have EMC personnel to accompany any vendor working on Department equipment in the IDOT Headquarters. The IDOT ComCenter Supervisor shall be notified by the Contractor as to the expected arrival time of any specialty vendor to allow access to the IDOT Headquarters building.

The Contractor is not required to perform General Maintenance on the building exterior or roof of the IDOT Headquarters.

**TSC Traffic Systems Center/Electrical Operations Field Office:**

The Contractor shall be responsible for 24/7 emergency repairs to all components of the UPS System or EMCMS System.

The Contractor shall perform snow removal operations and salting at TSC when there is snow or ice on the ground or sidewalks. The Contractor shall commence snow removal/salting operations by 6:30 A.M. on week days.

Refer to PM Programs herein for the TSC Traffic Systems Center/Electrical Operations Field Office.

**Building and Hut Maintenance**

The Contractor is not required to perform General Maintenance for building exterior or interior, or roofs for the Electrical Maintenance Field Office /Traffic Systems Center building or IDOT Headquarters building, however, specific items of equipment will have maintenance requirements as specified herein. The Contractor shall perform snow removal operations and salting as necessary when there is snow on the ground. The Contractor shall commence snow removal and salting operation at 6:30 AM during on week days as needed and whenever a snowstorm occurs.

The Contractor shall be responsible for 24/7 emergency repairs to all components of the UPS System at the Electrical Operations Field Office/Traffic Systems Center.

**Routine Maintenance:**

**Interior and Exterior Maintenance of Buildings and Huts  
(not including IDOT Headquarters or TSC)**

Includes, but is not limited to the following equipment and systems:

- Windows, doors, locks, fencing, gates, and roof
- Lighting systems for outdoor or indoor lighting, fixtures, controls, and all equipment
- Alarm systems and panels
- Heat and ventilation and air-conditioning (HVAC) systems and all equipment
- Fire extinguishers
- Smoke and heat detectors and systems
- Exit signs and emergency lighting
- Power for Highway Advisory Radio (HAR)
- Linak Desk with Controllers
- First aid kits and eye wash stations
- Antenna, antenna line, dehydrator line, and wave guides
- Tower Lighting Controllers & Tower Lights
- Exhaust fans
- Generators (maintenance requirements in Article 8.0)
- Power Command Alarm Status Indicator for Generator
- UPS systems

**Electrical Maintenance**

- Power Supply Systems
- Control Systems
- Distribution Panels
- Diagnostic Board
- Electrical Service Feeder Cable
- Electrical Power Apparatus
- Circuit Breakers
- Transformers
- Transfer Switches
- Power Wiring
- Power Strips and Surge Protectors
- 12-volt Batteries
- Generator Batteries/Back-up Batteries
- GFI Outlets and Regular Outlets
- Switches
- Rectifiers
- Tower Beacons
- Surge Arrestors
- Connections, conduit, cable, wire, and all associated devices
- Battery Chargers and Inverters
- Bypass Switches
- Generators

**Communications Maintenance**

- Communication Equipment
- Modems
- Radio Systems
- PLC Equipment
- Ethernet
- Computers
- Fiber Optic Cable, Panels, Connections, and Fiber Systems
- Microwave Radio Systems and Communications
- CCTV and Associated Equipment
- Radar Traffic Detection Equipment for IL 38 Ramp
- GPS Clock

The Contractor is not required to perform General Maintenance for building exterior at IDOT Headquarters building, however, specific items of equipment will have to be maintained as specified herein.

Generators shall be maintained as specified in Article 8.0

## **9.10 COMMUNICATION NETWORKS S-7**

### **9.10.1 General**

The Contractor shall maintain the communication networks and its infrastructure including I-NET/ATMS system, the SolarWinds Network Performance Management Network (NPM), wired and wireless devices, Fiber optics, email services, facsimile services, and the Electrical Maintenance Contract Management System (EMCMS) and Fleet Management System.

### **9.10.2 Communications**

The Contractor shall maintain under routine maintenance pay items the physical infrastructure between locations and equipment and/or nodal buildings including the fiber optic network and equipment including physical fiber optic cables trunk, distribution, laterals, copper cabling, fiber optic cables at each node, terminations, connections, pulling pedestal, interconnect, patch panels, fusion splices, splice boxes, splice enclosures of the fiber optic interconnect cables, modems, transceivers, raceways, enclosures, cabinets, handholes, vaults, tracer cables, cable distribution equipment & accessories at all remote facilities, buildings, IDOT Headquarters, TSC, expressways and arterials located along the expressway system and at other locations in District 1 for the transmission of video, data, and control signals around District 1 and to provide interconnection points to other governmental agencies, through nodal buildings and nodal cabinets.

Drawings showing the various nodes and the fiber optic interconnects will be made available to the prospective bidders and to the Contractor upon request.

Communication infrastructure equipment such as fiber cabinets, pulling pedestals and connections shall be incidental to the Surveillance System, including but not limited to the locations listed in Section 3.

Under routine maintenance the Contractor shall troubleshoot loss of connectivity, damaged and or degraded fibers from any cause whatsoever. Upon notification of a fiber problem, the Contractor shall perform testing with power meter and OTDR to determine the source of the problem and make repairs, damaged cable shall be replaced splice to splice or termination location. The Contractor shall respond and perform maintenance repairs as specified herein.

### **9.10.3 Network/System Administrator**

The Network Administrator shall be an efficient and reliable network professional that will monitor the IDOT VDS, ATMS, and EMCMS networks, ensure network availability, network security, perform necessary maintenance, and be on call to answer emergency situations and to support IDOT and EMC staff. The System administrator shall work at the TSC building from 7:00 AM to 3:00 PM for 130 days per year or increments thereof excluding weekend and State of Illinois holidays. The schedule may vary depending on workload, projects and emergencies. The Network Administrator shall be available 24X7 for emergency calls and shall have an assigned vehicle for field work during normal work hours and off hours response, and shall have PPE, and follow Departments safety rules and regulations. Working hours not specified herein will be paid through non-routine pay items GLH2 on hourly basis at IDOT facility, sick days and vacation days shall be credit back to IDOT through routine maintenance monthly invoice as approved by the Engineer.

### **Network/System Administrator Duties and Responsibilities**

- Manage day to day IDOT VDS, ATMS, and EMCMS network infrastructure
- Utilize network tools like Solar Winds to monitor network equipment and servers
- Maintain and optimize Solar Winds to provide critical outage and network issues via text and e-mail notifications to System Administrator, IDOT Engineers, and EMC Contractor staff
- Update Solar Winds configurations when new equipment is installed and connected to the IDOT VDS, ATMS, and EMCMS networks. Program Solar winds to scan and identify equipment that may have been installed without IDOT or EMC knowledge
- Identify, disable, and remove rogue network connections, equipment, or software operating with in the IDOT network
- Evaluate connectivity and network issues
- Troubleshoot network problems/errors
- Update and maintain network documentation. Physical inventories, drawings, configurations, firmware, software, etc.
- Modify configurations, utilities, software, etc.
- Review and comment on new network equipment design/implementation into existing IDOT VDS, ATMS, and EMCMS networks
- Assign IP addresses for new Equipment to be installed on IDOT Construction or Maintenance contracts/projects
- Configure equipment network settings for equipment supplied on IDOT Maintenance and/or Construction Contracts that will utilize communications over the IDOT VDS network
- Maintain fiber optic network documentation. GPS cords of physical infra-structure, fiber assignments, record drawings, approved catalog cuts, etc...
- Input new/updated data into 3-GIS fiber optic documentation software
- Install and update network system configurations and software/firmware upgrades as necessary
- Implement System Architects design for new IDOT VDS Network. Decommission existing network hardware and installation of new network hardware at D1 HQ, TSC and various field locations all while maintaining network performance and up time. Minimal interruption to network from the node being upgraded
- Maintain and implement latest network security measures across all IDOT VDS, ATMS, and EMCMS network devices including cellular gateways
- Manage, implement, and modify firewall settings as necessary to provide access for Center to Center communications through an ISP, WAN, or LAN between other State or local agencies
- Manage firewall settings and configurations for IDOT devices such as DMS, CCTV, and Pump Station devices that report status and provide control through cellular communications
- Setup and configure cellular gateways to be installed in the field for reporting status and control to servers that reside on the IDOT VDS, ATMS, and or EMCMS networks
- Shall perform and oversee networks, programs, fiber infrastructure management and associated equipment in routine and non-routine as specified herein and shall oversee new installation, coordination and configuration
- Report Monthly the state of the IDOT networks to the Engineer
- Perform assignments as requested by the Engineer

#### **9.10.4 Co-located Duct and/or Fiber**

##### **(Tollway Fiber on IDOT Property and IDOT Fiber on Tollway Property and CMS/IDOT fiber on IDOT Property)**

Locations include:

- I-290 between the Nordic tower and Biesterfield Road (IDOT ROW)
- I-290 between Biesterfield and I-90 ( IDOT ROW)
- IL-390 and IL-490 Elgin O-Hare western access (Tollway ROW)
- I-355 between Army Trail Road and Nordic Road (IDOT ROW)
- I-90 from Plaza 19 to Roselle Road (Tollway ROW)
- District wide four fibers in Tollway cable (Tollway ROW)
- I-355 from I-80 to Army Trail (Tollway ROW)
- I-94 from Russel Rd to Plaza 19 and I-94 from Golf to Plaza 19 (Tollway ROW)
- I-80 from I-355 to I-57 Hut (IDOT ROW)
- I-90/94 Dan Ryan from 103<sup>rd</sup> to 31<sup>st</sup> street.

When restoring a cut cable in a fiber route the Contractor, IDOT and Illinois Tollway Authority personnel will work to restore all data traffic as quickly as possible within their right of way. Each party will be separately responsible for their equipment repair. When repairs are in progress each party shall have a representative of that party observe the repairs. Each party's maintainer shall be responsible to bill the causing party for damages.

##### **Tollway Fiber on IDOT Property**

The Tollway shall restore their equipment in accordance with their specifications and standards.

##### **IDOT Fiber on Tollway Property**

Wherever shared/collocated equipment is damaged the Illinois Tollway personnel shall perform the restoration of all equipment. The Electrical Maintenance Contractor shall represent IDOT and shall oversee the repairs and assure they are performed to the Department specifications and standards. The Contractor shall perform testing in accordance with IDOT standards at the request of the Engineer. This work is paid through routine maintenance.

##### **CMS/IDOT Fiber Cable in IDOT Duct and Fibers in IDOT Cable**

Tickets shall be created and notification shall be made anytime the fiber is damaged and creates an outage in the following segments of expressway

- I-94 Dan Ryan from I-57 and Parnel to 31<sup>st</sup> St. where CMS/IDOT cable in IDOT spare conduit
- I-55 between weigh station in Bolingbrook to IL-355
- I-290 from Desplaines to I-88

E-mail or telephone notification shall be made to the following CMS personnel:

- Frank Walters           217-725-0208
- John Leonard           217-299-6127
- Robin Woodsome       312-497-7472

Routine and non-routine maintenance on IDOT fiber and conduit shall be performed and paid as specified herein.

CMS will maintain their own fiber cable in accordance with CMS standards.

#### **9.10.5 Network Maintenance**

The Contractor shall maintain all network hardware, telecommunication equipment and documentation under this Contract including but not limited to SONET's, switches, routers, GigE, GBIC's, SFP's, chassis, power supplies, enclosures and all associated hardware. The Contractor shall backup equipment software, configuration and maintain all licenses at all locations.

The Contractor shall assure continued operation of the network systems including whenever equipment is added to keep existing networks running smoothly. The Contractor shall troubleshoot and resolve problems until they are remedied. The Contractor shall advise and provide recommendations in a timely manner to the Engineer of potential conflicts with IP addresses and equipment connections.

Network equipment may require software upgrades and in the event of failure, replacement. For equipment which is no longer supported and network modifications, the Contractor shall assure equipment added to the networks does not potentially impact the system to avoid disruption in service and assure continued operations.

#### **9.10.6 Network Documentation**

The Contractor shall continuously update the fiber network documentation all record drawings to reflect existing network operations and submit to the Engineer monthly in the FTP site. (A copy of existing networks will be provided upon request.)

The Contractor shall maintain and document all new equipment information as described below and any changes to terminations/ports of fiber and Ethernet connection at all locations. Existing network diagrams for nodes, huts, cabinets or other locations will be provided. All locations specified herein this Contract shall be continuously updated during this contract. The Engineer will provide an Excel spreadsheet with fiber assignments and IP addresses for the Contractor to maintain and update. The Contractor shall furnish a progress report each month in the monthly routine work submittal.

##### Network Identification

- Servers|Workstations|Routers|Switches|Transceivers,etc.
- IP Addresses
- NetBIOS/Hostnames
- MAC Addresses
- Description
- Make/Model/Serial Numbers
- Network Configuration File within Switch

### Network Topology

- Diagrams| Network Maps
- Physical and Logical Diagrams
- Layer 3 Networking Diagrams

All diagrams shall be on a Visio format.

#### **9.10.7 Network Performance Management (NPM) Software**

The SolarWinds NPM software detects and diagnoses network performance issues to provide network health. It provides automated capacity forecasting, alerting and reporting with dynamic network maps, deep packet inspection and analysis.

The Contractor shall maintain the SolarWinds Network Performance Management (NPM) server and software on the IDOT District One VDS network. The Network Performance Management software, NPM, and server shall be maintained at the Electrical Maintenance Field Office/TSC building. The Contractor Dispatch Center shall also have an NPM terminal to access the IDOT VDS network. When new equipment is installed the Contractor shall update on the NPM server to reflect most recent changes. Refer also to Article 9.22 Warranty and Maintenance Agreements herein.

Contractor shall supply the Department with software operational support (maintenance) for the NPM software for each contract year. Software maintenance shall include free access to any software updates, upgrades, and 24x7 support from the vendor.

The Network Performance Management software shall include the management Information base (MIB) support that includes a MIB database that covers the vast majority of common network devices.

The Contractor shall assume the continued operation of NPM including the following items:

#### **Automated Network Device Discovery**

- Schedule network scans, automatically discover new devices on IDOT VDS network and begin monitoring them immediately
- Ensure that IDOT network devices are imported into the NPM monitoring database, regardless of vendor
- Monitor performance statistics from any SNMP enabled device regardless of vendor
- Contractor shall create custom network maps for each switch, router, and Vlan detected
- Automatically discover and display connections between devices and display on network maps
- View the network logically by geographic location and drill into more fine views



- Contractor shall use NPM software to monitor network performance indicators, such as disk space, CPU load, memory utilization, bandwidth utilization, packet loss, latency, errors, and quality of service for any SNMP-enabled devices and create tickets based on performance not met.
- Conduct detailed performance monitoring and analysis of all network elements
- Contractor shall setup alerts based on system log and SNMP trap messages
- Alerts shall be set up to alert the Engineer and staff via e-mail, network map, and mobile device
- Contractor shall setup and define device dependencies to ensure you don't receive unnecessary alerts and prevent floods of useless messages
- Contractor shall configure network alerts for correlated events and sustained conditions
- Contractor shall be able to create performance and availability reports using out-of-the box and community-generated templates
- Contractor shall create, import, or export a custom MIB poller to monitor any SNMP-enabled device
- Collect detailed information stored in device MIB table
- Monitor virtually any statistic available on networked devices

The Contractor shall maintain the existing NPM Solarwind server located at Traffic System Center:

- Dell Server Power Edge PER210II 3.1 GHz processor
- 8 GB RAM
- 1 x 462GB SCSI (RAID 1/Mirrored Settings)
- 1GBE NIC
- Windows 2008 Server R2

Contractor shall provide the Department training for up to three days and include up to 6 participants in 2019. Training shall be done at the Traffic Systems Center. Training shall include setup, customization, and optimization of the NPM software. Training shall be provided by an authorized partner of the NPM software provider.

The Contractor shall update all electronic record drawings when new equipment is added to reflect existing network operations, setup SNMP and any changes of terminations/ports of fiber and Ethernet connection at all locations. Existing network diagrams for nodes, huts, cabinets or other locations, and existing networks, will be provided.

The Engineer will provide an Excel spreadsheet with fiber assignments and IP addresses for the Contractor to maintain and update. The Contractor shall furnish a progress report of modification and additions in the monthly routine work submittal on the FTP site.

### **9.10.8 Fiber Logging and Labeling**

When the Contractor is notified of any deficiencies/abnormalities with fiber logging and/or labeling they shall be brought to the attention of the Engineer and a corresponding ticket shall be generated. The Contractor shall be responsible for record keeping of all equipment and labeling at each node, H.H, pull point, Hut, building, cabinet and equipment.

The Contractor shall insure that all fiber strands and connectors are properly tagged and labeled at each end, and shall tag that they conform to the Department's labeling scheme. The Contractor shall perform the data entry of all changes to the existing fiber optic cable system in accordance with the D1 Standard Cable Designation Scheme which is available for review upon request.

In addition to fiber labeling the Contractor is responsible for labelling power wiring, Ethernet, RS232, RS422, RS485, cables, blue hose cables, and coax, as designated by the Engineer which require Permanent labeling from a Brady labeling machine or equivalent. A Brother P-Touch type of labeler is not acceptable

### **9.10.9 ATMS/iNET Maintenance**

The Contractor shall maintain the I-NET/ATMS under routine maintenance. The INET/ATMS is used to control ramp metering, provide travel/congestion times, manage incidents/events and manage DMS messaging. The application was developed by Parsons (Delcan Systems), Schaumburg, IL. The system details and Network Diagrams will be furnished upon request at the Pre-Bid meeting. Bi-weekly calls shall be held to discuss the status of pending issues.

The routine maintenance for INET/ATMS includes preventive maintenance, monthly health check of INET/ATMS system, response, investigation and repair of trouble calls.

### **Software Support**

The Contractor shall upgrade I-NET software for creation of support graphics and color Text/sign per NTCIP 1203 V2 and V3 paid through routine maintenance.

### **Technical Support**

Vendor Technical Support under Routine Maintenance includes:

- Responding to correct and address trouble calls and questions from the Department based on the Service Level Agreement.
- Monitor System Resources and behavior at least once per month
- Check processes, CPU usage, error logs, etc. at least once per month
- Aid and assist the Department in user and database management such as adding and deleting users, adding system detectors, DMS, changes to travel time zones, and resetting user passwords
- Provide log of error messages and actions taken to remedy those situations. Also provide recommended action to be taken by Department on pending issues, which do not need immediate action, but need to be addressed before causing system interruptions.
- Security updates completed for other implementations of iNET will be released to the IDOT product according to the Vendors schedule for core improvements

- Vendor shall assist in creating and gathering custom reports, up to 60 hours per year. Above 60 hours will trigger a time and materials request to the Prime, detailing the need

The ATMS software relies on numerous 3<sup>rd</sup> party software platforms to run. Changes to these components can cause security risks or loss of functionality. As part of the updated Software Assurance yearly plan, the packages below will be covered. An update may be requested if a high level security risk is assessed, or if ATMS functionality is affected.

- Current version of Application Server - (Java or Wildfly)
- Current Database server – SQL Server
- Operating System – Windows
- Browser – Firefox
- JDK – Java Development Kit
- User Interface Tool – DOJO

Software changes of 3<sup>rd</sup> party software will be handled on a case by case basis. Once an issue has been identified as an interaction issue with 3<sup>rd</sup> party software the Vendor shall try to restore the system to a point earlier in time to mitigate the software issues. The Vendor shall notify the Engineer of the issue, what the resolution is, and with an estimate of resources needed to correct the problem.

The Software Assurance invoicing will be completed monthly, similar to the overall Vendor Procedures

The Contractor and his ATMS vendor, when applicable, shall provide on-call support based on the accompanying SLA (Service Level Agreement).

### **Service Level Agreements**

The Vendor shall begin support according to the following process. Vendor will have full remote access to the ATMS for support services starting January 1<sup>st</sup> 2019.

Support requests are broken down into 5 different levels of priority.

#### **Severity 1 (Critical):**

System or module failure that prevents IDOT from being able to perform the function necessary to manage field devices without a work-around available. If a workaround is available then drop one level of severity to Severity 2.

Severity 1 level includes:

- System shutdown
- Unable to manage field devices or place messages
- Major interface failure such as CAD interface
- IDOT staff are not able to log and manage issues in the system and no work around is available

**Severity 2 (Severe):**

System or module failure that Hinders IDOT's ability to operate multiple field devices and not specifically listed as a Severity 1 (Critical) priority.

**Severity 3 (Moderate):**

Problem that affects required functionality, but allows for overall operations without issues that significantly affect performance.

**Severity 4 (Minor):**

Request change of required functionality or new functionality.

**Severity 5 (Inconvenience):**

Suggested change or inconvenience noted, not part of the current system requirements. Support requests will be Initiated by submitting a System Problem Report (SPR) email to the Vendor primary contact. In the case of a Severity 1 or 2 (Critical or Severe) support request, IDOT staff will initiate support by phone request. For Severity 1 or 2 that are initially called in, IDOT will submit a written SPR on the first business day following the phone request.

Vendor will provide two phone contacts for Severity 1 and 2 service requests outside of normal business hours, including weekends and holidays. These contacts will be Vendor personnel familiar with the ATMS deployment. Normal business hours are defined to be nonholidays 8:00 AM to 5:00 PM CST, Monday-Friday.

In the case of a Severity 1 request, if the Vendor primary contact is not immediately available, IDOT will proceed to the secondary contact. The secondary contact shall elevate the issue to a Level 1 responder. Vendor will respond with a phone call back within 15 minutes after receiving the message to confirm receipt. For Severity 1 calls, Vendor support staff will immediately start work to resolve the issue. If a Severity Level 1 issue cannot be resolved within 2 hours, Vendor will provide a detailed report, describing the issue and the plan and timeframe for resolution.

For a Severity 2 request, Vendor will respond with a phone call/email within 2 hours during normal business hours or on the first business day following the request when received outside of normal business hours. After receiving the phone call or having confirmed receipt of the message for a Severity 2 request, Vendor shall start work to resolve the issue the next business day.

System Problem Reports for Severity Level 3 will be discussed and prioritized with IDOT, then scheduled accordingly, based on the mutually agreed to priority.

SPR's for Levels 4 and 5 will be tracked and logged for consideration for future enhancements if requested formally by IDOT.

## **Vendor and Contractor Procedures**

The Contractor shall insure that the Vendor provides a detailed monthly report by the third workday of the month, for all problems found and repairs made, in the past month. This report is in addition to the Contractor's EMCMS Ticket Summary.

The Contractor shall provide the following on-call support:

1. Traffic Systems Center (TSC) personnel shall inform the Contractor or the Contractor Dispatch personnel shall create an EMCMS ticket whenever problems are discovered.
2. The Contractor shall insure that the ATMS vendor shall respond within the required response time, and note time on the EMCMS ticket.
3. If the support and resolution requires less than 2 hours of the ATMS vendor's programmer's time, the TSC Engineer shall be telephoned by the Contractor with the ticket information. Repair work shall not commence without the TSC Engineer's approval. The required work shall be noted on the ticket and reported in the Vendors monthly report.
4. If the vendor support and resolution requires more than 2 hours of the ATMS vendor's time and/or the resolution exceeds the 7<sup>th</sup> call of a given month, the Contractor shall follow and document according to the following guidelines:
  - a. The EMCMS Ticket will include the date, time, workstation, and username at the time of the occurrence, description of the observed details, and screen print when applicable.
  - b. All actions taken by the vendor shall be documented on a general billing log, identified by the EMCMS ticket number. The Contractor shall obtain the General Billing Logs each day and email the TSC Engineer by the close of business the following day for the previous day's activities.
  - c. The vendor response shall include a detailed description of work required to resolve the problem or complete the improvement, and number of hours required to complete the task.
  - d. With TSC Engineer approval to continue the work, a non-routine authorization will be issued to the Contractor for the vendor repair work. Normally the Vendor shall have five business days to complete the non-routine work. If deemed an emergency by TSC Engineer, the Vendor work may be started immediately.

The Contractor shall maintain and provide technical support per the vendor qualifications as listed in Article 9.22

**9.10.10 Wired Communications**

The Contractor shall have the following wired telephone and data communications lines installed and fully operable by January 1, 2019:

- One (1) high speed (20 Mbps) point to point data line (minimum) for IDOT HQ to EMC Dispatch Center for communications, EMCMS, Lighting and Pump Station SCADA,
- The contractor shall have high speed data lines from his shops and or facilities with EMC Contract/Administration Office EMCMS to Contractors EMCMS communications.
- One (1) dedicated “hot-line” (PLNC) between the EMC Dispatch Center and the IDOT ComCenter for immediate response
- A minimum of four (4) incoming voice lines to the EMC Dispatch Center available to police agencies, etc. (The Contractor shall not utilize an automated voice-answering or voice mail option for the Dispatch Center.)
- One (1) telephone lines (DID or POTS) at the EMC Dispatch Center for dial-up access to the Pump Station’s AEGIS equipment
- One (1) telephone line (DID or POTS) at the EMC Dispatch Center for dial-up access to the Lighting SCADA
- Seven (7) telephone lines, (2 lines to monitor Econolite signals, 2 lines to monitor Eagle signals and 3 lines for polling the traffic signals) as applicable for Traffic Signal System, refer to Article 10.0
- Minimum one (1) ISDN line for video monitoring of the traffic signal intersections
- Other telephone lines as necessary for Contractor communications, and/or other Systems as needed.
- The Contractor shall have an Ethernet connection to a high speed ISP with a minimum 20Mbps point to point to monitor IDOT equipment, VDS video, Solarwind, 360 Server/client, and I Net Server etc., at TSC and for redundancy

The Contractor shall provide to the Engineer for approval, a proposed schedule stating when each phone line is to be installed. After installation the Contractor shall submit to the Engineer the list of the type of telephone lines, their outlet locations, applicable telephone numbers, and a contact person and telephone number for reporting problems. The Contractor is responsible under routine maintenance for installation charges, monthly billing, number change charges, and any other related telephone charges.

### **9.10.11 Wireless Communications**

The Contractor shall have a tablet for each of the field personnel to receive and transmit through wi-fi for the purpose and use on EMC work. The Contractor shall have all Contractor field personnel enter the ticket response information remotely from the field while at the response location. The preventive maintenance programs, patrols, and other inspection forms as specified herein shall be remotely entered and completed at the assigned location, and transmitted while at the location.

All personal shall have access to plans, records O&M manuals and full copy of the EMC contract 62F52. The tablet shall be compatible with the IDOT 3-GIS fiber management system which requires Windows OS 8.1 and EMCMS; a compatible tablet is the Surface Pro 3. The Contractor shall furnish by January 1<sup>st</sup> 2019 and maintain fifteen (15) Surface pro 3 tablets with 128 GB storage 4<sup>th</sup> generation Intel core i7 or equal for use by IDOT Engineers and Techs by Jan 1<sup>st</sup>, 2019. The tablets shall have protective cases, type cover, office 365, OneNote, latest acrobat reader multi-position kick stand, power supply adapters and shall have the capability to transmit and receive data remotely.

To facilitate Contractor communications, timely transmission of data, inspection of work, and transmittal of photos of damage to state property, individual units shall be assigned as described herein. All Contractor patrolmen, personnel positions, field supervisory or management personnel, subcontractor supervisory personnel shall be provided units equal or better than the Samsung galaxy s7 or as approved by the Engineer. The units shall have unlimited voice, unlimited text, seventeen with unlimited data and with activated wireless tethering capability, the largest battery available, a 16Gbit micro SD card with a minimum 8.0 megapixel camera or better, email service, and immediate photo labeling message and transmission capability. The units shall be provided with 12 volt car cord, 6 foot AC recharging cord, largest Lithium-Ion battery available, belt carry attachment, and hands-free receivers. The selected units shall meet all requirements of state laws and be designed for the approved model.

As these units are used for field work, it is necessary for the Contractor to maintain or replace to assure continuity of operation, contractor shall furnish additional spares and parts, belt clips, chargers, cords, adapters or batteries to all units, as necessary, during each contract year. Any necessary cables, CD with PC compatible software for the programming of numbers, name change software, and other programmable functions, and device necessary for the copying of SIMS cards, shall also be furnished to the Engineer.

Each communication unit shall be new, and models and accessory equipment shall be approved by the Engineer prior to purchase or lease by the Contractor. Following the award of the Contract the Contractor shall provide catalog cuts of the proposed unit(s). The Engineer shall agree with the Contractor on two proposed sample units for a one week trial. When a unit is found acceptable the Engineer shall notify the Contractor so the delivery of the new units will meet a delivery date. If a sample unit is found acceptable the Engineer shall notify the Contractor so the delivery of the new units will meet the specified dates.

The list of proposed call numbers shall be furnished to the Engineer for approval and assignment by December 3, 2018. The units shall be purchased or leased, and units delivered, ready for programming, with applicable software and cables, by December 17, 2018.

The Contractor is responsible under routine maintenance for all communication units, the monthly billing, email service provider, access and photo transmission fees, and other provider assistance as necessary for MCHD repair photo transmissions, data transfers and proper operation of the communication units. Also refer to Article 4.9.5 for further information regarding photo documentation of motorist caused damage and Engineer approved method of photo transmission.

## **9.10.12 Electrical Maintenance Contract Management System EMCMS**

### **General Requirements**

Successful performance of the Electrical Maintenance Contract is highly dependent upon an emergency call-out database, electrical systems inventories, and a timely, accurate flow of information regarding contract work and billing. The Electrical Maintenance Contract Management System (EMCMS), which facilitates the emergency call-out database and these functions, consists of hardware, software, and an information database to support these Contract needs. The Contractor shall maintain the Department EMCMS, which shall continue into this Contract to assure operational continuity. No disruption of the instantaneously-available emergency call-out location master information to the District 1 ComCenter will be permitted. The Vendor shall perform daily monitoring of software and hardware to assure continued operation.

The Contractor is required to have the complete EMCMS, including full data access through screens/reports, communication links, and all required equipment as specified elsewhere herein, in place at the EMC Office and EMC Dispatch Center for approval by the Engineer by December 14, 2018. The EMCMS entry documentation for Patrol routes shall be completed by January 1, 2019.

All items necessary to assure a functional operating system, including materials such as desktops, keyboards, mice, cables, KVM switches, laser printers, paper, ink cartridges, labor for installation/removal of equipment shall be the responsibility of the Contractor. In addition, the Contractor shall provide proper office space and access to system equipment at the approved Contractor facilities.

The Contractor shall respond to Department maintenance requests within one hour, providing the estimated time of repair, programming correction, or service restoration. All costs for the EMCMS system operation, vendor maintenance agreements, programming hours, and equipment warranties, except for the existing IDOT telephone lines, network connection and power provided by the Department, shall be borne by the Contractor and included in the routine maintenance



### **Training Requirements**

The EMCMS is a Windows based system and entry fields requirements are extensive and require training for Contractor personnel use. The Contractor shall provide the Engineer evidence of EMC personnel skills on the EMCMS and shall provide vendor training for all Contractor personnel performing or supervising data entry. All training shall be complete by January 31, 2019. A date, time and location for training must be provided for approval.

### **Equipment Requirements**

The Contractor is responsible for establishing EMCMS communications between the Contractor's facilities and central computer at District 1 TSC and shall provide terminals and other peripherals for Contractor access to the system.

### **EMCMS Disaster Recovery**

The Contractor shall have the EMCMS vendor maintain a disaster recovery that is stored remotely. The maintenance shall include monitoring and configuration access to the IDOT EMCMS and restoration of operation within 4 hours for a complete system recovery. A testing procedure shall be performed to verify and assure database integrity and equipment operation during disaster situation which shall be performed quarterly.

The Contractor shall provide and maintain:

#### **For Contractor's EMC Office**

A minimum of three (3) shared EMCMS printers and one (1) workstation for:

- Each Electrical System Manager
- Each Administration Manager
- Each Administrative Assistant
- EMC Field Desk

#### **For Contractor's EMC Dispatch Center**

- Minimum of one (1) shared EMCMS printer, and three (3) EMCMS workstations

### **EMCMS Vendor Maintenance and Support**

Only a Department approved maintainer may perform any changes on the EMCMS. To assure security and integrity of the system, the current maintainer of the EMCMS, Xsys Inc., 653 Steele Drive, Valparaiso, IN. 46385. Bidders will need to contact Xsys, Inc. (telephone 219-477-4816). The Vendor shall provide maintenance and operational support for all hardware (IDOT and Contractor owned or leased), for the servers/operating system for the database servers and its OS, including communications/network hardware between the servers and all remote workstations, all software, the back-up server, and information as carried in the database. Normal service restoration shall be within four (4) hours, except as otherwise permitted by the Engineer.

Maintenance requirements shall include online monitoring of system and equipment status, and data back-ups by qualified personnel, with preventive maintenance or component replacement as required to forestall preventable system failures. The Contractor shall provide a dedicated line into the server at TSC for use by the EMCMS programmer/service technician, as approved by the Engineer.

Operational vendor support shall include programming support for adjustments to system programs to address system malfunctions and occasional modifications or additions to the tables, screens, and reports employed in the system.

User documentation as developed during the course of this Contract shall be provided by the vendor and given to the Engineer at the end of this Contract.

#### **Equipment and Software Warranties**

The Contractor shall obtain and continue the EMCMS equipment and software warranties for the duration of the Contract starting January 1, 2019 and ending December 31, 2019. If this Contract is renewed the warranties shall be extended to cover each renewal year. Items for coverage include software, the server/operating system for the database servers and its OS, communications hardware between the servers and all remote workstations, and the back-up Server. The Contractor shall provide copies of all warranty agreements to the Engineer at the January, 2019 (and again in January of each renewal year) pay meeting.

#### **EMCMS Screens and Reports**

The Contractor is responsible for the maintenance and data entry in the most valued programs of the EMCMS, the Location Locate, tickets, authorizations, LEM reports, etc. The Contractor shall provide the information required to fill all fields on the EMCMS forms. A complete list of fields will be provided in the forms that will be provided at the pre-bid meeting. Also refer to response and maintenance requirements as listed in Article 4.0. The Contractor shall assure accurate and complete information is provided and entered into the EMCMS.

The Contractor is encouraged to review the EMCMS after the Pre-Bid Meeting to view all of the EMCMS screens and reports which shall be maintained on this Contract. Further information regarding maintenance of the EMCMS programs can be obtained from the EMCMS vendor.

### **9.10.13 Open for Future Use**

#### **9.10.14 Fleet Management GPS System**

##### **Scope of Work**

The Contractor shall have or acquire the services of a fleet management system vendor with a Web-based application to store, view, and analyze data for all Electrical Maintenance Contractor and Sub-Contractor vehicles when personnel are performing work on this Contract. It is the desire of the Department to utilize the latest technology available to monitor the response to locations of work on the Electrical Maintenance Contract. Many of the work assignments herein are based on patrols of a particular area, or have preventive maintenance programs which require work at a particular set of locations. Thus a web-based application will aid the Department in the monitoring of Contract work response and provide the Contractor efficiency in dispatching personnel.

The fleet management program shall provide a seamless overlaying of multiple mapping and fleet data for a view of all Contractor work every day. The system shall provide a minimum of two minute reporting of GPS location, direction of travel, odometer reading and engine hours, a stop detail report and duration; a timeline of the vehicle activity by date and time, with driver call # , name, vehicle identification, mapping (displays vehicles in real time performing Contract work), and detailed fuel usage to be viewed by an unlimited number of users.

The programming shall allow unlimited grouping hierarchy, unlimited geofences and landmarks, and have structured firewalls so all information is kept confidential and used by designated users. GPS tracking information shall be retained when the vehicle is out of cell coverage areas. The system shall be one which is capable to integrate to an Esri ArcGis GeoEvent Processor, which allows overlaying of multiple mapping. Historical data including all categories of obtained information and reporting shall be available to Department personnel for the duration of the contract. All information shall be provided on real time 24/7, with download capabilities of scheduled work or patrols. An interface shall be accessible to all Contractor assigned personnel, Contractor Dispatch personnel and all Department Engineers and Technicians working on the Electrical Maintenance Contract. And shall provide access to the site and database for a minimum of 7 years for a single user

The Contractor shall update the information on a daily basis as changes occur for personnel and equipment and the addition of landmarks through EMC and maintenance transfers. The Fleet management system shall only show personnel working on the EMC 62F52. Failure to provide accurate data will be a cause for liquidated damages as specified herein.

### **Requirements**

All vehicles shall be equipped with an in-vehicle GPS device that sends information via wireless or satellite communication to a remote data center over a secure network. The web-based application shall be accessible simultaneously to the Contractor and the Department personnel via desktop PC, handheld smartphone, or tablet. The fleet management system shall update every 90 seconds at a minimum.

The Contractor shall provide each driver/employee working on the EMC (including sub-contractors) an identification code and a key fob or equal. A driver identification reader, a GPS vehicle tracking unit, shall be installed in each vehicle for the purpose of receiving and transmitting the driver call number and vehicle information. All routes and work groups shall be named and programmed into the system for each of the patrolmen and crew(s) that perform assigned inspection and maintenance. Each patrolman and crew shall have a grouping for On maintenance locations separate from Off maintenance locations, and other locations that are non-EMC. New locations must be entered into the GPS system within 5 working days of maintenance transfer. The Contractor must provide and maintain service for IDOT access to archived/stored data using the same or an updated browser for a period of seven years.

### **Reporting**

The Contractor shall group locations in line with the EMC contract maintenance work routine and non-routine. Patrol routes and shall have the locations assigned to a patrolman in a landmark group, a land mark group for each PM program , or other established work reports with the prior day's data, (or weekly, monthly, quarterly, semi-annually and annually reports), shall be electronically accessible and downloadable 24/7 on excel spreadsheet using the Fleet management system and shall provide a printed copy to the Department Engineers/Technicians for viewing as requested by the Engineer. The GPS tracking software shall be able to generate reports by the minute, hour, month and year. The Contractor shall submit yearly, semi-yearly, quarterly and monthly program reports shall be submitted on the FTP site. Routine and non-routine authorization work GPS reports shall be submitted in the FTP site.

### **Work Prior to January 1, 2019**

The Contractor shall provide the Department a list of all personnel (including sub-contractors) who will be working on the EMC. Each name shall be assigned a unique driver identification code/key fob. The Contractor shall enter the personnel names and codes and all the necessary information for the fleet management software. All EMC locations (as found in Section 3), their GPS location (as provided by the Department) and other fixed equipment identifiers such as towers, poles, cabinets, etc. as objects/landmarks, must be entered to provide accurate reporting.

The Department shall work with the Contractor after the award of the EMC to properly set up the fleet management software so as to provide vital information for all involved. The Contractor shall grant the Department full access to the system and its development so Contract reporting requirements are met. The Contractor shall demonstrate the system use and operation by December 17<sup>th</sup>, 2018. The Contractor shall comply with appropriate Federal, State and Local laws, regulations and procedures to implement, operate and maintain the fleet management system and provide the Department access as specified herein.

### **Pre-Qualification Submittal**

The Contractor shall submit a letter of commitment to provide a fleet management system with the pre-qualifications submittal at the Pre-bid Meeting. The fleet management system shall be in operation at the start of the Contract on January 1, 2019.

### **9.10.15 Fiber Cable Management System**

The 3-GIS cable management system is used to document and manage horizontal and backbone cables, hardware, assets, pathways, locations, contacts, and detail equipment connections, test results, attaches drawings, photos and documents, creates a contact directory, and cable label. The Contractor shall provide labor for data entry and red-lining of plans into the fiber optic cable management system. The Contractor shall provide personnel to be trained to modify electronic record drawings, as specified in the respective articles herein, for the fiber cable management system, 3-GIS.

The Contractor shall use and update the Fiber Management System 3-GIS when performing inspection, cable locate and maintenance transfers.

## **9.11 VIDEO DISTRIBUTION DATA NETWORK S-7**

### **9.11.1 SONET System and Gig-E Network**

The Contractor shall maintain the SONET system network which has the video and data communication links between the IDOT District 1 Headquarters ComCenter, Traffic Systems Center and other facilities and RACS and REVLAC equipment. The SONET system network is comprised of the digital microwave radio system 6 GHz between Schaumburg Headquarters and the Nordic tower, 11 GHz between the Nordic repeater tower and the Hillside tower, and 6 GHz between the Schaumburg tower, ISP Des Plaines repeater tower and REVLAC Building E at 4755 Wilson Avenue in Chicago. The Gig-E network is an Ethernet path which runs on the SONET system.

### **9.11.2 CCTV Network and Associated Equipment**

The Contractor shall maintain the Expressway CCTV and associated equipment including IP and analog cameras, interconnecting fiber, power, control and coax and copper cable, switching equipment, surge suppression, over-current devices, monitors, interfaces to communications network equipment including layer 2 and layer 3 switches, media converter, video transceivers, codecs, video transmission and distribution equipment, switching equipment, video servers, video work stations, wireless links, fiber optic patch panels, fiber jumpers, connections, etc.

### **9.11.3 GCM Gateway Network**

This equipment/server posts a website with travel information for the Gary, Indiana; Chicago, Illinois; and Milwaukee, Wisconsin corridor area. Many travel screens are available included real time maps of congestion and construction data.

The Contractor may receive emails from the GCM Gateway Network support team using NAGIOS, notifying them of camera outages requiring the Contractor to issue a repair Ticket.

## **9.12 JOLIET MOVEABLE BRIDGES S-10**

### **General Maintenance Requirements**

Routine Maintenance:

- Create an EMCMS ticket for each power related problem found on the Moveable Bridges equipment
- The ticket shall note whether an equipment repair or replacement is necessary
- Trouble shoot to determine the cause of the bridge control malfunctions
- Moveable Bridge equipment such as Generators, CCTV shall be maintained in accordance with Article 8 and 9 as specified herein
- Electrical equipment and devices; to be furnished, removed and or installed, including relays, timers, JB's, switches, alarm panels, navigation signals, lighting on the bridge and in the control buildings, river traffic controls, sump pump, traffic signals and its associated equipment which is powered and controlled by the moveable bridge, and all electrical appurtenances.

The Contractor shall immediately repair these items as found or notified.

The Contractor shall not, however, start the repair/replacement of the other power equipment until the Engineer has been notified by phone or e-mail and has approved non-routine work/authorization.

Non-Routine Maintenance:

- Repairs and or replacement work for power equipment such as VFD's, contactors, heaters, distribution panels, lighting panels, disconnect switches, transfer switches, motors, incoming electrical service, conduit, wire, breakers, shall be paid through non-routine pay items in Section 2 herein.
- The Department may purchase the necessary replacement materials on this contract or from other sources, for the Contractor to install through non-routine pay items.
- Where Non-routine pay items do not exist, the Contractor shall create an EMCMS agreed price quote for Engineer approval.

#### **Monthly Moveable Bridge CCTV Inspection**

The Contractor shall perform a monthly inspection of the Bridge Monitoring CCTV and associated equipment at all locations and list problems found, or no problems found on form XB3. The IDOT Moveable Bridge Office Engineer shall receive the original (hard) copy of the monthly inspection, and the Contractor shall transmit a copy to the Engineer in the monthly routine submittal book. The scheduled inspection date for each location shall be listed on the Daily Agenda.

#### **Moveable Bridges Centralized and Integrated Controls Operation Contract 60P55**

The moveable bridges shall be maintained as specified above until maintenance is transferred to Construction contractor under contract 60P55, (June 2018 letting).

Upon the completion of the construction work the moveable bridges will have local and centralized control and operation of all six bridges from Ruby Street to Brandon Road in the City of Joliet. The moveable bridges will have control and power systems, closed circuit television cameras, monitors, generators and transfer switches, alarm panels, interconnecting cables, navigation lighting, highway lighting on the bridge, river traffic controls, conduit and wiring, circuit breakers, sump pumps, incoming electrical service feeder cable, fiber, network equipment, SCADA, communication equipment, and other appurtenances, also traffic signals and audible alerts for vehicular traffic on the moveable bridges which are powered from and controlled by the moveable bridge equipment.

While under construction the EMC Contractor shall provide qualified personnel to attend the testing, training and acceptance of new electrical bridge controls and power equipment. The Contractor will be notified of the scheduled testing and training dates and times during the contract year.

The expected completion date and transfer to Electrical Maintenance Contract is October 31<sup>st</sup> 2020. The EMC Contractor shall coordinate and cooperate with IDOT Construction and the construction contractor for the transfer of the Moveable Bridges centralized controls and power to the EMC.

Upon IDOT final acceptance of the completed Moveable Bridge electrical installation the construction contractor warrantee's the satisfactory in-service operations of the new bridge electrical installation, materials, products, and related components. This warranty will extend for a minimum of two years following the date of IDOT final acceptance of the bridge electrical installation for all six bridges.

Once the Contractor has resumed maintenance of the Moveable Bridges and responds to trouble calls/tickets, there will be a control Systems Vendor who shall be notified of the problems found and shall make the repairs. The Vendor contact information shall be furnished at the time of the maintenance transfer. The Vendor field staff is expected to respond to an emergency within eight (8) hours. The Vendor staff and system integrator will provide on-call warranty service for a period of two years (under contract 60P55) following the date of the IDOT acceptance of the bridge electrical installation for all six bridges.

### **9.13 MATTESON FLOOD WARNING SYSTEM S-11**

(Gates at Governors Hwy @ 214<sup>th</sup> St. and Governors Hwy @ 219<sup>th</sup> St.)

- Four (4) Solar Assisted 12 Flashing Beacons with two-line message board
- Two (2) High water sensor system
- Two (2) Radio signal based systems
- Two (2) Cellular based systems
- Four (4) 64'W X 3'H Barricade gates
- Two 14' Steel poles with foundation
- Four (4) Mast arm assembly and pole with foundation

The EMC Contractor shall respond to all problem calls/tickets and shall troubleshoot to determine the malfunction of the Matteson Flood Warning System. Labor and equipment shall be paid through non-routine maintenance pay items for work performed at the location, verified by GPS documentation. The Contractor shall provide a quote for repairs as directed by the Engineer.

When notified by the IDOT ComCenter or by a police agency that an incident has occurred at the location, the Contractor shall immediately dispatch personnel to the location. Incidents may include, but are not limited to:

- All motorist caused damage
- Malfunctions which suspend normal operations
- Intrusion alarms
- Power outages
- Live exposed voltage cables
- Changeable message signs
- Gates laying in roadway
- Failures of network (telephone, & radio)
- Events which pose a threat to safe, timely operations

The dispatched Contractor personnel shall arrive at the relevant system location within one (1) hour of notification of the incident, to assess and troubleshoot the system and/or to make the system operational. The defective equipment shall be permanently repaired as soon as possible, within 24 hours, unless approval is given by the Engineer. In addition to completing the ticket information, the Matteson Police Department shall be notified of any response and/or repairs as completed by Contractor personnel.

#### **9.14 CONTRACTOR IMMEDIATE RESPONSE AND REPAIR**

Per Article 4.3 herein, the Contractor is required to use as many personnel as necessary to respond to trouble calls within one (1) hour of notification, troubleshoot as necessary, provide temporary service restoration within four (4) hours or less and permanent repairs within seven (7) days, (unless stated in the chart below). The Contractor shall notify the Engineer of any repair work delays. Tickets are required for all maintenance items.

Due to the complexity of fiber optic work following the completion of temporary fiber optic repairs the Contractor shall agree with the Engineer as to the scope and date of permanent fiber optic repairs.

Incidents may include, but are not limited to:

- All motorist caused damage
- Camera failures
- Camera cleaning
- Malfunctions which suspend normal operations
- Fiber cable repair, fiber connections/terminations and patch panels
- Intrusion alarms
- Power outages
- Failures of network (telephone, & radio)
- Events which pose a threat to safe and timely operations



Article 4.0 discusses general response requirements of routine maintenance. The following chart lists the maximum response, service restoration, and permanent repair time the Contractor will be allowed to perform corrective action on specific surveillance system equipment before liquidated damages are assessed.

<b>Incident or Problem</b>	<b>Response Time</b>	<b>Service Restoration Time</b>	<b>Permanent Repair Time</b>
Camera Malfunction	1 hour	4 hours	48 hours
REVLAC or RACS System Malfunction or Damage	1 hour	4 hours	4 hours
Swing Gate Damage	1 hour	4 hours	4 hours
Ramp Gate Damage	1 hour	4 hours	21 days
Ramp Metering Malfunction or Damage	1 hour	4 hours *	10 days
Cabinet Damage	1 hour	48 hours	**
DMS Malfunction or Damage	1 hour	4 hours	10 days
Loss of Expressway Travel times T1 Chassis failure/ fiber or copper comm failure	1 hour	4 hours	14 days
Repair/Replace 2070 Lite Controller- DMS	1 hour	4 hours	24 hours
Repair/Replace Ramp Meter Controller 2070	1 hour	4 hours	24 hours
Cable Repairs (Temp Cable Needed)	1 hour	24 hours	21 days
Inoperable Microloop	1 hour	24 hours	14 days
Inoperable Microwave Vehicle Detector	1 hour	24 hours	14 days
Conduit Repairs	1 hour	24 hours	21 days
Inoperable Bluetooth Vehicle Detector	1 hour	72 hours	14 days
Repair/replace Induction loop lead-in cable	1 hour	24 hours	14 days
ATR site malfunction or damage	3 hours	5 days	21 days
Inoperable Loop Detector Units	1 hours	24 hours	24 hours
Malfunctioning Telemetry Power Supply, Transmitter or Receiver	1 hours	24 hours	24 hours
Beacon Light Outage	1 hour	4 hours	24 hours
Inoperable SenSys Device	1 hour	4 hours	7 days
Joliet Moveable Bridges	1 hour	4 hours	2 days
Matteston Flood Warning System	1 hour	4 hours	24 hours

\*In case of ramp metering cabinet knockdowns, service restoration of all component parts affecting the ramp metering operation shall be completed within four (4) hours or by the next ramp metering control period, whichever is first.

\*\* Dependent upon availability of new control cabinet

## **9.15 SPECIAL RESPONSE AREAS**

### **9.15.1 General Requirements**

The Contractor shall through routine maintenance respond to emergency service requests and perform inspections, per Engineers request, of Department owned equipment residing in non-EMC maintained areas of the University of Illinois Circle Campus building/roof top in Chicago, the Illinois State Police District Chicago offices in DesPlaines or Elgin, RWIS locations in District 1, the Illinois Thompson Center in Chicago, the EMC Dispatch Center, and the Illinois Tollway Authority Headquarters in Downers Grove, and other Tollway Authority Plazas throughout District 1. The Contractor shall provide the labor, equipment and material to perform repairs as approved by the Engineer and shall be paid through non-routine maintenance pay items.

### **9.15.2 University of Illinois – Circle Campus - 1140 S. Paulina St., Chicago**

Items to be maintained under routine maintenance include:

- One HD Ip bosch camera/PTZ and mounts
- 2 Bosch Cameras with PTZ and mounts
- Equipment Cabinet NEMA 4X
- Control Rocket Lynx Switch
- Equipment and connections
- Power Supplies
- GCM Gateway Network
- Fiber connection
- Siquira Video encoders

### **9.15.3 Illinois State Police District Chicago Office - DesPlaines**

A tower and associated transmission equipment including a 6 GHz active repeater is located at the Illinois State Police District Chicago office in Des Plaines. It is a microwave radio repeater facility for the transmission of signals between the REVLAC Control Building E and District 1 Headquarters, Schaumburg.

Items to be maintained under routine maintenance include:

- Microwave radio equipment, Department owned
- Backup Battery

### **9.15.4 RWIS Locations within District 1**

The Contractor shall respond and repair problems associated with electrical service to the cabinets for the IDOT Regional Weather Information stations (RWIS), and shall provide access, survey and troubleshoot equipment when requested by the Engineer.

### **9.15.5 Illinois Thompson Center (JRTC)**

The Contractor shall maintain the IDOT owned fiber optic patch panels, jumpers, fiber cables and fusion splice trays and associated equipment under routine maintenance.

### 9.15.6 EMC Dispatch Center

Items to be maintained under routine maintenance includes:

- Traffic System Conflict Monitor Alarm System
- AEGIS Alarm Equipment, EMC owned
- EMCMS, 360 workstations, REVLAC VDT equipment
- Other monitoring equipment as required and directed by the Engineer

Required for communications between Contractor's facilities and central computer at IDOT District 1 Headquarters:

#### **Lighting SCADA System**

One (1) server and monitor, all software including OS, GUI software, FIU cabinet, SCADA CPU's dedicated line and dial-up modems, radio power supplies and back-up batteries, rocket port, printers, radio concentrators, four VHF/UHF radio, portable UPS, batteries, and all other equipment and appurtenances

#### **PS SCADA System**

AB RSview server computer (hardware & software) dedicated lines and dial-up modems, computer monitor, printer, radio equipment, rocketport multi-serial board and cables, batteries and all other equipment and appurtenances

### 9.15.7 ComCenter HVAC at IDOT D1 Headquarters

The Contractor shall respond under routine maintenance 24/7 to HVAC trouble calls, and provide a qualified HVAC repair company to troubleshoot problems and provide labor, and repairs/replacements of the HVAC equipment. The Engineer shall be notified of all problems and malfunctions, and Engineer approval is required for equipment repair work, which will be paid through non-routine maintenance. The Contractor is required to have EMC personnel to accompany any vendor working on Department equipment.

### 9.15.8 EMC Work at Illinois Tollway Facilities

#### **EMC Items to be Maintained by the Contractor at Illinois Tollway Facilities (At Illinois Tollway Authority Central Administration and Plazas)**

- IDOT patch panels and fiber cable jumpers

There are specific procedures which must be followed for Illinois Tollway site access. The Contractor shall follow the official "Illinois Tollway Information Technology Procedure" (available on-line and/or at the Pre-Construction Meeting.) For all work other than emergency cases, two business day prior notice of planned work is required to schedule any site access. A Department representative must accompany the Contractor in all cases.

## 9.16 PREVENTIVE MAINTENANCE PROGRAMS

### **General Information**

The Contractor is required to perform certain preventive maintenance (PM) work within certain regular intervals or within certain time limits. The following descriptions provide a basic guide for PM work, but shall not be construed as all inclusive. Preventive maintenance required by the manufacturers shall be performed in addition to these inspections. All PM work shall be in compliance with manufacturers' specifications. PM forms will be available at the Pre-Bid Meeting.

The Contractor shall submit the PM program for the following month in the monthly routine work submittal. All PM work shall be completed per the chart as listed below, unless extensions are approved by the Engineer. All PM program work shall be scheduled on the Daily Agenda which shall list the specific type of inspection being performed (example: 9.18.6 Roof Inspection).

Following the completion of the preventive maintenance work all forms/spreadsheet shall be entered on the FTP site. Follow-up work shall be noted with the applicable Ticket number for each item found broken, damaged, malfunctioned which require repair or replacement. Repairs delayed due to parts on order, a work order number shall be provided and supplier information.

**REQUIRED PREVENTIVE MAINTENANCE PROGRAMS**

**Refer to Article 4.17.6 for submittal instructions**

<b>Art. #</b>	<b>Program Name</b>	<b># of Loc.</b>	<b>Completion</b>
9.16.1	ComCenter Weekly DVD inspection	1	Weekly
9.16.2	Weekly Camera Inspection	All	Weekly
9.12	Moveable Bridge CCTV Inspection	6	Monthly
9.17.1	Building and Hut Inspection	22	Monthly
9.17.2	REVLAC Transition Patrol	Refer to Article	Monthly
9.17.3	Battery and UPS Inspection	1	Monthly
9.17.4	Generator Inspection per 8.8.7/8.10.18	13	Monthly
9.17.5	Equipment Cleaning	22	Monthly
9.17.6	Ramp Metering Inspection	122	Monthly
9.17.7	DMS Sign Inspection	57	Monthly
9.17.8	Equipment Malfunctions & Repair Tracking	All	Monthly
9.18.1	Remote Data Collection & Standalone Station Inspection	3	Quarterly
9.18.2	TSC Building Roof Inspection & Cleaning	1	March, June, Sept. and December
9.18.3	Ramp metering cabinet inspection and cleaning	122	Quarterly
9.18.4	DMS Cabinet Inspection and Cleaning	57	Quarterly
9.19.1	Swing Gate Inspection	127	April and October
9.19.2	Ramp Gate Inspection	42	April and October

9.19.3	REVLAC/RACS Sign Inspection	73	April and October
9.19.4	Barrier Inspection	6	April and October
9.19.5	Cattron Inspection	10	April and October
9.19.6	Liebert HVAC Inspection & Cleaning	1	Early June & Late Nov
9.20.1	Dark Fiber Inspection and Testing	Refer to Article	May to June
9.20.2	Count Station Expressway I/O Validation	5 %/Year	May, June, July
9.20.3	Tower Site Inspection	10	June
9.20.4	Fiber Spice Box Inspection	13	July
9.20.5	HVAC Inspection	39	July
9.20.6	Full Building/Hut/Systems Inspection	22	July and August
9.20.7	Battery and UPS Testing	1	August
9.20.8	Fire Extinguisher Maintenance	23	November
9.20.9	Surveillance Cabinet Inspection and Cleaning	760	Yearly

**9.16.1 ComCenter Weekly DVD Inspection**

The Contractor shall inspect the ComCenter DVD process video for REVLAC once per week, to confirm the transitions are recording properly. This inspection shall be scheduled on the same day of the week, for the duration of the Contract. If a deficiency is found a ticket shall be created. The repair shall be completed or equipment replaced, under routine maintenance, within 24 hours.

**9.16.2 Weekly Camera Inspection**

All cameras as shown on the 360 workstation shall be viewed weekly for proper operation and communication. An Excel report shall be submitted to the IDOT Surveillance Engineer by 10:00 AM the same day by e-mail and it shall include The location number and address, a ticket number and problem found. Each week the report shall be updated to show ticket completions.

## **9.17 MONTHLY SCHEDULED PM WORK**

### **9.17.1 Building and Hut Inspection**

Once per month, the same week for the duration of the Contract, The Contractor shall inspect all buildings and huts twenty-two (22) locations, and Foster and Rodenburg buildings to insure proper operating condition of all equipment and to check for graffiti. The Engineer may add additional locations if a new building or hut is accepted for Contract maintenance.

Specific items to be checked include, but are not limited to:

- Allen Bradley PLC processors and all input and output cards; check for alarms
- Building rodent infiltration; seal openings found, check for roof leaks and repair
- Building site maintenance; empty trash cans, sweep floors and wet mop
- Graffiti; if found create ticket for scheduled cleaning
- Building HVAC operations and temperature control
- Camera focus and image
- Electrical Service (s) and repair lighting outages
- Indicator lamps; replace as required
- Modem communications, phone lines
- Perform site maintenance, remove debris, cut grass, trim trees
- Alarm indicators, create tickets if found
- fire extinguishers
- Secure facility

### **9.17.2 REVLAC Transition Patrol**

Once per month, on approximately the same day per month, for each month of the Contract, for the daytime reversible change (approximately 11:30 a.m.) and for the night-time reversible change (approximately 11:30 p.m.) the Contractor shall follow an IDOT ETP (Emergency Traffic Patrol) foreman through a complete gate operation at each REVLAC location in both inbound and outbound directions, to check equipment for proper operations.

### **9.17.3 Battery and UPS Inspection**

The Contractor shall inspect the batteries of the UPS Systems, and RF transmitter once per month at Schaumburg HQ. Water levels shall be checked, add if necessary. Connections shall be cleaned and tightened if necessary. The date of the inspection shall be listed on the daily agenda. Tickets shall be created for any problems found, and listed in the monthly routine work submittal.

### **9.17.4 Generator Inspection**

The Contractor shall perform monthly generator maintenance per Article 8.8.7 and 8.10.18 for all generators (13).

#### **9.17.5 Equipment Cleaning**

The Contractor shall provide monthly general interior site maintenance for equipment in buildings and huts at twenty-two (22) locations, IDOT Schaumburg ComCenter, IDOT ComCenter equipment room, and TSC equipment rooms, and the ISP/CMS facility (Tower radio hut with IDOT/ISP equipment) in Des Plaines. The Contractor shall follow manufacturers' recommendations using soft cloths that are dust free, which shall be used to remove dust build up. Four cans of compressed air and one box of cleaning swabs equal or better than Kensington Surface Guardian Swabs shall be delivered per month to the Field Office for Surveillance Systems equipment maintenance.

Verbal approval is needed from the ComCenter Supervisor 24 hours prior to scheduling the maintenance work. The work shall be scheduled for the same week of the month, for the duration of the Contract. The Contractor Daily Agenda shall note the time of the expected maintenance of each location.

#### **9.17.6 Ramp Metering Inspection**

The Contractor shall inspect the ramp meter locations monthly, normally between the time of 7:00AM and 1:00 PM.

Specific items to be checked during inspection as follows:

- LED signal outages
- Twisted heads
- Proper pavement markings
- Proper signage
- Flashing beacons
- Physical damage to cabinet, posts, signs and loops
- Power outage
- Proper signal cycling operation.

#### **9.17.7 DMS Sign Inspection**

The Contractor shall include the DMS sign inspection on the lighting patrol route for inspection by the night time lighting patrolman.

Specific Items to be Checked during inspection as follows:

- Power outage/message not visible
- Panel malfunctions
- LED malfunction
- Message distorted and illegible
- Discoloration problem
- Physical damage

#### **9.17.8 Equipment Malfunction and Repair Tracking**

Malfunction and repair of Surveillance equipment shall be recorded by the Contractor on tickets and transmitted monthly to the Engineer in an Excel spreadsheet on the FTP site. Information shall include date of failure, date of repair or replacement, reason for failure (lightning, material defect, etc.) equipment type, model, manufacturer, location and any other pertinent information as directed by the Engineer. Equipment replacement information shall include model, manufacturer, and source. Reports shall include monthly and accumulative totals.

#### **9.18 QUARTERLY SCHEDULED PM WORK**

Any deficiencies or malfunctions shall have tickets created and repairs performed per specifications herein. The Contractor shall complete the required spreadsheet inspections and load on the FTP site each quarter year. The spreadsheet forms will be supplied at the Pre-Bid meeting. The date of the inspection shall be listed on the Daily Agenda.

##### **9.18.1 Quarterly Remote Data Collection, Standalone Station Inspections**

The Contractor shall perform a quarterly inspection of the standalone data collections sites located within District 1. There are 3 sites and all are in the S23000 location series of EMCMS location numbers for reference. The Contractor shall check the alignment of the detector, measure battery voltages, check battery cabinet and that solar panels are tight to the pole, and if the location reports to another remote site/flasher, ensure proper operation of beacons. The Contractor shall also collect the bin data volume and occupancy and submit the data to the Engineer. The Department uses this data for future projects, ADTs, and for lane closure restrictions. Data shall be submitted to the Engineer at the end of March, June, September, and December in the monthly routine work submittal.

The EMC Dispatch Center shall be notified to create a ticket noting problems found and/or repairs made.

##### **9.18.2 TSC Building Roof Inspection & Cleaning**

The Contractor shall thoroughly clean the roof and remove surface dirt, debris and contaminants each March, June, September, and December. The roof drains shall be unclogged, and repairs performed as specified herein. The Engineer shall be notified 24 hours in advance of the scheduled work.

##### **9.18.3 Ramp Metering Cabinet Inspection and Cleaning**

The Contractor shall perform a complete inspection and cleaning of each Surveillance System Ramp Metering Cabinet (122 locations) quarterly. The Contractor shall complete S-10 logs and transmit each month in the routine maintenance work submittal. The form will be supplied at the Pre-Bid meeting.

Ramp metering cleaning shall be performed during non-peak congestion hours when ramp metering is not in operation controlling traffic. All work shall be noted on the Daily Agenda.



The inspection includes but is not limited to:

- Record Arrival Time
- Inspect Loop Detectors
- Check 2070 lite controller for proper operation (if applicable)
- Check tones for proper operation (if applicable)
- Verify functioning of bulbs, LED's, signal load relays, and flashing beacon controllers
- Telephone TSC for Location Turn-On
- Verify aim of beacon and signal head.
- Beacon head shall face the top of the ramp, the right hand signal facing the metering input loop (Loop 1), and the left hand signal shall face the top of leading edge of the demand loop (Loop 2).
- Replace LED outages or failures, and damaged lenses.
- Inspect cabinet PDA for proper operation (if applicable)
- Check for deficient pavement marking-Refer to TSC typical ramp meter striping plan
- Check for missing, damaged or loose signs.
- Check cabinet and signal foundation and tighten where necessary.
- Check lubrication of cabinet doors, hinges, and locks.
- Check tuning and operation of loop detectors and/or detector input files.
- Inspect stop bar striping for deficiencies.
- Log follow-up activity needed and telephone the EMC Dispatch Center for ticket number
- Record Departure Time

The Contractor shall wash the ramp control signal head lenses and reflectors, flashing beacons, and signs associated with each ramp metering installation, and clean the inside and outside of the cabinets. The cleaning materials and procedures shall be approved by the Surveillance Engineer prior to starting the work.

Before leaving the surveillance location, the Contractor shall verify the accuracy of the data with TSC personnel. The Contractor shall not leave the location until the Traffic Systems Center's personnel have checked on the accuracy of the data being received at the TSC office.

The EMC Dispatch Center shall be notified to create a ticket noting problems found and/or repairs made. Notify the Engineer of deficient ramp meter pavement markings and/or signage.

#### **9.18.4 DMS Cabinet Inspection and Cleaning**

The Contractor shall inspect, check and clean fifty seven (57) DMS cabinets and signs quarterly. The Contractor perform the inspection and cleaning, inside and out, in off-peak rush periods between 9:30 am and 2:00 PM Monday through Friday. The cleaning materials and procedures shall be approved by the Surveillance System Engineer. The Contractor shall complete S-10 logs and transmit each month in the routine maintenance work submittal. The form will be supplied at the Pre-Bid meeting. All work shall be reported on the Daily Agenda.

The inspection includes but is not limited to:

- Record arrival time
- Verify photocells operation
- Verify functioning of fans/heaters; replace or repair
- Check cabinet and meter foundation and tighten
- Seal all ducts with steel wool and duct seal.
- Replace filters
- Inspect/test battery back up units (BBU's) where applicable
- Inspect/test PDA's where necessary
- Check operation of DMS Controller for proper operation. Verify proper operation in remote and local modes. Verify proper firmware is loaded and proper sign configurations are loaded. If necessary, load correct firmware and configuration and check with TSC personnel that the DMS is properly operating
- Inspect communications and power cables incoming and outgoing.
- Verify with TSC personnel the message correctness and lamp or LED intensities on the DMS sign. Replace lamps (as a group, not individually) or LED panels as needed.
- Check voltage levels of power supplies and battery and adjust where needed.
- Check blank-out functions, power failure, and communications failures.
- Check levels on transmit and receive pair in cabinet.
- Check meter housing making sure it is seated properly, and weather-tight. If any problems, coordinate with utility company.
- Check for loose connections
- Check ribbon cables in sign enclosure for worn spots or breaks in the cable/insulation. Verify seating of components and connections. The DMS M.O.S.Y.S. sign are subject to vibrations which cause loose connections and ribbon cable which rest on metal surfaces to become worn and become shorted over a period of time. The Contractor shall take immediate corrective action to correct these problems when discovered.
- Hand wash and clean each DMS sign enclosure, inside and/or outside
- Record departure time

The EMC Dispatch Center shall be notified to create a ticket noting problems found and/or repairs made during the inspections. The Engineer shall be notified of any safety related issues.

### **9.19 SEMI-YEARLY SCHEDULED PM WORK**

The Semi-Yearly scheduled PM Work shall be performed in the presence of an IDOT inspector/Engineer except for the Cattron Inspection. Any deficiencies or malfunctions shall have tickets created and repairs performed per specifications herein. The Contractor shall complete the required spreadsheet inspections and load on the FTP site. The Contractor shall notify the Engineer of safety related problem immediately. The spreadsheet forms will be supplied at the Pre-Bid meeting. The date of the inspection shall be listed on the Daily Agenda.

#### **9.19.1 Swing Gate Inspection**

REVLAC and RACS Swing gate inspections for One hundred and twenty-seven (127) gates shall be performed twice a year, in April and October. Lubrication shall be performed once per year as a minimum.

Contractor shall:

- Open control cabinet and clean out debris or corrosion
- Check for fluid leaks in the cabinets and correct, if any
- Check oil level in the drive train and top off as required by the manufacturer's requirements
- Hand clean control cabinets with biodegradable detergent and water
- Replace gate tip if more than 20% of the tip is damaged, or when directed by the Engineer
- Check proximity limit switch alignment and bracket conditions
- Check electrical connectors and wiring condition
- Check drive and control components
- Lubricate components with lubricants as listed in maintenance manual
- Lube flange bearings only if seal failure is noticed
- Lube chain and sprocket with high grade aerosol chain lube
- Repair or replace speed reducer if it leaks oil
- Check that panel doors are closed and padlocked
- Operate the gate automatically to check for shear pin damage
- Operate the gate using the hand crank to check for operation
- Inspect quartzite j-box covers for damage.

The swing gates should extend and retract smoothly, without excess vibration or noise, stop quickly at extended or retracted positions, and, when in remote operation, provide prescribed status indicator and warning light indications.

All swing gates shall be washed. Washing shall be performed with a pressure washer and process and cleaning solutions recommended by the reflective sheeting manufacturer. Washing shall not take place when the temperatures are expected to drop below freezing. Residual cleaning solution shall not be left on the pavement after the cleaning operation. Any cleaning solution shall be removed before traffic is allowed to travel on the pavement.

### **9.19.2 Ramp Gate Inspection**

All gates installed on the entrance ramps to expressways (42) shall be operated and tested twice per year, in April and October, in presence of an IDOT inspector. Gates shall be hand cleaned with biodegradable detergent and water. Lubricate pivot bearings and locking arm with spray grease, inspect cone cabinets, and lubricate locks. If any gates are found to need re-striping, the work shall be performed in the field by the Contractor, at the time of this inspection. The re-striping material (which is different from the REVLAC swing gate striping) shall be furnished by the Department, prior to the start of work. The procedure shall be to hand clean the old striping while the gate is in its closed position, and then apply the new striping over.

If any crash barrels are found damaged the IDOT ComCenter shall be notified. The Contractor is not responsible for sand crash barrel replacement.

### **9.19.3 REVLAC/RACS Sign Inspection**

The fifteen (15) changeable Message (LED DMS) signs shall be inspected, cleaned and the preventive maintenance work performed in accordance with manufacturer's recommendations twice a year, in April and October. All work must be performed in the presence of an IDOT inspector. The inspection shall include but not be limited to the following items:

Contractor shall:

- Open control cabinet and clean out debris
- Hand clean control cabinets with biodegradable detergent and water
- Check Changeable message signs ventilation system assure all fans operational and clean filter and vents from dirt and debris
- Check LED Display and photocell operation
- Check communication system through remote control panels
- Open access covers on the sign and cabinet clean out any accumulation of bird and insect nests, dirt and dust, rodent or corrosion debris, seal all openings.
- Clean and inspect interior and exterior sign housing
- Check and adjust voltage to LED power supply
- Inspect and verify grounding system and ground resistance.
- Clean all associated control cabinets with biodegradable detergent and water
- Clean LED sign panels with a cloth and biodegradable detergent and water

All REVLAC and RACS auxiliary signs, dynamic message signs, Chevron signs, and LED signs (58) shall be inspected twice a year, in April and October.

#### **9.19.4 Barrier Inspection**

Barrier inspections (6) shall be conducted twice per year, in April and October. Contractor shall inspect all control cabinets, equipment access covers and hinged opening for proper closure (bolted or padlocked) and shall perform preventive maintenance in accordance with manufacturer's recommendations. The inspection shall include but not limited to the following items:

Contractor shall:

- Open control cabinets and clean out debris or corrosion
- Hand clean control cabinets and reflective strips with biodegradable detergent and water
- Check for fluid leaks in the cabinet and correct, if any
- Lubricate pillow block and idler sprocket bearings with multipurpose lithium grease, NLGI No. 2, or equivalent.
- Check oil level in the drive reducer and fill with SAE No. 20 motor oil, if necessary.
- Lubricate drive chains semiannually using an aerosol chain lubricant spray (WD-40 or similar compounds are not acceptable).
- Check net condition and positioning and check for damage or vandalism
- Check wire condition and terminations
- Open restraining barrier cover doors and hinged openings, clean, check drive chain and sprocket alignment and wear, counterweight cable attachment and general condition and check for oil leaks
- Check tower cover weather seal for wear or damage
- Check limit switches and actuators; adjustments, clearances, and secure mounting
- Check barrier net cables conditions, for tautness/tension and proper height
- Check stabilizer foot pads (replace worn or missing pads)
- Check inside of tower and cross ramp structure for accumulation of debris, dirt, dust, corrosion, animal nests, and excess grease
- Lubricate per maintenance manual

The restraining barrier should run smoothly, without excess vibration or noise, stop quickly at its raised or lowered positions, and, when in remote operation, ensure prescribed status and warning light indications are working.

#### **9.19.5 Cattron Inspection**

The Contractor shall conduct a PM program for Cattrons (10) at the Emergency Traffic Patrol (ETP) building, twice per year in April and October, to check batteries and confirm that the units link to the receiver/decoders at Buildings A/C/D/E. The units shall also be tested for battery voltage and the batteries shall be replaced as needed.

Since the units are needed daily by ETP for REVLAC operations, the PM shall be performed on a maximum of five (5) units at any one time and with maximum turn-around time of one business day, returning the units the same evening. If any unit is found to be defective, the unit shall be replaced with a spare unit until the repairs are completed. Tickets shall be issued for all defective units and reported in the monthly routine work submittal.

**9.19.6 Liebert HVAC inspection and cleaning**

Special Liebert units at the Electrical Field Office/TSC require twice per year cleaning and inspection from a certified HVAC company, in early June and late November.

**9.20 YEARLY SCHEDULED PM WORK**

Any deficiencies or malfunctions shall have tickets created and repairs performed per specifications herein. The Contractor shall complete the required spreadsheet inspections and load on the FTP site each quarter year. The spreadsheet forms will be supplied at the Pre-Bid meeting. The date of the inspection shall be listed on the Daily Agenda.

**9.20.1 Dark Fiber Inspection and Testing**

For each of the 10 highways in the Communication Network the Contractor shall test 10% of the “dark” fibers (fibers not in use), end to end with an OTDR at both 1310 and 1550 nm wavelengths for the length of the highway/expressway. The work shall be completed in May and June. The Engineer shall assign the 10% to be tested.. The test procedure shall comply with ANSI/TIA/EIA-569-A, Annex H, “Optical Fiber Performance Testing” and with ANSI/TIA/EIA-526-7, “Method 1: Optical Power Loss Measurements of Installed Single Mode Fiber Cable Plant.” The Contractor shall also check for loose connectors and repair if necessary.

**9.20.2 Count Station/Expressway I/O Validation**

The Contractor shall perform manual traffic counts at 5 percent of the Surveillance count Stations in District 1 or as directed by the Engineer in May, June & July. The Contractor shall manually count each lane of the count station for a pre-determined one hour duration. The start and end times shall be coordinated with TSC staff. TSC staff shall synchronize the Contractor start and end times based on the INET/ATMS clock used to start and end the hourly data collection sequence. These hourly counts will be used to validate the calculated INET/ATMS volumes collected along the corridor.

IDOT shall analyze the collected data, compare to the calculated INET/ATMS data and notify Contractor to issue Tickets where there are discrepancies in the I/O for upstream and down stream detector data.

**9.20.3 Tower Site Inspection**

The Contractor shall inspect the radio towers (11) yearly in June for any visual defects on the tower structure, lighting, monitoring system (where applicable), antenna, co-axial lines and wave guides, grounding system, site appearance and general condition, fencing and gates (standards per FCC title 47 Sec. 17.47) and locks where applicable. Tickets shall be created for any problems found. The date of the inspection, in June, shall be listed on the daily agenda. The Contractor shall submit the inspection form in the FTP site. Also note these requirements are applicable to the tower at the Rodenburg Maintenance Yard and Woodstock.

**9.20.4 Fiber Splice Box Inspection**

In the month of July, the Contractor shall inspect the listed fiber splice boxes (13) for water and/or sand entry and document the existing sequential cable footage (slack) as it enters the vault and as it exits the vault, if the label is visible on the fiber cable. If the label is worn off or missing then the Contractor shall estimate the footage. The Contractor shall also perform this inspection upon the request of the Engineer, for a maximum of twenty-five (25) additional locations.

The following locations shall be inspected, if water or sand has entered the splice box the Contractor shall re-seal or replace it.

Expressway	Can #	Location
I-57	1	OB Median – HH1 – AIJ2 (nearest light tower)
I-57	3	OB Center Median – Cam FS1
I-57	4	OB Center Median – Cam FS1A
I-57	8	OB Center Median – HH16
I-57	18	OB Center Median – HH for Cab. I23
I-57	19	OB Center Median – HH for Cab. I25
I-57	27	OB Center Median – T11C (nearest light pole)
I-55	9	East of Harlem Ave, IB Right Shou. – Cam 23
I-55	10	East of Harlem Ave, IB Right Shou. – Cam 21
I-55	11	West of Central Ave, IB Right Shou. – Cam 32
I-55	14	East of Cicero Ave, IB Shoulder – Cam 13
I-290	10	OB Median – HH4 – Cab. 0127
I-290	11	OB Median – Cab. 0129

All repair work shall be done under routine maintenance. The Contractor shall provide necessary Traffic Control for this work. The Contractor shall provide the Engineer the spreadsheet report with the inspection findings and submit in the monthly routine work submittal. All problems found during the inspection including damaged splice boxes, fiber trays and fiber cable, and/or damage to junction boxes or handholes shall have Tickets created.

**9.20.5 HVAC Inspection**

Once per year, during the month of July, the Contractor shall use a certified HVAC company to clean and test forty-one (41) outside HVAC coil units for the buildings and huts. This service work does not include Building B, Plato Building, or the IDOT HQ building units. The Contractor shall accompany the vendor at all facilities and shall provide the water and pressure washer necessary for this service. Three (3) Portable AC units one at I-57/80 hut and two at TSC shall be serviced inspected and cleaned once per year,

### 9.20.6 Full Building/Hut/Systems Inspection

A preventive maintenance program shall be conducted once per year, from July through August, for all buildings and huts, the IDOT Headquarters/ComCenter (EMC maintained equipment only), and ISP facility in Des Plaines; twenty-two (22) locations. All work shall be performed in presence of an IDOT inspector. The Contractor shall perform an inspection of each location and submit a report on an excel spreadsheet as specified below, items inspected that require, replacement and cleaning shall have tickets created. A summary of the tickets created and excel spreadsheet reports shall be included in the applicable monthly routine work submittal on the FTP site.

The Inspection shall include:

#### Refrigeration:

- Replace air filter
- Inspect and clean indoor coil, drain pan, and condensation drain line
- Inspect and clean blower motor and wheel
- Check electrical connections for tightness
- Check controls for proper orientation
- Inspect refrigerant tubing connections

#### Fans:

- Inspect and tighten bolts and set screws
- Inspect belt wear and alignment
- Clean exterior surfaces
- Replace filters
- Inspect and lubricate bearings if needed
- Check for proper control/line voltage and operation on supply/exhaust fan starters

#### Switchboards:

- Manually open and close breakers
- Check for torque values in secondary section of bus splices and connections
- Check for proper ammeter/voltmeter values

#### Panel boards:

- Inspect for moisture damage
- Replace any deteriorated insulation material
- Clean any accumulation of dust or dirt
- Inspect all connections for heat or other damage of loose connections
- Operate mechanical components
- Clean and dress copper electrical contacts
- Operate circuit breakers
- Replace burned out indicating lights

#### Transformers:

- Clean excessive dirt on windings & insulators



Automatic Transfer Switches:

- Inspect wiring and connections for tracking, overheating, and deterioration
- Tighten control circuit wiring terminals
- Check for free movement and contact continuity in manual switches
- Adjust time delay settings as necessary
- Clean or replace main, arcing, and auxiliary contacts
- Tighten lug connections and mounting insulation bolts
- Perform transfer operation
- Calibrate phase and voltage sensitive relays
- Clean and remove accumulated dust and dirt
- Check for proper operation or door closure, locking bars, and mechanism

Batteries:

- Check and record AC and DC voltages of each cell
- Verify torque specifications of nuts/bolts
- Clean surfaces
- Check AC/DC power converter charger (if applicable)

Ethernet Network:

- Check Cisco Equipment
- Check fiber media converters and switches
- Clean and remove accumulated dust and dirt
- Clean filter
- Check Hirschman Fiber/Ethernet transceivers

6 GHz Microwave Radio System:

- Clean outside and front panel of case
- Tighten cable connections
- Measure and record operating parameters
- Measure and record transmitter RF frequency
- Measure and record receiver IF frequency
- Measure and record receiver AGC voltage
- Check dehydrator

Modems Serial Fiber System:

- Remove dust from internal components with soft brush and low pressure air/vac

Antennas Microwave Radio:

- Check tightness of hardware on mount, shroud, radome, and feed
- Inspect antenna and repair when necessary

Remote Control (Cattron) System

Check fuse resistance and replace when necessary

- Check fuse holders for corrosion and clean when necessary
- Check primary power source for proper readings
- Check control transmitter, receiver/decoder, relay output rack for loose bolts/screws/clamps
- Check fuses, holders, resistors, and transformers for over heating
- Visually check antenna, mounting devices, cables and connectors

CCTV:

- Patrolmen shall inspect all equipment for cleanliness and proper operation, and check various levels and settings.

Alarms Checks on the following equipment:

- iMpath
- Optelicom
- Meridian
- Bosch
- Cisco
- IFS
- iMux

Controller for Tower Lights:

- Check and clean

PLC Servers:

- Check operations

DMS Signs:

- Check media converter
- Check fiber transceiver

Enclosures:

- Blow dirt out of programmable controllers, I/O modules & power supplies with compressed air
- Blow dirt out of T-60 with compressed air
- Brush dust & construction debris off of the I/O racks, wire troughs, & horizontal surfaces
- Brush dust and construction debris off of the T-60 and other horizontal surfaces
- Vacuum dust and construction debris out of cabinets
- Wipe dirt off of edges of doors and door frames
- Check ground bus connections and bonding wires and lugs for tightness and integrity
- Check screws on AB 1771-I/O swing-arms for tightness
- Check screws on terminal boards for tightness
- Test Random Access Memory (RAM) function
- Verify alarms are updating properly
- Verify hard drive is functioning normally
- Verify screen brightness is within normal parameters
- Verify PLC program backup is current and password protected
- Clean and inspect air filter
- Check bonding wires and lugs for tightness and integrity
- Check communication cable integrity
- Check alarm LED indicator lamp on AB I/O chassis

**General Items:**

- Replace or repair corroded conduit, junction boxes and connectors
- Replace or repair damaged weather stripping and/or minor leaks
- Replace batteries in the surge arresters, building clocks, and other equipment, per manufacturers' specifications
- PLC batteries to be replaced in April of each year
- Check heaters for correct operations, note problems on tickets
- Check door operations, note problems on tickets
- Wet mop the floor and maintain clean environment

**Roof Inspection and Repair for all Buildings and Structures (July thru August of each year)**

- The Contractor shall thoroughly clean the roof surface of dirt, debris, and contaminates.
- The Contractor shall conduct a full roof and flashing inspection on all buildings and structures, by accessing with ladder, and physically walking the roof, checking for leaks or deterioration. Any problems found shall be noted on a Ticket for repair.

Repair items as found:

- Small Holes and Cracks: Clean surface, apply mastic (roof cement) 1/8" to 1/4" thick into the hole or crack using a roofer's trowel or gloved hand, working the mastic into the opening and 2 to 4 inches beyond.
- Large Holes and Cracks: For damaged areas larger than 1/4" repair, clean surface, use self-adhering SBS Modified Asphalt Membrane by peeling off the backing and pressing it onto the area to remove any entrapped air. A coating of mastic (roof cement) shall be applied over all repaired areas.

**9.20.7 Battery and UPS Testing**

The Contractor shall employ a factory authorized service company to perform an inspection and preventive maintenance on the UPS, its transfer switch, and its battery and the battery charger of the UPS Systems and RF transmitter at twelve (12) location Huts, towers and facilities in the Surveillance system. The comprehensive inspection shall be conducted in August each year and shall include:

Perform initial and final voltage and current checks at each stage

System in bypass and de-energized:

- Check all components

System in bypass and energized:

- Check all alarms, measure and adjust critical setting

System energized and in normal:

- Perform short-term (2 minute) discharge to evaluate battery condition

The Contractor shall obtain a detailed service report from the Vendor service engineer. In addition to the readings the report shall note any deficiencies found and/or service recommendations. The Contractor shall submit the original service report in the August FTP site documentation. (Any necessary repairs shall be performed through a non-routine work authorization.) Tickets shall be created for any problems found. The date of the inspection(s) shall be listed on the daily agenda.

### **9.20.8 Fire Extinguisher Maintenance**

The Contractor shall have all fire extinguishers checked yearly for proper pressure through a fire inspection service, a minimum of once per year, in November. It will be necessary for the Contractor to travel with the fire inspection service personnel to unlock facilities. The Engineer shall be provided an email schedule of the yearly testing, prior to the start of the work.

In some locations the dry chemical fire extinguisher (a maximum of 23 units over 3 years), will need to be submitted to the fire inspection service for hydrostatic maintenance procedures which require the extinguisher to be tested by being emptied and re-filled (every 6 years) per the NFP specifications. The Contractor shall provide a spreadsheet with the location names and dates of the yearly inspection and date of the last 6-year maintenance and submit in the November FTP site report.

### **9.20.9 Yearly Surveillance Cabinet Inspection and Cleaning**

The Contractor shall perform an inspection of each surveillance expressway detector cabinet once per calendar year, seventy (70) locations per month, between January and November of each year and record on Log form S-11. The Log form S-11 sheets shall be transmitted, as completed for the month, in the routine work submittal on the FTP site. All work shall be noted on the Daily Agenda.

The work includes:

- Record start time
- Inspect Induction Loops
- Inspect electric service disconnect. Check Tones for proper operation
- Check 2070 lite controllers for proper operation (if applicable)
- Check radar speed warning sign and detector for proper operation (if applicable)
- Check Cabinet Foundation, tighten where necessary
- Check lubrication of cabinet doors, hinges, and locks
- Clean cabinet inside and out
- Inspect cabinet PDA for proper operation (if applicable)
- Check and record voltage levels for solar powered locations on the load side of the solar regulator, battery side, and solar panel side. Take necessary action to correct any issues found.
- Inspect solar panel attachment to aluminum pole. If any issues, take necessary action to make location safe.
- Check radar, microloop, magnetometer (SenSys) and bluetooth detector operation (if applicable).
- Check tuning and operation of loop detectors or detector input files
- Log follow-up activity needed and radio the EMC Dispatch Center to create ticket
- Update and Record/edit cabinet inventories
- Clean cabinet. (The cleaning materials and procedures shall be approved by the Surveillance Engineer prior to starting the work).
- Record departure time

Before leaving the Surveillance location, the Contractor shall call TSC and ask that the accuracy of data be checked. The Contractor shall not leave until the Traffic Systems Center personnel have check on the accuracy of the data being received at the Traffic Systems Center.

The EMC Dispatch Center shall be notified to create a ticket noting problems found and/or repairs made.

**9.21 REVLAC and RACS SOFTWARE MAINTENANCE SUPPORT**

For the duration of this Contract, and if renewed until December 31, 2021, the Contractor shall secure a commitment for software maintenance support specialty services with the original software developer, Engineered Software Products of Lawrenceville, GA (or an approved alternate) for the Surveillance Systems for emergency trouble shooting expertise and for the modification of the existing system as may be necessary.

The principal for Engineered Software Products is Mr. D. Grib Murphy, 770-682-8259. A letter of intent to provide these services is required from Engineered Software Products (or an approved alternate) to be presented to the Engineer at the Pre-Construction Meeting.

The following chart indicates software which shall be maintained and licenses renewed under this Contract. If this Contract is renewed the maintenance support agreements and licenses shall be extended until December 31, 2021, as incidental to routine maintenance.

<b>Rockwell Part Number</b>	<b>Serial Number</b>	<b>Software Description</b>	<b>Version</b>	<b>IDOT Use</b>
9357DNETL3D	1235020855	RSNetworkx DeviceNet	for 4.01.00	RACS
9357DNETL3D	1235020856	RSNetworkx DeviceNet	for 4.01.00	RACS
9357DNETL3D	1235020866	RSNetworkx DeviceNet	for 4.01.00	RACS
9357DNETL3D	1235020854	RSNetworkx DeviceNet	for 4.01.00	RACS
9357CNETL3D	1163019247	RSNetworkx ControlNet	for 4.01.00	RACS
9357CNETL3D	1163019248	RSNetworkx ControlNet	for 4.01.00	RACS
9357CNETL3D	1163019258	RSNetworkx ControlNet	for 4.01.00	RACS
9357CNETL3D	1163019246	RSNetworkx ControlNet	for 4.01.00	RACS
9324RLD300ENE D	1203023898	ControlLogix RSLOGIX 5000	& 11.11.00	RACS
9324RLD300ENE D	1203023899	ControlLogix RSLOGIX 5000	& 11.11.00	RACS
9324RLD300ENE D	1203023897	ControlLogix RSLOGIX 5000	& 11.11.00	RACS
9324RLD300ENE D	1203023909	ControlLogix RSLOGIX 5000	& 11.11.00	RACS
9324RLD300ENE D	1203023859	ControlLogix RSLOGIX 5000	& 11.11.00	RACS
9701VWSCWAEN E	2524000143	RSView SE Client	2.10.00	RACS
9701VWSCWAEN E	2524000142	RSView SE Client	2.10.00	RACS
9701VWSCWAEN E	2524000106	RSView SE Client	2.10.00	RACS
9701VWSCWAEN E	2524000107	RSView SE Client	2.10.00	RACS
9701VWSCWAEN E	2524000108	RSView SE Client	2.10.00	RACS
9701VWSS100AE NE	2527000100	RSView SE Server 100 Display	2.10.00	RACS
9701VWSS100AE NE	2527000101	RSView SE Server 100 Display	2.10.00	RACS
9701VWSTENE	2529000103	RSView Studio RSView Enterprise	for 2.10.00	RACS
9355WABGWENS	1006010204	RSLinux Gateway Software	2.40.01	RACS

Various Routes  
Section 2017-033-I  
Various Counties  
Contract No. 62F52

9324RL5300ENE	1112063372	RSLogix 5	5.20.10	REVLAC
9324RL5300ENE	1112063372	RSLogix 5 upgrade Ver. 6.0	6	RACS
9357CNETL3	1163019246	RSNetWorx Update	4.11.00	RACS
9357CNETL3	1163019247	RSNetWorx Update	4.11.00	RACS
9357CNETL3	1163019248	RSNetWorx Update	4.11.00	RACS
9357CNETL3	1163019258	RSNetWorx Update	4.11.00	RACS
9701VWSCWAEN E	2524000142	RSView SE Client	3.00.01	RACS
9701VWSCWAEN E	2524000143	RSView SE Client	3.00.01	RACS
9701VWSS100AE NE	2527000100	RSView SE Server 100 display	3.00.01	RACS
9701VWSS100AE NE	2527000101	RSView SE Server 100 display	3.00.01	RACS
9701VWSTENE	2529000103	RSV Studio for Enterprise	3.00.01	RACS
930125E3353	1476004195	RSView32 Runtime 5k		REVLAC(S)
9355WABENE	1008079409	RSLinux Professional	2.41.00-ENE	REVLAC(S)
930125E3353	1476004196	RSView32 Runtime 5k		REVLAC(C)
9355WABENE	1008079415	RSLinux Professional	2.41.00-ENE	REVLAC(C)
930125E3353	1476003669	RSView32 Runtime 5k		REVLAC(A)
9355WABENE	1008084954	RSLinux Professional	2.41.00-ENE	REVLAC(A)
930125E3353	1476004198	RSView32 Runtime 5k		REVLAC(D)
9355WABENE	1008079417	RSLinux Professional	2.41.00-ENE	REVLAC(D)
930125E3353	1476004197	RSView32 Runtime 5k		REVLAC(E)
9355WABENE	1008079416	RSLinux Professional	2.41.00-ENE	REVLAC(E)

Key: S =Dist 1 ComCenter/Schaumburg, A=REVLAC Bldg A, C=REVLAC Bldg C, D=REVLAC Bldg D, E=REVLAC Bldg E

## 9.22 WARRANTY AND MAINTENANCE AGREEMENTS

The Contractor shall obtain a from the listed vendors or approved equal for the following equipment and software through routine maintenance. The Warranty and maintenance agreements shall be for the duration of this Contract. If this Contract is renewed the warranty and maintenance agreements shall be extended until December 31, 2020 and 2021, incidental to routine maintenance. Refer to chart at the end of this Article.

### **REVLAC and RACS Systems**

Name: AB Rockwell Software support and updates  
Contact: Revere Electric or Englewood Electric Supply  
Obtain: Annual support agreements for Rockwell software

### **Nordic Tower, REVLAC Buildings A, C, D, and E, Hillside Hub**

Obtain: Uninterruptible Power Supplies (UPS) Maintenance Agreements with next business day field response

### **SmartNet Coverage for All CISCO Equipment**

A complete list of Cisco equipment will be provided at the Pre-Bid meeting.

Name: SBC or CISCO Authorized Service Vendor  
Contact: Laura Langen, 217-527-2037 (or other CISCO authorized service vendor)  
Obtain: Software Extended Support Maintenance Agreement for 24/7 coverage and 4 hour equipment replacement delivery

### **EMCMS Vendor Maintenance and Support**

As stated in Article 9.10.12, The Contractor shall obtain a support maintenance agreement required for the EMCMS. The Contractor may use the current maintainer of the EMCMS, Xsys Inc., 653 Steele Drive, Valparaiso, IN. 46385, for the duration of the Contract. Bidders will need to contact Xsys, Inc. (telephone 219-477-4816) to obtain a sample contract and cost estimates.

### **Premium Software Assurance Agreement (PSAA)**

The Contractor shall renew all Premium Software Assurance Agreements (PSAA) with 360/Flir Surveillance for VDS, Google maps and DMS Central Control System servers and clients located at TSC, District 1 ComCenter, District 3, and District 2 Radio Communications Center. The agreement shall be renewed annually as the EMC Contract options are renewed. The current PSAA expires February 23, 2019.

The PSAA shall provide coverage for the following:

- Support coverage Monday to Friday 8:00am to 5:00pm (PST) excluding major holidays
- Unlimited telephone, email and online technical support
- Logon web access to online knowledge base and FAQ's
- Free access to all interim and major releases, patches and device drivers within the product category
- Access to dedicated technical support developers
- Priority response and resolution of issues
- Remote configuration and troubleshooting assistance via internet



### **Skyline NTCIP Central Control Software**

The Contractor shall renew the current Skyline NTCIP Central Control Software, Annual Maintenance License, which covers the software used to maintain and operate Skyline DMS Sign within District 1. The current Skyline NTCIP Central Software Annual Maintenance license is due to expire in February 2019.

The Skyline NTCIP Central Control Software shall include the following;

- Telephone Assistance and/or via email, Monday through Friday, 8am to 5 pm MTN time
- Software upgrades, updates, and new releases or versions of software at such time as Skyline makes update available

The Contractor shall provide copies of the above list and any other signed maintenance agreements specified in this contract, with contact name and telephone number, all agreements term limits and details of equipment and response coverage, and monthly or yearly cost to the Contractor, by the first Pay Meeting of each contract year. Letters of intent shall be submitted to the Engineer at the Pre-Construction Meeting and prior to any EMC renewal.

### **Solar Winds**

The Contractor shall renew and maintain the SolarWinds Network Performance Management (NPM) server and software on the IDOT District One VDS network. The Network Performance Management software, NPM, and server shall be maintained at the Electrical Maintenance Field Office/TSC building. The Contractor Dispatch Center shall also have an NPM terminal to access the IDOT VDS network. The Contractor shall supply the Department with software operational support (maintenance) for the NPM software, equal to or exceeding SolarWinds Orion Network Performance Management Software, for 2019 and if renewed 2020 and 2021. Software maintenance shall include free access to any software updates, upgrades, and 24/7 support from the vendor.

### **Network Managed Service Support**

The Contractor shall furnish a managed network service support to monitor IDOT EMC network system 24X7. The Network management services shall provide event response notification and ticket management for critical alerts, restoration to incidents and problem management. The Network Management Service provider shall send out alerts and notification of critical events to IDOT and EMC designated personnel. The services shall include reporting and response management, and quarterly reports shall be provided for asset management, service review, and work specified in Article 9.10.5.

The name of the proposed Network Managed Service Support vendor shall be provided with references and resumes of qualified personnel for IDOT approval at the Pre-Construction meeting.

### **INET/ATMS MAINTENANCE AND Software Support**

The Contractor shall employ a sub-contractor for INET/ATMS specialty work. The vendor shall have an existing business presence within District1, a 24/7 on-call service capability, on-line monitoring and intervention capabilities, experience in programming using the existing software, qualified ongoing experience with hardware of the type installed, and qualified ongoing experience with software of the type installed. In addition, five (5) years experience is required for:

A data acquisition system, specifically synchronized VMIC front end processors:

- Coordination control of Dell Power Edge R720 servers networked to process, control, and archive data from the data acquisition system, within and outside IDOT for traffic management control information dissemination and analytical functions; in an environment similar to that of the Traffic Systems Center
- The software environment, similar to that of the Traffic Systems Center
- Provide software assurance

The vendor shall provide an offsite repository which provides for a complete INET/ATMS system back up in the event of a catastrophic failure which requires a complete reloading of the INET/ATMS software and configuration.

#### **Submittal for Engineer Approval**

The Contractor shall submit the following items at the Pre-Construction Meeting:

- The name of the proposed INET/ATMS vendor
- List of previous projects which involved the ATMS/I-Net software environment, the organization, contact person and title
- Resumes of the qualified personnel listed to work on the INET/ATMS  
(Resumes shall list previous projects and specific duties/responsibilities the individuals were responsible for as part of the project.)

### **9.23 CONTRACTOR FURNISHED SPARE MATERIALS & EQUIPMENT**

The Contractor shall furnish the minimum material and equipment listed below and store at a centralized location for ease and prompt access. The equipment and labor necessary for transportation, removal, installation, or re-installation of the items listed below shall be furnished by the Contractor and paid through routine maintenance bid items. The Contractor shall provide an inventory of the material used in the monthly routine work submittal on FTP site.

Usage quantities from a prior contract year are shown in parenthesis, however, this information is provided to bidders for information purposes only, and is not provided as an estimate of expected future Contract usage.

- Barrier reflective tape (16) minimum required 4
- Building lighting and lamps, inside and outside (6)
- Camera Surge Protection (25) minimum required 5
- Cattron batteries (8) minimum required 4
- Circuit breakers less than 40A (1)
- Contactors less than 40A (3)
- Cleaning materials and solution, power washing equipment
- Decals, (18) for gate numbering, cameras, poles, aux signs, and chevrons  
minimum required 24
- Fuses and switches (60)

- Gate tips (45) minimum required 24
- Indicator lights and lamps
- Photo cells (5) minimum required 3
- Phone modems (12)
- Relays (20)
- Shear pins and bushings (80) minimum required 25
- Snow removal supplies, salt
- Wire terminations
- Proximity Switch
- Timing delay relays
- Contactors

**9.24 DEPARTMENT FURNISHED MATERIALS AND EQUIPMENT FOR REVLAC, RACS AND RAMP GATES (S-4)**

The materials and equipment as listed below shall be made available to the Contractor by the Department for routine work (and non-routine work if approved and authorized by the Engineer). Labor and equipment necessary for transportation, removal, installation or re-installation, plus shipping, mailing, and handling charges are paid through routine maintenance bid items.

- Barrier crash detector
- Barrier dragnet assembly
- Barrier tape cartridges
- Gig-E switches
- LED Chevron, Auxiliary, Lane Usage, Gore and Barrier Signs
- Monitors
- Cameras
- Ramp Gates
- SM/MM Fiber Transceivers
- Swing Gate Arms

Equipment as listed above in the Contract EMC Spare Parts Inventory shall be removed, installed, and/or re-installed, shipped, mailed or handled by the Contractor through labor paid as incidental to routine maintenance bid items. The Contract Spare Parts Inventory will be replenished as needed and approved by the Engineer.

**9.25 EQUIPMENT/LOCATIONS INCLUDED IN SURVEILLANCE ROUTINE MAINTENANCE**  
Review Section 3

**ARTICLE 9.26– SOFTWARE ASSURANCE COVERAGE SHALL BE from 1/1/19 THROUGH 12/31/19 WITH YEARLY RENEWAL THROUGH 2021**

DESCRIPTION	COMPANY NAME	CONTACT NAME	PHONE & EMAIL
REVLAC Maintenance	ESP, Engineered Software Products, Inc., 1075 Progress Circle, Lawrenceville, GA 30043	Grib Murphy	770-682-8259
Annual Software Support Agreement for: Catalog # A-BP 9800DC8AUTOC DIRECTCNT 8-5 AUT, & Catalog # A-BP 9800DC24HMICOM DIRECTCNT 7X24 Large Packet of Information from Rockwell Automation with Site Support Agreement, Supported Software Listing, Authorization Number 7010401	Purchase Order to: EESCO, Englewood Electrical Supply United Electric Division of WESCO Distribution, Inc., Joliet, IL Invoice from: EESCO, 2401 Internationale Pkwy, Unit C, Woodridge IL 60517	N/A	N/A
Hillside Hut/REVLAC, Annual UPS Support Agreement, LaMarche Battery Charger/Inverter & UPS (Cloride UPS only at Hillside)	Purchase Order to: Protech Services 28915 North Herky Dr., #110, Lake Bluff, IL 60044 Invoice from: ProTech Services 610 Executive Campus Dr., Westerville, OH 43082	N/A	800-882-6474
Nordic Tower Hut – Liebert, Roosevelt Ramp Bldg LaMarche – Annual UPS Support Agreement,	Purchase Order to: Protech Services 28915 North Herky Dr., #110, Lake Bluff, IL 60044 Invoice from: ProTech Services 610 Executive Campus Dr., Westerville, OH 43082	N/A	800-882-6474

REVLAC Buildings A, C, D, and E, Annual UPS Support Agreement		-	-
I-80 Hut, I-55 Weigh Station Hut, I-55A Hut, Ryan Hut (66 <sup>th</sup> & State) Eaton, Annual UPS Support Agreement	TBD		
SmartNet Coverage for CISCO Equipment, software extended support for 24/7 coverage and 4 hour equipment replacement delivery	AT & T Datacomm Inc. P.O. Box 66998, St. Louis, MO 63166	Laura Langen	720-889-8692 l12726@ att.com
Radio removals, re-installations, and new installations	Chicago Communications	N/A	
Annual Service Agreement, 24-Port Voicemail System for ComCenter, with 24/7 software support and field response during business hours	Time Business Systems 916 Central Ave. Roselle, IL 60172	N/A	630-529-5220
EMCMS, Hardware & Software Maintenance	Xsys, Inc. 653 Steele Dr., Valparaiso, IN 46385	Arman Sarkisian	219-477-4816 IDOT@Xsys.c om
Premium Software Assurance Agreement PSAA for Primary and Secondary servers & clients, located at ComCenter and TSC which run Cameleon ITS software and drivers, support coverage, M-F, 8 am to 5pm, PST	360 Surveillance/FLIR	Jim Barry Traffic Signal Company	630-513-8000 trafsigco@ aol.com-
Network Performance Management and Software Annual Agreement for Dist 1 Headquarters Network	360 Surveillance	Jim Barry Traffic Signal Company	630-513-8000 trafsigco@ aol.com

Bing Maps Licensing	360 Surveillance	Jim Barry Traffic Signal Company	630-513-8000 trafsigco@ aol.com
Software Operational Support & Maintenance for the NPM software	SolarWinds	N/A	512-530-8100 512-682-9300
Yearly Tech Support for All Pump Station SCADA System Software	TBD	N/A	
Alarm Center for Windows, Upgrade & Support for Item ACS-220WW, SN#6177, refer to invoice for specifications	Security Information Systems, Inc., 6314 Kingspointe Parkway #3, Orlando, FL 32819	N/A	407-345-1550
INET, 24/7 on-call service capability, software maintenance and support, provide monthly report on INET/ATMS system INET software Assurance	Parsons — 650 E. Algonquin Rd, Suite 104, Schaumburg, IL. 60173	Preston Judkins	847-925-0120
Virus Protection Software annual renewal for DMS field units	TBD	N/A	
NTCIP Central Control Software, Annual Maintenance License, for software to maintain and operate DMS Signs, business hour response, software upgrades	Skyline Products	N/A	
TSC, UPS Maintenance & Support, 24/7, for Eaton PowerWare, 9390-100, EC515CBB07, 80 batteries		N/A	

## **ARTICLE 10.0 – TRAFFIC SIGNAL SYSTEM**

### **10.1 TRAFFIC SIGNAL SYSTEM DESCRIPTION**

The Traffic Signal System consists of electronically operated traffic control devices owned and maintained by the Department, which includes traffic signal installations and the integrated closed-loop traffic signal monitoring system, and flashing beacon installations.

The Traffic Signal installations (locations) include, but are not limited to, master and local controllers, time base coordinators, coordination units, intersection monitors, modems, controller cabinets, battery backup systems (UPS), phone lines, microwave communication lines, detectors (induction loop type, magnetic type, wireless type, microwave type, video type, pedestrian push-button and infrared type, and light sensing or radio communication emergency vehicle type), incandescent and light emitting diode (LED) signal heads (traffic and pedestrian), aviation red obstruction beacons, internally illuminated fiber optic signs, LED signs, pedestrian signal signs, audible and countdown pedestrian signals, electronically steerable beam LED signals, in-pavement lights, hybrid beacons (pedestrian and emergency vehicle) systems, LED enhanced signing, traffic signal posts, mast arm assembly and poles, electric cable (standard multi conductor, shielded multi conductor, coaxial and fiber optic), conduit, communications lines and conduit between intersections, concrete foundations, handholes, junction boxes, service installations, ground rods, railroad interconnect security systems, pan/tilt/zoom video cameras and control units, red light running enforcement video cameras, microwave interconnect systems, radio interconnect systems, communication switches, video decoders, combination poles with luminaire mast arms including the luminaire, lighting mast arm, combination pole lighting controls, combination pole cabling, transit signal priority (TSP) equipment and other appurtenances. The Closed Loop Monitoring System (CLMS) includes approximately 325 master controllers interconnected to approximately 2250 intersection controllers. Also included in the CLMS are the interconnect cable, conduit, handhole systems, hardware, software, supplies for the Schaumburg headquarters office, and CLMS field equipment for monitoring including dial-up and cellular communication equipment. The Lake County Division of Traffic's PASSAGE system currently includes approximately three hundred sixty five (365) and Kane County Division of Transportation traffic management system has approximately thirty-five (35) IDOT intersection controllers with additional intersections planned. Other agencies such as DuPage County, City of Naperville and the City of Aurora also operate traffic management systems on State routes.

Flashing beacon(s) on approaches to a signalized controlled intersection shall be considered an integrated device of the traffic signal location and not paid separately as one (1) or more T-2b locations. These flashing beacons have yellow modules/lenses, are mounted with advance warning signs and are electrically powered/controlled by the traffic signal controller cabinet or separately powered/controlled (solar/battery power or electric utility connection). The flashers will include signal sections, power connection or service installation, flasher controller in cabinet or signal head, cable and conduit as well as solar panels and batteries, and all necessary appurtenances.

All combination poles with luminaire mast arms including the luminaire(s), lighting mast arm(s), combination pole lighting controls and cabling shall be maintained under Article 10, the Traffic Signal System, and shall be considered a component of the traffic signal installation or location. The luminaire(s), the lighting mast arm, cabling for the luminaire on combination mast arm poles and control components shall be maintained in the manner listed in Article 7, Lighting and Sign Illumination System. Standard light poles that have traffic signals attached will be maintained in Article 7, except in some instances the poles may be under maintenance of other agencies.

For a list of Traffic Signal Locations refer to Section 3.

#### **10.1.1 Traffic Signals – System Equipment Type - T-1a and T-1b**

T-1a traffic signals are generally constructed with metal poles and posts with underground cabling to the controller cabinet and power source. T-1b traffic signals are generally constructed with wood poles with most signal heads span wire mounted with underground or aerial cabling to the controller cabinet and power source. A traffic signal installation location shall consist of all flasher equipment controlled by or connected to the traffic signal controller and cabinet or powered separately and located on a state, county, or township route approach to the signalized intersection. The Contractor shall maintain all traffic signal equipment connected at a traffic signal installation location and the District 1 Closed Loop Monitoring System, including but not limited to the following:

- Traffic signal heads and mounting hardware, traffic signal posts and bases, mast arm assemblies, poles, shrouds, screening, and foundations including anchor bolts.

The traffic signal heads shall consist of, but are not limited to, signal sections, all mounting hardware, back plates, reflective back plates, louvers, visors, aviation red obstruction lights, special signal sections with flashing white strobes, incandescent lamps, programmable and steerable beams and LED modules.



- Pedestrian and bicyclist signal heads, pedestrian and bicyclist push button detectors, pedestrian and bicyclist posts, foundations, infrared detectors, accessible pedestrian signals (APS), countdown pedestrian signals and associated signs, special pedestrian and bicyclist detection amplifiers and loop/detection.
- Traffic signal controllers are pre-timed, semi-actuated, or actuated NEMA, Caltrans or Advance Traffic Controllers (ATC) types with cabinets and enclosures.
- Controller cabinet or enclosure with all associated equipment including but not limited to system communications equipment, battery backup systems (UPS), switching units (including Layer I, II, and III switches), intersection coordinators, time switches and, where applicable, pedestal and foundation.
- Emergency vehicle preemption (EVP) equipment, intersection monitoring devices, and transit signal priority (TSP) where applicable.

(The cost of repairing or replacing the EVP and TSP equipment shall be invoiced, by the Contractor, directly to the local agency, as instructed by the Traffic Signal Engineer.)

- Red light running enforcement equipment is generally located within State ROW and utilizes separate facilities than the traffic signal installation except access to field cables within the controller cabinet for signal status. Red light running enforcement equipment is not the maintenance responsibility of the State or this contract. However, if the red light running system impacts the normal operation or visibility of the traffic signals or is determined to be a safety hazard by the Traffic Signal Engineer, the cost of repairing, replacing, removing or the like shall be invoiced by the Contractor directly to the local agency as instructed by the Traffic Signal Engineer.
- All vehicle detection including magnetic detector(s), wireless detector(s), video detector(s), cameras, detector loop(s), micro loops, preformed detector loops, microwave detector(s), radar detector(s) FLIR type detection camera systems and emergency vehicle detector(s) along with their related amplifiers, microprocessors, access points, relays, video decoders, relays and diodes

(The maintenance of video detection shall include all necessary modifications to programmable detection zones and cleaning to assure proper operation as directed by the Traffic Signal Engineer. Microwave or radio communication for video detection including transmitters, receivers, antennas, reflectors and other miscellaneous communication equipment either on the sending end, receiving end, or in between shall be included as part of the Video Detection).

- Illuminated regulatory and warning signs.

(The illumination shall be accomplished by incandescent lamps, fluorescent lamps, neon tubes, LEDs or fiber optic lights)

- Illuminated street name signs.

(The illumination is generally accomplished by LEDs. For lighted street name signs not maintained by the State, the cost of repairing or replacing any associated equipment shall be invoiced, by the Contractor, directly to the local agency, as instructed by the Traffic Signal Engineer).

- Traffic signal conduit and interconnect conduit and raceways between traffic signals

(The conduit may be in the ground or attached to structure).

- Traffic signal handholes and interconnect handholes.

Handholes are located in traveled pavement, shoulders area, sidewalks, medians and other areas. Repair of handhole damage caused by the failure of the immediate surrounding area may be paid with non-routine maintenance item(s) if directed by the IDOT Traffic Signal Engineer.

- Traffic signal cable and interconnect cable including copper wire and fiber optic.

The Contractor, with the approval of the Traffic Signal Engineer, may temporarily use spare fibers to re-establish communication. A list of these locations shall be maintained by Contractor and reported to the Traffic Signal Engineer on a monthly basis. When field conditions permit, the Contractor shall replace the damaged fiber cable with new fiber optic cable under routine maintenance.

- Traffic signal wireless interconnect system

- Electrical and telephone service installations

- Cellular communications that include but limited to routers, antennas, gateways, switches and converters.

- Pan, tilt and zoom (PTZ) camera installations.

- Traffic adjusted master controllers with solid state features with associated equipment and where applicable, cabinet and foundation

(The associated equipment shall consist of modems, telephone jacks, switching units, interface boards for copper and fiber optic type interconnect cables, Layer I, II or III switches noise suppressers and all associated components for a coordinated traffic control system.)

- Railroad interconnected traffic signal equipment, conduit, wiring, and security systems
- Signal heads and conduit attached to railroad cantilever structures
- Grounding systems complete with ground rods, ground wells, and grounding cable
- Flashing or steady burn LED enhanced warning and regulatory signs may include pedestrian actuation, supplemental lighting, solar panels, batteries, radio control cabinet and other all necessary appurtenances.

(For flashing or steady burn lighted signs not maintained by the State, the cost of repairing or replacing any associated equipment shall be invoiced, by the Contractor, directly to the local agency, as instructed by the Traffic Signal Engineer).

- A span wire traffic signal installation T-1b includes many of the items noted above plus wood poles with down guys, span wire cable, span wire accessories, and tether wires, and all other associated equipment.

#### **10.1.2 Flashing Overhead Mount Beacons – System Equipment Type - T-2a**

The Contractor shall maintain a signal head(s), flashing beacon overhead mounted, flasher controller in a housing and the complete span wire installation. The signal head shall consist of one (1) or more faces with any number of signal sections. The span wire installation shall consist of two (2) or more wood poles with down guys, span wire cable, span wire accessories, electric cable, ground rods, service installation, conduit, and handholes. Overhead flasher locations include units mounted on sign structures.

### **10.1.3 Flashing Low Mount Beacons - System Equipment Type - T-2b**

Flashing beacon(s) on approaches to an intersection with stop sign control on the cross road, an intersection controlled by all-way stop signs, an intersection controlled by T2a type flashers or signalized intersections where the signal is maintained by others shall be considered a single "T" System Code location and not paid individually as multiple T-2b locations or multiple "T" System Code locations. These flashing beacons are mounted with advance warning signs and are electrically powered/controlled by solar/battery power or electric utility connection.

Flashing beacon(s) on stop signs at an intersection shall be consider a single "T" System Code or T-2b location and not paid individually as multiple T-2b locations. These flashing beacons are mounted on stop signs and are electrically powered/controlled by solar/battery power or electric utility connection.

The Contractor shall maintain a signal head(s), flashing beacon low mount, solar powered flasher (where applicable), flasher controller in a housing, solar panels, batteries, ground rods, service installation, a traffic signal post, foundation, conduits, cabling and handholes. The signal head may consist of one or more signal sections mounted on the same object.

## **10.2 GENERAL MAINTENANCE RESPONSIBILITIES**

The Contractor shall at all times maintain stock of sufficient materials and equipment to make temporary and permanent repairs within the limits specified in Articles 4 and 10.

The Contractor shall maintain all items listed in the System Description under routine maintenance, unless otherwise stated herein. Unless specifically noted, all work required herein this Article shall be paid through routine maintenance. Also refer to general response and maintenance requirements as listed in Article 4.0. In addition, the Contractor shall:

- Maintain the IDOT inventory of traffic signal equipment on database software as directed by the Traffic Signal Engineer
- Maintain and update the EMCMS data for all traffic signal items. Also, when transferring a traffic signal off IDOT maintenance, the Contractor shall include on the Locations Notes page or other permanent data field approved by the Engineer, the IDOT contract or Permit number, IDOT Local Roads and Street's section number, Tollway contract number, or similar reference. Electric Utility information specific to each traffic signal location (TS#) such as account numbers, tower numbers, contact information and any other information required by the Traffic Signal Engineer, shall be included in the EMCMS.

- Maintain a library of repair and operation manuals for equipment in the IDOT signal inventory
- Purchase and maintain up to date licensed software to operate and maintain all Closed Loop Traffic Signal Systems, Video and Detection Systems, and related central/traffic (CMS, TMS, etc.) management systems for Contractor personnel and IDOT personnel's laptops and desk computers (approximately 15 locations). This shall include but is not limited to the latest versions of Centracs, Tactics, TransSuite, MarcNX, and Aries as directed by the Traffic Signal Engineer.
- Purchase and maintain repair and testing equipment necessary to meet the response or repair time requirements of the Contract. Calibration of test equipment shall be completed in accordance with manufacturer recommendations.
- Provide technical assistance at traffic signal inspections and maintenance transfers
- Provide inspections monthly of the traffic signal system through Contractor provided staff of IMSA level II technicians
- Clear snow, ice, dirt, debris or address other conditions that obstruct visibility of any traffic signal display or access to traffic signal equipment
- Trim vegetation to provide visibility of traffic signals as directed by the Traffic Signal Engineer
- Relamp all 150 watt, 135 watt, 90 watt and 54 watt signal sections each contract year with approximately 365 days between relamping. Relamp 80 intersections with LED type signal sections annually. LED relamping locations will be provided by IDOT.
- Replace UPS batteries at 15 traffic signal locations designated by IDOT.
- Record and maintain data base for traffic signal equipment malfunctions and LED module outages by date, location, manufacturer, type, model and other related information
- Inspect and report on all mast arm poles yearly. The report on damaged mast arm poles shall include dimensioned photos of damaged poles. Reports shall include TS#, location, anchor bolt and foundation visual condition.

- Inspect half the number of conflict monitors and MMUs (group A) in 2019 and 2021 and the remaining conflict monitors and MMUs (group B) in 2020. The Contractor shall submit the list of groups A and B in Excel spread sheet format or other format approved by the Engineer for approval.
- Inspect all railroad interconnected signals on the State Highway System (even those maintained by others) on a yearly basis. This inspection shall be coordinated with the IDOT Railroad Engineer, Illinois Commerce Commission (ICC) and the associated railroad company.
- Maintain the District's Closed Loop Traffic Signal System (CLMS) and central/traffic (CMS, TMS, etc.) management systems as described within this Article. This includes monitoring and maintenance of any signals included in the Lake County (PASSAGE), Kane County, DuPage County and any other Traffic Management (TMC/TMS/CMS) system within Region One/District One. The Contractor, at no cost to the Department, will supply to the Department any new software required for the monitoring and maintenance of TMC system signals. The signals within the TMC system network will be monitored as described in the CLMS later in this Article. The necessary computer components (use of one or more PCs is anticipated) and one or more standard phone lines and cellular communications required to interface with the TMC system are included in the CLMS. All CLMS requirements remain in effect for all signals transferred to this system.
- When bagging signal heads is required, light tan colored traffic and pedestrian signal reusable covers shall be used to cover dark/un-energized signal sections and visors. Covers shall be made of outdoor fabric with urethane coating for repelling water, have elastic fully sewn around the cover ends for a tight fit over the visor, and have a minimum of two straps with buckles to secure the cover to the backplate. A center mesh strip allowing viewing without removal for signal status testing purposes shall be part of the cover. Covers shall include a message indicating the signal is not in service.

- Replace existing dial-up service for five (5) closed loop traffic signal systems designated by the Traffic Signal Engineer. Work shall include but not be limited to installation, set-up, support and configure of the cellular communication system to work with IDOT District One's network. Equipment shall include but limited to 1) a rugged cellular modem certified with Verizon Wireless designed with 2 ethernet ports and an RS232 port for connection the traffic signal controller, 2) an external low profile antenna mounted to the traffic signal cabinet, 3) a router with 2 ethernet ports with static IP address assigned by IDOT, 4) for those traffic signals with controllers that are not ethernet compatible, additional hardware and cabling will be needed, 5) all appurtenances necessary to provide cellular communication for the closed-loop system. IDOT District One has installed cellular communication equipment at three (3) locations within the District. For questions regarding these locations, please contact Dan Elder, IT/Network Engineer, Mobotrex, at 563-328-4491 or [delder@mobotrex.com](mailto:delder@mobotrex.com). The necessary SIM card will be provided by the District once testing has been completed and accepted by IDOT.

### **10.3 RESPONSE AND REPAIR TIME REQUIREMENTS**

The Contractor shall respond to all malfunctions of the traffic signal system in a reasonable time. In addition to the daily routine and non-routine maintenance requirements of the traffic signal system, the Contractor shall provide sufficient manpower to respond to all notification of malfunctions on a 24-hour basis, 7 days a week. The Contractor is required to keep a time and date log in a searchable data base format approved by the Engineer of each response from the time of the initial report (ticket issuance) to the time of the final permanent repair. PDF files will not be acceptable. The Contractor is required to notify the Traffic Signal Engineer by email by the next business day when any response time is not met.

Article 4.0 discusses general work requirements of routine maintenance for all systems. The following chart lists maximum response, service restoration, and permanent repair times for which the Contractor will be allowed to perform corrective action on the Traffic Signal System.

**FAILURE OR DAMAGE TO:**

<b>ITEM</b>	<b>RESPONSE TIME</b>	<b>SERVICE RESTORATION</b>	<b>PERMANENT REPAIR</b>
Cabinet	1 hour	24 hours	21 days
Controllers and Peripheral Equipment	1 hour	4 hours	21 days
System Detector Loop	1 hour	NA	7 days
All Other Detectors	1 hour	NA	21 days
Signal Head and Lenses	1 hour	4 hours	7 days
Aviation Red Beacon	1 hour	4 hours	7 days
Mast Arm Assembly and Pole	1 hour	4 hours	7 days*
Traffic Signal Post	1 hour	4 hours	7 days
Cable and Conduit	1 hour	4 hours	7 days
Interconnect and Telemetry	1 hour	4 hours	7 days
Graffiti Removal	NA	NA	7 days
Misalignment of Signal Heads	1 hour	4 hours	4 hours
Closed Loop Monitoring System	1 hour	24 hours	14 days
Post and Poles Plumb Vertically	NA	NA	21 days
Controller, Post & Pole Foundations	NA	NA	21 days
Complaints, Calls, Controller or System Alarms, Timing, Phasing, Programming	1 hour	4 hours	NA
Patrol Truck Deficiencies	NA	24 hours	24 hours

\*Mast arm assembly and pole must be set within 7 days after foundation repairs are completed or after a replacement pole and/or arm assembly become available. In the case of a new pole and/or arm assembly the Contractor must furnish a copy of the signed and dated delivery receipt from the shipping company. Temporary head placement shall meet the requirements of the current Manual on Uniform Control Devices (MUTCD) for driver visibility and temporary replacement of damaged or knockdown of a mast arm pole assembly shall require construction of a full or partial span wire signal installation or other method approved by the Engineer, at no additional cost to the Department, to assure signal heads are located overhead and over traveled pavement. Temporary replacement of mast arm mount signals with post mount signals will not be permitted.



#### **10.4 REPAIR OF SIGNAL LAMP/MODULE OUTAGES**

Signal indication and internally illuminated sign lamp outages must be replaced in the following manner:

Immediate corrective action must be provided if only one (1) signal indication remains in operation on an approach. This also includes left turn and right turn arrow indications if only one (1) signal indication remains in operation. If two (2) or more signal indications remain in operation for any given phase (movement) on any approach to an intersection, the replacement of the LED module, burned-out lamp, damaged socket, or damaged cable shall be accomplished within one (1) working day for red or red arrow indications and two (2) working days for all other indications following discovery and/or notification of the outage. LED modules not providing a full circular color, arrow, symbol and the like shall be replaced within one (1) working day for red or red arrows indications and two (2) days for all other indications following discovery and/or notification of the outage.

Immediate corrective action must be provided for partially or dark LED or incandescent type pedestrian indications and internally illuminated signs. The replacement of a LED module, damaged socket or damaged cable for a pedestrian signal indication or an internally illuminated sign such that the illuminated symbol is still identifiable must be accomplished within the next working day following discovery and/or notification. At the time of replacement of a malfunctioning LED module, burned out lamp or lamps, the reflector, lens and LED module lens cover shall be cleaned. All replacement lamps shall meet the requirement of Article 10, Group Relamping of Flashing Beacon and Traffic Signal Locations.

#### **10.5 SIGNAL DAMAGE EQUIPMENT REPLACEMENT**

Damage to flashing beacons or traffic signal heads requires immediate corrective action. Refer to Article 4.0 for EMCMS documentation requirements.

The location of a temporary or permanent traffic signal head installation shall meet the requirements of the MUTCD and the following:

- The minimum acceptable signal display is two (2) overhead far side signal faces directed toward the through traffic movements of each approach and two (2) signal faces directed toward any separate turning movement (where provided) on each approach pending permanent repairs, except where the distance from the stop line to the far side signal exceeds one hundred fifty (150) feet which requires a near right signal face to be in place. Existing conditions may require additional signal displays as directed by the Traffic Signal Engineer.

- Signal faces on mast arm assemblies for through traffic on any one (1) approach shall not be less than eight (8) feet apart measured horizontally between center lines of face with a minimum mounting height of seventeen (17) feet above the crown of pavement surface. See the District's Detail Sheets for additional mounting requirements.
- Damaged signal heads including pedestrian signals and push buttons, including APS type, shall be replaced in-kind. Incandescent shall replace incandescent; LED's shall replace LED's and new pedestrian count-downs shall replace pedestrian count-down types unless otherwise directed by the Traffic Signal Engineer.
- Locations where pedestrian signal indications are present one (1) pedestrian signal head must face each direction of a pedestrian crosswalk.
- A span wire signal face shall contain the same type, number, and size of lenses as the signal face being replaced except that twelve inch sections shall replace eight inch or nine-inch sections. LED modules shall then be replaced with LED modules of the same make to minimize performance differences, unless directed otherwise by the Traffic Signal Engineer.

#### **10.6 POWER OUTAGES AND FLASHING OPERATION PROCEDURES**

When repairs at a signalized intersection require that the controller be disconnected and power is available, the Contractor shall place the intersection on flashing operation. If there is no flasher, the Contractor shall install a temporary flasher in the controller cabinet. The signal shall flash red for all directions unless a different flashing operation has been directed by the Traffic Signal Engineer. Transition out of flashing mode shall follow MUTCD procedures.

At signal installations where power is not available due to a power failure, or the need to disconnect power for safety, or a flasher must be installed, the Contractor shall install at least one stop sign, Illinois Standard Sign R1-1-36x36 on each approach to the intersection as a temporary means of regulating traffic. The stop sign shall be located at the stop bar and mounted at a height of 5-ft above curb or shoulder with a set-back of 12-ft from travel pavement unless otherwise directed by the Traffic Signal Engineer. The Contractor, when installing temporary stop signs, must switch the controller to the flashing operation when responding to a power failure. If the approach flash is yellow, the Contractor is not to place a temporary stop sign unless the flashing operation is changed to red by direction of the Traffic Signal Engineer.

The Contractor shall furnish and equip all vehicles involved with the maintenance of traffic signal installations with a sufficient number of stop signs to be erected as specified herein.

**10.7 NEW, REVISED OR TRANSFERRED TRAFFIC SIGNAL AND FLASHING BEACON INSPECTIONS**

The Contractor shall furnish a trained representative for each traffic signal inspection that requires a new or existing traffic signal installation be added to the Contract or the transfer of an existing traffic signal installation of this Contract to another agency or contractor. Refer also to transfer requirements in Article 4.0 and the District 1 Traffic Signal Special Provisions.

The Contractor shall:

- Analyze all fiber test results insuring performance conforms with the Standard Specifications for Road and Bridge Construction and the District 1 Traffic Signal Special Provisions.
- Analyze all induction loop detector loops at the controller cabinet insuring that each detector loop or set of detectors conforms with the Standard Specifications for Road and Bridge Construction and the District 1 Traffic Signal Special Provisions.
- Assure other vehicle detection, such as video, radar and electromagnetic systems, are set-up properly.
- Analyze the controller program provided by the controller manufacturer to insure that the phase and overlap designation on the traffic signal sequence drawing is provided correctly in the controller program and cabinet wiring drawings.
- Insure that the phase timings in the traffic signal controller are those provided by the Department.
- Assist in placing the traffic signal in operation by observing the signal display and checking of the conflict monitor or MMU while all vehicle traffic is stopped, and shall report any operational discrepancies or signal outages to the Area Traffic Signal Maintenance and Operations Engineer immediately.
- Assist the Area Traffic Signal Maintenance and Operations Engineer in walking all approaches of the signal installation inspecting all traffic signal items for conformance with the Department's specifications for the project and aiming of the traffic signal heads.
- Assist in the testing and adjusting of emergency vehicle preemption equipment. The Contractor shall insure that any time railroad preemption is in operation with emergency vehicle preemption that the railroad preemption has priority over the emergency vehicle preemption equipment.

- Assist in the testing and adjusting of UPS equipment.
- Insure that the locations containing railroad preemption are programmed in accordance with the approved railroad preemption program and that all special lock out devices are operating.
- Be responsible for inspecting each location to determine the completion of construction punch lists as directed by the Traffic Signal Engineer. The punch lists shall be prepared and provided by the Traffic Signal Engineer and the Contractor shall return written verification of punch list completion or non-completion.
- Upon request, review locations proposed for loop replacement in ongoing pavement resurfacing, patching or grinding construction contracts.

## **10.8 PATROL INSPECTIONS**

### **10.8.1 General Requirements**

The Contractor shall provide a sufficient workforce and equipment to patrol all flashing beacon and traffic signal locations. Each installation shall be patrolled and inspected once every month for proper alignment of vehicle and pedestrian signal heads, display outages (all sections of every pedestrian and vehicular signal head), visors, backplates, alignment of posts and mast arm poles, mounting hardware, aviation obstruction lights, special traffic signal sections with red lenses and accompanying circular white halo lamps, shielding of optically programmed faces, foundations, anchor bolts, detection, communications and general operation of the traffic signal. The Contractor shall repair or replace all worn, missing or damaged components as specified herein.

Unless otherwise permitted or requested by the Traffic Signal Engineer, except for emergencies, the Contractor is required to schedule the IDOT traffic signal patrol routes the first portion of each workday and on the approved route day. Emergency services required by IDOT or other agencies shall be attended to immediately, however, any incomplete daily patrol shall be completed (by others or the original patrolman) during the normal patrol work week. This may require patrols after the normal workday has ended in order to complete the normal patrol workweek.

When conducting the Patrol Inspection each Traffic Signal Patrolmen shall notify the EMC Dispatch Center of the following:

- Patrolman Arrival and Departure Time and Approved Route Inspection Location
- Time and Reason for Patrolman Departure from Approved Route Inspection Location and Name of Municipality or Agency requesting the emergency service. (Example: Accident with damage and traffic signal full outage -- Cook County requesting the Emergency Service)

All repairs not completed at the time of the patrol route inspection must be noted on the Ticket and turned over to Contractor's area supervisor. Repairs not completed at the time of the patrol route inspection are subject to the time limits in Article 10.

At the end of each work day the EMC Dispatch Center shall notify the Traffic Signal Engineer and all Department TS Area Engineers and Technicians, via email, of the following:

- List of all incomplete patrols for the day
- Specific reason for each individual incomplete patrols
- Plan as to how Contractor will make-up each incomplete patrols

The EMC Dispatch Center is required to keep a Patrol Route Maintenance Log. All Patrol records shall be maintained and submitted to the Traffic Signal Engineer; the Weekly Patrol Report, and the four weeks shall be transmitted in the monthly routine work submittal to the Engineer, and also provided on a CDROM.

#### **10.8.2 Routine Patrol Duties and Responsibilities**

The Contractor's responsibilities shall include but limited to inspecting, repairing and replacing the following items:

- Align and straighten all traffic signal equipment including but not limited to signal heads, traffic signal posts, controller or service installation pedestals, mast arm assemblies and poles, foundations and mounting hardware.
- Check all anchor bolts for mast arm poles, signal posts, controller cabinets, and, in addition, all bolts used to attach the mast arm to the pole.
- Replace missing or damaged bolt covers, mast arm shrouds, screening and handhole access covers.

- Tighten screws related to signal post base plates, back plates, anchor bolt covers, handhole access covers, service installation covers and controller cabinets.
- Repair or replace any failed or damaged signal components including signal controllers, cabinets or peripheral equipment, signal heads, back plates, or mounting hardware, posts or mast arms, illuminated signs, detectors (vehicle, bicyclist and pedestrian), cable, conduit, faded or damaged pedestrian signs, sign frames and other signal appurtenances which are part of a signal installation.
- Electrical grounds shall be maintained in accordance with the National Electrical Code.
- Signal back plates shall be replaced or re-painted if any unpainted surface is exposed. Reflectorized backplates with peeling or missing reflectorized tape shall be replaced in-kind with new reflectorized backplates.
- The Contractor shall keep current the EMCMS and an Excel spreadsheet list of locations with red-light running (RLR) cameras, emergency vehicle preemption (EVP), Transit Signal Priority (TSP), Bus Rapid Transit (BRT) and traffic monitoring cameras. While performing patrol duties, for the duration of the Contract, the Contractor Patrolman shall make note of any red-light running camera locations, emergency vehicle preemption (EVP), Transit Signal Priority (TSP), Bus Rapid Transit (BRT) and traffic monitoring camera locations, the agency responsible for their installation, and report the installations or removals once per month on a cumulative yearly spreadsheet using Excel, to be transmitted in the monthly routine work submittal.

### **10.8.3 Controller and Cabinet Inspections**

The Contractor shall provide a sufficient work force and equipment to inspect all controllers and cabinets as provided once every month:

- The patrol person shall visually inspect the inside of each controller cabinet. The visual inspection will include checking all timing intervals and time base coordination programs to insure all settings are correct including that the clocks are set to the same hour, minute and second at all locations within the time base coordination system.

- All detector amplifiers shall be visually inspected to insure that the vehicle detectors are receiving vehicle calls and the calls are being placed into the controller. Loop detector amplifiers with automatic vehicle identification necessary for bus preemption shall be inspected to ensure they are receiving vehicular phase calls and bus preempt calls; and the calls are being placed into the controller. Bicycle loop detector amplifiers shall be tested for proper operation. Pedestrian push button detectors shall be tested by pushing each detector and watching for the related walk indication to appear. Other vehicle detection systems shall be tested, cleaned, and aligned for optimum operation.
- Test system communication for proper operation.
- Update database on appropriate software for closed loop monitoring system and central/traffic (CMS, TMS, etc.) management systems on a laptop computer, tablet or other device approved by the Traffic Signal Engineer.
- Equipment manuals, box prints and cable logs are to be maintained in each controller cabinet.
- GPS latitude and longitude coordinates of the controller cabinet, electric service location, UPS, mast arm pole assemblies, posts, fiber optic cable handholes and other items as listed herein, shall be recorded or verified annually for use in the District's record retention and maintenance system. Refer to Article 4.17.7 for GPS documentation.
- Uninterruptible Power Supply (UPS) shall be tested once every four (4) weeks to assure proper operation of the traffic signals upon loss of normal electric utility power. Manual transfer and power loss transfer shall be tested which shall not put the signal in flash. Nominal output voltage and current along with battery string voltage shall be measured and compared to manufacturer's expected values and recorded. Batteries not meeting minimum ratings and capacities shall be replaced under routine maintenance.
- Railroad preemption, emergency vehicle preemption and bus preemption shall be tested during the cabinet inspection. All program settings and each sequence of operation shall be verified to be correct during each inspection.
- EVP, TSP, BRT and equipment shall be tested during the cabinet inspection.

All costs of repairing or replacing damaged or missing emergency vehicle preemption equipment is the responsibility of the local fire district or municipality and should not be reflected in the Contractor's bid price for routine maintenance items (maintaining the light detectors, light detector amplifiers, radio transmitters and receivers, antennas, confirmation lights, cables and/or related components). TSP and BRT equipment shall be treated similarly to EVP equipment but PACE is responsible for maintenance costs.

The Contractor shall create a ticket and notify the appropriate agency, immediately, that their EVP, TSP or BRT equipment is not operating and ask if immediate repairs are requested or if an estimate of repairs is necessary before repair work is provided. A copy of all WR Tickets, correspondence and invoices shall be provided in the monthly routine maintenance work submittal.

#### **10.8.4 Routine Work Requests – RR Tickets**

The Contractor shall provide signal operating inspection tasks upon request (RR Tickets) such as:

- Inspect the timing operation of a signal installation at a specific time period and provide a recommendation for improving traffic flow
- Program timing parameter changes
- Determine the phasing or operation of a signalized installation
- Check the condition or verify the presence of equipment at a signalized location
- Provide a copy of timing parameters in use at a signalized location
- Provide recommendations to improve the safety or the operation of a signalized location
- Provide a compiled list of all locations meeting specified criteria



## **10.9 INVENTORY REQUIREMENTS**

### **10.9.1 Asset Inventory**

The Contractor shall provide a complete traffic signal equipment inventory, in an Excel spreadsheet, of the signalized intersection including signal equipment located inside and outside of the controller cabinet. The exact format and inventory items shall be determined by the Traffic Signal Engineer. This work shall be completed by May 1<sup>st</sup> of 2019, and kept current with maintenance transfers of new equipment. If this Contract is renewed the asset inventory information shall be kept current through the renewal years.

The Contractor shall also be responsible for updating and maintaining the Access data base or other data base designated by the Traffic Signal Engineer for traffic signal equipment inventory. The data base shall have corrections noted and submitted to the Traffic Signal Engineer with the yearly May 1<sup>st</sup> Asset Inventory.

### **10.9.2 New Equipment on Maintenance Transfers**

The Contractor shall complete the form "IDOT District 1-Traffic Signal Inventory" for:

- A new traffic signal installation added to the Contractor's maintenance.
- Maintenance of an existing traffic signal installation when it is transferred from another agency to the Department.
- Maintenance of a traffic signal installation, which had been under construction when it is accepted for maintenance by the Department.
- A change in inventory at an existing signal installation.

The Contractor shall provide an updated form with a revised date for all locations being accepted for maintenance even if there is no change in inventory items on the form (the date shall reflect the acceptance of maintenance). The Bureau of Traffic reserves the right to make minor modifications to the form such as adding or deleting items or modifying the format, but without changing the overall scope of the form.

Refer to Article 4.0 for Formal Transfer of Maintenance responsibilities.

### **10.9.3 GPS Verification**

The Contractor shall record or verify the GPS latitude and longitude coordinates of the signal equipment as listed herein for use in the District's record retention system. Refer to Article 4.17.7 for GPS Documentation.

## **10.10 GROUP REPLAMPING OF FLASHING BEACON AND TRAFFIC SIGNAL LOCATIONS**

### **10.10.1 Schedules and Reports**

#### **Replacement of Incandescent Signal Displays**

Most of the traffic signals in IDOT District One, including pedestrian signals, have been converted to LED type optics. The Contractor shall replace the signal displays (intersection and pedestrian signals) at all the state maintained incandescent traffic signal locations annually. The Contractor shall complete the work by October 1st of each the calendar year.

#### **Re-Lamping Schedule Prepared by Contractor**

The Contractor shall provide a schedule of all locations to be relamped by each relamping crew. This schedule shall be approved by the Traffic Signal Engineer. If more than one crew is used, each crew is to work within a different patrol route. Each relamping crew is to be equipped with an EMC Contractors wireless communications unit and the number shall be furnished to the Area Traffic Signal Maintenance and Operations Engineer and Technicians prior to the start of work. The Contractor is to notify the Traffic Signal Engineer, in writing, of his planned starting date. On the first day of relamping, through the completion of relamping, the Contractor shall include on the Daily Traffic Signal Agenda the following:

- Call number of each relamping crew leader
- The relamping route number, the week of the patrol route, the day of week in the patrol route and the intersection that the crew is starting from

Upon completion of the relamping, lens washing and reflector washing, the Contractor shall furnish to the Traffic Signal Engineer a completion report no later than August 1<sup>st</sup> of the contract year.

The schedule for the second year and third year relamp program shall be approved by the Traffic Signal Engineer prior to commencement. Patrolmen will not be used for group relamping until routine patrols are completed. Documentation shall be provided to the Traffic Signal Engineer on a daily basis indicating what routes will be covered in the group relamping, what personnel will be used, and must also submit a statement of completion of routine patrol.

#### **10.10.2 Daily Reports**

At the completion of each day's work each relamping crew shall furnish a report indicating all locations which were relamped that day. The report must also indicate lenses that were replaced and lenses that require replacement that the crew did not have a supply of and must be replaced later. This written report must be sent to the Traffic Signal Engineer's office by email before 7:15 AM of the next working day. The starting location of a relamping crew may be revised at the direction or approval of the Traffic Signal Engineer.

#### **10.10.3 Lens Cleaning and Replacement**

The Contractor shall as a part of the relamping wash the reflector and inside and outside of each lens. Lenses that are damaged in any manner whatsoever must be replaced. This includes lenses that have discolored areas, holes, and arrow and pedestrian lenses that are peeling and light is visible in areas other than with the prescribed arrow or "Walk or Don't Walk " area.

The Contractor is required to replace damaged lenses for any part of the signal system as needed or as directed by the Traffic Signal Engineer, regardless of annual or bi-annual relamp schedule.

#### **10.10.4 Special Types of Lamps Required for Special Indications**

All Aviation Red Obstruction Lights on traffic signal posts or mast arm assemblies and poles shall be relamped at the same time the traffic signal installation is relamped as part of the yearly traffic signal group relamping. The lamps used in the Aviation Red Obstruction Lights shall meet or exceed the requirements for the fixture's lamp set by the manufacturer of the fixture.

Special traffic signals sections with red lenses and accompanying circular white halo strobe lamps shall be relamped.

#### **10.10.5 Specification of Lamps**

All incandescent lamps provided for relamping must have the current calendar year placed in the area containing the lamp's rating. The 150 watt special lamps for optically programmed signals and fluorescent lamps must be dated with indelible ink. The marking shall be on the back of the 150 watt lamp and on the left end of the fluorescent lamp. The lamps provided by the Contractor shall meet the following criteria:

- Twelve inch signal sections: 135 watts, 1650 minimum initial lumens, 16,000 hour lamp life with a two year warranty, 95% Krypton gas filled clear bulb, 3 inch light center (incandescent lamp). H&H Industries 135A21 or approved equal.
- Eight inch traffic or nine inch pedestrian sections: 54 watts, 530 lumens, 8,000 hour, 3 inch light center (incandescent lamp).

- Twelve inch pedestrian signal section: 90 watts, 1000 minimum initial lumens, 16,000 hour lamp life with a two year warranty, 95% Krypton gas filled clear bulb, 2-7/16 inch light center (incandescent lamp). H&H Industries 90A19 or approved equal.
- Twelve inch optically programmable section, 150 watts, 6,000 hours (seal beam)
- Fluorescent and other replacement lamps shall be replaced with a lamp of similar characteristics and wattages. All fluorescent lamps shall be CAW/HO type.
- Aviation Red Obstruction Light lamps are to meet or exceed the recommendations of the fixture manufacturer.
- Special traffic signal section with red lens and accompanying circular white halo strobe lamps shall meet or exceed the recommendations of the fixture manufacturer.

#### **10.10.6 Lamp Disposal**

The Contractor's crew must relamp the entire intersection on the same working day. Old lamps shall be disposed of in accordance with the manufacturer recommendations and Environmental Protection Agency and requirements in Article 4.0 as stated herein.

#### **10.10.7 LED Relamping**

The Contractor shall replace all LED displays (intersection, flashers and pedestrian signals) at eighty (80) state maintained traffic signal locations annually. The locations to be relamped are intended to be designated by the Traffic Signal Engineer prior to March 1 of the contract year. The Contractor shall complete the work by October 1 of each the calendar year.

Each intersection shall have a consistent make and model of LED display installed. Each LED display installed shall be labeled with the month and year of installation. The LED display shall be approved by the Traffic Signal Engineer and meet all current ITE and NEMA standards and the requirements of the Standard Specifications for Road and Bridge Construction and The District 1 Traffic Signal Special Provisions. The replaced LED display shall become the Contractor's property and shall be recycled without re-use.

#### **10.11 UNINTERRUPTIBLE POWER SUPPLY (UPS) BATTERY REPLACEMENT**

The Contractor shall replace all UPS batteries at 15 State maintained traffic signal locations each contract year. The proposed locations for battery replacement are listed herein. This list will be finalized by March 1 of each contract year by the Traffic Signal Engineer with battery replacement work for all locations completed by October 1<sup>st</sup> of each contract year.

Work shall include, but not be limited to, removal of existing batteries from State ROW, furnishing and installing new battery replacements, recycling of existing batteries, cleaning of battery cable connections and cleaning of UPS compartment shelves, vents and filters. New batteries shall meet the requirements listed in the District 1 Traffic Signal Special Provisions for Uninterruptible Power Supply including run time, sizing, rating and warranty.

Existing batteries shall be recycled meeting all applicable sections of US EPA and IL EPA publications along with the Code of Federal Regulations for transportation.

#### **10.12 ANNUAL CONFLICT MONITOR/TESTING PROGRAM**

Conflict monitors and MMUs shall be tested once every two years. One-half of the system shall be tested by November 15th of each contract year. In addition, the conflict monitor or MMU shall be tested after damage is done to the cabinet such as a lightning strike, cabinet hit or knocked-down, etc. The Contractor shall conduct a complete bench test of all conflict monitors or management malfunction units. The testing method shall be pre-approved by the Traffic Signal Engineer and shall include:

- Removing the intersection's monitor and running a complete test at the Contractor's shop with a conflict monitor/MMU tester unit.
- A spare monitor should be installed temporarily while the test is being performed or monitors may be shop-tested by rotating pre-tested monitors to the field.
- Documentation of the tested monitor should be made which includes the following:
  1. Date
  2. Name of Technician
  3. Location – including EMCMS location number, intersection name, city and/or county
  4. Serial number of conflict monitor
  5. Comments regarding fail or pass conditions
- Failed monitors should either be repaired so that they pass the monitor test or replaced with a new monitor that passes the test.

Unless prior approval is given by the Traffic Signal Engineer, all the above items shall be completed by the Contractor within the same working day at a single traffic signal installation. The Contractor shall provide a schedule for this work to the Traffic Signal Engineer. Any deviation from the approved schedule shall be approved by the Traffic Signal Engineer.

The Contractor shall provide a final completion report listing all the signal installations with the date the work was completed and verifying that each item has been completed in an Excel spreadsheet file saved to a CD-ROM and submitted to the Traffic Signal Engineer by December 1<sup>st</sup>. The Contractor will be required to provide Progress Reports at the Traffic Signal Engineer's request showing the locations which have been completed to that date.

Conflict Monitors/ Malfunction Management Units shall not be replaced at railroad interconnected intersections without prior notification of the Traffic Signal Engineer.

#### **10.13 ANNUAL MAST ARM ASSEMBLY AND POLE INSPECTION**

The Contractor shall inspect all mast arm assemblies, mast arm poles and mounting brackets and hardware supporting traffic signal heads or pedestrian signal heads. (Also review Contractor Advisory Inspections in Article 4.0.)

This inspection shall be completed between April 1 and August 1 of the contract year and may be concurrent with the group relamping in Article 10.10 or done separately. The Contractor shall furnish schedules for this program a minimum of one week in advance of the start of work. The inspection shall be conducted in the same manner as described in Article 10.10, which requires reporting the Daily Work Schedule and follow-up documentation of the work. The inspection shall focus on the structural elements of the mast arm assembly and must include a close-up, arms length investigation of the following elements:

- Mast Arm
- Mast-to Pole Connection
- Pole
- Base Plate
- Anchor Bolts

The arm of the assembly shall be visually inspected at all signal head connections for any defects, such as cracks or buckles. The mast arm-to-pole connection shall be inspected for significant loss of section, cracks in welds or base metal, and deterioration of the connection plates. The bolts of the arm-to-pole connection shall be inspected for tightness and condition.

The pole shall be checked for external corrosion, impact damage, perforation by rust through, and any discernible deflection, distortion or cracking. The pole shall be closely checked for corrosion near the base plate, especially if mounted on a grout bed. The welds of the pole-to-base plate connection shall be checked for cracks.

The base plate shall be checked for any severe section loss or deformation.

The anchor bolts of the mast arm shall be inspected to verify that the existing nuts are not loose or missing. The anchor bolts shall also be checked for any corrosion or bending.

Mast Arm Inspection forms are to be scanned and grouped together by intersection. Each traffic signal location shall be one (1) PDF file. The file name is to be labeled in the following format:

- TS#\_Date of Inspection\_MAI.PDF
- Date of Inspection is to be MMYYYY – no spaces
- Example: TS12345\_042016\_MAI.PDF

Upon discovery of any buckles, significant structural defects (loose nuts, severe corrosion or dents, cracks in welds, plates or structure, etc.), the Contractor will immediately notify the Illinois Department of Transportation at (847)705-4424 and take corrective action as directed by the Traffic Signal Engineer to insure the assemblies do not pose an immediate hazard.

The Contractor's crew must inspect the entire intersection on the same working day.

The Contractor shall provide the Traffic Signal Engineer a completed form MA-1 or MA-2 (single or double mast arm assemblies), "Annual Mast Arm Inspection Report Form" for each Department maintained traffic signal mast arm assembly and pole inspected by September of the contract year in pdf format on a CDROM.

Digital pictures, noted by TS number, location name, county, town and corner (SE, NW, etc.) of any deficient equipment noted in Article 10.13 shall be included with report forms on a labeled CD-ROM.

#### **10.14 ANNUAL RAILROAD INTERCONNECTED TRAFFIC SIGNAL INSPECTION**

The Illinois Commerce Commission will conduct an inspection of all Department traffic signal locations, which are interconnected with railroad crossing flashing signal warning devices with or without railroad gates. Locations not maintained by the Contractor but under the District 1 route jurisdiction system are also included. The inspection shall be completed on an annual basis during the calendar year.

In addition to the Contractor an inspection team may consist of personnel from the Department's Bureau of Traffic, the railroad responsible for the railroad crossing warning equipment, and the Illinois Commerce Commission. The Traffic Signal Engineer will schedule the inspection of each railroad interconnected location based on the availability of personnel from each involved agency.

The Contractor shall be responsible for making all necessary measurements as directed by the Traffic Signal Engineer. He shall determine all signal time intervals and controller settings, which pertain to railroad preemption. The sequences of operation shall be checked and the Contractor shall conduct all necessary tests. Any deficiencies or recommendations shall be reported directly to the Traffic Signal Engineer.

The Contractor shall maintain and update individual security software and prompts for the approximately 150 railroad interconnected signals in District 1. These items shall remain under strict security and be transferred back to the Department at the end of the Contract. The Contractor shall at all times provide and maintain one (1) Eagle/Siemens traffic signal controller and (1) Econolite traffic signal controller, at a location to be approved by the Traffic Signal Engineer, loaded with District 1 approved security software, which can be used to replace damaged equipment in the field. The controller model shall be as directed by the Traffic Signal Engineer.

#### **10.15 DETECTOR LOOP MAINTENANCE AND REPLACEMENT**

##### **10.15.1 Traffic Signal Loop Resealing**

The Contractor shall reseal all existing traffic signal detector loop wire which has become exposed or as directed by the Traffic Signal Engineer. The Contractor will clean all debris and damaged detector loop sealer from the existing saw cut. Loop detector wire that is exposed will be reinstalled into the existing saw cut and held in place by wedges prior to the resealing of the detector loop.

##### **10.15.2 Detector Loop Replacement**

The Contractor must replace all detector loops, which become inoperable. The cost of replacing the detector loop shall be part of Traffic Signal Routine Maintenance. Detector loops that are damaged by state forces shall be replaced and paid through a Non-Routine Authorization letter.



A detector loop, which is milled out during a pavement resurfacing, will be replaced as part of the Department's resurfacing contract. The Department's Electrical Maintenance Contractor will be notified by the Traffic Signal Engineer to dispatch a patrol person to the location to disconnect the loop detector cable from its terminals and place the affected phase or phases on maximum recall. At this time the Traffic Signal Engineer will instruct the Contractor representative as to the maximum green time that is to appear for each of the affected phases.

System Detector Loops shall be replaced throughout the entire year. Non-System Loops, at the Contractor's option, between November 30th and March 1st may be replaced by a loop or with a temporary vehicle detector approved by the Traffic Signal Engineer, at no additional cost to the Department. The Department approved vehicle detector shall be installed to provide adequate detection in place of the detector loop to the satisfaction of the Traffic Signal Engineer and it shall be removed and replaced permanently by a detector loop by March 31st. If the Contractor is unable to install cable for the temporary vehicle detector due to frozen or full conduits, with prior approval from the Traffic Signal Engineer, the Contractor may temporarily span the cable overhead as long as proper clearances over the roadway can be maintained. No additional compensation shall be provided for vehicle detector cable or for any special installation requirements.

At locations where the Contractor deems the pavement condition to be unfit to replace an existing inoperable detector loop with a new loop, the Contractor shall, with prior approval from the Traffic Signal Engineer, install a video detection system or other Department approved detection system selected by the Traffic Signal Engineer. The new detection system shall be installed in accordance with the applicable specification under Non-Routine Work. Otherwise the cost of providing and installing the new detection system complete including all necessary connections, monitors, electronics handhole drilling, trench and backfill, unit duct and restoration shall be included in routine maintenance of the traffic signal installation and no extra payment shall be allowed.

#### **10.16 VIDEO AND OTHER DETECTION**

At the beginning of the EMC 2019 it is estimated that District 1 will have approximately one hundred (100) intersections with video, radar, wireless or other detection in operation. Video and other detection types will increase each year. The Contractor shall provide license software for each of the System Patrolmen who have video and other detection types in their respective area. The System Patrolmen shall be fully instructed in the operation and maintenance of each detection system.

At the beginning of the EMC 2019 it is estimated that District 1 will have one hundred twenty-five (125) tilt/ pan/zoom video cameras in operation. The Contractor shall provide licensed software for each of the System Patrolmen which have this video in their respective areas. The System Patrolmen shall be fully instructed in the operation and maintenance of these cameras.

## **10.17 INTEGRATED CLOSED-LOOP TRAFFIC SIGNAL MONITORING SYSTEM (CLMS)**

### **10.17.1 Contractor Responsibilities**

The Contractor will, on a daily basis, monitor, review, and maintain the District 1 closed loop monitoring and CLMS system. Refer to CLMS as described in Article 10.1. The Contractor shall use a local area network (LAN) computer system, with licensed software for each brand of master controller (used in District 1) to monitor the District 1 closed loop signal system. The LAN system shall communicate with each master through dial-up telephone lines or cellular communications. The LAN shall also be capable of comparing data bases with the Department's LAN at the District Headquarters in Schaumburg. The Contractor shall provide daily and weekly reports updating the status of the CLMS. The Contractor shall also provide current licensed traffic signal system software for all laptop/tablet computers used by its patrolmen.

A copy of the Official District 1 Closed-Loop Data Base shall be supplied to the Traffic Signal Engineer at the termination of this Contract. The data base shall also be electronically provided to the next Maintenance Contractor at the termination of this contract.

### **10.17.2 Department LAN and Software Support**

The Department's tagged equipment such as desk top PCs remain the maintenance responsibility of the Department, unless otherwise noted herein.

The Contractor shall provide personnel who can demonstrate competence in the proper operation of all closed loop monitoring software currently in use by District 1. The Contractor shall provide competent personnel for LAN maintenance and repair as defined in the definition of terms under Article 12.0 for specialty service. All costs to maintain daily communication between the Contractor's LAN and the Department's LAN will be included under routine maintenance.

### **10.17.3 Responsibilities**

The Contractor shall concurrently monitor all Closed Loop Traffic Control Systems maintained by him under this contract on a 24 hour per day, 7 days per week basis. The Contractor's system monitoring functions shall include, but not be limited to, the reception of telephone calls from Closed Loop System Master Controllers and the storing, displaying, and acting upon any reported events, alarms, equipment failures, operational exceptions and programmed data collection. The Contractor shall have sufficient dedicated telephone lines, dedicated Close Loop Monitoring System(s) with appropriate software, and qualified electrical technicians to provide for the monitoring of all closed-loop traffic control systems being maintained under this contract.

The Contractor shall program all Closed Loop Systems to receive all system alarms, events, and messages on its Central Closed Loop Monitoring System(s). The Contractor shall respond to all alarms, events, and messages and provide the indicated response or corrective action within the time frame specified in the "Response and Repair Time Requirements" listed under Article 10.3. The Contractor's Dispatch Center shall also be equipped with the necessary equipment to receive all alarms, events, and messages as described above. Before the end of the first month of the contract, the Contractor shall submit a list of alarms, events, or messages that each brand of Closed-Loop System is programmed to send to the Contractor's dispatch center for approval by the Traffic Signal Engineer.

The Contractor shall maintain the integrity of the timings and programming information contained in the local controllers and the master controllers. The Contractor shall maintain each Closed Loop Traffic Control System in the mode for which it has been setup and programmed (i.e., Traffic Responsive (TRP), Time-of-Day (TOD), FREE, etc.). The Contractor shall maintain its own data base of local and master controller timings, settings and programming information including graphic displays for intersections and systems. This data base shall be kept by the Contractor for use in the normal course of system maintenance. The Contractor's data base shall be the Official District 1 Closed Loop System Data Base. This data base shall also include Municipal and County maintained Closed Loop Traffic Signal Systems that are on marked and u marked IDOT routes. The Contractor shall insure data base agreement between IDOT Schaumburg Headquarters Data Base and the Official District 1 Closed Loop Data Base.

The Contractor shall provide an Status Report of each master controller and its local controllers (including municipal and county maintained Closed Loop Traffic Signal Systems on IDOT maintained routes) once every day, seven (7) days a week. This Status Report shall be done in addition to any field patrols done as part of Routine Maintenance. The Status Report shall document that all equipment is working properly.

In addition, this electronic patrol shall include, but not be limited to, system loop checks (failed, maximum presence, and no activity), local loop checks, loops with system outputs (volume/occupancy checks), (i.e.failed, Max presence, no activity), master controllers answering, local intersections on line (telemetry checks). Any exceptions found shall be reported to the Traffic Signal Engineer via email by 8:00 AM every work day and corrected within the time frame specified in the "Response and Repair Time Requirements" listed under Article 10.3. The format and content required for this email shall be approved by the Traffic Signal Engineer. Any discrepancies shall further be reported in the Closed Loop System Status Report.

All changes to Local or Master Controller programming shall have prior approval of the Traffic Signal Engineer. Minor temporary changes to alleviate any sporadic operational problems are acceptable provided it is done by a qualified IMSA certified electrical technician, and reported to the Traffic Signal Engineer as soon as practical. Major re-programming will be done through a comprehensive traffic study independent of this maintenance contract. The Contractor shall keep records of all changes to local and master controller data bases with the dates the changes were implemented and the name of the individual who authorized the changes.

The Contractor shall maintain a Closed-Loop System Operational Log accumulating in it the day to day operational information for the District's Closed Loop Traffic Control Systems. This log shall contain a listing of all program and mode changes that have occurred in each system and any anomalies to normal operation. The Contractor shall monitor this log for any changes from normal system operating modes and the Contractor shall report them to the Traffic Signal Engineer as soon as practical. The repeated cycle failures, loss of coordination, excessive pre-emptions or conditions that dictate manually commanded free operation shall be reported. The operational log shall be maintained by the Contractor for the duration of this contract. Up to 6 months of the current log shall be available for inspection at any time and copies shall be provided the Traffic Signal Engineer upon request. The format, content, and method used to keep the Operational Log shall be approved by the Traffic Signal Engineer.

The Contractor shall also maintain a Closed-loop System Failure Log for all Closed Loop system alarms, events, anomalies, and reported failures. It shall contain the date, time of occurrence, the corrective action taken, a notation as to the cause, and a record thereon as to the repair time required to correct the malfunction. The System Failure Log shall be maintained by the Contractor for the duration of this contract. 6 months of the current log shall be available at any time for inspection by the Traffic Signal Engineer and copies shall be provided to the Traffic Signal Engineer upon request.

The Contractor shall prepare a Closed-loop System Status Report every two (2) weeks. Copies of the System Status Report shall be forwarded to the Traffic Signal Engineer and the Signal Systems Engineer on the first and third week of every month. The System Status Report shall describe the status of each closed-loop system being maintained by the Contractor under this contract and a summary of failures and alarms occurring within each system during the two (2) week reporting period. The Closed-loop Operations Log and the Closed Loop Failures Log System Status Report shall in addition highlight any equipment failures that were not attended to, repaired or brought back into operation within the required time frame specified in the Repair Time Table and the reason for failing to meet the specified response/repair time schedule. The report format shall be approved by the Traffic Signal Engineer.

Where applicable, to insure proper system operation and alarm reporting (should a master controller go into backup), the Contractor shall maintain a location specific backup program in the backup PROMS of each Master Controller. The backup program in PROM shall duplicate the normal master programming as closely as possible. The Contractor shall be responsible for maintaining the backup programming and incorporating appropriate changes whenever normal programming changes are made at a Master or when directed to do so by the Traffic Signal Engineer. Should a Master Controller ever need to be removed or replaced, the Contractor shall make the appropriate backup PROM switch with the replacement controller.

One month prior to the contract start date, the Contractor shall supply to the Traffic Signal Engineer for approval, his proposal for the Closed Loop Monitoring System to be located at the Contractor's place of business. The proposal shall include a detailed description of the proposed Closed Loop Monitoring System and a timetable for the installation of the system and components.

The Contractor shall assist consultants who are preparing Signal Coordination and Timing (SCAT) reports for the Department. This assistance shall be limited to a qualified Contractor representative at a system location during a consultant download of system timings at that location at the time of the download. Occasional operational questions by the consultants may also need to be answered by the Contractor as well as any required correction of items related to the maintenance of systems. In instances beyond these such as multiple requests for assistance in downloading system timing, programming errors which result in Contractor maintenance intervention, or multiple requests for assistance in programming, the Contractor will be allowed to bill the consultant. An itemized bill, including the date and system number, as well as the reason for the bill shall be submitted to the Traffic Signal Engineer in conjunction with the bill being sent to the consultant.

#### **10.18 SITE MAINTENANCE**

As part of routine maintenance, the Contractor shall trim trees and bushes blocking the line of sight of the traffic signal or flasher face to the motorists. Line of sight standards are established in the Manual on Uniform Traffic Control Devices for Streets and Highways. All trimmed branches shall be legally disposed of by the Contractor off the right-of-way. The Traffic Signal Engineer, at any time during the contract year, may request trimming of trees or bushes. This trimming must be completed immediately.

#### **10.19 PAINTING BY OTHERS ON STATE MAINTAINED FACILITIES**

Other agencies will be permitted to paint traffic signal equipment, utilizing their own forces, as approved by the Traffic Signal Engineer. The Contractor is required to inspect the location, before and after the location is painted, as part of routine maintenance. Maintenance will not be transferred. The Contractor will document dates of painting in the dispatch log. If any damages are observed to IDOT equipment as result of the painting, the Contractor will repair immediately, and recover the expenditures through 3<sup>rd</sup> party damages. (Refer to Article 4.0 for 3<sup>rd</sup> party documentation/repair requirements).

#### **10.20 LOCKS AND KEYS**

Each traffic signal cabinet and UPS cabinet shall be furnished with a padlock that meets the specifications of the weather resistant padlock currently specified for District 1 pump stations or as specified by the Traffic Signal Engineer, equal or better than Master Lock 6125KA. The key number shall be approved by the Traffic Signal Engineer prior to the purchase/install. If the equipment is currently locked with a Master Lock 6125KA model the Contractor may replace the cylinder and new key (for Master Lock 6125KA) instead of replacing the entire lock. Railroad interconnected traffic signal controller cabinets and associated UPS cabinet shall have a similar lock number but different cylinder and key than standard traffic signal and UPS cabinets. It is estimated that there are 150 railroad traffic signal cabinets and 2550 standard traffic signal cabinets and 2500 UPS cabinets that require padlocks.

#### **10.21 EQUIPMENT MALFUNCTION AND REPAIR TRACKING**

Malfunction and repair of traffic signal equipment shall be recorded by the Contractor on tickets and reported monthly to the Traffic Signal Engineer in a data base on a CDROM. Information shall include date of failure, date of repair or replacement, reason for failure (lightning, water damage, etc.) equipment type, model, manufacturer, location and any other pertinent information as directed by the Traffic Signal Engineer. Equipment replacement information shall include model, manufacturer, and source (new, Department stock, other location etc.). Reports shall include monthly and accumulative totals. LED module failures/outages shall include the information noted above and include age of module, color and display (ball, arrow, pedestrian hand/man/outline/full/count-down, etc.).

## **10.22 TRAFFIC SIGNAL OUTAGE AND OPERATION REPORT**

The Contractor shall maintain a data base that tracks traffic signal outages and operation and generates a report that provides a comprehensive list of these traffic signals locations on a daily and monthly basis. The report shall include, but is not limited to:

- Traffic signal locations that are currently dark or are in flashing red mode
- Traffic signal locations that have been dark or in flashing red mode within the last 24 hour period
- Locations identified by TS number, intersection and route, county and community
- Identify reason for dark or flashing condition with estimated time/date of restoration to normal operation
- Corrective action taken with date and time normal operation was restored

The report shall be generated from the data base and emailed to the Traffic Signal Engineer, Area Signal Engineers and IDOT ComCenter every 8 hours starting at 4am each morning.

In the case of storms or other emergency situations, reports shall be made every 4 hours as or as otherwise directed by the Traffic Signal Engineer. Monthly reports shall be submitted to the Engineer and Traffic Signal Engineer on CDROM.

## **10.23 RAILROAD INSURANCE**

The Contractor shall obtain railroad protective liability insurance coverage for performing non-routine work relating to the installation of new traffic signal facilities on railroad R.O.W. where the Department has no existing appurtenances, e.g., railroad interconnect, railroad structure mounted traffic devices, etc.

## **10.24 NON-ROUTINE MAINTENANCE**

Refer to Section 2 to review Special Provisions for non-routine work pay items.

### **10.24.1 NON-ROUTINE WORK IN THE RAILROAD RIGHT OF WAY**

The Contractor shall be responsible for obtaining any necessary permits as required by the railroad for any non-routine work to be performed on the railroad right-of-way. The Contractor shall also be responsible to coordinate all activities between the Department and the railroad.

The Contractor shall be responsible for completing any required forms and shall coordinate all activities between the Department and the railroad. Any fees associated with obtaining the permit shall be paid by the Department in accordance with Article 109.05 of the Standard Specifications for Road and Bridge Construction, as modified and noted in Article 6.0.

**10.25 LOGS AND FORMS**

A sample of logs and forms as required for this Contract will be available at the Pre-Bid Meeting.

**10.26 EQUIPMENT/LOCATIONS INCLUDED IN TRAFFIC ROUTINE MAINTENANCE**

Review Section 3



## **ARTICLE 11.0 – DEFINITIONS, SPECIFICATIONS & STANDARDS**

### **Definitions of Terms Used Herein:**

**AEGIS** District 1 Dial-up Pump Station Alarm System

**ANSI** American National Standards Institute

**ATMS** Advanced Traffic Management System

**AVL** Automatic Vehicle Locator

**BASE STATION** When used herein describes a short range transceiver which connects a computer or other wireless devices to a central hub and allows a connection to a network

**CLEAR/CLEARING SITE FOR SAFETY** When used herein “clear” is ticket terminology, the departure of the Contractor personnel from the initial response to the site of a reported incident of damage or trouble on system equipment after verifying that the highway is safe for the motoring public. “Clearing Site for Safety” Refers to a term used herein to assure the Electrical, Mechanical and Structural integrity of IDOT property maintained under this contract is safe for workers and the motoring public. Site clearing shall comply with the most current standards (such as NEC and OSHA requirements) as applicable.

**CLMS** Closed-Loop (Traffic Signal) Monitoring System

**CMS** Changeable Message Sign

**COMCENTER** Illinois Department of Transportation, District 1 Communications Center

**COMPLETION DATE** When a completion date is specified, the Contractor shall complete all work subject to the date on or before the specified date.

**CONTRACT SPARE PARTS** When used herein refers to stocks of materials and equipment which are state owned, are to be kept separate from the Contractor’s materials and equipment, and shall be used exclusively for the Department’s installations and systems.

**DAMAGED EQUIPMENT** Any piece of equipment owned or maintained by the Department that is no longer capable of functioning as originally designed, or as since modified, or any piece of equipment that has deteriorated sufficiently in the opinion of the Engineer so that failure is imminent or for which safety could be a concern

**DBE** Disadvantaged Business Enterprise

**DEPARTMENT** When used herein stands for the Illinois Department of Transportation

**DID** Direct Inward Dialing

**DISPATCH CENTER** The Contractor's 24/7 dispatching area as required herein, also referred herein as the EMC Dispatch Center

**DISTRICT 1/REGION 1** IDOT Department of Transportation area defined as Cook, DuPage, Kane, Lake, McHenry, Will, a portion of Kendall Counties, and specified locations herein, where District 1 equipment is maintained, in other Illinois counties.

**DMS** Dynamic Message Sign

**DWDM** Dense Wavelength Division Multiplexing

**EFO** Illinois Department of Transportation, District 1, Bureau of Traffic, Electrical Maintenance Field Office, 445 Harrison St., Oak Park, IL. 60304

**EMC** Electrical Maintenance Contract or the Electrical Maintenance Contractor

**EMCMS** Electrical Maintenance Contract Management System (database)

**EMERGENCY** A condition which is a hazard to the public, or is designated by the Engineer to be a hazard of such severity that life and property are endangered and which requires immediate corrective action

**ENGINEER** IDOT Resident Engineer on this Contract or authorized representative

**EQUIPMENT SERVICE** Refers to the servicing and/or restoration of any equipment to normal operating condition and appearance necessitated by service equipment wear-out, failure, damage or loss

**EXTENSIVE** Covering or affecting a large area

**FIU** Field Interface Unit, sometimes called an FEP, Front End Processor

**FROM ANY CAUSE WHATSOEVER** When used herein shall include any and all causes except those resulting in extensive damage from declared area wide disasters such as fires and floods, acts of the public enemy, or an Act of God. (The declared disaster exclusion will be valid only for the area and time period specified by IEMA and FEMA policies.)

**GCM GATEWAY** Gary-Chicago-Milwaukee Corridor Transportation Information Network

**GENERAL BILLING INVOICE** Refers to a daily invoice created by the Contractor for time and material work or additional services rendered or work performed for, or on behalf of, a 3rd party, on any part thereof or concerning System installations and equipment owned by IDOT which is included under the scope of maintenance of this contract. Examples would include 3rd party construction related damage repair invoices, work for 3rd party permits involved with construction in the state ROW, 3rd party invoicing for additional cable locate services, etc.

**GUI** Graphical User Interface

**HUT/SHELTER (COMMUNICATIONS)** Refers to a building or structure used to house equipment which may contains equipment for IDOT Towers

**IDOT INSPECTOR** Employees of the Illinois Department of Transportation assigned duties by the Engineer

**IMMEDIATE CORRECTIVE ACTION** Refers to all activity necessary to restore the safe operating integrity of a system or system element, without delay

**IMSA** International Municipal Signal Association

**INET** Intelligent Networks

**ISP/CMS** Illinois State Police Area in a State of Illinois Central Management Service facility

**KNOCKDOWN (KD)** Refers to damage which results in the knockdown of a light pole, luminaire, or cabinet, a traffic signal or cabinet, a surveillance signal or cabinet, or camera pole and camera

**LABOR, METHODS, AND EQUIPMENT** Definition is applicable per the Standard Specifications for Road and Bridge Construction, per Article 108.06 Labor, Methods, and Equipment.

**LIGHT TOWER** Also known as High Mast Lighting Tower

**LIGHTING INSTALLATION** One or more lighting units powered from one common electric service

**LIGHTING SCADA** The standard specifications for the Illinois Department of Transportation, District 1, Lighting System Supervisory Control and Data Acquisition System

**LOCATION** For purposes of this Contract, a single defined locally-operational sub-portion of a defined system, usually having a unique electric service or service combination, operated from a unique control cabinet, building, etc., and having a unique system identifier in the Contract, and paid through routine maintenance. A location may also refer to a tower in a maintenance yard or equipment attached to or in a building, cabinet, tower or other structure which are paid through the location from which it is located and/or powered.

**MANUAL ON TRAFFIC CONTROL DEVICES (M.U.T.C.D.)** State of Illinois "Manual on Uniform Traffic Control Devices for Streets and Highways"

**MOSCAD** Motorola Supervisory Control and Data Acquisition

**MOSYS** Motorist Outreach System, a computer system located at the Traffic Systems Center and ComCenter, which controls Dynamic Message Signs at various expressway locations

**MOTORIST CAUSED HIGHWAY DAMAGE (MCHD) REPAIR FUND** A budgeted, re-appropriated item in the state budget from which the IDOT is given the replacement costs for damaged system equipment caused by motorists, if a police accident report links the motorist to the accident.

**NAGIOS** A software monitoring system that enables organizations to identify and resolve IT infrastructure problems before they affect critical business processes

**NEC** National Electrical Code

**NEMA** National Electrical Manufacturers Association

**NON-ROUTINE WORK** Non-routine work shall refer to all maintenance work which is not included under routine work, but which is authorized and paid separately. IDOT is under no obligation to issue authorizations for non-routine work. Methods of payment include use of contract pay items, established agreed prices, or other force mechanisms.

**NORMAL WEATHER** Time during which regular dispatch operations continue; no storm alert procedures in effect.

**OFF MAINTENANCE** Term used to define a system location which is not being maintained by the state's maintenance contractor

**ON MAINTENANCE** Term used to define a system location which is being maintained by the state's maintenance contractor

**OSHA** Occupational Safety Health Administration

**PATROLMAN** Defines an electrician, who is assigned regular electrical system patrol and street maintenance response duties by the Contractor. Patrolmen have the responsibility for inspecting and servicing a pre-assigned select group of installations in accordance with a defined regular time schedule. The assigned installations may be from any one (1) or all, of the Electrical Systems included under the overall scope of the Contract.

**PAY MEETING** The Pay Meeting is held on the third Thursday of each month, to which the Contractor brings the monthly invoice for the payment of the reconciled quantities of routine maintenance work and monthly summary and completed/approved non-routine invoices from the prior month.

**PERMANENT REPAIR TIME** Amount of time from initial notification to the Contractor until the time permanent (non-temporary) repairs are made

**PLC** Programmable Logic Control

**PM** Preventive Maintenance or Preventive Maintenance Program

**PLNC** Private line telephone service which provides a direct connection between two points through an automatic ring signal at one end when initiated at the other.

**POTS** Plain old telephone service

**PRIVATE LOCATION** When used herein refers to locations which are not maintained under the EMC but which are owned or maintained by other agencies or municipalities and are entered, maintained, and kept current in the EMCMS by the Contractor

**PS** Pump or Pumping Station

**PS-SCADA**

The standard specifications for the Illinois Department of Transportation, District 1, for Pumping Station Supervisory Control and Data Acquisition System

**QA/QC** Quality Assurance/Quality Control

**RACS** IL 38 (Roosevelt Rd) Ramp Access Control System

**RAMP** When used in context of the REVLAC system, it refers to an entire reversible lane entrance ramp, including, but not limited to, signs, outside gates, barrier, inside gates, and/or the highway pavement that transitions from one roadway element to another. In this Contract, it may also refer to all access control equipment and systems associated with a particular ramp location.

**RESPONSE TIME** Amount of time from the initial notification to the Contractor until a repair person physically arrives at the location.

**REVLAC** Reversible Lane Access and Control System for the Kennedy Expressway

**ROUTINE MAINTENANCE** Refers to all work required to staff, equip, patrol, inspect and maintain/repair electrical systems, whole and operational, at locations as defined herein, covered under and paid through routine maintenance pay items

**ROW** Right of Way

**RUS** Rural Utilities Service, USDA

**SALVAGE** Material/equipment which has been removed from the installed location, inspected for quality, and re-stored in Contract Spare Parts for further use, if directed by the Engineer

**SCADA** Supervisory Control and Data Acquisition System

**SEOC** State Emergency Operations Center

**SERVICE RESTORATION TIME** Amount of time from the initial notification to the Contractor until the time the system is safe and operational. (In cases of motorist caused damage, when the undamaged portions of the system are operational.)

**SPECIALTY SERVICE** Specialty Service, or Specialty Service Work shall refer to work performed by entities other than the electrical maintenance contractor who may not be pre-qualified subcontractors but whose services are necessary because of specialized equipment, specialized expertise or the maintenance restrictions on a particular piece of electrical system equipment. Examples of specialty service entities include traffic signal control equipment and cabinet repair, motor repair shops, pump re-build shops, communication and/or electronics repair shops, software programmers/developers, manufacturer's authorized repair agents and similar service providers. Such work is not restricted to in-shop work and such services may be field-performed. Such services will not be considered as materials.

**STANDARD SPECIFICATIONS** Illinois Department of Transportation's "Standards Specifications for Road and Bridge Construction"

**STORM ALERT** A communication issued by the IDOT ComCenter, as provided by its weather service. Upon receipt of this report, the EMC Dispatch Center storm alert procedure goes into effect.

**SYSTEM** When used herein refers to any or all the Electrical Systems covered by this Contract including Lighting System, Pump Station System, Surveillance System, and Traffic Signal System.

**SYSTEM ENGINEER** When used herein refers to IDOT Engineers in charge of maintenance for a particular electrical system for a designated IDOT Bureau.

**SYSTEM TYPE** When used herein refers to various types of equipment within the electrical systems

**TBD** To Be Determined

**THIRD PARTY** Any entity other than IDOT or the Contractor

**TICKET** Maintenance documentation record which is used by the Contractor to record various types of malfunctions, failures, damages, knockdowns, vandalism, theft or various other concerns relating to safety matters and/or the reported follow-up response information as necessary to make temporary and/or permanent repairs to restore and/or assure that the system equipment is operating in a normal manner. A ticket consists of various entry screens; dispatch, field response, crew repair follow-up, MCHD repair log, and 3rd party damage information.

**TOWER (COMMUNICATIONS)** When described herein refers to a 3-legged tower, monopole, pole, or similar structure which supports a telecommunications antenna operated above ground in a fixed location, free-standing, guided, or other building structure.

**TRAFFIC SPECIFICATIONS** The Illinois Department of Transportation's "Standard Specifications for Traffic Control Items", and "Keeping the Expressway Open to Traffic".

**TSC** The Illinois Department of Transportation, District 1, Bureau of Traffic, Traffic Systems Center, 445 W. Harrison, Oak Park, IL 60304

**TSC SPECIFICATIONS** The Illinois Department of Transportation's "Standard Specifications for Traffic Control Items" which includes current design standards for the traffic surveillance system

**UPS** Uninterruptible Power Supply

**WEEK** A period of seven (7) consecutive calendar days. Any multiple of this term shall mean a corresponding multiple of number of calendar days.

**WORK DAY** A normal work day is the 1<sup>st</sup> eight hour shift, in a 24 hour day, Monday through Friday, where the Contractor works straight time. Where Articles herein specify work day, this definition applies.

**YARD** Any District 1 maintenance yard, sign shop, or other field facility

**24/7** Refers to operations required twenty-four hours per day, seven days per week.

All definitions in referenced publications and standards shall apply, except as may be modified herein.

**SPECIFICATIONS AND STANDARDS.** The latest issue, at the bid date, of the following standards, including subsequent additions or revisions made prior to the bid date, shall apply to all work, materials and equipment furnished and installed under this Contract. In case of conflict with any or parts of the standards listed below the Special Provisions contained herein shall take precedence and shall govern. In case of conflict between referenced standards, the most stringent as determined by the Engineer, shall take precedence and shall govern.

**ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS**

- Standard Specifications for Road and Bridge Construction, current version
- Note: Article 801.02, Standards of Installation shall apply to all systems under this Contract and is not limited to Lighting.
- Design Manual Section 3-600 published on Highway Lighting
  - Flaggers' Handbook
  - Highway Standards
  - Manual on Uniform Traffic Control Devices
  - Accommodating Utilities on Rights-of-Way of IL. State Highway System
  - Recurring Special Provisions for Traffic Signals, Road and Bridge
  - Special Provisions for Special Non-RCRA Waste and RCRA Hazardous Waste Working Conditions
  - BDE Special Provisions
  - Standard Specifications for Traffic Control Items
  - Supplemental Construction Specifications and Recurring Specifications, Current Version

**IDOT DISTRICT 1 - STANDARDS AND SPECIFICATIONS**

- Confined Entry Space Policy
- District 1 Highway Standards
- Freeway Details Freeway Entrance and Exit Ramp Closure Details TC-8
- Traffic Control Details for Freeway Shoulder and Partial Ramp Closures TC-17
- Micro Computer Management Manual
- Permit Specifications Governing Permit Work on State Right-of-Way
- Recurring Traffic Signal Specifications
- Recurring Special Provisions for Roadway Lighting
- Resident Engineers Construction Guide for Electrical Equipment Construction on State Highways
- Standard 2308-4 (Day or Night Moving Operations)
- Standard Specifications for Electrical Maintenance Contract Management System
- Standard Specifications for the Emergency Data Acquisition System
- Standard Specifications Integrated Closed-Loop Traffic Signal Monitoring
- Standard Specification for Pump Station Supv. Control/Data Acquisition System
- Standards for Roadway Lighting by Permit on State Routes
- Standard Traffic Signal Design Details
- Traffic Signal Plan Preparation and Design Guide
- Traffic Surveillance Special Provisions & Traffic Surveillance Typical Drawings
- Keeping the Expressway Open to Traffic



## **NATIONAL STANDARDS AND SPECIFICATIONS**

- An Informational Guide for Roadway Lighting, published by American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Washington, DC 20001
- Insulated Cable Engineers Assn. and Underwriters Laboratories publications when applicable for cable and other materials
- National Electrical Manufacturers Association Standards, American National Standards Institute, where applicable, for signals, lamps, ballasts, and other accessories
- American National Standards Institute, where applicable, for ballasts, and other accessories
- ASTM Standards for materials
- All applicable manuals and policies of FHWA
- American National Standard Practice for Roadway Lighting, published by Illuminating Engineering Society of North America, 120 Wall St., 17th Floor, New York, NY 10005, Phone (212-248-5000)
- National Electrical Code, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269, approved by the American National Standards Institute, Publication #ANSI/C2, published by IEEE, 345 E. 47th Street, New York, NY 10017
- Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, an AASHTO Publication
- Institute of Traffic Engineers Technical Report No. 1 (A Standard for Adjustable Face Vehicular Traffic Control Heads)
- Emergency Response Guidebook by U.S. Dept. of Transportation, latest version, for further assistance call National Response Center (NRC) 1-800-424-8802
- Hazardous Materials Regulations, Hazardous Materials Transportation Uniform Safety Act of 1990, Hazardous Materials Regulations and Motor Carrier Safety Regulating by U.S. Department of Transportation
- OSHA, all applicable regulations
- RUS, all applicable regulations
- IMSA Standards & manuals
- Federal Communications Commission

## **ARTICLE 12.0 CHARTS**

**The below listed information is provided from data submitted by past Contractor(s) and is provided for information purposes only.**

### **TICKET TYPES:**

<b>AV</b>	AVL (for years 2013-2015)
<b>BA</b>	Barrier (for years 2013-2015)
<b>CA</b>	CCTV/Camera
<b>CT</b>	Cable Trouble
<b>DA</b>	Damage (not caused by Motorist)
<b>EQ</b>	Equipment Malfunction or Problem
<b>GB</b>	General Billing by Contractor to 3 <sup>rd</sup> Party
<b>ID</b>	IDOT has placed a "Hold" on the Ticket
<b>LP</b>	Loop Problem
<b>MC</b>	Motorist Caused Damage
<b>MT</b>	Maintenance Transfer (for years 2016-2017)
<b>OM</b>	Off Maintenance
<b>OT</b>	Multiple Outages
<b>RR</b>	Routine Work Request
<b>SO</b>	Single Outage
<b>SR</b>	Service Request
<b>SW</b>	Swing Gate Malfunction (for years 2013-2015)
<b>UT</b>	Utility Problem
<b>VO</b>	Void
<b>WA</b>	Working Upon Arrival/Working as Programmed
<b>WR</b>	Work to be Performed for Other Parties

<b>2017 TICKET TOTALS</b>					
<b>Ticket Type</b>	<b>Lighting System</b>	<b>PS System</b>	<b>Surveillance System</b>	<b>Traffic Signal System</b>	<b>TOTAL BY TICKET TYPE</b>
CA	NA	NA	233	21	254
CT	15	NA	1	114	130
DA	22	0	7	28	57
EQ	653	344	736	2876	4609
GB	11	0	8	93	112
ID	24	0	10	0	34
LP	NA	NA	31	223	254
MC	348	2	86	494	930
MT	92	1	39	761	893
OM	17	51	6	19	93
OT	39	1	3	7	50
RR	0	0	0	9	9
SO	57	1	22	358	438
SR	66	41	78	91	276
UT	54	140	73	249	516
VO	12	8	18	75	113
WA	27	16	31	528	602
<b>Total:</b>	<b>1437</b>	<b>605</b>	<b>1382</b>	<b>5946</b>	<b>9370</b>

<b>2016 TICKET TOTALS</b>					
<b>Ticket Type</b>	<b>Lighting System</b>	<b>PS System</b>	<b>Surveillance System</b>	<b>Traffic Signal System</b>	<b>TOTAL BY TICKET TYPE</b>
CA	NA	NA	217	22	239
CT	30	NA	3	153	186
DA	51	1	8	78	138
EQ	668	423	921	3280	5292
GB	14	0	13	83	110
ID	10	0	13	8	31
LP	NA	NA	27	265	292
MC	383	0	107	504	994
MT	68	1	50	515	634
OM	33	77	0	26	136
OT	60	4	7	17	88
RR	16	0	1	49	66
SO	72	3	119	451	645
SR	58	47	81	167	353
UT	67	170	69	232	538
VO	18	5	33	72	128
WA	31	12	33	495	571
<b>Total:</b>	<b>1579</b>	<b>743</b>	<b>1702</b>	<b>6417</b>	<b>10441</b>

\*Advanced Systems were combined into Surveillance System in 2016

\*Extra Systems were combined into Lighting System in 2016

2015 TICKET TOTALS							
Ticket Type	Advanced System	Lighting System	PS System	Surv. System	Traffic Signal System	Extra Systems	TOTAL BY TICKET TYPE
AV	12	NA	NA	NA	NA	NA	12
BA	5	NA	NA	NA	NA	NA	5
CA	172	NA	NA	NA	NA	NA	172
CT	NA	11	NA	0	151	3	165
DA	0	42	0	23	42	8	115
EQ	177	154	450	493	2194	117	3585
GB	0	16	1	2	64	5	88
ID	0	3	0	6	29	4	42
LP	NA	NA	NA	15	233	NA	248
MC	33	319	0	111	410	7	880
OM	4	44	115	0	27	0	190
OT	1	18	2	4	14	61	100
RR	0	1	0	0	0	1	2
SO	6	8	0	116	431	29	590
SR	8	39	33	0	5	4	89
SW	90	NA	NA	NA	NA	NA	90
UT	8	64	156	34	287	6	555
VO	4	9	7	4	53	6	83
WA	22	22	26	25	595	4	694
<b>Total:</b>	<b>542</b>	<b>750</b>	<b>790</b>	<b>833</b>	<b>4535</b>	<b>255</b>	<b>7705</b>

2014 TICKET TOTALS							
Ticket Type	Advanced System	Lighting System	PS System	Surv. System	Traffic Signal System	Extra Systems	TOTAL BY TICKET TYPE
AV	21	NA	NA	NA	NA	NA	21
BA	14	NA	NA	NA	NA	NA	14
CA	283	NA	NA	NA	NA	NA	283
CT	NA	26	NA	2	111	1	140
DA	2	36	0	12	55	3	108
EQ	191	174	505	705	2455	166	4196
GB	0	9	0	14	84	2	109
ID	0	10	0	6	3	8	27
LP	0	0	0	13	292	0	305
MC	30	331	0	108	432	4	905
OM	0	56	50	0	42	0	148
OT	0	39	0	9	20	68	136
RR	0	9	0	0	0	0	9
SO	6	15	0	143	800	28	992
SR	16	27	39	3	10	5	100
SW	89	NA	NA	NA	NA	NA	89
UT	12	69	170	41	670	14	976
VO	4	9	8	7	94	4	126
WA	13	25	38	20	633	8	737
<b>Total:</b>	<b>681</b>	<b>835</b>	<b>810</b>	<b>1083</b>	<b>5701</b>	<b>311</b>	<b>9421</b>

2013 TICKET TOTALS							
Ticket Type	Advanced System	Lighting System	PS System	Surv. System	Traffic Signal System	Extra Systems	TOTAL BY TICKET TYPE
AV	13	NA	NA	NA	NA	NA	13
BA	9	NA	NA	NA	NA	NA	9
CA	186	NA	NA	NA	NA	NA	186
CT	NA	11	NA	1	104	2	118
DA	11	52	6	41	100	6	216
EQ	206	181	397	683	2390	162	4019
GB	3	13	0	2	55	0	73
ID	0	9	0	7	8	5	29
LP	0	0	0	17	281	0	298
MC	13	335	0	71	452	10	881
OM	0	33	17	7	34	3	94
OT	0	47	0	12	10	74	143
RR	1	0	0	0	0	2	3
SO	2	30	1	181	921	33	1168
SR	7	31	39	1	16	1	95
SW	51	NA	NA	NA	NA	NA	51
UT	16	93	99	65	612	8	893
VO	6	23	7	5	114	5	160
WA	13	56	26	59	688	6	848
<b>Total:</b>	<b>537</b>	<b>914</b>	<b>592</b>	<b>1152</b>	<b>5785</b>	<b>317</b>	<b>9297</b>

**TRAFFIC SIGNAL SYSTEM – TICKET TOTALS BY TYPE AND YEAR**

<b>Ticket Type</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>	<b>5 YR AVE BY TICKET TYPE</b>
CA	21	22	NA	NA	NA	<b>22</b>
CT	114	153	151	111	104	<b>127</b>
DA	28	78	42	55	100	<b>61</b>
EQ	2876	3280	2194	2455	2390	<b>2639</b>
GB	93	83	64	84	55	<b>379</b>
ID	0	8	29	3	8	<b>10</b>
LP	223	265	233	292	281	<b>259</b>
MC	494	504	410	432	452	<b>458</b>
MT	761	515	NA	NA	NA	<b>638</b>
OM	19	26	27	42	34	<b>30</b>
OT	7	17	14	20	10	<b>14</b>
RR	9	49	0	0	0	<b>29</b>
SO	358	451	431	800	921	<b>592</b>
SR	91	167	5	10	16	<b>58</b>
UT	249	232	287	670	612	<b>410</b>
VO	75	72	53	94	114	<b>82</b>
WA	528	495	595	633	688	<b>588</b>
<b>Total:</b>	<b>5946</b>	<b>6417</b>	<b>4535</b>	<b>5701</b>	<b>5785</b>	<b>5680</b>



**PUMP STATION SYSTEM – TICKET TOTALS BY TYPE AND YEAR**

<b>Ticket Type</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>	<b>5 YR AVE BY TICKET TYPE</b>
DA	0	1	0	0	6	1
EQ	344	423	450	505	397	424
GB	0	0	1	0	0	0
ID	0	0	0	0	0	0
MC	2	0	0	0	0	0
MT	1	1	NA	NA	NA	1
OM	51	77	115	50	17	310
OT	1	4	2	0	0	1
RR	0	0	0	0	0	0
SO	1	3	0	0	1	1
SR	41	47	33	39	39	40
UT	140	170	156	170	99	147
VO	8	5	7	8	7	7
WA	16	12	26	38	26	24
<b>Total:</b>	<b>605</b>	<b>743</b>	<b>790</b>	<b>810</b>	<b>592</b>	<b>708</b>

**SURVEILLANCE SYSTEMS – TICKET TOTALS BY TYPE AND YEAR**

<b>Ticket Type</b>	<b>2017</b>	<b>2016</b>	<b>2015*</b>	<b>2014*</b>	<b>2013*</b>	<b>5 YR AVG BY TICKET TYPE</b>
CA	233	217	172	283	186	<b>218</b>
CT	1	3	0	2	1	<b>1</b>
DA	7	8	23	14	52	<b>21</b>
EQ	736	921	777	829	962	<b>845</b>
GB	8	13	2	14	5	<b>8</b>
ID	10	13	6	6	7	<b>8</b>
LP	31	27	15	13	17	<b>21</b>
MC	86	107	144	138	84	<b>112</b>
MT	39	50	NA	NA	NA	<b>45</b>
OM	6	0	4	0	7	<b>3</b>
OT	3	7	5	9	12	<b>7</b>
RR	0	1	0	0	1	<b>0</b>
SO	22	119	122	149	183	<b>119</b>
SR	78	81	8	19	8	<b>39</b>
UT	73	69	42	53	81	<b>64</b>
VO	18	33	8	11	11	<b>16</b>
WA	31	33	47	33	72	<b>43</b>
<b>Total:</b>	<b>1382</b>	<b>1702</b>	<b>1375</b>	<b>1764</b>	<b>1689</b>	<b>1582</b>

\*Includes Advanced System Totals

**LIGHTING SYSTEM – TICKET TOTALS BY TYPE AND YEAR**

<b>Ticket Type</b>	<b>2017</b>	<b>2016</b>	<b>2015*</b>	<b>2014*</b>	<b>2013*</b>	<b>5 YR AVE BY TICKET TYPE</b>
CT	15	30	14	27	13	<b>20</b>
DA	22	51	50	39	58	<b>44</b>
EQ	653	668	271	340	343	<b>455</b>
GB	11	14	21	11	13	<b>14</b>
ID	24	10	7	18	14	<b>15</b>
MC	348	383	326	335	345	<b>347</b>
MT	92	68	NA	NA	NA	<b>80</b>
OM	17	33	44	56	36	<b>37</b>
OT	39	60	79	107	121	<b>81</b>
RR	0	16	2	9	2	<b>6</b>
SO	57	72	37	43	63	<b>54</b>
SR	66	58	43	32	32	<b>46</b>
UT	54	67	70	83	101	<b>75</b>
VO	12	18	15	13	28	<b>17</b>
WA	27	31	26	33	62	<b>36</b>
<b>Total:</b>	<b>1437</b>	<b>1579</b>	<b>1005</b>	<b>1146</b>	<b>1231</b>	<b>1280</b>

\*Includes Extra System Totals

<b>TRAFFIC SIGNAL SYSTEM -- MOTORIST CAUSED DAMAGE -- BY YEAR</b>														
	<b>JAN</b>	<b>FEB</b>	<b>MA R</b>	<b>APR</b>	<b>MAY</b>	<b>JUN E</b>	<b>JUL Y</b>	<b>AUG</b>	<b>SEP T</b>	<b>OC T</b>	<b>NOV</b>	<b>DE C</b>	<b>TOTA L</b>	<b>MO. AVG</b>
2017	58	39	47	26	36	40	29	43	25	44	52	55	494	<b>41</b>
2016	60	52	40	38	47	46	33	31	19	49	36	53	504	<b>42</b>
2015	71	38	31	29	20	23	31	30	24	30	51	32	410	<b>34</b>
2014	67	40	51	21	26	29	33	23	39	33	37	33	432	<b>36</b>
2013	37	56	42	35	31	32	27	23	28	38	41	62	452	<b>38</b>
2012	47	38	40	30	36	32	38	28	20	42	35	32	418	<b>35</b>
2011	46	103	40	32	36	35	42	29	24	34	39	63	523	<b>44</b>
2010	40	48	27	31	23	39	31	30	43	36	34	68	450	<b>38</b>
2009	64	53	36	32	27	26	34	23	27	46	19	58	445	<b>37</b>
2008	71	70	46	40	50	40	33	45	34	41	36	83	589	<b>49</b>
<b>10 YR AVG</b>	<b>56</b>	<b>54</b>	<b>40</b>	<b>31</b>	<b>33</b>	<b>34</b>	<b>33</b>	<b>31</b>	<b>28</b>	<b>39</b>	<b>38</b>	<b>54</b>		<b>39</b>

<b>LIGHTING SYSTEM -- MOTORIST CAUSED DAMAGE -- BY YEAR</b>														
	<b>JAN</b>	<b>FEB</b>	<b>MA R</b>	<b>APR</b>	<b>MAY</b>	<b>JUN E</b>	<b>JUL Y</b>	<b>AUG</b>	<b>SEP T</b>	<b>OC T</b>	<b>NOV</b>	<b>DE C</b>	<b>TOTA L</b>	<b>MO. AVG</b>
2017	37	22	50	22	36	23	27	17	17	35	31	31	348	<b>29</b>
2016	38	41	38	39	23	24	26	32	19	23	20	60	383	<b>32</b>
2015	41	32	34	19	18	24	21	21	21	28	22	37	318	<b>27</b>
2014	70	37	29	16	24	31	20	31	19	8	21	25	331	<b>28</b>
2013	44	46	31	20	19	27	22	15	20	26	22	43	335	<b>28</b>
2012	36	38	25	18	28	26	35	25	24	31	31	35	352	<b>29</b>
2011	51	40	19	32	28	21	26	21	17	25	22	36	338	<b>28</b>
2010	34	28	29	22	15	30	21	17	13	26	31	58	324	<b>27</b>
2009	46	42	30	19	19	22	19	33	16	27	17	51	341	<b>28</b>
2008	76	68	40	27	29	20	28	19	23	20	28	81	459	<b>38</b>
<b>10 YR AVG</b>	<b>47</b>	<b>39</b>	<b>28</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>25</b>	<b>23</b>	<b>19</b>	<b>25</b>	<b>25</b>	<b>46</b>		<b>29</b>

These numbers do not include the Extra Systems for years 2008 through 2015, which has an additional average of 6 tickets per year.

<b>SURVEILLANCE SYSTEM -- MOTORIST CAUSED DAMAGE -- BY YEAR</b>														
	<b>JAN</b>	<b>FEB</b>	<b>MA R</b>	<b>AP R</b>	<b>MA Y</b>	<b>JUN E</b>	<b>JUL Y</b>	<b>AUG</b>	<b>SEP T</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>TOT AL</b>	<b>MO . AVG</b>
2017	6	9	10	5	2	2	8	9	9	7	12	7	86	7
2016	14	16	6	7	4	8	3	9	7	6	10	17	107	9
2015	15	21	8	7	4	3	6	5	7	8	11	16	111	9
2014	30	20	11	10	4	8	1	3	3	4	4	10	108	9
2013	5	10	1	5	7	5	4	7	6	8	5	8	71	6
2012	16	5	2	4	3	6	5	8	5	4	7	10	75	6
2011	10	12	7	8	5	3	3	5	1	4	3	5	66	6
2010	9	12	2	4	2	3	3	5	3	2	3	10	58	5
2009	18	10	2	5	1	4	1	3	4	3	3	3	57	5
2008	13	14	7	6	6	3	7	8	4	3	4	8	83	7
<b>10 YR AVG</b>	<b>14</b>	<b>13</b>	<b>6</b>	<b>6</b>	<b>4</b>	<b>5</b>	<b>4</b>	<b>6</b>	<b>5</b>	<b>5</b>	<b>6</b>	<b>9</b>		<b>7</b>

These numbers do not include the Extra Systems for years 2008 through 2015, which has an additional average of 3 tickets per year.

**SECTION 2 – SPECIAL PROVISIONS**  
**GAC1 AERIAL CABLE WITH MESSENGER WIRE**

**Description.** This item consists of furnishing, installing, testing and connecting aerial electric cable of the size indicated for temporary lighting or service as specified by an Engineer, and as shown on the contract drawings. The cable shall be new, unless otherwise indicated.

**Materials.** Section 818 and 1066 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item.

**Method of Measurement.** The aerial electric cable will be measured in feet in place and will be taken as the length of the messenger wire. Measurement will be made in a straight line between changes in direction and to the centers of light standards and control cabinets. Sag of the aerial cable or vertical cable will not be measured for payment. When the Engineer requests the used temporary cable be replaced with new, the new cable shall be measured for payment. Used aerial cable will not be measured for payment but shall be included in the cost of the item.

**Basis of Payment.** This item will be paid at the contract unit price per foot for AERIAL CABLE WITH MESSENGER WIRE, 4-1/C up to NO. 2 of the size and number of conductors indicated which shall be payment in full for the work described herein.

The cost of disconnecting and abandoning in place the existing cables feeding underpass, sign, and ramp lighting and reconnecting to the temporary lighting system shall be included in the contract unit price for this item.

The cost of removing the used cable shall be included in the cost of the new cable. The rewiring to facilitate relocation of the cable due to staging or other construction requirements shall be included in the cost of this item.

**GC01–GC06 CONDUIT, GALVANIZED STEEL, ATTACHED TO STRUCTURE**

**Description.** This item shall consist of furnishing and installing galvanized steel or PVC coated conduit, fittings and accessories attached to structure for roadway or building, as specified herein and as shown on the contract drawings. All conduit splices shall be threaded as directed by the Engineer.

These items shall conform to Sections 1088 and 811 of the Standard Specifications for Road and Bridge Construction, current version, for this pay item, with the following exceptions:

Add the following to Article 811.03(b) of the Standard Specifications: “The personnel installing the PVC coated conduit shall be certified by the conduit manufacturer for installing PVC coated conduit.”

Delete the following sentence of the third paragraph of Article 1088.01(a) (3) of the Standard Specifications: "The exterior galvanized surfaces shall be coated with a primer before the PVC coating to ensure a bond between the zinc substrate and the PVC coating."

**Conduit Wall Seals.** Conduit wall seals shall be incidental to the conduit specified under this item. Conduit wall seals used in new concrete walls shall consist of a polyvinylchloride (PVC) oversize sleeve with sealing assemblies at both sides of the wall. The sealing assemblies shall be cast iron alloy or malleable iron with pressure rings and neoprene sealing grommets, membrane clamp and they shall be tightened by means of hex-head screws. Each wall seal shall accept multiple conduit sizes. The sealing assemblies' castings shall be hot-dip galvanized.

Conduit wall seals used in cored holes in existing concrete shall consist of an assembly of an oversize outside pressure disc with membrane clamp, a neoprene sealing ring and an interior pressure disc, with the discs tightened by means of not less than three stainless steel socket head cup tightening screws with stainless steel washers. Pressure discs shall be PVC-coated steel.

**Installation.** These items shall conform to Sections 811 of the Standard Specifications for Road and Bridge Construction, current version, for this pay item, with the following exceptions.

**Method of Measurement.** Conduit shall be measured for payment in feet in place. Measurements shall be made in straight lines along the centerline of the conduit between ends and changes in direction. Vertical conduit shall be measured for payment. Liquid-tight flexible conduit shall be included in the bid price for conduit attached to structure regardless of size and type.

**Basis of Payment.** This work will be paid at the contract unit price per foot of CONDUIT, GALVANIZED STEEL or PVC coated, attached to structure for roadway or building, of the type, diameter, and number of raceways wide by the number of raceways high, which price shall be payment in full for furnishing and installing the galvanized steel conduit and fittings complete.

- GC01 CONDUIT, GALVANIZED STEEL, ATTACHED TO STRUCTURE, ¾ TO 1 ¼"
- GC02 CONDUIT, GALVANIZED STEEL, ATTACHED TO STRUCTURE, 1 ½ TO 2 ½"
- GC03 CONDUIT, GALVANIZED STEEL, ATTACHED TO STRUCTURE, 3 TO 5"
- GC04 CONDUIT, GALVANIZED STEEL, ATTACHED TO STRUCTURE, PVC COATED, ¾ TO 1 ¼"
- GC05 CONDUIT, GALVANIZED STEEL, ATTACHED TO STRUCTURE, PVC COATED, 1 ½ TO 2 ½"
- GC06 CONDUIT, GALVANIZED STEEL, ATTACHED TO STRUCTURE, PVC COATED, 3 TO 5"



## **GC07–GC08 CONDUIT, GALVANIZED STEEL, ENCASED IN CONCRETE**

**Description.** This item shall consist of furnishing and installing raceways, fittings and accessories encased in concrete as specified herein and as shown on the contract drawings.

**Materials.** These items shall conform with Section 810 and 1088.01 (a), (b), and (c) of the Standard Specifications for Road and Bridge Construction, Current version, for this pay item, with the following exceptions:

Revise Article 810.04 of the Standard Specifications to read:

“Installation. All underground conduit shall have a minimum depth of 30-inches (700 mm) below the finished grade.”

Add the following to Article 810.04 of the Standard Specifications:

“All metal conduit installed underground shall be Rigid Steel Conduit unless otherwise indicated on the plans.”

Add the following to Article 810.04 of the Standard Specifications:

“All raceways which extend outside of a structure or duct bank but are not terminated in a cabinet, junction box, pull box, handhole, post, pole, or pedestal shall extend a minimum of 300 mm (12”) or the length shown on the plans beyond the structure or duct bank. The end of this extension shall be capped and sealed with a cap designed for the conduit to be capped. The ends of rigid metal conduit to be capped shall be threaded, the threads protected with full galvanizing, and capped with a threaded galvanized steel cap. The ends of rigid nonmetallic conduit and coilable nonmetallic conduit shall be capped with a rigid PVC cap of not less than 3 mm (0.125”) thick. The cap shall be sealed to the conduit using a room-temperature-vulcanizing (RTV) sealant compatible with the material of both the cap and the conduit. A washer or similar metal ring shall be glued to the inside center of the cap with epoxy, and the pull cord shall be tied to this ring.”

Add the following to Article 810.04(c) of the Standard Specifications:

“Coilable non-metallic conduit shall be machine straightened to remove the longitudinal curvature caused by coiling the conduit onto reels prior to installing in trench, encasing in concrete or embedding in structure. The straightening shall not deform the cross-section of the conduit such that any two measured outside diameters, each from any location and at any orientation around the longitudinal axis along the conduit differ by more than 6 mm (0.25”).” The longitudinal axis of the straightened conduit shall not deviate by more than 20 mm per meter (0.25” per foot” from a straight line. The HDPE and straightening mechanism manufacturer operating temperatures shall be followed.

**Method of Measurement.** Conduit shall be measured for payment in feet in place. Measurements shall be made in straight lines along the centerline of the conduit between ends and changes in direction. Vertical conduits shall be measured for payment. Liquid-tight flexible conduit shall be included in the bid price for conduit attached to structure regardless of size and type.

**Basis of Payment.** This work shall be paid at the Contract unit price per foot for furnishing and installing:

GC07 CONDUIT, GALVANIZED STEEL, ENCASED IN CONCRETE,  $\frac{3}{4}$  TO 2  $\frac{1}{2}$ "

GC08 CONDUIT, GALVANIZED STEEL, ENCASED IN CONCRETE, FROM 3" TO 5"

of the type, diameter, and number of raceways wide by the number of raceways high specified, which shall be payment in full for the work as described herein.

### **GC09–GC10 CONDUIT, GALVANIZED STEEL, IN GROUND**

**Description.** This item shall consist of furnishing and installing galvanized steel conduit, fittings and accessories in the ground, either pushed, trenched, plowed, or directionally bored with fittings complete as specified herein and as shown on the contract drawings. All conduit splices shall be solid threaded couplings as directed by the Engineer. Trenching, backfilling and restoration are incidental to this pay item in accordance with the District 1 Traffic Signal Specifications.

These items shall conform to Sections T420 and T642 of the Traffic Specifications and District 1 Traffic Signal Specifications, except as herein revised. All conduits shall be placed at a depth of thirty inches, except under railroad tracks the conduit shall be a minimum of five feet.

Add the following to Article 811.03 of the Standard Specifications:

“Pavement, driveways, sidewalk, and curbs shall not be removed to install electrical conduits.”

Revise Article 810.04 of the Standard Specifications to read:

“Installation. All underground conduit shall have a minimum depth of 30-inches (700 mm) below the finished grade.”

Add the following to Article 810.04 of the Standard Specifications:

“All metal conduit installed underground shall be Rigid Steel Conduit unless otherwise indicated on the plans.”

Add the following to Article 810.04 of the Standard Specifications:

“All raceways which extend outside of a structure or duct bank but are not terminated in a cabinet, junction box, pull box, handhole, post, pole, or pedestal shall extend a minimum of 300 mm (12”) or the length shown on the plans beyond the structure or duct bank. The end of this extension shall be capped and sealed with a cap designed for the conduit to be capped. The ends of rigid metal conduit to be capped shall be threaded, the threads protected with full galvanizing, and capped with a threaded galvanized steel cap. The ends of rigid nonmetallic conduit and coilable nonmetallic conduit shall be capped with a rigid PVC cap of not less than 3 mm (0.125”) thick. The cap shall be sealed to the conduit using a room-temperature-vulcanizing (RTV) sealant compatible with the material of both the cap and the conduit. A washer or similar metal ring shall be glued to the inside center of the cap with epoxy, and the pull cord shall be tied to this ring.”

Add the following to Article 810.04(c) of the Standard Specifications:

“Coilable non-metallic conduit shall be machine straightened to remove the longitudinal curvature caused by coiling the conduit onto reels prior to installing in trench, encasing in concrete or embedding in structure. The straightening shall not deform the cross-section of the conduit such that any two measured outside diameters, each from any location and at any orientation around the longitudinal axis along the conduit differ by more than 6 mm (0.25”).” The longitudinal axis of the straightened conduit shall not deviate by more than 20 mm per meter (0.25” per foot” from a straight line. The HDPE and straightening mechanism manufacturer operating temperatures shall be followed.

Add the following to Article 811.03 of the Standard Specifications:

“Pavement, driveways, sidewalk, and curbs shall not be removed to install electrical conduits.”

**Method of Measurement.** Conduit shall be measured for payment in feet in place. Measurements shall be made in straight lines along the centerline of the conduit between ends and changes in direction. Vertical conduits shall be measured for payment. Liquid-tight flexible conduit shall be included in the bid price for conduit attached to structure regardless of size and type.

**Basis of Payment.** This work will be paid at the contract unit price per foot for CONDUIT, GALVANIZED STEEL, IN GROUND of the type, diameter, and number of raceways wide by the number of raceways high, which price shall be payment in full for furnishing and installing the galvanized steel conduit either pushed, trenched, plowed or directionally bored with fittings, complete. Trenching, backfilling and restoration, including removal and replacement of sidewalk are incidental in accordance with the District 1 Traffic Signal Specifications.

GC09 CONDUIT, GALVANIZED STEEL, IN GROUND, ¾ TO 2 ½ INCH

GC10 CONDUIT, GALVANIZED STEEL, IN GROUND, 3 TO 5 INCH.

## **GC11 CONDUIT, NON-METALLIC, COILABLE, IN GROUND**

**Description.** This item shall consist of furnishing and installing coilable non-metallic, fittings and accessories in the ground, either pushed, trenched, or directionally bored with fittings complete as specified herein and as shown on the contract drawings.

**Materials.** These items shall conform with Sections T420 and T642 of the Traffic Specifications and District 1 Traffic Signal Specifications, except herein revised. All conduit shall be placed at a depth of thirty inches, except under railroad tracks the conduit shall be a minimum of five feet.

Also, these items shall conform to Sections 1088 and 810 of the Standard Specifications for Road and Bridge Construction, Current version, shall apply to this pay item, with the following exceptions:

The duct shall be a plastic duct which is intended for underground use and which can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance. The duct and its manufacture shall conform to the standards of NEMA Publication TC7 and ASTM Designation D3485.

The duct shall be made of high density polyethylene which shall meet the requirements of ASTM Designation D 1248, Type III Class C and the requirements listed in table 2-1 of NEMA TC7. Submittal information shall demonstrate compliance of these requirements.

Duct dimensions shall conform to the standards listed in table 2-2 of NEMA TC7. Submittal information shall demonstrate compliance with these requirements.

As specified in NEMA TC7, the duct shall be clearly and durably marked at least every 10 feet with the material designation (HDPE for High Density Polyethylene), nominal size of the duct and the name and/or trademark of the manufacturer.

**Method of Measurement.** Conduit shall be measured for payment in feet in place. Measurements shall be made in straight lines along the centerline of the conduit between ends and changes in direction. Vertical conduits shall be measured for payment. Liquid-tight flexible conduit shall be included in the bid price for conduit attached to structure regardless of size and type.

Coilable nonmetallic conduit installed in excess of the limits described will not be measured for payment.

**Basis of Payment.** This work will be paid for at the contract unit price per foot of CONDUIT, NON-METALLIC, COILABLE, IN GROUND, 1 ¼" of the type, diameter, and number of raceways wide by the number of raceways high, which price shall be payment in full for furnishing and installing the conduit in ground, coilable non-metallic either pushed, trenched, or directionally bored with fittings complete. Trench and backfill will be paid for separately except the restoration of ground is incidental to this pay item.

### **GC13 CONDUIT, PVC, FOR BUILDINGS, 1", SCHEDULE 40**

**Description.** This item shall consist of furnishing and installing rigid non-metallic conduit, fittings and accessories as specified herein and as shown on the contract drawings exposed or embedded within or upon a building or structure.

**Materials.** Rigid non-metallic conduit shall be manufactured in accordance with U.L. Standard 651 and NEMA TC2, accessories in accordance with UL 514 and TC-3, General Service Administration (GSA) WC-1094A, NEC Article 352 (Type RNC) and shall be U.L. listed and labeled Schedule 40 PVC.

Elbows and nipples shall conform to the specifications for conduit. The cost of fittings, couplings, elbows, nipples and other such conduit appurtenances shall be included in the bid unit price for conduit.

**Conduit Wall Seals.** Conduit wall seals shall be incidental to the conduit specified under this item. Conduit wall seals used in cored holes in existing concrete shall consist of an assembly of an oversize outside pressure disc with membrane clamp, a neoprene sealing ring and an interior pressure disc, with the discs tightened by means of not less than three stainless steel socket head cup tightening screws with stainless steel washers. Pressure discs shall be PVC-coated steel.

#### **Installation.**

**General.** Rigid non-metallic conduit shall be installed in conformance with the requirements of NEC Article 352, except where more stringent requirements are specified herein.

The ends of the conduit shall be cut square and thoroughly reamed before installation. All burrs and rough edges shall be removed.

Bends of rigid nonmetallic conduit shall be so made that the conduit will not be damaged and that the internal diameter of the conduit will not be effectively reduced. Field bends shall be made only with bending equipment identified for the purpose, and the radius of the curve of the inner edge of such bends shall not be less than that shown on Table 354.24 of the National Electrical Code.

Conduit joints shall be coupled. Connection to couplings, fittings and boxes shall be with a suitable-type cement inherently resistant to atmospheres containing corrosive agents.

Conduit runs shall have no more than 270 degrees of bends (the equivalent of three 90 degree bends) between pull points. Bends shall be long radius type unless specifically approved by the Engineer. Bends may be either factory-made bends or field bends using suitable bending apparatus.

Whenever possible, conduits shall be installed so as to drain to the nearest opening, box or fitting. Fasteners used to mount conduit supports, and other associated items attached to the structure shall be suitable for the weight supported and shall be compatible with the structure material, i.e. wood screws shall be used for solid masonry or concrete and clamps shall be used for structural steel. Expansion anchors shall not be less than ¼ inch trade size and shall extend at least 2 inches into the masonry or concrete. Power-set anchors shall not be less than ¼ inch trade size and they shall extend at least 1 ¼ inch into the masonry or concrete.

**Mounting.** Unless otherwise indicated or specified, surface-mounted conduits shall be held in place by one-hole clamps and clamp backs. Conduits which are mounted to steel beams or columns shall be held in place by suitable beam clamps. Conduit entering the wet well area of the pump station shall be mounted using stainless steel clamps and clamp backs. All other clamps, clamp backs and beam clamps shall be of electro-plated malleable iron.

Unless otherwise indicated, conduits suspended from the structure shall be supported by trapeze or other hangers approved by the Engineer. Trapeze hangers shall be hot-dip galvanized steel channels or angle irons with conduits held in place by heavy-duty stainless steel U-bolts, nuts and lock washers. Trapeze hangers shall be hung using threaded stainless steel rods not less than 3/8 inch diameter and appropriate anchors or by other means approved by the Engineer.

Conduit supports shall be within 3 feet of each cabinet, panel, box, compression bell fitting. The maximum distance between supports shall be 3 feet.

**Method of Measurement.** Conduit shall be measured for payment in feet in place. Measurements shall be made in straight lines along the centerline of the conduit between ends and changes in direction. Vertical conduits shall be measured for payment.

**Basis of Payment.** This work shall be paid at the Contract unit price per foot furnished and installed CONDUIT, PVC, FOR BUILDINGS, 1 INCH, SCHEDULE 40, as indicated, which shall be payment in full for the work as described herein.

#### **GC14 CONDUIT, REMOVAL**

**Description.** This work shall consist of disconnecting, removing, dismantling and transferring off the site existing conduit, including connectors and appurtenances as herein specified and as directed by the Engineer. Except as otherwise indicated or directed by the Engineer, the existing conduit shall be deemed not salvageable upon removal and shall then be disposed of off the site.

**Construction Requirements.** No removal work shall be permitted without approval from the Engineer. Any damage resulting from the removal and/or transportation of the existing conduit and associated hardware, shall be repaired to its original condition, or replaced in kind, at the Contractor's own expense, to the satisfaction of the Engineer. The Engineer shall be the sole judge to determine the extent of damage.

**Method of Measurement.** Conduit removal shall be measured for payment in feet in place. Measurements shall be made in straight lines along the centerline of the conduit between ends and changes in direction. Vertical conduit shall be measured for payment.

**Basis of Payment.** This item shall be paid at the contract unit price per foot for CONDUIT REMOVAL, including connectors and appurtenances, which shall be payment in full for the work as described herein.

#### **GCC1 CONTROLLER, CALCIUM CHLORIDE PUMP**

**Description.** This item shall consist of furnishing and installing an electrical control cabinet with control devices and wiring as shown on the plan prepared by an Engineer for Calcium Chloride pump in a maintenance yard facility as specified herein.

**Materials.** The completed controller shall be UL approved as an industrial control panel. The cabinet shall be single door design, wall mounted type, NEMA 4X, not less than 14 gauge Type 304 stainless steel. All external hardware shall be stainless steel. The cabinet shall adequately house all required components with ample room for arrangement and termination of wiring. A 60 percent fill capacity shall be the design guideline. The controller shall have all the components as shown on the electrical plan to operate remotely and manually the calcium chloride pump, refer to the Standard Specifications for Road and Bridge Construction, current version, section 1068.(e) for detailed operating criterion.

**Method of Measurement.** Each calcium chloride pump controller, inspected and approved by the Engineer, shall be counted, each, as a unit for payment, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for CONTROLLER, CALCIUM CHLORIDE PUMP, which shall be payment in full for furnishing and installing the controller, complete, as specified herein.

## GCE1 OUTSIDE PLANT CATEGORY 5E ETHERNET CABLE

**Description.** This item shall consist of furnishing and installing an Outside Plant Category 5e Ethernet cable as described herein and as indicated in the Plans.

### Material/Cable Construction.

Pair Count:	4
Conductor:	Solid annealed copper
AWG (mm):	24 (0.51)
Filling Compound:	PFM™ thixotropic gel
Insulation:	Solid polyolefin
Shield/Armor:	Electrically continuous 0.008 in (0.20 mm) polymer coated smooth aluminum tape, applied with an overlap
Dry Water Block:	SAP powder
Jacket:	Black, sunlight and weather resistant polyethylene
Characteristic Impedance Ohms:	100 ± 15
Nominal Velocity of Propagation % :	65
Performance Compliance:	ANSI/TIA-568-C.2 ANSI/ICEA S-107-704-2006 RoHS-compliant REACH-compliant

The Outside Plant Category 5e Ethernet cable shall be equal to or exceed Superior Essex BBDNe Outside Plant Category 5e Ethernet cable.

**Method of Measurement.** Outside Plant Category 5e Ethernet cable will be measured for payment in feet in place installed and tested. Fiber optic cable will be measured horizontally and vertically between the changes in direction, including slack cable.

**Basis of Payment.** This work will be paid for at the contract unit price per foot for Outside Plant Category 5e Ethernet cable as specified. Payment shall not be made until the cable is installed, spliced and tested in compliance with these special provisions.



## **GE01–GE02 ELECTRIC CABLE ASSEMBLY**

**Description.** This item shall consist of furnishing and installing multi-conductor power cable, suitable for direct burial, in conduit or trench, as specified herein, complete with all testing. The cable shall be an assembly of insulated power conductors, plus an insulated ground wire cabled in accordance with UL 1277 with fillers and binder tape, and with a jacket overall. The cable shall be UL Listed for direct burial use and shall be rated 90 degrees C dry and 75 degrees C wet.

**Materials.** Materials shall be according to Article 1076.01 and 1066.06 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item.

**Installation.** Section 870 of the Standard Specifications for Road and Bridge Construction, Current version, shall apply to this pay item, with the following exceptions:

Add the following to Article 870.03 of the Standard Specifications:

“Bored and Pulled. A remotely steerable, fluid cutting tunneling system is to be used to install the cable assembly. The tunneling system shall be electronically detectable and shall line the tunnel with a clay lining as it tunnels. The tunneling system shall be approved by the Engineer prior to its use.”

**Method of Measurement.** Electric cable assembly, in conduit or trench, shall be measured, per feet.

**Basis of Payment.** This item shall be paid at the contract unit price per foot for :  
GE01 ELECTRIC CABLE ASSEMBLY, XLP, 3/C NO. 2, 1/C NO. 6 XLP GREEN  
GE02 ELECTRIC CABLE ASSEMBLY, XLP, 3/C NO. 4, 1/C NO. 6 XLP GREEN  
of the size and number of conductors indicated, which shall be payment in full for furnishing, installing in conduit or trench and testing the cable as specified herein.

## **GE03–GE07 ELECTRICAL CABLE IN CONDUIT, XLP**

**Description.** This work shall consist of furnishing materials and labor for installation of electric cables in conduit as shown on the contract drawings or as otherwise indicated, complete with all splicing, identification, terminating and testing. Replacing existing cable shall be included in this pay item.

Sections 817 and 1066 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item, with the following exception(s):

Add the following to Article 1066.03(b) of the Standard Specifications:

Cable sized No. 2 AWG and smaller shall be UL listed Type RHH/RHW and may be Type RHH/RHW/USE. Cable sized larger than No. 2 AWG shall be UL listed Type RHH/RHW/USE."

**Method of Measurement.** The cable shall be measured for payment in feet, in place. Measurements shall be made in straight lines between changes in direction and to the centers of equipment. All vertical cable and permissible cable slack shall be measured for payment. A total of 6 ft. slack shall be allowed for the end of a run terminating at a panel and 4 ft. will similarly be allowed when terminating at a wall-mounted panel. Additional vertical distance for the height of conduit risers, etc., as applicable, will be measured for payment for equipment so mounted.

**Basis of Payment.** This item will be paid at the contract unit price per foot for furnish & installation of:

GE03 ELECTRICAL CABLE, XLP, 1/C UP to No. 6

GE04 ELECTRICAL CABLE, XLP, 1/C No. 4 to No.1

GE05 ELECTRICAL CABLE, XLP, 1/C from No. 1/0 to No. 2/0

GE06 ELECTRICAL CABLE, XLP, 1/C from No. 3/0 to No. 4/0

GE07 ELECTRICAL CABLE, XLP, 1/C from No.250 to 500 MCM

of the size, number and type of conductors indicated, which shall be payment in full for the work as described herein.

#### **GE08 ELECTRIC CABLE, PULL OR REMOVE**

**Description.** This work shall consist of pulling and/or removing an existing electric cable from a conduit.

**Method of Measurement.** Electric cable in conduit, pull/remove, shall be counted, each, per foot.

**Basis of Payment.** This work will be paid for at the contract unit price per foot per electrical cable for ELECTRIC CABLE, PULL OR REMOVE, which price shall be payment in full for removing the electric cable complete. If two or more cables in a conduit are to be removed each cable will be measured for payment separately.

#### **GE09 ELECTRICAL CABLE, THWN**

**Description.** This work shall consist of furnishing materials and labor for installation of electric cables in conduit as specified herein and indicated by the Engineer, complete with all splicing, identification, terminating and testing.

**Materials.** All cables shall be U.L. listed as Type THHN or THWN per Standard 83, rated for 600 volts, 90 degrees C. dry and 75 degrees C. wet. They shall be suitable for installation in wet and dry locations, expose to the weather, and shall be resistant to oils and chemicals. It shall conform to the Federal Specification J-C-30B. The U.L. listing mark, cable voltage, insulation type and ratings, as well as the cable size shall all be clearly printed on the cable in a color contrasting with the insulation color. Conductors shall be annealed uncoated copper per UL Standard 83 or 1063 and unless otherwise indicated, shall be Class B or Class C stranded. Conductors used for general building lighting and receptacle circuits may be solid.

Each cable shall be insulated with Polyvinyl Chloride (PVC) and sheathed with nylon complying with requirements of UL Standard 83 for Types THHN or THWN. The minimum thickness at any point, of the PVC insulation, shall be not less than 90 % of the specified average thickness.

Unless otherwise indicated, cable shall be solid full color coded via insulation color. Unless specifically approved by the Engineer, color coding of neutral and ground wires shall be by means of colored insulation, except where bare ground wires are indicated.

Branch circuit from panelboards, for lighting, receptacles and similar loads shall be color coded by means of colored wire insulation. Colors shall be as selected by the Contractor but a sufficient number of colors shall be used such that wiring in common enclosures is clearly differentiated and color combinations or runs are generally not repeated. Care shall be taken in the phasing of combined-neutral circuit runs. Switched legs shall be differentiated from un-switched legs of a circuit.

Wiring shall be color coded by means of colored wire insulation as follows:

“line”: black  
neutral: white  
ground: green  
others: color coded using a repeating color format as approved by the Engineer. Signal cable conductor insulation shall be color coded.

**Quality Control.** Submittal information shall include demonstration of compliance with all specified requirements. All cables shall be new, having been manufactured within the 18 months preceding the date of delivery to the site. All cables shall be delivered to the site in full reels. Cable on the reels shall be protected from damage during shipment and handling by wood lagging or other means acceptable to the Engineer. Reels shall be tagged or otherwise identified to show the UL listing.

**Installation.** Wired and cables shall be carefully installed to avoid damage to insulation and cable jackets as applicable. Wire lubricant shall be used when pulling wires into conduits. The lubricant shall be no-injurious to conduits, conductors, insulations or jackets and the lubricant shall be UL listed. Each run of cable shall have sufficient slack. Where a number of wires are trained through a box, manhole or handhole, they shall be bundled using appropriate cable ties and supported to minimize pressure or strain on cable insulation. Wire and cable shall not be bent to a radius less than the manufacturer's recommended bending radius, either in permanent placement or during installation. Cable pulling apparatus shall have no sharp edges or protrusions which could damage cables or raceways.

Wire splices will not be allowed on an SCADA system signal or control wiring. All splices must be approved by the Engineer. Splices and terminations, as required, shall be incidental to this item and shall be in conformance with Basic Materials and Methods, elsewhere herein.

All wiring shall be tagged with pre-printed, self-sticking, wrap or heat-shrink type wire markers or other markers approved by the Engineer. Hand written wire markers are not acceptable. The tagging shall be applied at each termination and splice. The tagging shall include the full circuit and wire designation. Markers shall be permanent, of a size recommended by the manufacturer for the respective wire size and shall be applied as recommended by the marker manufacturer. All wiring shall be terminated as indicated by the Engineer.

**Testing.** After installation, the cable shall be tested as approved by the Engineer. Cable failing to pass the test shall be replaced with new cable at no additional cost.

**Method of Measurement.** The cable shall be measured for payment in feet in place. Measurements shall be made in straight lines between changes in direction and to the centers of equipment. All vertical cable and permissible cable slack shall be measured for payment.

A total of six (6) feet slack shall be allowed for the end of a run terminating at a panel and four (4) feet will similarly be allowed when terminating at a wall-mounted panel. Additional vertical distance for the height of conduit risers, etc., as applicable, will be measured for payment for equipment so mounted.

**Basis of Payment.** This work shall be paid at the Contract unit price per foot installed ELECTRICAL CABLE, THWN, 1/C from No. 14 to No. 10 of the size and type indicated, which shall be payment in full for the work as described herein.

#### **GF01 FIBER OPTIC TRUNK/DISTRIBUTION/LATERAL CABLE UP TO 96 SM**

Effective: May 24, 2018

**Description.** The Contractor shall furnish and install loose-tube, single-mode, fiber optic cable of the number of fibers specified as shown in the plans and as directed by the Engineer.

Other ancillary components, required to complete the fiber optic cable plant, including but not limited to, moisture and water sealants, cable caps, fan-out kits, etc., shall be included in the cost of fiber optic cable and will not be paid for separately.

**Materials.** The single-mode, fiber optic cable shall incorporate a loose, buffer-tube design. The cable shall be an accepted product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1999 for a single sheathed, non-armored cable, and shall be new, unused and of current design and manufacture.

**Fibers.** The cables shall use dispersion unshifted fibers. The optical and physical characteristics of the un-cabled fibers shall include:

The single-mode fiber shall meet EIA/TIA-492CAAA, "Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers," and ITU recommendation G.652.D, "Characteristics of a single-mode optical fiber cable."

<b>Physical Construction</b>			
<b>Requirement</b>		<b>Units</b>	<b>Value</b>
Cladding Diameter		( $\mu\text{m}$ )	$125.0 \pm 0.7$
Core-to-Cladding Concentricity		( $\mu\text{m}$ )	$\leq 0.5$
Cladding Non-Circularity			$\leq 0.7 \%$
Mode Field Diameter	1310 nm	( $\mu\text{m}$ )	$9.2 \pm 0.4$
	1550 nm		$10.4 \pm 0.5$
Coating Diameter		( $\mu\text{m}$ )	$245 \pm 5$
Colored Fiber Nominal Diameter		( $\mu\text{m}$ )	253 - 259
Fiber Curl radius of curvature		(m)	$> 4.0$ m

<b>Optical Characteristics</b>				
<b>Requirement</b>		<b>Units</b>	<b>Value</b>	
Cabled Fiber Attenuation	1310 nm	(dB/km)	≤ 0.4	
	1550 nm		≤ 0.3	
Point discontinuity	1310 nm	(dB)	≤ 0.1	
	1550 nm		≤ 0.1	
Macrobend Attenuation	Turns	Mandrel OD	(dB)	
	1	32 ± 2 mm		< 0.05 at 1550 nm
	100	50 ± 2 mm		< 0.05 at 1310 nm
	100	50 ± 2 mm		< 0.10 at 1550 nm
	100	60 ± 2 mm		< 0.05 at 1550 nm
	100	60 ± 2 mm		< 0.05 at 1625 nm
Cable Cutoff Wavelength ( $\lambda_{ccf}$ )		(nm)	< 1260	
Zero Dispersion Wavelength ( $\lambda_0$ )		(nm)	1302 ≤ $\lambda_0$ ≤ 1322	
Zero Dispersion Slope ( $S_0$ )		(ps/(nm <sup>2</sup> •km))	≤ 0.089	
Total Dispersion	1550 nm	(ps/(nm•km))	≤ 3.5	
	1285-1330 nm		≤ 17.5	
	1625 nm		≤ 21.5	
Cabled Polarization Mode Dispersion		(ps/km <sup>2</sup> )	≤ 0.2	
IEEE 802.3 GbE - 1300 nm Laser Distance		(m)	up to 5000	
Water Peak Attenuation: 1383 ± 3 nm		(dB/km)	≤ 0.4	

**Cable Construction.** The number of fibers in each cable shall be as specified on the plans.

Optical fibers shall be placed inside a loose buffer tube. The nominal outer diameter of the buffer tube shall be 3.0 mm. Each buffer tube shall contain up to 12 fibers. The fibers shall not adhere to the inside of the buffer tube.

Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." The fibers shall be colored with ultraviolet (UV) curable inks.

Buffer tubes containing fibers shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." Buffer tube colored stripes shall be inlaid in the tube by means of co-extrusion when required. The nominal stripe width shall be 1 mm.

For cables containing more than 12 buffer tubes, standard colors are used for tubes 1 through 12 and stripes are used to denote tubes 13 through 24. The color sequence applies to tubes containing fibers only, and shall begin with the first tube. If fillers are required, they shall be placed in the inner layer of the cable. The tube color sequence shall start from the inside layer and progress outward.

In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and shall not be subject to fading or smearing onto each other. Colors shall not cause fibers to stick together.

The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrinkback requirements of 7 CFR 1755.900.

Fillers may be included in the cable core to lend symmetry to the cable cross-section where needed. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer. Fillers shall be nominally 2.5 mm or 3.0 mm in outer diameter.

The central member shall consist of a dielectric, glass reinforced plastic (GRP) rod (optional steel central member). The purpose of the central member is to provide tensile strength and prevent buckling. The central member shall be overcoated with a thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.

Each buffer tube shall contain a water-swellable yarn for water-blocking protection. The water-swellable yarn shall be non-nutritive to fungus, electrically non-conductive, and homogeneous. It shall also be free from dirt or foreign matter. This yarn will preclude the need for other water-blocking material; the buffer-tube shall be gel-free. The optical fibers shall not require cleaning before placement into a splice tray or fan-out kit.

Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process.

Water swellable yarn(s) shall be applied longitudinally along the central member during stranding.

Two polyester yarn binders shall be applied contrahelicallly with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking, and dielectric with low shrinkage.

For single layer cables, a water swellable tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The water swellable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

For dual layer cables, a second (outer) layer of buffer tubes shall be stranded over the original core to form a two layer core. A water swellable tape shall be applied longitudinally over both the inner and outer layer. The water swellable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

The cables shall contain one ripcord under the sheath for easy sheath removal.

Tensile strength shall be provided by the central member, and additional dielectric yarns as required.

The dielectric yarns shall be helically stranded evenly around the cable core.

The cables shall be sheathed with medium density polyethylene (MDPE). The minimum nominal jacket thickness shall be 1.4 mm. Jacketing material shall be applied directly over the tensile strength members (as required) and water swellable tape. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The MDPE jacket material shall be as defined by ASTM D1248, Type II, Class C, Category 4 and Grades J4, E7 and E8.

The jacket or sheath shall be free of holes, splits, and blisters.

The cable jacket shall contain no metal elements and shall be of a consistent thickness.

Cable jackets shall be marked with the manufacturer's name, month and year of manufacture, sequential meter or foot markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code (NESC), fiber count, and fiber type. The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white, with the exception that cable jackets containing one or more co-extruded white stripes, which shall be printed in light blue. The height of the marking shall be approximately 2.5 mm.

The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

The shipping, storage, and operating temperature range of the cable shall be -40°C to +70°C. The installation temperature range of the cable shall be -30°C to +70°C.

**General Cable Performance Specifications.** The fiber optic cable manufacturer shall provide documentation and certify that the fiber optic cable complies with the following EIA-455-xxx Fiber Optic Test Procedures (FOTP):

When tested in accordance with FOTP-3, "*Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components*," the change in attenuation at extreme operational temperatures (-40°C and +70°C) shall not exceed 0.15 dB/km at 1550 nm for single-mode fiber and 0.3 dB/km at 1300 nm for multimode fiber.

When tested in accordance with FOTP-82, "*Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable*," a one-meter length of unaged cable shall withstand a one meter static head or equivalent continuous pressure of water for one hour without leakage through the open cable end.

When tested in accordance with FOTP-81, "*Compound Flow (Drip) Test for Filled Fiber Optic Cable*," the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 70°C.



When tested in accordance with FOTP-41, "*Compressive Loading Resistance of Fiber Optic Cables*," the cable shall withstand a minimum compressive load of 220 N/cm (125 lbf/in) applied uniformly over the length of the sample. The 220 N/cm (125 lbf/in) load shall be applied at a rate of 2.5 mm (0.1 in) per minute. The load shall be maintained for a period of 1 minute. The load shall then be decreased to 110 N/cm (63 lbf/in). Alternatively, it is acceptable to remove the 220 N/cm (125 lbf/in) load entirely and apply the 110 N/cm (63 lbf/in) load within five minutes at a rate of 2.5 mm (0.1 in) per minute. The 110 N/cm (63 lbf/in) load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 110 N/cm (63 lbf/in) load. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fibers and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-104, "*Fiber Optic Cable Cyclic Flexing Test*," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-25, "*Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies*," except that the number of cycles shall be two at three locations along a one meter cable length and the impact energy shall be at least 4.4 Nm (in accordance with ICEA S-87-640)", the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-33, "*Fiber Optic Cable Tensile Loading and Bending Test*," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a rated tensile load of 2670N (601 lbf) and residual load of 30% of the rated installation load. The axial fiber strain shall be  $\leq 60\%$  of the fiber proof level after completion of 60 minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be  $\leq 20\%$  of the fiber proof level after completion of 10 minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-85, "*Fiber Optic Cable Twist Test*," a length of cable no greater than 2 meters shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-37, "*Low or High Temperature Bend Test for Fiber Optic Cable*," the cable shall withstand four full turns around a mandrel of  $\leq 20$  times the cable diameter after conditioning for four hours at test temperatures of  $-30^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$ . Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears, or other openings. The change in attenuation shall not exceed 0.30 dB at 1550 nm for single mode fiber and 0.50 dB at 1300 nm for multimode fiber.

**Quality Assurance Provision.** All cabled optical fibers > 1000 meters in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel. The cable manufacturer shall be TL 9000 registered.

**Packaging.** Top and bottom ends of the cable shall be available for testing. Both ends of the cable shall be sealed to prevent the ingress of moisture. Each reel shall have a weather resistant reel tag attached identifying the reel and cable. The reel tag shall include the following information:

- Cable Number
- Gross Weight
- Shipped Cable Length in Meters
- Job Order Number
- Product Number
- Customer Order Number
- Date Cable was Tested
- Manufacturer Order Number

Cable Length Markings

a: Top (inside end of cable)

b: Bottom (outside end of cable)

The reel (one flange) marking shall include:

- Manufacturer
- Country of origin
- An arrow indicating proper direction of roll when handling
- Fork lift-handling illustration
- Handling Warnings

Each cable shall be accompanied by a cable data sheet. The cable data sheet shall include the following information:

- Manufacturer Cable Number
- Manufacturer Product Number
- Manufacturer Factory Order Number
- Customer Name
- Customer Cable Number
- Customer Purchase Order Number
- Mark for Information
- Ordered Length
- Maximum Billable Length
- Actual Shipped Length
- Measured Attenuation of Each Fiber

The cable shall be capable of withstanding a minimum-bending radius of 20 times its outer diameter during installation and 10 times its outer diameter during operation without changing the characteristics of the optical fibers.

The cable shall meet all of specified requirements under the following conditions:

- Shipping/storage temperature: -58° F to +158° F (-50° C to +70° C)
- Installation temperature: -22° F to +158° F (-30° C to +70° C)
- Operating temperature: -40° F to +158° F (-40° C to +70° C)
- Relative humidity from 0% to 95%, non-condensing

**Optical Patch Cords and Pigtails.** The optical patch cords and pigtails shall comply with the following:

The optical patch cords shall consist of a section of single fiber, jacketed cable equipped with optical connectors at both ends. The factory installed connector furnished as part of the optical patch cords and pigtails shall meet or exceed the requirements for approved connectors specified herein. The fiber portion of each patch cord and pigtail shall be a single, jacketed fiber with optical properties identical to the optical cable furnished under this contract. The twelve-fiber single-mode fiber optic cable shall be installed as a pigtail with factory installed ST or SC compatible connectors. The patch cords shall comply with Telcordia GR-326-CORE

**Connectors.** The optical connectors shall comply with the following:

- All connectors shall be factory installed ST compatible connectors. Field installed connectors shall not be allowed
- Maximum attenuation 0.4dB, typical 0.2dB
- No more than 0.2dB increase in attenuation after 1000 insertions
- Attenuation of all connectors will be checked and recorded at the time of installation with an insertion test minimum 5 times checked with an OTDR
- All fibers shall be connectorized at each end
- All fibers shall terminate at a fiber patch panel
- Unused fibers will be protected with a plastic cap to eliminate dust and moisture
- Termination shall be facilitated by splicing factory OEM pigtails on the end of the bare fiber utilizing the fusion splicing method. Pigtails shall be one meter in length.

## CONSTRUCTION REQUIREMENTS

**Experience Requirements.** Personnel involved in the installation, splicing and testing of the fiber optic cables shall meet the following requirements:

A minimum of three (3) years' experience in the installation of fiber optic cables, including fusion splicing, terminating and testing single mode fibers.

Install two systems where fiber optic cables are outdoors in conduit and where the systems have been in continuous satisfactory operation for at least two years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the installed fiber optic systems.

One fiber optic cable system (which may be one of the two in the preceding paragraph), which the Contractor can arrange for demonstration to the Department representatives and the Engineer.

Installers shall be familiar with the cable manufacturer's recommended procedures for installing the cable. This shall include knowledge of splicing procedures for the fusion splicer being used on this project and knowledge of all hardware such as breakout (furcation) kits and splice closures. The Contractor shall submit documented procedures to the Engineer for approval and to be used by Construction inspectors.

Personnel involved in testing shall have been trained by the manufacturer of the fiber optic cable test equipment to be used, in fiber optic cable testing procedures. Proof of this training shall be submitted to the Engineer for approval. In addition, the Contractor shall submit documentation of the testing procedures and a copy of the test equipment operation manual for approval by the Engineer.

**Installation in Raceways.** Prior to installation, the Contractor shall provide a cable-pulling plan. The plan shall include the following information:

- Identify where each cable will enter the underground system and the direction each pull
- Identify locations where the cable is pulled out of a handhole, coiled in a figure eight, and pulled back into the hand hole
- The plan shall address the physical protection of the cable during installation and during periods of downtime
- Identify the location of slack storage locations
- Identify the locations of splices
- Identify distances between fiber access points and crossings

The cable-pulling plan shall be provided to the Engineer for approval a minimum of 15 working days prior to the start of installation. The Engineer's approval shall be for the operation on the freeway and does not include an endorsement of the proposed procedures. The Contractor is responsible for the technical adequacy of the proposed procedures.

During cable pulling operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and pulling operations. Unless specified otherwise by the fiber optic cable manufacturer, the outside bend radius of the cable during installation shall be no less than 20 times the outside diameter of the fiber optic cable. Entry guide chutes shall be used to guide the cable into the handhole conduit ports. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation-bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the cable manufacturers specifically approve the array.

If figure-eight techniques are used during cable installation, the cable shall be handled manually and stored on the ground. The cable shall be placed on tarps to prevent damage from gravel, rocks, or other abrasive surfaces. Tarps should also be used in muddy conditions to keep the cable clean. Enough area to accommodate the cable length to be stored and sufficient personnel to maintain the required minimum-bending diameter as well as avoid kinking or otherwise damaging the cable shall be provided. If the cable has been figure-eighted in preparation for a forward feed, the figure-eight must be flipped over to access the outside cable end. Provide sufficient personnel to avoid kinking the cable as the figure-eight is flipped over. When removing the cable from the figure-eight, use care to avoid kinking the cable and violating the minimum-bending diameter.

Power assisted or figure-eight eliminator equipment, which is used to eliminate manual figure-eight procedures, shall not be used unless specifically allowed by the cable manufacturer in writing.

The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. A dynamometer or in-line tensiometer shall be used to monitor tension in the pull-line near the winch. This device must be visible to the winch operator or used to control the winch. The pulling system shall have an audible alarm that sounds whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the engineer as well as included in the record drawing package.

The use of a breakaway link (swivel) may be used to ensure that the maximum tension of the cable is not exceeded. Breakaway links react to tension at the pulling eye and shall not be used in lieu of tension measuring devices. All pulling equipment and hardware which will contact the cable during installation must maintain the cable's minimum bend radius. Equipment including sheaves, capstans, bending shoes, and quadrant blocks shall be designed for use with fiber optic cable.

The cable shall be pulled into the conduit as a single component, absorbing the pulling force in all tension elements. The central strength member and Aramid yarn shall be attached directly to the pulling eye during cable pulling. "Basket grip" type attachments, which only attach to the cable's outer jacket, shall not be permitted. A breakaway swivel, rated at 95% of the cable manufacturer's approved maximum tensile loading, shall be used on all pulls. When simultaneously pulling fiber optic cable with other cables, separate grooved rollers shall be used for each cable.

To minimize the exposure of the backbone cable and to facilitate the longer lengths of fiber optic cable, the Contractor shall use a "blown cable" (pneumatically assisted) technique to place the fiber optic cable. A Compressed air cooler shall be used when ambient air temperatures reaches 90°F or more.

Where cable is to be pulled through existing conduit which contains existing cables, optical or other, the existing cables shall be removed and reinstalled with the fiber optic cable as indicated on the plans. The removal of the cable(s) shall be paid for separately. Reinstallation of the existing cables, if indicated on the plans, along with the fiber optic cable shall be included in this item for payment.

**Tracer Wire.** A tracer wire shall be installed with all fiber optic cable runs. One tracer wire shall be installed along with the fiber optic cable in each raceway. If a raceway has more than one fiber optic cable, only one tracer wire per raceway is required. If there are parallel raceways, a tracer wire is required in each raceway that contains a fiber optic cable. Tracer wire shall be installed in raceway segments which are metallic to provide a continuous tracer wire system.

The tracer wire shall be a direct burial rated, number 12 AWG (minimum) solid (.0808" diameter), steel core soft drawn high strength tracer wire. The wire shall have a minimum 380 pound average tensile break strength. The wire shall have a 30 mil high density yellow polyethylene (HDPE) jacket complying with ASTM-D-1248, and a 30 volt rating.

Connection devices used shall be as approved by the tracer wire manufacturer, except wire nuts of any type are not acceptable and shall not be used.

The cost of the tracer wire shall be included in the cost of the fiber optic cable and not paid for separately.

**Aerial Fiber Optic Cable.** Aerial fiber optic cable assemblies shall be of a self-supporting figure-8 design. The fiber optic cable shall be as described herein and shall be waterblocked utilizing water-swallowable materials. The cable assembly shall be designed and manufactured to facilitate midspan access.

The submittal information must include a copy of the standard installation instructions for the proposed cable. Installed cable sag shall not exceed 1% of the span distance. The submittal information must also include catalog cuts for all hardware to be utilized in the installation.

### **Construction Documentation Requirements.**

#### Installation Practices for Outdoor Fiber Optic Cable Systems

The Contractor shall examine the proposed cable plant design. At least one month prior to starting installation of the fiber optic cable plant, the Contractor shall prepare and submit to the Engineer for review and approval, ten (10) copies of the Contractor's "Installation Practices for Outdoor Fiber Optic Cable Systems" manual. This manual shall address the Contractor's proposed practices covering all aspects of the fiber optic cable plant. This submittal shall include all proposed procedures, list of installation equipment, and splicing and test equipment. Test and quality control procedures shall be detailed as well as procedures for corrective action.

**Operation and Maintenance Documentation.** After the fiber optic cable plant has been installed, ten (10) complete sets of Operation and Maintenance Documentation shall be provided. The documentation shall, as a minimum, include the following:

- Complete and accurate as-built diagrams showing the entire fiber optic cable plant including locations of all splices
- Final copies of all approved test procedures
- Complete performance data of the cable plant showing the losses at each splice location and each terminal connector
- Complete parts list including names of vendors

**Testing Requirements.** The Contractor shall submit detailed test procedures for approval by the Engineer. All fibers (terminated and un-terminated) shall be tested bi-directionally at both 1310 nm and 1550 nm with both an Optical Time Domain Reflectometer (OTDR) and a power meter with an optical source. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

Fibers which are not to be terminated shall be tested with a temporary fusion spliced pigtail fiber. Mechanical splice or bare fiber adapters are not acceptable.

The Contractor shall provide the date, time and location of any tests required by this specification to the Engineer at least 5 working (7 calendar) days before performing the test. Included with the notification shall be a record drawing of the installed fiber optic cable system. The drawings shall indicate actual installed routing of the cable, the locations of splices, and locations of cable slack with slack quantities identified.

Upon completion of the cable installation, splicing, and termination, the Contractor shall test all fibers for continuity, events above 0.1 dB, and total attenuation of the cable. The test procedure shall be as follows:

A Certified Technician utilizing an Optical Time Domain Reflectometer (OTDR) and Optical Source/Power Meter shall conduct the installation test. The test equipment used shall have been calibrated within the last two years. Documentation shall be provided. The Technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.

A fiber ring or fiber box shall be used to connect the OTDR to the fiber optic cable under test at both the launch and receive ends. The tests shall be conducted at 1310 and 1550 nm for all fibers.

All testing shall be witnessed by the IDOT Engineer and a copy of the test results (CD ROM or USB Drive) shall be submitted on the same day of the test. Hardcopies shall be submitted as described herein with copies on CD ROM.

At the completion of the test, the Contractor shall provide copies of the documentation of the test results to the Project Engineer. The test documentation shall be submitted as two bound copies and three CD ROM copies, and shall include the following:

Cable & Fiber Identification:

- Cable ID
- Cable Location – Beginning and End Point
- Operator Name
- Date & Time
- Fiber ID, including tube and fiber color
- Wavelength
- Pulse width (OTDR)
- Refractory index (OTDR)
- Setup Parameters
- Range (OTDR)
- Scale (OTDR)
- Setup Option chosen to pass OTDR “dead zone”

Test Results shall include:

- OTDR Test Results
- Total Fiber Trace
- Splice Loss/Gain
- Events  $\geq 0.10$  db
- Measured Length (Cable Marking)
- Total Length (OTDR)
- Optical Source/Power Meter
- Total Attenuation (dB/km)

Sample Power Meter Tabulation:

Power Meter Measurements (dB)									
Location		Fiber No.	Cable Length (km)	A to B		B to A		Bidirectional Average	
A	B			1310 nm	1550 nm	1310 nm	1550 nm	1310 nm	1550 nm
		1							
		2							
<b>Maximum Loss</b>									
<b>Minimum Loss</b>									

The OTDR test results file format must be Bellcore/Telcordia compliant according to GR- 196-CORE Issue 2, OTDR Data Standard, GR 196, Revision 1.0, GR 196, Revision 1.1, GR 196, Revision 2.0 (SR-4731) in a “.SOR” file format. A copy of the test equipment manufacturer’s software to read the test files, OTDR and power, shall be provided to the Department. These results shall also be provided in tabular form, see sample below:

Sample OTDR Summary				
Cable Designation:	TCF-IK-03	OTDR Location:	Pump Sta. 67	Date: 1/1/00
Fiber Number	Event Type	Event Location	Event Loss (dB)	
			1310 nm	1550 nm
1	Splice	23500 Ft.	.082	.078
1	Splice	29000 Ft.	.075	.063
2	Splice	29000 Ft.	.091	.082
3	Splice	26000 Ft.	.072	.061
3	Bend	27000 Ft.	.010	.009

The following shall be the criteria for the acceptance of the cable:

The test results shall show that the dB/km loss does not exceed +3% of the factory test or 1% of the cable’s published production loss. However, no event shall exceed 0.10 dB. If any event is detected above 0.10 dB, the Contractor shall replace or repair the fiber including that event point.

The total loss of the cable (dB), less events, shall not exceed the manufacturer’s production specifications as follows: 0.5 dB/km at both 1310 and 1550 nm.

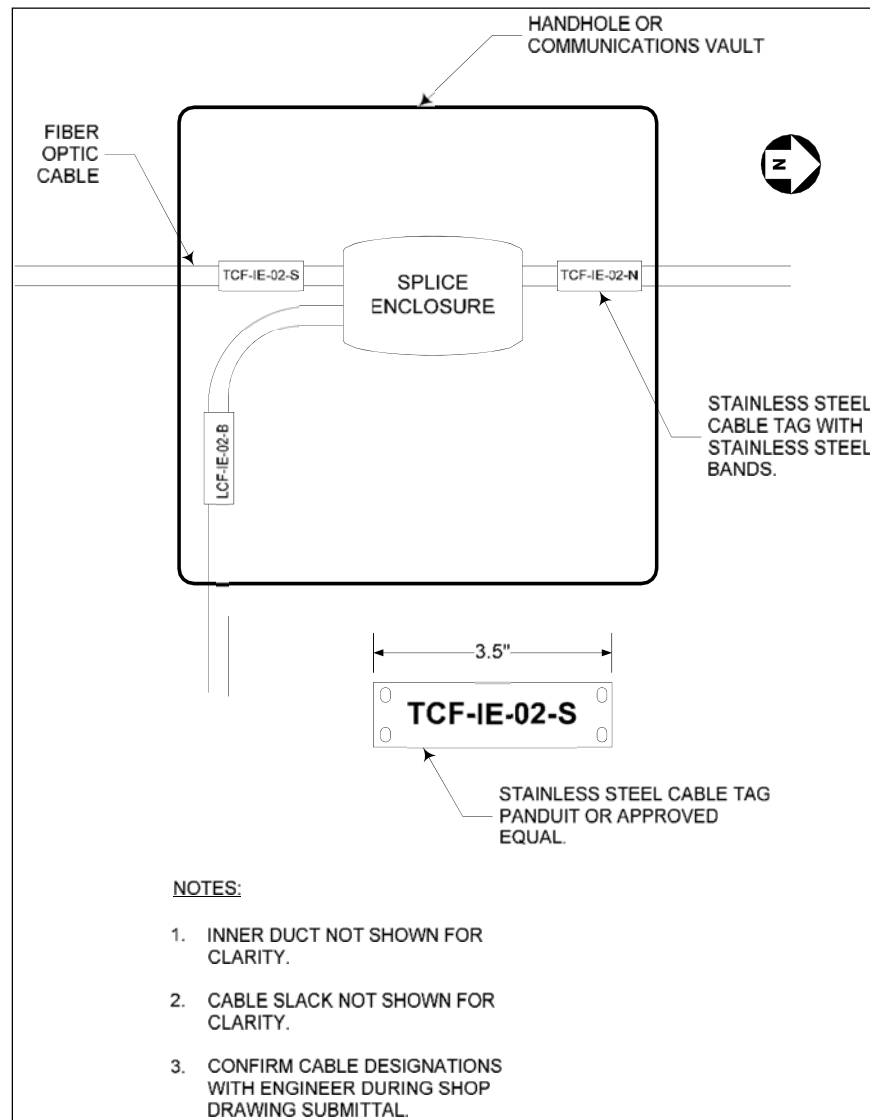


If the total loss exceeds these specifications, the Contractor shall replace or repair the cable run at the no additional cost to the state, both labor and materials. Elevated attenuation due to exceeding the pulling tension, or any other installation operation, during installation shall require the replacement of the cable run at no additional cost to the State, including labor and materials.

**Splicing Requirements.** Splices shall be made at locations shown on the Plans. Any other splices shall be permitted only with the approval of the Engineer. Splices will be paid for separately. All splice locations must be identified in the Record Drawings. Cable runs which dead-end at a handhole, communications vault, interconnect cabinet, or any other type of enclosure, shall be dead ended in a splice enclosure.

**Slack Storage of Fiber Optic Cables.** Included as a part of this item, slack fiber shall be supplied as necessary to allow splicing the fiber optic cables in a controlled environment, such as a splicing van or tent. After splicing has been completed, the slack fiber shall be stored underground in handholes or in the raised base adapters of ground mounted cabinets in accordance with the fiber optic cable manufacturer's guidelines. Fiber optic cable slack shall be 100 feet for each cable at each splice location, above or below ground. Fiber optic cable slack shall be 50 feet for each cable at access points, above or below ground, where splicing is not involved. If the innerduct is cut, the ends of the innerduct should extend beyond the first vertical rack so they can be secured at that point. This slack shall be measured for payment.

Fiber optic cable shall be tagged inside handholes with yellow tape containing the text: "CAUTION - FIBER OPTIC CABLE." In addition, permanent tags, as approved by the engineer, shall be attached to all cable in a hand hole or other break-out environment. These tags shall be stainless steel, nominally 0.75" by 1.72", and permanently embossed. These tags shall be attached with stainless steel straps, and shall identify the cable number, the number of fibers, and the specific fiber count. Tags and straps shall be Panduit or approved equal. See figure below:



Label the destination of each trunk cable onto the cable in each handhole, vault or cable termination panel.

**Method of Measurement.** Fiber optic cable will be measured for payment in feet in place installed and tested. Fiber optic cable will be measured horizontally and vertically between the changes in direction, including slack cable. The entire lengths of cables installed in buildings will be measured for payment

**Basis of Payment.** This work will be paid for at the contract unit price per foot for FIBER OPTIC TRUNK/DISTRIBUTION/LATERAL CABLE UP TO 96 SM of the type, size, and number of fibers specified. Payment shall not be made until the cable is installed, spliced and tested in compliance with these special provisions.

### **GF03 FIBER OPTIC CABLE, HYBRID 12 MM AND 24 SM**

**Description.** This work shall conform with Section 871 of the Standard Specification for Road and Bridge Construction and District Traffic Signal Specifications as directed by the Signal Engineer.

**Method of Measurement.** The Fiber Optic Cable, Hybrid 12 MM and 24 SM, shall be measured for payment at the contract unit price each which cost shall include the cost of furnishing all labor, materials, documentation, tools and equipment to install, test, and make the location operational.

**Basis of Payment.** This work will be paid for at the contract unit price per foot for Fiber Optic Hybrid 62.5/125 multimode (MM) 12 fiber and single mode 24 fiber, which price shall include furnishing and installing the fiber optic cable, necessary slack, cable termination and testing, distribution, enclosures, breakout kits, connectors, lashing wire, messenger wire, splices, pigtail assemblies and all other materials, hardware, and labor necessary to complete the installation as directed by the Signal Engineer. The single mode fiber shall comply with the requirements in GF01. In addition to traffic signal use, this item may also be used at pumping stations and other highway systems.

### **GF04 FIBER OPTIC TERMINATION PANEL, 12F OR 24F**

**Description.** Work under this item shall consist of furnishing and installing a fiber optic termination panel, type and size as specified on the plans and described herein. This equipment will be used to link field equipment using single-mode fiber optic cable.

**Materials.** The fiber optic termination panel shall provide storage, protection, and termination of optical fibers. The units shall be compact, stackable, and built in splice trays with routing guides. The termination panel shall be made of a durable metal and suitable for building entrance. The termination panel shall be mountable in multiple configurations including wall and DIN rail applications. Each Termination panel shall be provided with factory terminated and tested single mode pigtail ST or SC adaptors. The Fiber optic termination panel shall be equal to or exceed Corning Single-Panel Housing (SPH). The factory terminated ST or SC adaptors shall be equal to or exceed Corning Closet Connector Housing (CCH) Panel, pigtailed, ST or SC Connectors

#### **Construction Requirements.**

The Fiber Optic Termination Panel shall be installed in the Traffic Signal, surveillance cabinets or pump stations as specified on the Plans. The panels shall come with cable strain relief hardware and pull out label for administrative documentation. All work shall be neat and in a workmanlike manner. Care shall be taken as to not crush or kink the fiber optic cable. If in the opinion of the engineer the cable has been crushed or kinked, the entire cable span shall be removed and replaced at the Contractor's expense.

**Method of Measurement.** The fiber optic termination panel, 12 F or 24F, shall be measured for payment at the contract unit price each which cost shall include the cost of furnishing all labor, materials, documentation, tools and equipment to install, test, and make the location operational.

**Basis of Payment.** Fiber Optic Termination Panel, 12F or 24F will be paid for at the Contract unit price each. This price shall be payment for furnishing and installing the Fiber Optic Termination Panel, 12F or 24F along with any necessary fiber optic patch cords and any other materials, hardware, and labor necessary to complete the installation.

#### **GF05 FIBER OPTIC PATCH PANEL 96 SM**

**Description.** This item shall consist of furnishing and installing a 96 port, ST or SC style, rack or wall mounted, patch panel for single mode fiber. The hardware shall include label holders, numbered ports, front and rear cable management rings.

Splicing shall be as described in GF01.

**Materials.** The Fiber Optic patch panel shall be rack or wall mounted complete with strain relief, routing clips, guides, and mounting brackets for proper installation. Each Fiber Optic Patch panel shall be provided with factory terminated and tested single mode pigtail ST or SC adaptors. Each Fiber Optic patch panel shall be equipped with enough splice trays that provide positive holding and retention of the splice/heat shrink, fiber loop retention, and additional strain relief to secure the buffer tubers for the entire cable assembly being terminated. The rack mounted Fiber optic patch panels shall be equal to or exceed Corning Closet Connector housing (CCH) panel that holds up to 12 CCH pigtailed ST or SC single mode Connectors. The wall mount fiber optic patch panel shall be equal to or exceed Corning Classic Wall-Mountable Connector Housing (WCH-CLSSC-12P).

**Method of Measurement.** The fiber optic patch panel, 96 SM, shall be measured for payment at the contract unit price each which cost shall include the cost of furnishing all labor, materials, documentation, tools and equipment to install, test, and make the location operational.

**Basis of Payment.** The work will be paid for at the Contract unit price each for Fiber Optic Patch Panel 96 SM, which shall be payment in full for furnishing, delivering, installing, trimming, and organizing fiber optic cable and testing, supplying optical pigtails and patch cords and all other materials and labor necessary to complete the installation

#### **GF06 FIBER OPTIC SPLICE CLOSURE**

**Description.** Work under this item shall consist of furnishing and installing a Fiber Optic Splice Closure as described herein.

##### **Fiber Optic Splice**

The Contractor shall splice optical fibers from different cable sheaths and protect them with a splice closure at the locations shown on the Plans. Fiber splicing consists of in- line fusion splices for all fibers described in the cable plan at the splice location.

## **Materials**

### **Splice Closures**

Splice Closures shall be designed for use under the most severe conditions such as moisture, vibration, impact, cable stress and flex temperature extremes as demonstrated by successfully passing the factory test procedures and minimum specifications listed below:

### **Physical Requirement**

The closure shall provide ingress for up to four cables in a butt configuration. The closure shall prevent the intrusion of water without the use of encapsulates.

The closure shall be capable of accommodating splice organizer trays that accept mechanical or fusion splices. The splice closure shall have provisions for storing fiber splices in an orderly manner, mountings for splice organizer assemblies, and space for excess or un-spliced fiber. Splice organizers shall be re-enterable. The splice case shall be UL rated.

Closure re-entry and subsequent reassembly shall not require specialized tools or equipment. Further, these operations shall not require the use of additional parts.

The splice closure shall have provisions for controlling the bend radius of individual fibers to a minimum of 38 mm (1.5 in.).

## **Factory Testing**

### **Compression Test**

The closure shall not deform more than 10% in its largest cross-sectional dimension when subjected to a uniformly distributed load of 1335 N at temperature of -18° and 38°C (0 and 100° F). The test shall be performed after stabilizing at the required temperature for a minimum of two hours. It shall consist of placing an assembled closure between two flat parallel surfaces with the longest closure dimension parallel to the surfaces. The weight shall be placed on the upper surface for a minimum of 15 minutes. The measurement shall then be taken with weight in place.

### **Impact Test**

The assembled closure shall be capable of withstanding an impact of 28 N-M at temperatures of -18° and 38°C (0 and 100° F). The test shall be performed after stabilizing the closure at the required temperature for a minimum of 2 hours. The test fixture shall consist of 9 kg (20 lb) cylindrical steel impacting head with a 50 mm (2in) spherical radius at the point where it contacts the closure. It shall be dropped from a height of 305 mm (12 in.) The closure shall not exhibit any cracks or fractures to the housing that would preclude it from passing the water immersion test. There shall be no permanent deformation to the original diameter or characteristic vertical dimension by more than 5%.

### **Cable Gripping and Sealing Testing**

The cable gripping and sealing hardware shall not cause an increase in fiber attenuation in excess of 0.05 dB/fiber at 1550 nm when attached to the cables and the closure assembly. The test shall consist of measurements from six fibers, one from each buffer tube or channel, or randomly selected in the case of a single fiber bundle. The measurements shall be taken from the test fibers before and after assembly to determine the effects of the cable gripping and sealing hardware on the optical transmission of the fibers.

### **Vibration Test**

The splice organizers shall securely hold the fiber splices and store the excess fiber. The fiber splice organizers and splice retaining hardware shall be tested per EIA Standard FOTP-II, Test Condition 1. The individual fibers shall not show an increase in attenuation in excess of 0.1 dB/fiber.

### **Water Immersion Test**

The closure shall be capable of preventing a 3 m (10 ft) water head from intruding into the splice compartment for a period of 7 days. Testing of the splice closure is to be accomplished by the placing of the closure into a pressure vessel and filling the vessel with tap water to cover the closure. Apply continuous pressure to the vessel to maintain a hydrostatic head equivalent 3 meters (10 ft.) on the closure and cable. This process shall be continued for 30 days. Remove the closure and open to check for the presence of water. Any intrusion of water in the compartment containing the splices constitutes a failure.

### **Certification**

It is the responsibility of the Contractor to insure that either the manufacturer or an independent testing laboratory has performed all of the above tests, and the appropriate documentation has been submitted to the Department. Manufacturer certification is required for the model(s) of closure supplied. It is not necessary to subject each supplied closure to the actual tests described herein.

## **CONSTRUCTION REQUIREMENTS**

The closure shall be installed according to the manufacturer's recommended guidelines.

The Contractor shall submit the proposed locations of the mainline splice points for review by the Department.

The Contractor shall prepare the cables and fibers in accordance with the closure and cable manufacturers' installation practices. A copy of these practices shall be provided to the Engineer 21 days prior to splicing operations.

As directed by the Engineer, the Contractor (at no additional cost to the Department) shall replace any cable splice not satisfying the cable splice requirements set forth in the fiber optic cable spec GF01.

The Contractor shall secure the Splice Closure to the side of the splice facility using cable support brackets. All cables shall be properly dressed and secured to rails or racks within the manhole. No cables or enclosures will be permitted to be on the floor of the splice facility. Cables that are spliced inside a building will be secured to the equipment racks or walls as appropriate, and indicated on the Plans.

**Method of Measurement.** The fiber optic splice enclosure, shall be measured for payment at the contract unit price each which cost shall include the cost of furnishing all labor, materials, documentation, tools and equipment to install, test, and make the location operational.

**Basis of Payment.** The work will be paid for at the contract unit price for Fiber Optic Splice Enclosure, which shall be payment in full for furnishing, delivering, installing, trimming, and organizing the fiber optic splice, testing, and all other materials and labor necessary to complete the installation.

**GF07 FIBER OPTIC INNERDUCT, UP TO 1 ½”**

**Description.** This item shall consist of furnishing, installing, splicing, connecting and demonstrating continuity of fiber optic cable innerduct of sizes specified herein and as shown on the contract drawings. The innerduct shall be High Density Polyethylene.

**Materials.**

**General.**

The duct shall be a spiral ribbed plastic duct which is intended for underground use and which can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance. The ribbed duct shall have internally designed longitudinal ribs for reduced pulling frictions and increased lubrication effectiveness

The duct shall be made of high density polyethylene which shall meet the requirements of ASTM D 3035. The innerduct material shall be composed of high density polyethylene meeting the requirements of PE334470E/C as defined in ASTM D3350.

Submittal information shall demonstrate compliance with the details of these requirements. Dimensions.

Duct dimensions shall conform to the standards listed in ASTM D3035, SDR-11. Submittal information shall demonstrate compliance with these requirements.

Nominal Size (Diameter)	Inside Diameter (minimum)	Outside Diameter (Average)	Wall Thickness (Min.)	Bend Radius (minimum)	Pull Strength	Weight Average (lbs/100ft.)
1”	1.030”	1.315”	0.120”	14”	500	19
1.25”	1.313”	1.660”	0.151”	17”	750	31
1.5”	1.506”	1.900”	0.173”	19”	1000	40

**Marking.**

As specified in NEMA Standard Publication No. TC-7, the duct shall be clearly and durably marked at least every 10 feet with the material designation (HDPE for high density polyethylene), nominal size of the duct, and the name and/or trademark of the manufacturer.

Color. **Orange**

**Fiber Optic Trunk Cable**

(Ducts containing cables of 96 fibers)

**Blue**

Fiber Optic Trunk Cable

(Ducts containing cables of 12,6, or 4 fibers and 96 fiber ducts designated as distribution fibers)

Innerduct shall be colored as directed by the Engineer.

**Installation.**

**Pulling Tension.**

Pulling tension of the duct shall be monitored throughout the pull and pulling tension shall not exceed those listed in the table or the specific manufacturer maximum pulling tensions as indicated in the catalog cut submittals. Failure to monitor the pulling tension will result in non-payment of that particular duct span and the span may be reinstalled with new duct at no additional cost to the State. Lubricants used shall be compatible with the duct.

**Junction boxes.**

Where duct passes through junction and/or pull boxes, the duct shall remain continuous unless a break is specifically indicated in the plans or as directed by the Engineer.

**Handholes and Communications Vaults.**

Where duct passes through handholes or vaults, the duct shall be looped uncut within the handhole unless otherwise indicated on the Plans or directed by the Engineer.

**Bends.**

Minimum bending radius shall be in accordance with the above table or the manufacturer's recommended radius, whichever is larger. Bends shall be made so that the duct will not be damaged and the internal diameter of the duct will not be effectively reduced. The degrees of bend in one duct run shall not exceed 360° between termination points.

**In Trench**

Where duct is installed in trench, it shall be placed in the bottom of the trench after all loose stones have been removed and all protruding stones have been removed or covered with backfill material as directed by the Engineer.

Where duct is shown to be installed in trench, it shall be installed at a depth not less than 30 inches unless otherwise indicated or specifically directed by the Engineer.

The inner duct may be plowed into place. Unless otherwise indicated or specifically approved by the Engineer, plowing of inner duct shall lay the duct in place and shall not pull the duct through the length of the cut behind a bullet-nose mandrel or similar apparatus. In all cases, plowing operations shall be non-injurious to the duct.



### **In Raceway**

Where duct is installed in raceways, lubricating compounds shall be used where necessary to assure smooth installation.

### **Encased in Concrete**

Concrete shall be class SI complying with Section 720 of the Standard Specifications.

Steel Reinforcement Bars. Steel reinforcement bars shall comply with Section 706.10 of the Standard Specifications.

Underground concrete-encased conduit shall be supported on interlocking plastic spacers specifically designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common duct bank shall be not less than 2 inches. The interlocking spacers shall be used at a minimum interval of 8 ft.

Concrete cover overall shall not be less than 3 inches all around the encased run. Space below the conduit, and concrete fill shall be assured. Care shall be exercised during concrete placement to assure that there are no voids, so that spacers are undisturbed, and so that conduit joints stay secure and unbroken. Concrete shall be deflected during placement to minimize the possible damage to or movement of the conduits.

Conduit encased in concrete shall have steel reinforcing where installed below roadway or other paved vehicle areas (including shoulder) and the reinforcement shall extend not less than 5 feet additional from the edge of pavement unless otherwise indicated. Steel reinforcement shall not be less than No. 4 bars at corners and otherwise spaced on 12-inch centers, tied with No. 4 bars on 12-inch centers.

The Engineer shall examine all conduit joints for compliance with section 5 of this specification before concrete is poured.

#### **Embedded**

Conduit embedded in structure shall be supported on interlocking plastic spacers specifically designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common structure shall be not less than 2 inches. The interlocking spacers shall be used at a minimum interval of 8 ft.

Concrete cover overall shall not be less than 3 inches all around the embedded run. Space below the conduit, and concrete fill shall be assured. Care shall be exercised during concrete placement to assure that there are no voids, so that spacers are undisturbed, and so that conduit joints stay secure and unbroken. Concrete shall be deflected during placement to minimize the possible damage to or movement of the conduits.

The Engineer shall examine all conduit joints for compliance with section 5 of this specification before concrete is poured.

**Joints**

All HDPE duct to HDPE duct joints shall be made with an approved duct fusion splicing device.

HDPE coilable non-metallic conduit to non-HDPE coilable non-metallic conduit joints shall be either made with an approved mechanical connector or with a chemical compound. Both methods must be specifically designed for joining HDPE coilable non-metallic conduit. Minimum pullout force for the chemical compound shall be as listed in the following table.

Nominal Size		Pullout Force	
mm	in	N	Lbs
31.75	1.25	2400	540
38.1	1.50	2535	570
50.8	2.0	3335	750
63.5	2.5	4445	1,000
76.2	3.0	6225	1,400
101.6	4.0	8890	2,000

**Measurement.** The duct shall be measured for payment in linear feet in place as described herein. Measurements shall be made in straight lines between horizontal changes in direction between the centers of the terminating points (poles, cabinets, junction boxes). Vertical measurement of the duct shall be as follows:

For runs terminating at junction boxes and/or control cabinets, the vertical measurement shall be taken from the bottom of the trench, or horizontal raceway, to a point 18-inches beyond the center of the junction box or control cabinet.

For runs terminating at poles, the vertical measure shall be taken from the bottom of the trench, or horizontal raceway, to a point 18-inch beyond the center of the light pole handhole regardless of light pole mounting method.

Innerduct installed in excess of the limits described herein shall not be paid for.

**Basis of Payment.** This item will be paid for at the contract unit price per foot installed for FIBER OPTIC INNERDUCT, UP TO 1 1/2", of the size of duct as indicated, which shall be payment in full for all material and work as specified herein.

**GF08 FIBER OPTIC CABLE, INSTALL ONLY**

**Description.** This item shall consist of retrieving from the owner's storage facility, installing and testing a single mode fiber optic cable of the type, size, and number of fibers specified, at the locations shown in the plans. Splicing, testing, splice closures, documentation and all other miscellaneous equipment to make a complete and operational system shall be as described in GF01, termination and or patch panels, shall be as described in GF04 or GF05, fiber optic splice closure shall be as described in GF06.

**Pre-Installation Testing at the Owners' Storage Facility.** An optical domain reflectometer (OTDR) shall be used to evaluate the length and quality of cable reels prior to their use on the project. Testing shall be done as described in GF01. Cable which does not meet the requirements set forth in GF01 shall not be installed on the project. It is the Contractor's responsibility to ensure that the fiber is suitable for installation. If cable which does not meet GF01 and is installed, the Contractor shall remove said cable at this/her own expense. Contractor shall make the Engineer aware of the cable which does not meet the Specification. The Engineer will assign an alternate reel or length of cable for installation on the project. The Contractor will be responsible for testing all cable assigned for install under this pay item. The Contractor shall not be entitled to extra compensation for testing multiple cable reels or cable lengths.

**Method of Measurement.** The fiber optic cable shall be measured for payment at the contract unit price per foot which cost shall include the cost of furnishing all labor, materials, documentation, tools and equipment to install, test, and make the location operational.

**Basis of Payment.** The installation of fiber optic cable shall be measured in feet of cable actually installed between controllers. This work will be paid for at the contract unit price per foot for Fiber Optic Cable Install Only of the type, size, and number of conductors specified, which price shall include retrieving, loading, transporting, installing, and all necessary slack to connect between controllers. Patch panels, inner duct, termination panels, and splice closures shall be paid for separately.

#### **GFC1 FOUNDATION, CONCRETE, TYPE 1**

**Description.** Concrete foundations shall be constructed to support ITS equipment cabinets (Type 1 foundations) at locations as indicated on the Plans. This work shall include installing any necessary hardware (entering conduits, bolts, anchor rods, grounding, etc.) as shown on the Plans. This work shall also include any topsoil, fertilizing, seeding, and mulching of the distributed areas in accordance with Sections 211, 250, and 251 of the Standard Specifications.

**Materials.** Type 1 concrete foundations shall be according to materials defined in Article 835.02 of Section 836 of the Standard Specifications. All anchor bolts shall be in accordance with Section 1006.09 of the Standard Specifications except that all anchor bolts shall be hot dipped galvanized full length of the anchor bolt including the hooks. Anchor bolts shall provide bolt spacing as shown in the Plans and as required by the cabinet manufacturer.

The Type 1 concrete foundations shall also be fabricated in accordance with Section 1070 of the Standard Specifications. These concrete foundations shall be fabricated from material new and unused in any previous application. The manufacturer shall provide a Certificate of Compliance that the materials are new and meet the specified requirements in accordance with the Standard Specifications and as shown on the Plans.

**Construction Requirements.** The Engineer will determine the final placement of the Type 1 concrete foundations. Type 1 concrete foundation dimensions shall be in accordance with those dimensions shown in the Plans on the detail sheet "Concrete Foundation Type 1 (Model 334 Cabinet) Detail". The foundation shall be located as required in order to avoid existing and relocated utilities. The top of the foundation shall be finished level. Shimming of the appurtenance to be attached will not be permitted.

Prior to pouring the foundation, the Contractor shall check the Plans for the specific number, size, and direction of conduit entrances required at the given location. All conduits in the foundation shall be installed rigidly in place before concrete is deposited in the form. Bushings shall be provided at the ends of the conduit. Anchor rods and ground rod shall be set in place before the concrete is deposited by means of a template constructed to space the anchor rods according to the pattern of the bolt holes in the base of the appurtenance to be attached. The appurtenances shall not be erected on the foundation until the bases have cured for at least (7) days. The Concrete shall cure according to Article 1020.13 of the Standard Specifications.

**Method of Measurement.** Concrete foundations shall be measured for payment, in feet of the concrete foundation in-place installed in accordance with the total length of concrete foundation required for Type 1 foundations as indicated on the Plans and as directed by the Engineer. Extra foundation depth, beyond the directive of the Engineer, will not be measured for payment.

**Basis of Payment.** Payment will be paid for at the Contract unit price, per foot of FOUNDATION, CONCRETE, TYPE 1, of the diameter and length indicated. The price shall include payment in full for all necessary excavation, backfilling, disposal of unsuitable material form work, furnishing, installing, and testing all materials (entering conduits, bolts, anchor rods, grounding, etc.) within the limits of the foundation. Any topsoil, fertilizing, seeding, and mulching of the distributed areas as well as all associated labor is to be included in this Contract unit price.

#### **GFR1 FOUNDATION REMOVAL**

**Description.** This item shall consist of removing a metal foundation or concrete foundation to a level at least three feet below the adjacent grade, disposing of the foundation outside the right-of-way, backfilling the excavated areas with approved material and reconstructing the surface to match the adjoining area. If the concrete foundation is located in the sidewalk area, the entire sidewalk square or squares where the concrete foundation is located shall be replaced with new sidewalk. This item shall conform to Section 444 of the Traffic Specifications and as required by the Engineer.

**General.** Concrete foundations shall be removed to at least 2 ft. below grade with removed material disposed of off the site. The metal foundations shall be removed completely from the ground. The removal shall extend deeper where required to facilitate roadway construction at no additional cost. Underground conduits and cables shall be separated from the foundation at 2-1/2 ft. below grade and shall be abandoned or re-used as indicated.

The space caused by the removal of the foundations shall be back-filled with trench backfill in accordance with Section 208 of the Standard Specifications.

The removal of an existing concrete foundation shall meet the requirements of Section T444 of the Traffic Specifications.

The removal of a concrete foundation three feet or less in depth below grade shall be removed completely and disposed of outside of the right-of-way. A concrete foundation greater than three feet in depth shall have the first three feet below grade removed and disposed of outside of the right-of-way.

The area where the foundations have been removed shall be backfilled and restored to meet the existing grade and terrain.

**Basis of Payment.** This item shall be paid at the contract unit price each for FOUNDATION REMOVAL, which shall be payment in full for the removal and disposal of a foundation as specified herein.

## **GGR1 GROUND ROD**

**Description.** This item shall consist of furnishing, installing and connecting ground rods for the grounding of service neutral conductors and for supplementing the equipment grounding system via connection at poles or other equipment throughout the system. All materials and work shall be in accordance with Article 250 of the NEC.

Articles 806, and 1087.01 of the Standard Specifications for Road and Bridge Construction, Current version, shall apply to this pay item.

For Traffic Signal Applications, the District 1 Traffic Signal Specifications and the District 1 Standard Traffic Signal Design details shall apply to this item.

**Materials.** Materials shall be according to the following Articles of Section 1000 - Materials

<u>Item</u>	<u>Articles/Section</u>
(a) Ground Rod	1087.01
(b) Copper Ground Wire	1066.02

**Installation.** All connections to ground rods, structural steel or fencing shall be made with exothermic welds. Where such connections are made to insulated conductors, the connection shall be wrapped with at least 4 layers of electrical tape extended 152.4 mm (six inches) onto the conductor insulation.

Ground rods shall be driven so that the tops of the rod are 24 inches below finished grade. Where indicated, ground wells shall be included to permit access to the rod connections. Where indicated, ground rods shall be installed through concrete foundations. Where ground conditions, such as rock, preclude the installation of the ground rod, the ground rod may be deleted with the approval of the Engineer.

Where a ground field of electrodes is provided, such as at control cabinets, the exact locations of the rods shall be documented by dimensioned drawings as part of the Record Drawings.

Ground rod connection shall be made by exothermic welds. Ground wire for connection to foundation steel or as otherwise indicated shall be stranded uncoated bare copper in accordance the applicable requirements of ASTM Designation B-3 and ASTM Designation B-8 and shall be included in this item. Unless otherwise indicated, the wire shall not be less than No. 2 AWG. Where connections are made to epoxy coated reinforcing steel, the epoxy coating shall be sufficiently removed to facilitate the exothermic weld.

**Method of Measurement.** Ground rods shall be counted, each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for a GROUND ROD, which shall be payment in full for furnishing and installing the materials and work specified herein.

#### **GH01–GH04 HANDHOLE**

**Description.** This item shall consist of furnishing and installing a handhole at the location shown on the plans or as diverted by the Engineer.

**Material.** Materials shall be according to Section 814 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item. The outside cover shall contain a legend "IDOT TSC", or "IDOT TRAFFIC", or "IDOT LIGHTING" as directed by the engineer.

**Installation.** The installation of a handhole shall meet the requirements of Section T428 of the Traffic Specifications, except as follows: All concrete handholes are to be cast in place against undisturbed earth. No precast concrete handholes will be accepted. All conduits will enter the handhole at a depth of 30 in. except for the conduits between the curb and first handhole for detector loops when the handhole is less than 5 ft. from the detector loop.

**Basis of Payment.** This work will be paid for at the contract unit price each for:

GH01 HANDHOLE

GH02 HANDHOLE, FIBER OPTIC

GH03 HANDHOLE, HEAVY-DUTY (SURVEILLANCE, TRAFFIC, LIGHTING)

GH04 HANDHOLE, HEAVY-DUTY, DOUBLE

which price shall be payment in full for all necessary excavating, backfilling, disposal of unsuitable materials, and furnishing all materials within the limits of the handhole.

#### **GH05 HANDHOLE, HEAVY DUTY, SPECIAL**

**Description.** This item shall consist of constructing a heavy-duty handhole, special extra large cast in place, complete with heavy duty frame and cover and in accordance with the following requirements and conforming in all respects to the lines, grades, and dimensions shown on the plans or as directed by the Engineer. All handholes shall be installed in accordance with the Standard Specifications for Road and Bridge Section 814 and TSC Typical TY-1TSC-400#15.

**Materials.** All materials shall conform to Section 1088.05 and 1088.06 of the Standard Specifications for Road and Bridge. All handholes shall be constructed of Class S1 concrete meeting the requirements of the Standard Specifications for Road and Bridge construction Article 1020.

**Construction Details.** Handhole of the type specified shall be constructed in accordance with the details shown on the plans and conform to the following requirements:

**Concrete.** Concrete construction shall be done in accordance with the provisions of Concrete for Structures and incidental Construction contained in the Standard Specifications for Road and Bridge Construction, Section 503

**Placing Castings.** Castings shall be set accurately to the finished elevation so that no subsequent adjustment will be necessary. Castings shall be set flush with a sidewalk or pavement surface. When installed in an earth shoulder away from the pavement edge, the top surface of the casting shall be 25.4 mm (1 inch) above the finished surface of the ground.

**Backfilling.** Any backfilling necessary under a pavement, shoulder, and sidewalk or within 60 cm (2 feet) of the pavement edge shall be made with sand or stone screenings.

**Forming.** Forms will be required for the inside face of the handhole wall, and across all trenches leading into the handholes excavation. The ends of conduits leading into the handhole shall fit into a conduit bell which shall fit tightly against the inside form and the concrete shall be carefully placed around it so as to prevent leakage. Handhole walls shall be 10 inches.

**French Drain.** A French drain conforming to the dimensions shown on the plans shall be constructed in the bottom of the handhole excavation.

**Steel Hooks.** Each handhole shall be provided with four galvanized steel hooks of appropriate size, one on each wall of the handhole.

**Frame and Cover.** The outside of the cover shall contain a Type "G" handle for lifting and a legend "IDOT" "TSC" cast in. Frame shall be HD F&C 184 Kg (405 lbs.)

**Hinges.** Type "T" hinges required only on heavy duty special only.

**Cleaning.** The handhole shall be thoroughly cleaned of any accumulation of silt, debris, or foreign matter of any kind, and shall be free from such accumulations at the time of final inspection.

**Basis of Payment.** This work will be paid at the contract unit price each for a HANDHOLE, HEAVY DUTY, SPECIAL, which price shall be payment in full for all necessary excavating, backfilling, disposal of surplus material and form work, frame and cover, and furnishing all materials within the outside limits of the handhole.

## **GH06 HANDHOLE, REMOVE**

**Description.** This work shall consist of removing the frame and cover of an existing handhole, breaking off the top section of the handhole wall to a minimum depth of 6 inch below the surrounding grade, or as specified, disposing of the concrete debris outside the right-of-way, backfilling the hole with approved material, reconstructing the surface to match the adjoining area, and disposing of the frame and cover as directed by the Engineer. If the handhole is located in the sidewalk area, the entire sidewalk square or squares where the handhole is located shall be replaced with new sidewalk per applicable contract pay items.

**Method of Measurement.** Remove handhole shall be counted, each.

**Basis of Payment.** This work will be paid for at the contract unit price each for HANDHOLE, REMOVE which price shall be payment in full for all labor and materials necessary to complete the work as described herein.

### **GH07 HANDHOLE, REBUILD**

**Description.** This item shall consist of rebuilding and bringing to grade a handhole at a location shown on the plans or as directed by the Engineer.

**General.** The work shall consist of removing the handhole frame and cover and the wall of the handhole to a depth of 203.2 mm (8 in.) below the finished grade. Upon completion, four (4) holes, 101.6 mm (4 in.) in depth and, 12.7 mm (1/2 in.) in diameter, shall be drilled into remaining concrete; one hole centered on each of the four handhole walls. Four (4) #3 steel dowels, 203.2 mm (8 in.) in length, shall be furnished and shall be installed in the drilled holes with a masonry epoxy.

All concrete debris shall be removed from State right-of-way to a location approved by the Engineer. The area adjacent to each side of the handhole shall be excavated to allow forming. All steel hooks, handhole frame, cover, and concrete shall be provided to construct a rebuilt handhole according to applicable portions of Section 814 of the Standard Specification for Road and Bridge Construction. (The existing frame and cover shall be replaced if it was damaged during removal or as determined by the Engineer.)

**Method of Measurement.** Each handhole, which is rebuilt, shall be counted as a unit of payment.

**Basis of Payment.** This work will be paid for at the contract unit price each for HANDHOLE, REBUILD, which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above and as indicated on the drawings.

### **GH08 HANDHOLE, REBUILD EXISTING TO HEAVY-DUTY TYPE**

**Description.** This item shall consist of partial removal of an existing concrete traffic single handhole, reconstruction to the specifications of heavy duty handhole including new frame and cover, at location(s) shown in the plans or as directed by the Engineer.

**General.** The work shall consist of removing the existing handhole frame and cover and the wall of the handhole to a depth of 381 mm (15 in.) below the finished grade. Upon completion, four (4) holes, 101.6 mm (4 in.) in depth and, 12.7 mm (1/2 in.) in diameter, shall be drilled into the top of the remaining concrete; one hole centered on each of the four handhole walls. Four (4) #3 steel dowels, 203.2 mm (8 in.) in length, shall be furnished and shall be installed in the drilled holes with a masonry epoxy. All concrete debris shall be removed from State right-of-way to a location approved by the Engineer. Any pavement or asphalt surface removal required to install the new concrete shall have straight and neat edges using a method approved by the Engineer. Care shall be taken to protect the existing traffic signal cable. Any cable damage shall be reported immediately and repaired as directed by the Area System Engineer.

All steel hooks, handhole frame, cover, and concrete shall be provided to construct a rebuilt heavy duty handhole according to applicable portions of Section 814 of the Standard Specification for Road and Bridge Construction.



**Method of Measurement.** Each existing handhole, which is partially removed and reconstructed to a heavy-duty handhole, complete, shall be counted as a unit payment.

**Basis of Payment.** This work will be paid for at the contract unit price each for HANDHOLE, REBUILD EXISTING HANDHOLE TO HEAVY-DUTY TYPE, which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above and as indicated on the drawings.

## **GIG1 INSPECTION, STANDBY GENERATOR**

**Description.** The Contractor shall furnish a factory trained service representative to complete a comprehensive generator inspection, as specified herein, at designated locations.

**Locations.** This work shall be applicable to all generators and shall not be limited to generators at the Pump Stations, Base Stations, Traffic Systems Center (TSC), Fiber Huts, Moveable Bridges and two (2) in Contract Spare Parts.

**Work Description.** The inspection shall consist of, but not limited to the following items, which are described on form GIG1.

- 1) Cooling System
- 2) Fuel System
- 3) Air Induction and Exhaust System
- 4) Lube Oil System
- 5) Starting System
- 6) Engine Monitors and Safety Controls
- 7) Generator Accessories
- 8) Control Panel
- 9) Gas Engine
- 10) Megometer Test
- 11) Load Bank Test
- 12) Switch Gear Inspection

**Method of Measurement.** Each inspection that is completed according to form GIG1 and the inspection report submitted and approved by the Engineer shall be counted as unit for payment.

**Basis of Payment.** This item shall be paid at the contract unit price, each, for INSPECTION, STANDBY GENERATOR, which shall be payment in full for the work described herein.

**Generator Inspection Service List**

AGREEMENT NO.	CUSTOMER (NAME AND ADDRESS)	ACCOUNT NO.	
GENERATOR SET LOCATION		CONTRACT	TELEPHONE NO.
ENGINE MODEL	SERIAL NO.	SERVICE METER	DATE
GENERATOR MODEL	SERIAL NO.	VOLTS	KILOWATTS

**COOLING SYSTEM -----SATISFACTORY – UNSATISFACTORY --**  
**COMMENTS**

- 1. RADIATOR/HEAT EXCHANGER
- 2. COOLANT
- 3. HOSES AND CONNECTORS
- 4. FAN DRIVE PULLEY AND FAN
- 5. FAN BELTS
- 6. JACKET WATER HEATER
- 7. WATER PUMP
- 8. THERMOSTATS

**FUEL SYSTEM**

- 9. FUEL TANK
- 10. WATER TRAP SEPARATOR
- 11. FUEL LINES & CONNECTORS
- 12. GOVERNOR & CONTROLS
- 13. FUEL FILTERS-PRIM./SEC.
- 14. FUEL PRESSURE

**AIR INDUCTION AND EXHAUST SYSTEM**

- 15. AIR FILTER
  - 16. AIR FILTER SERVICE
  - 17. INDICATOR
  - 18. AIR INLET SYSTEM
  - 19. TURBOCHARGER
  - 20. EXHAUST MANIFOLD
  - 21. EXHAUST SYSTEM
  - 22. VALVES & VALVE ROTATORS
- YES  NO

RECOMMEND LOAD BANK

**LUBE OIL SYSTEM**

- 23. OIL
  - 24. OIL FILTERS
  - 25. OIL PRESSURE
  - 26. CRANKCASE BREATHER
  - 27. S-O-S
- 

**STARTING SYSTEM**

- 28. BATTERIES
  - 29. BATTERIES-SPECIFIC GRAVITY
  - 30. BATTERY CHARGER
  - 31. STARTING MOTOR
  - 32. ALTERNATOR
- 

**ENGINE MONITORS AND SAFETY CONTROLS**

- 33. GAUGES
  - 34. SAFETY CONTROLS
  - 35. REMOTE ANNUN./ALARMS
- 

**GENERATOR**

- 36. BEARINGS
  - 37. SLIP RINGS & BRUSHES
  - 38. SPACE HEATERS
  - 39. VIBRATION ISOLATORS
- 

**CONTROL PANEL**

- 40. START CONTROLS-MAN./AUTO
  - 41. VOLTMETER
  - 42. AMMETER
  - 43. FREQUENCY METER
  - 44. CIRCUIT BREAKER
  - 45. AUTO TRANSFER SWITCH
- 

**GAS ENGINE**

- 46. GAS LINES & CONNECTORS
  - 47. CARBURETOR & LINKAGE
  - 48. MAGNETO/DISTRIBUTOR
  - 49. IGNITION SYSTEM
  - 50. SPARK PLUGS
- 

**MEGOHMETER TEST**

- 51. MAIN STATOR
  - 52. MAIN ROTOR
  - 53. EXCITER STATOR
  - 54. EXCITER ROTOR
-

**LOAD BLANK TEST**

- 55. REGULATOR MFG. \_\_\_\_\_
- 56. EACH OF THE SPECIFIED LOADS SHALL BE TESTED FOR A HALF HOUR.
- 57. REGULATOR MODEL \_\_\_\_\_
- 58. HOUR METER START \_\_\_\_\_ STOP \_\_\_\_\_
- 59. RACK SETTING \_\_\_\_\_
- 60. VOLTAGE STABILITY \_\_\_\_\_

61. PERCENT OF LOAD	0%	25 %	50 %	75 %	100 %					
62. KW METER										
63. VOLTMETER L1 TO L2										
64. VOLTMETER L2 TO L3										
65. VOLTMETER L3 TO L										
66. AMMETER L1										
67. AMMETER L2										
68. AMMETER L3										
69. FREQUENCY METER- HZ										
70. ELAPSED TIME METER-HOURS										
71. ENGINE SPEED-RPM										
72. LUBE OIL PRESSURE-PSI										
73. WATER TEMPERATURE (F)										
74. FUEL OIL PRESSURE- PSI										
75. AMBIENT TEMPERATURE (F)										
76. LUBE OIL TEMPERATURE-IN										
77. LUBE OIL TEMPERATURE-OUT										

COMMENTS/RECOMMENDATIONS:

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\_\_\_\_\_  
SERVICE TECHNICIAN                      DATE                      CUSTOMER REPRESENTATIVE      DATE

**Generator Inspection Service List**  
**Switchgear Inspection Check**

Automatically start engine and transfer load.  
(Record time it takes to start engine.)

Run engine for ½ hour and take following readings:

- 1. Amps
- 2. Volts
- 3. Oil Pressure
- 4. Water Temperature
- 5. Fuel Pressure
- 6. Frequency
- 7. Kilowatts
- 8. R.P.M.

**Automatically stop engine and observe for proper shutdown.**

- 1. Automatic Transfer Switches                      Observe, Work, Clean
- 2. Contacts    Observe, Work, Clean
- 3. Relays    Observe, Work, Clean
- 4. Timers    Observe, Work, Clean
- 5. Indicators    Observe, Work, Clean

**Automatic start and Load Transfer**

- 1. Time delay for start signal                      \_\_\_\_\_ seconds
- 2. Time engine to start and pick-up                      \_\_\_\_\_ seconds
- 3. Total    \_\_\_\_\_ seconds

**Automatic Load Retransfer and engine stop signal**

- 1. Time for normal restoration to retransfer                      \_\_\_\_\_ minutes
- 2. Unload running time    \_\_\_\_\_ minutes
- 3. Total    \_\_\_\_\_ minutes

**Comments:** \_\_\_\_\_

#### **GIT1 INSPECTION, THERMO GRAPHIC**

**Description.** This work shall consist of furnishing equipment, materials and labor for a thermo graphic inspection of electrical systems, including the main service entrance panel, and sub panels at the maintenance yards and other facilities in District 1, as specified by the Engineer. The testing must be performed by a qualified company, with prior experience in such type of testing, and shall be approved by the Engineer. An inspection report, including thermo graphs of the equipment tested and deficiencies noted, shall be furnished.

**Method of Measurement.** Each inspection that is completed, and report submitted and approved by the Engineer, shall be counted as unit for payment.

**Basis of Payment.** This work shall be paid at the Contract unit price each, for INSPECTION, THERMO GRAPHIC, of the facility specified, which shall be payment in full for the work as described herein.

#### **GJ01 JUNCTION BOX AND ALL APPURTENANCES, REMOVE**

**Description.** This work shall consist of completely removing an existing junction box and all appurtenances, being careful not to damage those existing conduits which will be re-used in the system. In case of an existing conduit being damaged, a new conduit will be furnished in place. The repair work will not be paid for separately, but will be incidental to this bid item. The junction box and cover will be disposed of as directed by the Engineer and all debris removed beyond the right-of-way.

**Method of Measurement.** Each junction box, which is removed including all appurtenances, shall be counted as a unit of payment.

**Basis of Payment.** This work will be paid for at the contract unit price each for JUNCTION BOX AND ALL APPURTENANCES, REMOVE, which price shall be payment in full for all labor and material necessary to complete the work as described above.

## **GJ02–GJ03 JUNCTION BOX, STAINLESS STEEL**

**Description.** This item shall consist of furnishing and installing a stainless steel junction or pull box of the size indicated in locations shown on the contract drawings and as directed by the Engineer. It is not intended to use for installation of fixture.

Section 813 and 1088 of the Standard Specifications for Road and Bridge Construction, Current version, shall apply to this pay item with the following exceptions: Revise the second sentence of the third paragraph of Article 1088.04 of the Standard Specifications to read: "The gasket shall be extruded directly onto the junction box cover."

**Basis of Payment.** This work shall be paid for at the contract unit price each for:  
GJ02 JUNCTION BOX, STAINLESS STEEL, UP TO 6 INCH DEPTH  
GJ03 JUNCTION BOX, STAINLESS STEEL, 8 INCH DEPTH  
of the size indicated, which shall be payment in full for the work as described herein.

## **GLH1-GLH5 LABOR HOURS**

**Description.** This item shall consist of providing a fixed hourly rate of labor for qualified personnel to perform work within District 1 on any system at any location as approved by the Engineer. Bid price hourly rate must be inclusive of all overhead, profit, travel time and all other costs not specified herein. Hours of work shall only be counted for actual work performed at the site as requested by the engineer. The hourly rate shall include the equipment and test instruments to perform work. The Contractor shall submit a fixed hourly rate that will be utilized for any project or work under this contract.

Union Certified Electrician/Journeyman or equivalent to troubleshoot, repair, remove or install electrical equipment in accordance with NEC 2017.

IT Support to troubleshoot, modify, program and upgrade the I-NET, EMCMS, network, and other IT based technologies services that have been specified herein article 9.0 for the applicable equipment.

Maintenance Helper or equivalent must be proficient in MS office Suite and Access, must perform work creating databases and entering or importing data into spreadsheets and databases, fiber cable management and scanning documentation.

Foreman must be a certified electrician with a minimum of 5 years' experience as Electrician and 3 years as Forman in a lead role who oversees planning and implementation of large electrical projects leading skilled Electricians in the installation, alteration, maintenance, and repair of electrical systems and equipment.

Electrician helper assists a Journeyman Electrician and or Forman on major projects or independently performs routine electrical work. Performs electrical repairs to include, but not limited to, outlets, switches, and ballasts; removes and replaces light fixtures; and repairs faulty equipment and systems

**Method of Measurement.** The measurement for payment in Hour increments shall be made for labor performed as directed and approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This item will be paid at the contract unit price per Hour for:

- GLH1 Certified Electrician/Journeyman
- GLH2 IT Support
- GLH3 Maintenance Helper
- GLH4 Foreman
- GLH5 Electrician Helper

### **GPC1 PUMP, CALCIUM CHLORIDE**

**Description.** This item shall consist of removing, furnishing and installing a DB Series Model DB10 up to 1 1/2 HP, sealless Mag Drive pump for calcium chloride as specified herein.

**Materials.** The pump (Finish Thompsons Inc., model no. DB10V-10P – M206 or better) shall be sealless with magnetic drive, extremely resistant to corrosion and able to handle acids, caustics, chemicals. The motor shall be rated for continuous duty, totally enclosed fan cooled and generates at least 3450 rpm with a closed impeller. It shall be made out of Polyvinylidene Fluoride (PVDF) material rated to -20°F. and shall be UL listed and CSA certified.

**Installation.** The Contractor shall remove the existing pump, if applicable, for calcium chloride spray pump at the maintenance yard and replace with the pump as specified herein. It shall be wired as per NEC requirement. The cable and conduit if corroded shall be replaced during the installation. It shall be paid separately using non-routine pay items.

**Method of Measurement.** The pump of HP as indicated, furnish and install complete with wiring, shall be counted, each.

**Basis of Payment.** This work shall be paid at the contract unit price to furnish and install PUMP, CALCIUM CHLORIDE, up to 1 1/2 HP, which price includes all labor, material and equipment necessary to remove, dispose of, and replace the existing pump, as specified herein.

### **GPV1 PAVEMENT SEALCOATING**

**Description.** The Contractor shall patch where necessary and seal coat the pavement, within the fenced areas, at each building, hut, and structure once per year in April, per the following specifications. The Engineer's decision shall be final as to the determination of which application and products are utilized.

**Preparation.** Pavement surface oils shall be removed by washing with an applicable detergent and brushing and/or pressure wash cleaning. All dirt, gravel, leaves, etc., must be removed from the pavement and the pavement must be completely dry, prior to crack sealing and seal coating.



**Installation.** The Contractor (or Specialty Vendor as approved by the Engineer) shall furnish and install two (2) coats of an appropriate sealcoat coal tar emulsion sealer. The product must meet or exceed both the Air Force and Federal R-P 355e GSA-FSS and the American Society for Testing and Material Specification D-3320-74T specifications. All manufacturers' mix specifications are to be followed as the proper amounts of washed silica sand provide added traction and longevity to the seal finish. A sealer latex enhancer shall be added to increase the longevity and color of the finish. The sealer shall be transported in steel hydraulically agitated tanks to ensure the application of a consistent and uniform mixture at the work site. The seal coating shall be applied at a temperature above 50 degrees F. with a spray device or drag broom assembly, but a uniform distribution is required.

The first seal coat shall be allowed to dry not less than four (4) hours but no more than six (6) hours before the second coat of seal coat is applied. The pavement shall be roped or taped off so no traffic uses the pavement for twenty-four (24) hours after the second coat of seal coat is applied.

The Contractor (or Specialty Vendor as approved by the Engineer) shall furnish and install crack sealant where necessary. Only hot (350 F.) pour rubberized commercial parking lot crack sealant, similar or better than "Flex-A-Fill" shall be used.

**Basis of Pavement.** This item shall be paid at the contract unit price per square yard for PAVEMENT SEALCOATING, .12 gallons of seal per square yard for the first coat and .06 gallons per square yard for the second coat of seal coating for ASMC pavement.

#### **GRB1 RADIO TOWER BEACON,**

**Description.** This item shall consist of furnishing the parts, labor and equipment to restore flashing beacon light and group relamp the remaining lights at that elevation on a District 1 communication microwave tower, within 24 hours of notification, as specified herein by the Engineer.

**General.** The District 1 has radio towers located in six counties listed in Section 3 that have flashing beacon lights manufactured by Honeywell or an equivalent, for lighting and other obstructions to aerial navigation as specified by the FAA, FCC. The optical system is designed to provide a definite 360 degrees horizontal beam. The beacon must be used with a beacon flasher or tower lighting control installed inside the control room to achieve the proper flash rate.

The beacon light has either a mechanical flashers, immune to AM tower RF frequencies, or an electronic lighting controls to flash several lights on tower, including a photocell for automatic day/night operation.

**Outage.** The outage is reported by the night outage patrolman, regular patrolman or called in by District 1 ComCenter to the Contractor's dispatch center. The Contractor should dispatch immediately and respond to the call to check for the outage. The patrolman shall inspect beacon light to isolate the problem by checking breaker, flasher circuit and associated controls. The defective component shall be reported within one (1) hour to District 1 ComCenter.

The defective lamp and the remaining lamps at that elevation shall be replaced within 24 hours of notification to restore the beacon lighting of the tower. If it needs a new or different flashing control board, the contractor should order the part by overnight delivery or furnish temporary lighting to restore beacon lighting within 24 hours at no extra cost to this pay item.

**Method of Measurement.** Microwave tower flashing beacon light restored, and group relamp of remaining lights at that elevation, shall be counted, each.

**Basis of Payment.** This work shall be paid at the contract unit price each for a RADIO TOWER BEACON, RELAMP, which price shall be payment in full for furnishing parts, labor and equipment to restore a beacon light and relamp the remaining lights at that elevation, as specified herein.

## **GRT1 RADIO TOWER, INSPECTION AND REPORT**

**Description.** This item shall consist of inspection, testing and reporting on District 1's communication radio tower, as specified by the Engineer, by a factory approved Service Company, as described herein.

**Materials.** The specialty company shall furnish the necessary labor, equipment and tools to inspect and test radio tower, located in six (6) counties (refer to Section 3 for list of locations), as outlined on the "Tower Condition Report". The specialty contractor shall be equipped with all recommended test equipment and provide the accompanying report data.

**Work Description.** The tower maintenance and inspection procedures shall be as per ANSI/TIA 222-G. Information on this document can be found at [www.tiaonline.com/standards/catalog](http://www.tiaonline.com/standards/catalog). The copy can be accessed at: [www.nationwide.com/codes/codes/tia/Annexes/e\\_1.htm](http://www.nationwide.com/codes/codes/tia/Annexes/e_1.htm)

**Reporting.** The Contractor shall submit a report of data for all items stated on the form. The report shall also include any pertinent changes made or required to the radio tower.

**Method of Measurement.** Each inspection of a radio tower location including submittal of its report and approved by the Engineer shall count as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for a RADIO TOWER, INSPECTION AND REPORT, which price shall be payment in full for submitting the report as specified herein.

### **GSD1 SIDEWALK, REMOVE AND REPLACE**

**Description.** This work consist of the removal and disposal of existing sidewalk and the construction of new sidewalk at locations shown on the plans, in accordance with Sections 424 and 440 of the Standard Specifications for Road and Bridge Construction and as directed by the Engineer.

**Method of Measurement.** Sidewalk removal and replacement shall be measured for payment in place and the area computed in square feet.

**Basis of Payment.** This work will be paid for at the contract unit price per square feet for SIDEWALK, REMOVE AND REPLACE, which price includes all labor, material and equipment necessary to remove and dispose of the existing sidewalk and to construct the new sidewalk as specified herein.

### **GSO1 SODDING**

**Description.** This item shall conform to applicable requirements of Section 252 of the Standard Specifications for Road and Bridge construction. The Contractor shall prepare the ground surface, furnish, transport and install sod including labor and other materials required, as directed by the Engineer.

This item shall conform to Section T252 of the Standard Specifications.

Locations that are to be sodded will be shown on the plans or as directed by the Signal Engineer.

**Basis of Payment.** This work will be paid for at the contract unit price per square foot of SODDING, which price includes all labor, material and equipment necessary to furnish and place the sod, including sod watering as specified herein. Removal and disposal of the existing sod shall be incidental to the contract unit price.

## **GTC1–GTC2 TRAFFIC CONTROL**

**Description.** This item of work shall include furnishing, installing, maintaining, replacing, relocating and removing all traffic control devices used for the purpose of regulating, warning or directing traffic on Expressway during maintenance or construction activities throughout this contract.

The Contractor shall contact the District One Bureau of Traffic in advance of beginning work as specified herein.

**Basis of Payment.** This work will be paid for at the contract unit price per each for  
GTC1 SINGLE LANE TRAFFIC CONTROL  
GTC2 TWO LANE TRAFFIC CONTROL

of the closure type indicated, which price shall be payment in full for all labor to install, maintain, replace, relocate and remove all traffic control devices indicated in the plans, specifications, or authorizations.

Delays to the Contractor caused by complying with these requirements will be considered incidental to the item for traffic control and no additional compensation will be allowed for daytime or nighttime closures (or for traffic lanes or ramp closure) on the expressway.

## **GU01–GU03 UNIDUCT WITH XLP INSULATED CABLES**

**Description.** This item shall consist of furnishing, installing splicing, connecting, and testing of electric cable in unit duct with warning tape of sizes specified herein and as shown on the contract drawings. The unit duct shall be an assembly of insulated conductors, which are factory pre-installed in a continuous flexible plastic duct. Article 810.04 shall apply for unit duct and warning tape installation.

The unit duct shall be manufactured and installed in accordance with NEC Article 354.

As stated in NEC Article 354.12, the unit duct shall not be used in exposed locations, and inside buildings except for termination purposes, and in hazardous (classified) locations.

Section 816 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item.

**Method of Measurement.** The unit duct will be measured for payment in feet in place. Measurements will be made in straight lines between changes in direction and to the centers of equipment and boxes access points. 10 feet will be allowed when terminating cable at a controller. Three feet of slack will be allowed at light pole, handholes, pull boxes, junction boxes, and similar locations.

All vertical unit duct will be measured for payment. The vertical distance required for breakaway devices, barrier walls, concrete pedestals, etc., and the depth of any burial will be measured. Changes in direction shall assume perfect straight line runs, ignoring actual raceway sweeps.

**Basis of Payment.** This item will be paid at the contract unit price per linear feet for:  
GU01 UNIDUCT, WITH XLP INSULATED CABLES, 3/C NO.6 & 1/C NO.8 GREEN, 1”  
GU02 UNIDUCT, WITH XLP INSULATED CABLES, 3/C NO.4 & 1/C NO.6 GREEN, 1 ¼”  
GU03 UNIDUCT, WITH XLP INSULATED CABLES, 3/C NO.2 & 1/C NO.6 GREEN, 1 ½”  
of the size of duct as indicated, which shall be payment in full for all material and work as specified herein.

#### **GU04 UNIDUCT, INSTALL ONLY**

**Description.** This item shall consist of retrieving from Owner’s storage facility, loading and installing, splicing, connecting, and testing of electric cable in unit duct of sizes specified herein and as shown on the contract drawings. The unit duct shall be an assembly of insulated conductors, which are factory pre-installed in a continuous flexible plastic duct.

As stated in NEC Article 354.12, the unit duct shall not be used in exposed locations, and inside buildings except for termination purposes, and in hazardous (classified) locations.

Section 816 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item.

**Method of Measurement.** The unit duct will be measured for payment in feet in place. Measurements will be made in straight lines between changes in direction and to the centers of equipment and boxes access points. 10 feet will be allowed when terminating cable at a controller. Three feet of slack will be allowed at light pole, handholes, pull boxes, junction boxes, and similar locations.

All vertical unit ducts will be measured for payment. The vertical distance required for breakaway devices, barriers wall, concrete pedestals, etc., and the depth of any burial will be measured. Changes in direction shall assume perfect straight line runs, ignoring actual raceway sweeps.

**Basis of Payment.** This item will be paid at the contract unit price per linear feet for UNIDUCT, INSTALL ONLY, of the size of cut as indicated, which shall be payment in full for installing the item as specified herein.

#### **GWR1–GWR2 WELDING RECEPTACLE AND PLUG**

**Description.** Furnish and install welding receptacles and mating plug, 30 Amp or 60 Amp, 3 Poles, 208 Volts, or 2 poles, 240 Volts, complete with interlocked fusible disconnect switch, at the Maintenance Yards, Sign Shops and other Department facilities in District 1, as directed by the Engineer.

**Installation.** The installation shall include all hardware, junction box and other appurtenances. Removal of the existing receptacle and plug, if necessary, shall be included in this work. Conduit and wire installation shall be paid through other pay items, where needed.

**Method of Measurement.** Welding Receptacle and mating plug of the amperage and number of poles specified, furnished and installed shall be counted, each.

**Basis of Payment.** This work shall be paid for at the contract unit price each for WELDING RECEPTACLE AND PLUG, furnish and install, of the rating and number of poles specified by the Engineer, which price shall be payment in full for furnishing, delivering, storing, installing and connecting the receptacle, complete.

GWR1 Welding Receptacle, 30 Amp, Furnish and Install

GWR2 Welding Receptacle, 60 Amp, Furnish and Install

### **LIGHTING SYSTEM NON-ROUTINE PAY ITEMS**

#### **LA01 ARM, OR TWIN ARM WITH LUMINAIRE, INSTALL ONLY**

**Description.** This item shall consist of retrieving from Owner's storage facility, loading, and installing, one or two mast arms or twin arm with luminaires(s) and associated hardware on one light pole, as specified herein, at locations designated by the Engineer. Furnished arm(s) and/or luminaire(s) shall be paid separately.

**Installation.** Installation shall be in accordance with Article 830 of the Standard Specifications for Road and Bridge Construction, Current version.

The mast arm or arms shall be set at right angles to the centerline of the pavement, unless otherwise shown on the plan.

Each arm shall be mounted as indicated and as required for the permanent installation, or temporary lighting on wood pole installation.

This item shall be coordinated with the applicable luminaire (with pole wire and fusing), foundation and anchor bolts, breakaway device (if applicable) which shall be provided under separate pay items, as applicable.

The installation shall be complete with pole wire, fusing and connection to the applicable lighting feeder circuits, all incidentals to this item.

Arms shall not be installed until luminaires are available for installation, which shall be at the same time the pole is installed. This item shall not be paid unless the coordinated assembly of the pole and luminaire is installed, complete.

The manufacturer's recommendations shall be followed during the installation process. The wiring connections shall be made in accordance with the National Electric Code. The Contractor shall energize the system to assure that all the components are working in accordance with their specifications and carrying rated load.

**Method of Measurement.** Arm, or twin arm, with luminaire(s), on light pole, shall be counted, each, installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for ARM, OR TWIN ARM WITH LUMINAIRE, INSTALL ONLY, which shall be payment in full for installing the item as specified herein.

#### **LB01 BREAKAWAY DEVICE, T-BASE**

**Description.** This item shall consist of furnishing and installing a breakaway device, transformer base, height specified, for standard, davit, or painted davit light pole, with all associated hardware, as specified herein.

**Materials.** Materials shall be according to Article 1070.04 of the Standard Specifications for Road and Bridge Construction, Current version, except that certification shall be submitted from the supplier that the device used under the conditions of the particular design meets the 1985 AASHTO breakaway specification.

Breakaway device and transformer base information submitted for approval shall include any recommendations of the Manufacturer for storage as provided under this contract.

The packaging of the breakaway devices, transformer bases, shall incorporate the provisions recommended by the Manufacturer to accommodate storage.

Revise the second sentence of Article 1070.04(a)(1) of the Standard Specifications to read:

“Certification shall be submitted from the supplier that the device used under the conditions of the particular design meets the 1985 AASHTO breakaway specification.”

The breakaway device, transformer base for a painted davit light pole is normally installed on the Kennedy Expressway at Power Center C & D. The height, top and bottom bolt circle as specified on the plan submitted shall be used as part of this pay item.

#### **MATERIALS FOR PAINTED DAVIT LIGHT POLES ONLY:**

**Preparation.** Components shall receive a mild etch solvent cleaning.

**Primer.** Components shall receive two (2) coats of epoxy primer. The primer shall be a polyamide white epoxy primer with a corrosion inhibitor having a solid content, by volume, of not less than 65% (+/3%). Each coat shall be applied in a 3-5 dry MIL thickness.

**Finish Coat.** Components shall receive one finish coat of aliphatic urethane enamel having a solid content, by volume, of not less than 58% (+/3%). The finish coat shall have a dry MIL thickness of 1.5-2.5 mils. The color of the finish paint shall match that of the existing State owned davit poles which is Benjamin Moore Iron Clad Bronzitone No. 16360. A sample of the proposed paint color shall be submitted for approval to the Engineer.

**General.** The cleaning and finish work shall be performed indoors, under conditions of controlled temperature, humidity and dust in full conformance with the paint manufacturer's recommendations, and in the presence of an authorized representative of the paint manufacturer.

The paint manufacturer shall certify, in writing that the preparation and finishing of the breakaway transformer base housings has been done properly and in conformance with the Manufacturer's recommendations, and will furnish this certification, together with its standard warranty in triplicate, when the finishing is complete.

A certification from the paint manufacturer, attesting the intent to witness the finishing operation and to provide the above-referenced certification together with a copy of the paint manufacturer's standard warranty shall be included with the pole submittal information.

**Installation.** Installation shall be in accordance with Section 838 of the Standard Specification for Road and Bridge Construction, Current version.

Manufacturer's recommendations shall be followed during the installation process.

Add the following to Article 838.03(a) of the Standard Specifications:

"All nuts, bolts, washers, and lock washers required for the installation of the transformer base to the pole shall be included as a part of this item."

When changing from the old-style break away devices to a t-base style the anchor rods may not be exposed long enough to engage the mounting nuts properly, the top of the concrete foundation shall need to be grounded down to expose enough anchor rod for the mounting nuts to engage properly, this work shall be incidental to the pay item.

**Method of Measurement.** Breakaway device, transformer base of the height, top and bottom bolt circle diameter specified for standard, davit, or painted davit light pole, shall be counted, each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for BREAKAWAY DEVICE, T-BASE, FURNISH AND INSTALL, with all associated hardware, of the bolt circle and height as specified, which shall be payment in full for furnishing the item as specified herein.

## **LBB1 BREAKER, BRANCH 20A TO 70A**

**Description.** This item shall consist of furnishing and installing a circuit breaker, regular or GFI type, of the amperage and number of poles specified, with all associated hardware, for overload and short circuit protection for conductors and connected apparatus, as specified herein, as shown on the plans, (where applicable), or as directed by the Engineer.

**General Requirements.** All feeders, branch circuits, and auxiliary and control circuits shall have overcurrent and short circuit protection for conductors and connected apparatus. Unless otherwise indicated, the overcurrent protection shall be by means of circuit breakers.



**Material.** Unless otherwise indicated, circuit breakers shall be standard UL-listed molded case, thermal-magnetic bolt-on type circuit breakers with trip-free indicating handles.

Unless otherwise indicated, circuit breakers shall have a UL-listed interrupting rating of not less than 10,000 rms symmetrical amperes at rated circuit voltage for which the breaker is applied. All breakers shall be equipped with auxiliary dry contacts. These contacts may be on the breaker body or off a breaker-attached device. Contacts shall be in a normally open configuration.

**Installation.** The branch breaker shall be installed into the panel in accordance with the manufacturer's recommendation and in accordance with the National Electrical Code, as indicated on the plan drawing (if applicable) or as directed by the Engineer. All the connections shall be tight to prevent any arcing. The branch breaker shall be labeled to indicate circuits. The auxiliary contact switch, if used, shall be wired as directed by the Engineer.

**Method of Measurement.** Breaker, branch, shall be counted, each, as a unit of payment, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for a BREAKER, BRANCH, 20A to 70A, of the amperage and number of poles specified, which shall be payment in full to provide an installation, complete and operating.

### **LBB2–LBB3 BREAKER, MAIN**

**Description.** This item shall consist of removing (if upgrading), furnishing, and installing a main breaker, amperage and number poles as per plan or specified for overload and short circuit protection for conductors and connected apparatus as specified herein. All feeders, branch circuits, auxiliary, and control circuits shall have overcurrent and short circuit protection for conductors and connected apparatus. Unless otherwise indicated, the overcurrent protection shall be by means of circuit breakers.

**Material.** Unless otherwise indicated, main breakers shall be standard UL-listed molded case, for reverse feed applications, thermal-magnetic bolt-on type circuit breakers with trip-free indicating handles. Unless otherwise indicated, main breakers shall have a UL-489 interrupting rating of not less than 35,000 rms symmetrical amperes at 480 volts and 65,000 rms symmetrical amperes at 240 Volts. Multi-pole main breakers larger than 100 amps size shall have instantaneous adjustable magnetic trip settings. The main breaker shall be equipped with auxiliary contacts

**Removal.** Prior to the removal of any equipment, the Contractor shall arrange an inventory inspection with the Engineer. All equipment shall be inspected and logged as to type, size and condition. No removal work shall be permitted without approval from the Engineer. Any damage resulting from the removal and/or transportation of the main breaker shall be repaired, to its original condition, or replaced in kind, at the Contractor's own expense, to the satisfaction of the Engineer.

**Installation.** Unless otherwise indicated, power wiring shall be of the size specified for the corresponding service conductors and shall be rated RHH/RHW, 600 volts and tagged with the self-sticking cable markers. The labor and material to make the appropriate terminal connections in the cabinet as directed by the Engineer shall be incidental to this pay item.

The manufacturer's recommendations shall be followed during the installation process. The wiring connections shall be made in accordance with the National Electric Code. The Contractor shall energize the system to assure that all the components are working in accordance with their specifications and carrying rated load. The main lugs shall be secured in line with Underwriters' Laboratories standards to prevent lugs from turning or loosening when incoming cables are installed. The current carrying parts shall be secured in place to prevent flexing and loosening or damage during and after installation. At the branch circuit, breakers and associated wiring shall be labeled to identify the location of equipment and/or loads used. The auxiliary contact switch, if used, shall be wired as directed by the Engineer.

**Method of Measurement.** Main breaker shall be counted, each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each of MAIN BREAKER, of the type and size indicated below, which shall be payment in full for furnishing and installing a main breaker as shown on the plan and as specified herein, with all related hardware necessary to provide a complete installation.

LBB2 BREAKER, MAIN 60A TO 100A

LBB3 BREAKER, MAIN 125A TO 250A

## **LBT1 BUCK-BOOST TRANSFORMER**

**Description.** This item shall consist of furnishing and installing a single-phase buck-boost transformer of KVA specified complete with all the appurtenances and all required hardware, connecting cables and terminal connections as specified herein and as directed by the Engineer. The unit(s) may be installed on a sign structure or on a bridge structure or in a lighting control cabinet or at a location specified by the Engineer. Units are single-phase but can be installed as a three-phase bank.

**General Requirements.** The buck-boost transformer is used as an auto-transformer for slight upward (boost) or downward (buck) adjustments in voltage. Buck-boost transformers are encapsulated designs with totally enclosed, non-ventilated enclosures. In an auto-transformer, the primary and secondary are electrically and mechanically connected together. Auto-transformers can be used only where local electrical codes permit and isolation of the two circuits are not required.

**Material.** The transformers shall be UL listed and/or CSA approved to meet or exceed all applicable NEMA, ANSI, UL, OSHA, and CSA requirements. The enclosure shall be NEMA 3R suitable for indoor/outdoor applications, coated with a UL approved ASA-61 gray finish. The transformer shall be encapsulated with electrical grade epoxy and silica sand to completely seal the core and coil from moisture and contaminants. It shall be tested in accordance with the latest issue of UL 506 and CSA C22.2 No. 47. The conductor material shall be copper, and the insulation shall be rated for class 180 degrees Celsius.

**Installation.** Unless otherwise indicated, power wiring shall be of the size specified for the corresponding service conductors and shall be rated RHH/RHW, 600 volts and tagged with the self-sticking cable markers. The labor and material to make the appropriate terminal connections in a junction box as directed by the engineer shall be incidental to this pay item.

The manufacturer's recommendations shall be followed in the installation. The wiring connections shall be made in accordance with the National Electric Code. The Contractor should energize the system to assure that all the components are working in accordance with their specifications and carrying rated load. The Contractor shall provide the electrical data as specified and directed by the Engineer.

**Method of Measurement.** Buck-Boost transformer shall be counted, each, as specified, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for a single-phase BUCK-BOOST TRANSFORMER, of the KVA specified, which shall be payment in full for furnishing all labor, materials and equipment to install the transformer(s) and related appurtenances necessary to provide a complete and operational installation.

#### **LC01 CONTROLLER, DUPLEX CONSOLE, WITH RADIO**

**Description.** This item shall consist of furnishing and installing a roadway lighting controller, duplex console type with radio control and associated wiring for control of highway lighting and delivering to storage a lighting controller, as specified herein. All work shall be according to the Article 7 – Lighting System in Section 1 and Standard Specification for Road and Bridges Construction.

**Method of Measurement.** Each lighting controller, duplex console type, with radio control, inspected and approved by the Engineer, shall be counted, each, as a unit for payment, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for CONTROLLER, DUPLEX CONSOLE TYPE, WITH RADIO, which shall be payment in full for furnishing and installing the lighting controller, complete, as specified herein.

#### **LC02 CONTROLLER, DUPLEX CONSOLE, WITHOUT RADIO**

**Description.** This item shall consist of furnishing and installing a roadway lighting controller, duplex console type, without radio control, including associated wiring, for the control of highway lighting, as specified herein. All work shall be according to the Article 7 – Lighting System in Section 1.

**Method of Measurement.** Lighting controller, duplex console type, without radio, shall be counted, each, as a unit for payment, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for CONTROLLER, DUPLEX CONSOLE, WITHOUT RADIO CONTROL, which shall be payment in full for furnishing and installing the lighting controller, complete, as specified herein.

### **LC03 CONTROLLER, LIGHTING, INSTALL ONLY**

**Description.** This item shall consist of retrieving from Owner's storage facility, loading, transporting and installing a lighting controller complete with all the appurtenances and all required hardware as specified herein, at locations designated by the Engineer. The lighting controller and foundation shall be paid separately. The Contractor shall transport, handle and store (as applicable) the lighting controller in complete conformance with the manufacturer's recommendations and as directed by the Engineer.

**Installation.** The lighting controller shall be installed as shown on the contract plans or as directed by the Engineer. The installation work shall be in accordance with Section 825 of the Standard Specifications for Road and Bridge Construction, current version, except the foundation will be paid separately.

Manufacturer's recommendations shall be followed during the installation process. The wiring connections shall be made as shown on the drawings and in accordance with the National Electrical Code. The Contractor shall energize the lighting controller to assure that all the components are working in accordance with their specifications and carrying rated load.

**Method of Measurement.** Lighting controller shall be counted of the type specified, each, installed.

**Basis of Payment.** This item will be paid at the contract unit price each for CONTROLLER, LIGHTING, INSTALL ONLY, of the type specified, which shall be payment in full for the complete installation as specified herein.

### **LC04 CONTROLLER, LIGHTING, REMOVE AND SALVAGE**

**Description.** This item shall consist of disconnecting, completely removing, transporting to the Owner's storage facility, unloading as salvage and stacking or boxing if necessary, and all types of existing lighting controller or designated components thereof, as specified herein. Proper documentation of Owner's salvage is required in this pay item.

**General.** Prior to the removal of any equipment, the Contractor shall arrange an inventory inspection with the Engineer. All equipment shall be inspected and logged as to type, size and condition.

No removal work shall be permitted without approval from the Engineer. Direct buried underground electric cables need not be removed. Cables which are abandoned shall be cut one foot below ground level. Cables in unit duct shall be removed from the duct, or as designated by the Engineer. Duct shall be abandoned and cut one foot below ground level.

Except as otherwise indicated, the cabinet, control equipment, and all associated hardware and appurtenances shall remain the property of the Owner and shall be delivered to the Owner or the Owner's electrical maintenance facility.

Unless otherwise directed by the Engineer, the concrete foundation shall be removed to at least two feet below grade and disposed of off the job site. The underground conduits and cables shall be separated from the foundation at 2.5 feet below grade and abandoned. The space caused by the removal shall be backfilled with trench backfill in accordance with Section 815 of the Standard Specifications.

Any damage resulting from the removal and/or transportation of the controller, control equipment, and associated hardware, shall be repaired to its original condition, or replaced in kind, at the Contractor's own expense, to the satisfaction of the Engineer. The Engineer shall be the sole judge to determine the extent of damage.

**Method of Measurement.** Each lighting controller, and all associated control equipment, which is removed, delivered to storage, unloaded, inspected, stacked and documented properly, shall be counted as a unit for payment.

**Basis of Payment.** This item shall be paid at the contract unit price each for existing CONTROLLER, LIGHTING, REMOVE AND SALVAGE, which shall be payment in full for the work specified herein.

#### **LC05 CONTROLLER, SINGLE DOOR, CONSOLE, WITHOUT RADIO**

**Description.** This item shall consist of furnishing and installing a roadway lighting controller, single door, console type, without radio control, including associated wiring, for the control of roadway lighting, as specified herein. All work shall be according to the Article 7 – Lighting System/Section 1.

**Method of Measurement.** Lighting controller, single door enclosure, console type, without radio control, shall be counted, each, as a unit for payment, furnished and installed.

**Basis of Payment.** This item will be paid at the contract unit price each for CONTROLLER, SINGLE DOOR, CONSOLE, WITHOUT RADIO, which shall be payment in full for furnishing and installing the controller, as specified herein.

#### **LC06 CONTROLLER, COMBINATION LIGHTING**

**Description.** This item shall consist of furnishing and installing a roadway lighting controller, mounted on traffic signal cabinet for combination lighting and associated wiring as specified herein.

**Material.** The lighting controller shall be as follows:

Enclosure: The completed controller shall be an industrial control panel NEMA 4X with an overall dimension of 20" X 16" X 8" as shown on the plan, and shall comply with UL 508 standards. The enclosure shall be made out of molded fiberglass polyester with gray finish and enhanced with UV inhibitors to protect against outdoor weathering. The door fasteners shall be stainless with butterfly type twist lock including a provision for padlocking.

Electrical components; Refer to the figure L-21 BE – 235 or latest for cabinet wiring diagram and list of components. Article 1068 (d), and (e) of the Standard Specification for Road and Bridge Construction, current revision shall apply to this pay item.

**Installation.** The lighting controller installation shall be according to the details, location, and orientation shown on the plan.

**Method of Measurement.** Each lighting controller, combination type, inspected and approved by the Engineer, shall be counted, each, as a unit for payment, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for CONTROLLER, COMBINATION LIGHTING, which shall be payment in full for furnishing and installing the lighting controller, complete, as specified herein.

### **LCL1 CLOCK, DIGITAL ASTRONOMICAL**

**Description.** This item shall consist of removing, furnishing and installing, a solid state digital astronomical time clock with necessary contactors for control of lighting, as specified herein. All boxes required for proper storage shall be included in this item.

**Materials.** Article 1068.01 (e) (1) of the Standard Specifications for Road and Bridge Construction, Current version, shall apply to this pay item. The timing of the unit shall be synchronous with the 60-Hertz power line frequency.

**Installation.** The Contractor shall transport and handle the digital time switch in complete conformance with the manufacturer's recommendations. Manufacturer's recommendations shall be followed during the installation process.

The contact rating of the time switch shall be sufficient to energize the contactor. If an external relay is needed to energize the contactor, then the relay, wiring, and installation shall be incidental to this pay item.

The digital astronomical time switch shall be installed inside the lighting controller or as indicated on the plan drawing and wired accordingly. It shall be programmed to set time of the day and set other functions to operate the lighting.

**Method of Measurement.** Digital astronomical clock, furnished, removed and installed shall be counted each for payment.

**Basis of Payment.** This item shall be paid at the contract unit price each for a CLOCK, DIGITAL ASTRONOMICAL, which shall be payment in full for furnishing and installing as specified herein.

### **LCN1–LCN2 CONTACTOR**

**Description.** This item shall consist of furnishing and installing a lighting contactor, with number of poles, with or without an auxiliary switch contact, as per plan and wiring for control of lighting as specified herein.

**Material.** Article 1068.01(e) (4) of the Standard Specifications for Road and Bridge Construction, Current version, shall apply to this pay item with the following exception:

Revise the first sentence of Article 1068.01(e)(4) of the Standard Specifications to read:

"Contactors shall be electrically operated, mechanically held as specified, with the number of poles required for the service and with operating coil voltage as indicated."

Ampere rating of contactors shall be not less than that required for the duty shown and shall otherwise be rated as indicated.

Contactors shall come equipped with normally open, dry, auxiliary contacts. A device attached to the CAM of the contactor may provide these contacts. Unless otherwise indicated, the contactor-operating coil shall operate at 240 volts, single phase and contactors furnished under this specification shall be with continuous rating as specified per pole at 480 Volts AC.

**Installation.** The lighting contactor shall be carefully installed in accordance with the manufacturer's recommendation and in accordance with the design requirements represented on the plans. The wire sizes listed on the manufacturer's catalog shall be utilized and it must meet the National Electrical Code. The proper electrical clearance between the live metal parts and grounded metal shall be maintained. The proper size wire shall be used for control circuit connections designated "L", "O" and "C" supplied with clamp type terminals. The auxiliary contact, if used, shall be wired as directed by the Engineer.

**Method of Measurement.** Lighting contactor shall be counted, each, as a unit of payment, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for LIGHTING CONTACTOR, of the amperage indicated below, which shall be payment in full for furnishing and installing the lighting contactor, complete, as specified herein.

LCN1 CONTACTOR, 125A TO 250A

LCN2 CONTACTOR, 30A TO 100A

#### **LD01-LD04 DECAL SET, LIGHTING UNIT**

**Description.** This item shall consist of furnishing and installing, a lighting unit identification decal set for a pole or underpass, a lighting unit identification decal set including bracket for underpass mounting, a lighting unit identification decal set for a light tower with painted surface only, or a light tower which has a camera mounted on the luminaire ring, at installations and at heights as designated by the Engineer. This work shall also include the removal of all existing decals as necessary to complete the installation in a neat and aesthetically pleasing manner.

**Materials.** Article 1069.06 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item.

**Installation.** Underpass luminaires, including appurtenances, identification brackets and conduit, and associated anchors, shall not be attached and/or drilled into precast, prestressed concrete beams. However, existing anchors, which have been installed improperly, shall be left in place. (Removal of such would cause more damage to the beam, than leaving the anchors in place). Articles 830.03, 835.02 and 844.03 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item.

**Method of Measurement.** Lighting unit identification decal set shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing an IDENTIFICATION (ID) DECAL SET, of the size per maximum character mounting as described below, which shall be payment in full for the work as specified herein.

LD01 DECAL SET, LIGHTING UNIT, POLE, 4 INCH, MAX 10 CHARACTERS

LD02 DECAL SET, LIGHTING UNIT, TOWER, 8 INCH, MAX 10 CHARACTERS

LD03 DECAL SET, LIGHTING UNIT, TUNNEL OR UNDERPASS WITH BRACKET, 4 INCH,  
MAX 10

CHARACTERS

LD04 DECAL SET, LIGHTING UNIT, TOWER WITH CAMERA, 4 INCH, MAX 10  
CHARACTERS

#### **LDS1 DISCONNECT SWITCH**

**Description.** This item shall consist of removing, furnishing and installing a disconnect switch, as directed by the Engineer.

**Materials.** The disconnect switch shall be 600 volt, 2-pole or 3-pole, up to 60-ampere, fusible, with solid neutral in a NEMA 4X stainless steel enclosure, complete with 20 ampere, 600 volt, dual element, time delay 4L, Class R fuses, having a UL listed interrupting rating of not less than 200,000 rms symmetrical amperes at rated voltage and suitable for use as service equipment for building.

Fuse holders shall be standard type fuse holders complete with fuses. All electrical materials shall conform to Article 1065, latest version of Standard Specification for Road and Bridge Construction. Raceways shall be as detailed on the plans. Wire from the base fuse to the disconnect switch and to the sign luminaires shall be as specified for pole wire.

The fuse at the base of the sign structure shall be 30 ampere with a solid neutral assembly.

**Removal.** Prior to the removal of any equipment, the Contractor shall arrange an inventory inspection with the Engineer. All equipment shall be inspected and logged as to type, size and condition.

No removal work shall be permitted without approval from the Engineer.

Any damage resulting from the removal and/or transportation of the controller, control equipment, and associated hardware, shall be repaired to its original condition, or replaced in kind, at the Contractor's own expense, to the satisfaction of the Engineer.



**Installation.** The Contractor shall provide all equipment, transportation and labor necessary to install the equipment as specified. New wiring, conduit and luminaires will be paid by separate pay items specified elsewhere herein.

Manufacturer's recommendations shall be followed during the installation process. The wiring connections shall be made as shown on the drawings and in accordance with the National Electrical Code. The Contractor shall energize the disconnect switch to assure that all the components are working in accordance with their specifications and carrying rated load.

**Method of Measurement.** Removing, furnishing and installing each Disconnect Switch for a sign unit or State owned facilities as specified above, and approved by the Engineer, shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for removing, furnishing and installing a DISCONNECT SWITCH, which shall be payment in full for the work specified herein.

## **LDS2 ON/OFF SWITCH**

**Description.** This item shall consist of furnishing and installing ON/OFF switch, the removal of old switch is incidental, as directed by the Engineer.

**Materials.** The ON/OFF switch shall be 600 volt, 2-pole, 3-pole, 2-Way or 3-Way, up to 20-ampere, having a UL listed interrupting rating of not less than 20,000 rms symmetrical amperes at rated voltage and suitable for building.

All electrical materials shall conform to Article 1065, latest version of Standard Specification for Road and Bridge Construction.

**Removal.** Prior to the removal of any equipment, the Contractor shall arrange an inventory inspection with the Engineer. All equipment shall be inspected and logged as to type, size and condition.

No removal work shall be permitted without approval from the Engineer.

Any damage resulting from the removal and/or transportation of the controller, control equipment, and associated hardware, shall be repaired to its original condition, or replaced in kind, at the Contractor's own expense, to the satisfaction of the Engineer.

**Installation.** The Contractor shall provide all equipment, transportation and labor necessary to install the equipment as specified. New wiring, conduit and luminaires will be paid by separate pay items specified elsewhere herein.

Manufacturer's recommendations shall be followed during the installation process. The wiring connections shall be made as shown on the drawings and in accordance with the National Electrical Code. The Contractor shall energize the ON/OFF switch to assure that all the components are working in accordance with their specifications and carrying rated load.

**Method of Measurement.** Removing, furnishing and installing each ON/OFF Switch for State owned facilities as specified above, and approved by the Engineer, shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for removing, furnishing and installing an ON/OFF SWITCH, which shall be payment in full for the work specified herein.

### **LDS3 MOTION SENSOR**

**Description.** This item shall consist of furnishing and installing a Motion Sensor with visual indicator and hardware as specified herein. All required hardware is incidental to this pay item, however, the conduit and wiring, shall be paid under a separate pay item.

**Materials.** The Motion Sensor shall be ceiling mount H-Moss Adaptive Technology with passive infrared to cover up to 1,500 sq. ft. areas, equivalent to or better than Hubbell model ATP1500C. It should be able to study their environment and automatically adjust the time delay and sensitivity to optimize the sensor's performance for specific application.

The motion sensor must be used in conjunction with a control unit. The control units provide a 24 volts dc power supply for one (1) to three (3) sensor. The control unit must be selected for the operating voltage of application from 120 V to 240 V, 60 Hz.

**Transportation.** The Contractor shall transport, handle and store (as applicable) the Motion Sensor in complete conformance with the manufacturer's recommendations.

**Installation.** The Motion Sensor shall be ceiling mounted as indicated on the contract drawing or as directed by the Engineer, if applicable, AAR Add-A-Relay. The installation shall be complete with necessary conduit and cable (paid under separate pay item) and connected to the applicable circuit.

The Contractor shall mount to a junction box for hard ceiling; attach to cover plate by using machine screws and punching a small hole through the ceiling tile for the sensor wires or using threaded mounting post then running sensor wires through the center of the post.

The Contractor shall use NEMA 4X enclosure cover "ACIPE" for the sensor and install the control unit inside the NEMA 4X box for the wet locations. The box and cover shall be made out of heavy-duty die cast aluminum, 0.094 in. thick for damp or wet locations and shall be in compliance with the NEC Article 406-8(B). The box shall be UL listed and comply with Federal Spec. W-C586C.

**Method of Measurement.** A Motion Sensor, shall be counted, each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing a MOTION SENSOR which shall be payment in full for the item specified herein.

## **LE01 ELECTRICAL OUTLET, GFCI TYPE**

**Description.** This item shall consist of furnishing and installing a ground fault interrupter, (GFCI) with an indicator visual or audible, and all required hardware as specified herein. All required hardware is incidental to this pay item, however, the circuit breaker for the GFI outlet, shall be paid under a separate pay item.

**Materials.** The box and cover shall be made out of heavy-duty die cast aluminum, 0.094 in. thick for damp or wet locations and shall be in compliance with the NEC Article 406-8(B). The box shall be UL listed and comply with Federal Spec. W-C586C. The ground fault interrupter shall be of specification grade, NEMA 3 configuration and comply with applicable UL, CSA and Federal Standards. The cover shall be UL listed for wet locations and comply with UL Standard 514. The GFCI shall have a light indicator when it is energized. The GFCI receptacle shall have an end of life provision when it is incapable of passing its internal test function (can no longer provide ground fault protection), it will either render itself incapable of delivering power, or indicate by visual or audible means that the device must be replaced. The GFCI shall be capable of reverse line-load mis-wire so that it will deny power to the receptacle face if it is mis-wired.

**Transportation.** The Contractor shall transport, handle and store (as applicable) the GFI outlets in complete conformance with the manufacturer's recommendations.

**Installation.** Each GFCI shall be mounted as indicated on the contract drawing or as directed by the Engineer. The installation shall be complete with necessary cable (paid under separate pay item) and connected to the applicable feeder circuit. The circuit breaker shall be labeled for the appropriate GFI.

**Method of Measurement.** A ground fault interrupter (GFI), shall be counted, each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing an ELECTRICAL OUTLET, GFCI TYPE which shall be payment in full for the item specified herein.

## **LE02 CONVENIENCE RECEPTACLE, 20 AMP**

**Description.** Furnish and install convenience receptacles, 20A, Voltage as specified by the Engineer for Maintenance yards, Sign Shops and other Department facilities in District 1, as directed by the Engineer. Installation shall include all hardware, junction box, and other appurtenances. Removal of the existing receptacle, if necessary, shall be included in this work. Conduit and wire installation shall be paid through other pay items, where needed.

**Method of Measurement.** Electrical convenience receptacle, 20 Amp, shall be counted, each, furnished and installed.

**Basis of Payment.** This work shall be paid at the contract unit price each for CONVENIENCE RECEPTACLE, 20 Amp, which price shall be payment in full for furnishing, delivering storing, installing and connecting the receptacle complete.

## **LF01 FOUNDATION, LIGHT POLE**

**Description.** This item shall consist of the construction of a steel reinforced concrete light pole foundation, up to 30" diameter, of the diameter specified, complete with raceways, as specified herein. Excavation in rock will be paid as specified in Section 502.12 for Excavation for Structures. The foundation depth shall be as indicated in the Foundation Depth Table on the plans (where applicable) or as directed by the Engineer.

The foundation shall include soil testing, excavation, reinforcement, concrete, anchor bolts, nuts, washers and raceways as well as clean-up and restoration of the location when such work is not provided under other paid items.

Sections 836, 1020, 1070 and also Articles 1006.08, 1006.09, 1088.01, of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item with the following:

Anchor bolts for light poles shall be heat-treated. Therefore, an exothermic ground wire connection shall not be made to the anchor bolt. Instead, a mechanical connection of the ground wire shall be made to the anchor bolt. However, the cable connections to the ground rod and the rebar cage shall be exothermic.

**Method of Measurement.** Light pole foundation of the diameter and depth specified shall be counted, per linear foot, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price for soil testing, furnishing and installing per linear foot for FOUNDATION, LIGHT POLE of the diameter specified, of the depth indicated, which shall be payment in full for the work as specified herein.

## **LF02 FOUNDATION, LIGHT POLE, METAL**

**Description.** This item shall consist of furnishing and installing a metal foundation of the diameter specified for a light pole, consisting of a helix type screw base, base plate, pilot point and hardware for supporting a light pole as specified herein. Excavation in rock will be paid as specified in Section 502.12 for Excavation for Structures.

**Materials.** Article 1070.01 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item.

**Installation.** Installation shall conform to Article 836.03 (b) of the Standard Specifications for Road and Bridge Construction, current version.

**Method of Measurement.** Light pole foundation of the diameter specified shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for a FOUNDATION, LIGHT POLE, METAL, of the diameter, specified, which shall include all excavation or drilling except excavation in rock, backfilling, disposal of unsuitable material, form work and furnishing all materials within the limits of the foundation.

### **LF03 FOUNDATION, LIGHT TOWER, UP TO 54 INCH DIAMETER**

**Description.** This item shall consist of the construction of a steel reinforced concrete light tower foundation, up to 54 inch in diameter, complete with raceways, as specified herein. The foundation depth shall be as indicated in the Foundation Depth table on the plans (where applicable) or as directed by the Engineer.

The foundation shall include soil testing, excavation, reinforcement, concrete, anchor bolts, nuts, washers and raceways as well as clean-up and restoration of the location.

Excavation in rock shall be paid according to Section 502.05 and 502.12 of the Standard Specifications for Road and Bridge construction, current version.

Sections 837 of the Standard Specifications for Road and Bridge Construction, current version, shall apply to this pay item with the following.

**Method of Measurement.** Light tower foundation, up to 54" in diameter, shall be counted, per linear foot depth, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price for furnishing and installing per linear foot for FOUNDATION, LIGHT TOWER, UP TO 54 INCH DIAMETER, of the depth indicated which shall be payment in full for the work as specified herein.

### **LF04 FOUNDATION, LIGHTING CONTROLLER**

**Description.** This item shall consist of furnishing and installing a concrete foundation for a lighting controller cabinet as specified herein, shown on the plans, or as directed by the Engineer. The material and labor for the ground field shall be incidental to pay item.

**Materials.** Concrete shall be Class SI complying with Section 1020 of the Standard Specifications, current version.

The anchor bolts shall comply with ASTM A576. The entire length of the anchor bolts shall be hot dipped galvanized steel according to ASTM 153. The nuts, lock washers, and flat washers shall be galvanized also.

The foundation shall include a 1 inch diameter galvanized steel raceway for the ground field connection.

Conduit raceways shall be heavy wall rigid polyvinylchloride (PVC) conduit, (Schedule 40) UL listed and in conformance with NEMA TC2 and Federal Specifications WC-1094A. Raceways shall be of the number and size as indicated on the drawing.

The foundation shall include a ground field of (3) 5/8 inch X 10 ft. copper-clad steel ground rods connected via 2/0 bare copper wire. All connections shall be made with exothermic welds. The ground wire shall be stranded, uncoated, bare copper in accordance with the applicable requirements of ASTM Designation B-3 and B-8.

**Installation.** Installation shall comply with Section 825 of the Standard Specifications for Road and Bridge Construction, current version.

The foundation shall have a depth and size as shown on the contract drawing. The top of the foundation shall extend twelve inches from the surrounding finished grade and the edges shall be beveled. A poured, 4-inch thick concrete pad, 4 feet wide X 4 feet shall be provided in front of the cabinet with an expansion joint. Exact concrete pad dimensions and location shall be confirmed with the Engineer, prior to installation. The ground field shall be a 10 feet triangle as shown on the drawing. Each ground rod shall be within a ground well as detailed on the drawing. No ground well shall be placed in the concrete pad in front of the controller. The cabinet shall be caulked at the base. All the conduit entrances into the cabinet shall be sealed with a pliable waterproof material.

**Method of Measurement.** Lighting Controller, console type, foundation shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each, for furnishing and installing FOUNDATION, LIGHTING CONTROLLER, which shall be payment in full for the work as specified herein.

#### **LP01 LIGHT POLE, KIT**

**Description.** This item shall consist of removing existing damaged basic materials, and furnishing and installing new basic materials such as new lamp, fuses, fuse holder, decal, pole wire, pole cap, or photocell if specified, hardware, nut covers, hand hole door and grommets in conjunction with the use of a light pole from State's storage facility, and utilizing one or two mast arms and luminaires. This item shall also include the removal of old decals, accident reference markers and graffiti from used poles prior to installation at new locations.

**Materials.** Materials shall be in accordance with Section 1065 and 1066 of the Standard Specifications for Road and Bridge Construction, Current version.

**Installation.** Installation shall be in accordance with Section 830 of the Standard Specifications for Road and Bridge Construction, Current version.

The luminaire shall be cleaned from inside/outside, replace bulb with new one rated for minimum of 40,000 hrs. equal or better than Sylvania ET 18 – 67584 and test before installation.

**Method of Measurement.** Light pole kit for Contract Spare Parts light pole, shall be counted, each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for LIGHT POLE, KIT which shall be payment in full for removing damaged materials, and furnishing and installing all new materials including the necessary hardware as specified herein.

## **LP02 LIGHT POLE UNIT, INSTALL ONLY**

**Description.** This item shall consist of retrieving from State's storage facility (if required), loading, transporting and installing an aluminum light pole unit which is a standard, davit, or painted davit light pole with (all sizes) mast arm or twin mast arm, and (all types) luminaire(s), complete with appurtenances, length of 10 to 60 feet and all required hardware including bolt covers as specified herein.

**Installation.** Installation shall be as described in Section 830, except that the light pole shall be set plumb on the foundation without the use of shims, grout or any other leveling devices under the pole base. The mast arm or arms shall be set at right angles to the centerline of the pavement. (The leveling area of the luminaire shall be set in a plane parallel to the roadway taking into consideration the upgrade or downgrade and the super-elevation of the roadway).

The Contractor shall transport, handle and store (as applicable) the metal light pole in complete conformance with the manufacturer's recommendations.

The luminaire shall be washed and relamped as specified under Light Pole Kit. This item shall include the applicable luminaire (with pole wire and fusing), foundation, anchor bolts, and breakaway device which shall be provided under separate pay item.

Poles shall not be installed until luminaires are available for installation which shall be at the same time the poles are installed. Poles shall not be installed and left standing without a coordinated installation of mast arm and luminaire.

The removal of breakaway couplings and installation or replacement with breakaway device (T-Base) is included part of the installation procedure and it will not be paid separately.

**Method of Measurement.** Light pole unit, shall be counted, each, installed.

**Basis of Payment:** This item shall be paid at the contract unit price each for LIGHT POLE UNIT, INSTALL ONLY, of the length and mounting height as indicated by the Engineer, which shall be payment in full for the work as specified herein. This item shall not be paid unless the coordinated assembly, including mast arm, luminaire, and breakaway device if specified, is complete.

## **LP03 LIGHT POLE UNIT, REMOVAL AND SALVAGE**

**Description.** This item shall consist of the disconnection, removal, dismantling, and transportation to the State's storage facility and unloading as salvage, a light pole unit, which is a standard, davit, or painted davit light pole with (all sizes) arm or twin arm, and (all types) luminaire(s), complete with appurtenances, as specified herein and as directed by the Engineer. Removal of the associated conduit, wire and junction boxes shall be included in this item. This pay item shall also include all storage documentation as required by the Engineer.

**General.** Light pole removal shall be in accordance with Section 842 of the Standard Specifications for Road and Bridge Construction, current version. Proper documentation of owner salvage is required.

Prior to the removal of any equipment, the Contractor shall arrange an inventory inspection with the Engineer. All equipment shall be inspected and logged as to type, size and condition. No removal work shall be permitted without approval from the Engineer.

Any damage resulting from the removal and/or transportation of the light pole shall be repaired, to its original condition, or replaced in kind, at the Contractor's own expense, to the satisfaction of the Engineer.

**Method of Measurement.** Each light pole unit, which is removed, delivered to storage, unloaded, inspected, and documented properly, shall be counted as a unit for payment.

**Basis of Payment.** This item shall be paid at the contract unit price each for LIGHT POLE UNIT, REMOVAL, SALVAGE, which shall be payment in full for the removal and disposition of light pole as specified herein.

#### **LP04 WOOD POLE UNIT, INSTALL ONLY**

**Description.** This item shall consist of retrieving from State's storage, loading, transporting and installing a wood pole with mast arm(s) and luminaire(s) complete with appurtenances of the mounting height as specified herein, including all necessary hardware and accessories required. The wood light pole unit shall be paid separately.

**Installation.** Installation shall be in accordance with Section 830 of the Standard Specifications for Road and Bridge Construction, current version.

The Contractor shall be paid separately for CCTV and Traffic Signal installation using the non-routine pay items if the wood pole is used for CCTV on Traffic Signal.

The Contractor shall transport and handle the light pole in complete conformance with the manufacturer's recommendation.

**Mechanical Damage.** Poles are not acceptable if they contain indentations attributed to loading or handling slings that are 1/4 inch or more deep over 20% or more of the pole circumference, or more than 1/2 inch deep at any point. Other indentations or abrasions, for example, forklift damage, chain-saw damage, etc., shall not be more than 1/10 the pole diameter at the point of damage up to a maximum of 1 inch. Such damage is permitted in an oversized section, where the excess of wood shall be taken into consideration in evaluating the effects of the damage. In any case, the circumference for a given class is still required to be not less than the specification minimum."

**Method of Measurement.** Wood pole unit of the mounting height as specified, complete with necessary hardware shall be counted, each, installed.



**Basis of Payment.** This item shall be paid at the contract unit price each for WOOD POLE UNIT, INSTALL ONLY, of the mounting height up to 90', shall be payment in full for installing a wood pole unit with necessary appurtenances as specified herein.

#### **LP05 WOOD POLE UNIT, REMOVAL AND SALVAGE**

**Description.** This item shall consist of disconnecting, completely removing, dismantling, transporting to the State's storage, and unloading as salvage, a wood pole with mast arm(s) and luminares(s) complete with appurtenances, as specified herein. Removal of the CCTV and Traffic Signal, associated conduit, wire and junction boxes shall be included in this item. Proper documentation of the owner's salvage is required with this pay item.

**General.** Prior to the removal of any equipment, the Contractor shall arrange an inventory inspection with the Engineer. All equipment shall be inspected and logged as to type, size and condition. No removal work shall be permitted without approval from the Engineer. Any damage resulting from the removal and/or transportation of the light pole unit shall be restored, to its original condition, or replaced in kind, at the Contractor's own expense, to the satisfaction of the Engineer.

**Method of Measurement.** Each wood pole unit, complete with CCTV, Traffic Signal, Arm and Luminaire which is removed, delivered to storage, unloaded, inspected, and documented properly, shall be counted as a unit for payment.

**Basis of Payment.** This item shall be paid at the contract unit price each for WOOD POLE UNIT, REMOVAL AND SALVAGE, complete with CCTV, Traffic Signal, Arm and Luminaire, which shall be payment in full for the removal and disposition as specified herein.

#### **LPN1 PANEL, DISTRIBUTION**

**Description.** This item shall consist of removing (if upgrading) furnishing and installing, a lighting and distribution panel of the amperage (up to 400 Amps) and number of poles (up to 42) specified for lighting and/or equipment with branch breakers as specified by the Engineer.

**General Requirements.** The panel with all of its electrical components and parts shall be assembled in a neat orderly fashion. All of the electrical cables shall be installed in a trim, neat, professional manner. The cables shall be trained in straight horizontal and vertical directions and be parallel, next to, and adjacent to other cables whenever possible. The completed controller shall be UL listed as an industrial control Panel under UL 508 and UL 98, service entrance rated panel.

If the enclosure of the existing service or distribution panel is in good condition, the Contractor may use the existing enclosure and replace only the panel board upon approval by the Engineer.

**Materials.** The panel board shall be test-verified by, and listed with, Underwriters Laboratories, Inc. and shall meet all NEMA standards for panelboards. Panel board shall be designed for sequence phase connection of branch circuit devices to allow complete flexibility of circuit arrangement (1,2 or 3 poles) to evenly balance the electrical load on each phase. Main lugs shall be mechanical, solderless type, and approved for Cu or Al conductors. The chassis shall be sturdy, rigid and shall assure accurate alignment of interior with panel front. The fronts (trims) and flush-type lock/latch handle assembly shall have an appearance equivalent to an ANSI-61 light gray finish. Wiring gutters shall be furnished in accordance with Underwriters' Laboratories Inc. standards.

**Main Breaker. (omit if main lug only panel)** The main breaker shall be of the same manufacturer as the lighting or distribution panel. The electrical requirement shall be of the voltage, phase and ampacity of the lighting or distribution panel. The lugs of the main breaker shall be sized to handle the required cable size of the incoming cable. Unless otherwise indicated, main breakers shall be standard UL-listed molded case, thermal-magnetic bolt-on type circuit breakers with trip-free indicating handles. Unless otherwise indicated, main breakers shall have a UL-489 interrupting rating of not less than 35,000 rms symmetrical amperes at 480 volts and 65,000 rms symmetrical amperes at 240 Volts. Multi-pole main breakers larger than 100 amps size shall have instantaneous adjustable magnetic trip settings. The main breaker shall be equipped with auxiliary contacts.

The interrupting capacity shall be capable of removing a fault at the applied voltage without damage to the breaker. The breaker may be a fixed trip or interchangeable trip as specified by the engineer. The breaker shall be specified as "fully rated" unless noted otherwise. The main breaker shall be a thermal magnetic trip breaker unless noted otherwise.

Top feed or bottom feed should be as specified. The "on/off" position shall be clearly visible and designed to operate in a vertical plane "on" up, "off" down. A tripped indicated of the breaker shall be clearly visible. Lugs on the breaker shall be suitable for 75 degrees Celsius wire. The breaker shall be UL listed for use in lighting and distribution panels.

**Circuit Breakers.** All feeders, branch circuits, and auxiliary and control circuits shall have overcurrent protection. Unless otherwise indicated, the overcurrent protection shall be by means of circuit breakers.

Unless otherwise indicated, circuit breakers shall be standard UL-listed, molded case, thermal-magnetic, bolt-on-type circuit breakers with trip-free indicating handles.

Unless otherwise indicated circuit breakers shall have a UL-listed interrupting rating of not less than 10,000 rms symmetrical amperes at rated circuit voltage for which the breaker is applied.

The number of branch circuit breakers shall be as indicated on the control cabinet detail drawings or lighting system wiring diagram, whichever is greater, plus two (2) spare circuit breakers.

**Ground & Neutral Bus Bars.** Separate ground and neutral bus bars shall be provided. The ground bus bar shall be copper, mounted on the equipment panel, fitted with 22 connectors of the type as shown on the plans, as a minimum. The neutral bar shall be similar. The heads of connector screws shall be painted white for neutral bar connectors and green for ground bar connectors.

**Standards.** The panel boards shall meet the following applicable industry standards, except where noted:

1. Underwriters' Laboratories, Inc.
  - a. Panelboards: UL67
  - b. Cabinets and boxes: UL50

Note: Only panelboards contain UL listed devices can be UL labeled.

2. National Electrical Code – Article 408 and 409
  3. NEMA Standards: PB1
  4. Federal Specifications
    - a. Panelboards: W-P-115c
    - b. Molded case breakers W-C-375a,b
    - c. Fusible Switches: W-S-865c
    - d. NFPA: 79

**Removal.** Prior to the removal of any equipment, the Contractor shall arrange an inventory inspection with the Engineer. All equipment shall be inspected and logged as to type, size and condition.

No removal work shall be permitted without the approval of the Engineer.

Any damage resulting from the removal and/or transportation of the lighting distribution panel, of the size as specified, shall be repaired to its original condition, or replaced in kind, at the Contractor's own expense, to the satisfaction of the Engineer.

**Installation.** Service entrance equipment NEC Article 230 and UL, require that a panel used as service entrance equipment must be located near the point where the supply conductors enter the building.

A disconnectable electrical bond must be provided between the neutral and ground.

A service-entrance-type UL label must be factory installed.

The main lugs shall be secured in line with Underwriters' Laboratories standards to prevent lugs from turning or loosening when incoming cables are installed.

The current carrying parts shall be secured in place to prevent flexing and loosening or damage during and after installation.

At the branch circuit, breakers and associated wiring shall be labeled to identify the location of equipment and/or loads used.

The manufacturer's recommendations shall be followed during the installation process. The wiring connections shall be made in accordance with the National Electric Code. The Contractor shall energize the system to assure that all the components are working in accordance with their specifications and carrying rated load.

**Method of Measurement.** Lighting and distribution panel removed, furnished and installed shall be counted, each,

**Basis of Payment.** This item shall be paid at the contract unit price each for PANEL, DISTRIBUTION, of the amperage (up to 400 Amps) and number of poles (up to 42) of the amperage and number of poles specified, which shall be payment in full for removing, furnishing and installing the distribution panel, as specified herein.

## **LT01–LT02 LIGHT TOWER**

**Description.** This item shall consist of furnishing, delivering to State's storage facility and unloading, as specified, and installing a light tower including a lowering device with ring, luminaires and lamps, as specified herein. The tower foundation shall be provided under separate pay items. The specifications for this item shall be fully coordinated with the lowering device, ring, luminaire, and foundation requirements.

**Materials.** Materials shall be in accordance with Article 1069.08 of the Standard Specifications for Road and Bridge Construction, current version with the following exceptions:

Revise the sixth and eighth paragraphs of Article 1069.08(a) of the Standard Specifications to read:

The handhole shall have a door with a full collar of similar material that extends over the handhole frame to exclude liquids and contaminants when closed against the flange and gasketed handhole opening. The door shall be mounted with a full-height stainless steel piano hinge or not less than two stainless steel hinges or other hinge arrangement acceptable to the Engineer. A bolt through door and frame eyelet shall not constitute an acceptable hinge. Hinges shall be heavy duty, suitable for the weight of the handhole door. Hinges shall be welded to the handhole frame and shall be welded or attached with stainless steel nuts, bolts, and lock washers (5 minimum) to the handhole door. Rivets will not be allowed to attach any hardware. The door/opening shall be gasketed in a manner, which will prevent the entry of water into the pole, and the door shall have a tight compressive seal employing a tubular gasket with a flexible wire core. The gasket shall have a mechanical gripping action and be mounted on a metal edge inside the handhole door. The door shall be held closed with 12-gauge captive stainless steel clamps. The clamps shall be held closed with spring loaded captive clamps. The clamps shall have a depth stop feature to insure uniform sealing pressure at all clamp points. A minimum of four (4) clamps shall be used around the non-hinged sides of the door assembly. A stainless-steel padlock hasp and staple shall be provided for locking the door. Door hardware shall be stainless steel. The door shall be equipped with an integral door stop mechanism.”

Revise the last paragraph of 1069.08 (b), (2) Inspection, to read:

“The independent welding inspector shall send the test results directly to the Engineer at the following address:

Illinois Department of Transportation  
Division of Highways, District 1  
Attn: Electrical Operations  
201 West Center Court  
Schaumburg, Illinois 60196-1096

The cost for all independent welding inspections shall be included in the unit price for the bid item.”

Add the following to Article 1069.08(c) of the Standard Specifications:

“The primer paint shall be white polyamide epoxy, with minimum solids by volume 65%. The primer shall be applied in two coats to a total thickness of 6-8 mils dry film thickness following manufacturer's method of application. The two primer coats shall be of different colors.

The finish paint shall be silicone-alkyd resin type paint poly-silicone enamel, minimum solids by volume 53%. The finish paint shall be applied in one coat to a 2-3 mils dry film thickness following manufacturer's method of application. The finish paint shall be applied to the outside surface only.”

Revise the second and third paragraphs of Article 1069.08(p) of the Standard Specifications to read:

“A flexible UL Listed Class II conductor shall be installed between the lightning rod and the grounding lug on the top of the tower shaft. The conductor shall be a rope lay cable consisting of 28 strands of No. 14 AWG cooper wire. The cable shall have a minimum outside diameter of 7/16”, a cross sectional area of 58 mm<sup>2</sup>, and a net weight of 1668 N per 375 pounds per 1000 ft. The same conductor shall be attached with studs and exothermic welds at tower shaft sections. The grounding conductor terminations shall be UL Listed.”

**Installation.** Installation and shipment shall be in accordance with Article 835.04 of the Standard Specifications for Road and Bridge Construction, current version.

**Method of Measurement.** Light tower shall be counted, each, furnished, and installed complete.

**Basis of Payment.** This item shall be paid at the contract unit price each for LIGHT TOWER, of the length as specified below, which shall be payment in full for furnishing and installing complete as specified herein. The tower foundation shall be paid under separate pay item.

LT01 LIGHT TOWER, 110 FT. OR LESS IN LENGTH

LT02 LIGHT TOWER, 111 FT. OR MORE IN LENGTH

### **LT03 YEARLY LIGHT TOWER, IN PLACE, CLEAN AND PAINT**

**Description.** The Contractor shall sand blast, prime a tower, standing in place on the foundation with luminaire ring assembly and hood, either complete or part of, as directed by the Engineer. The Contractor shall prepare the existing deteriorated surfaces and paint all designated surfaces of the various components of the light towers with coatings specified by the Engineer.

The work involves the surface preparation and application of coating materials on existing steel light towers greater than 80 ft. high. The Contractor shall provide all management, supervisory, administration, quality control personnel, labor forces and all other services required to carry out the surface preparation work, coating operations, including the furnishing, handling and removal of spent abrasive material, if required and all testing and reporting as specified herein.

#### **Tower Number, Luminaire Quantity Decals, and Accident Reference Marker Decals.**

All identification decals shall be removed prior to the start of work and replaced after the finish coat has fully dried. Removal of all decals, purchase of new decals, and installation of new decals shall be incidental to this pay item. Following sufficient curing of the finish coat, new tower number and luminaire quantity decals 8 inch x 9 inch shall be affixed to the tower at locations where the existing decals were removed during the surface preparation process. The Contractor shall schedule the decal replacement six months from the time the tower was painted, allowing sufficient time for the finish coat to dry.

**Responsibilities.** The Contractor shall be responsible for the planning and performance of all scaffolding work, ventilation, enclosures, protective covers, and utilization of labor and equipment, supplying and maintaining of tools, test equipment, enclosures, scaffoldings, etc., purchasing and/or requisitioning of supplies, performing tests to assure proper lasting equipment performance and required dry film thickness of coatings, relocating and/or removing all temporary equipment, enclosures, scaffolding, etc. at the completion of the work, or as directed by the Engineer throughout the course of the job schedule to permit the work of others, providing the testing and inspection, equipment, and services for all surface preparation and material application, protecting all existing equipment, piping, ducts, etc. and complete coated areas from damage resulting from blasting work and/or misapplied coating materials, and removal of all debris from the work site.

**General Work Provisions.** All coating work shall be done in a careful workmanlike manner using the materials specified herein in strict accordance with this Specification.

Surface preparation and coating application shall be in accordance with the Coating Schedule contained herein. The manufacturer's specifications regarding the mixing, thinning, application, drying and general handling of the various materials shall be followed as being supplementary to this Specification.

The scaffolding, ladders, etc., required for surface preparation and/or painting shall be designed for loads not less than those established by the State of Illinois. All coatings shall be applied as recommended by the manufacturer. Thinning shall be done only as recommended by the manufacturer for a particular application.

The surfaces to be coated shall be dry. No coating work shall be done in damp weather (rain, fog, mist, dew, etc.) which might cause a slight amount of moisture to collect or condense on the surface. No coating work shall be done when the ambient air temperature is below 50 degrees Fahrenheit or above 100 degrees Fahrenheit. No coating work shall be done if the relative humidity exceeds 85% or if the substrate temperature is not at least 5 degrees Fahrenheit above the dew point.

Coatings shall be applied in a workmanlike manner by skilled applicators. All coatings must be evenly spread and smoothly flowed on and shall be free from runs and sags. Care shall be taken to apply a film of uniform thickness that completely covers all surfaces required to be coated and avoids local thin spots.

All coating materials shall be specified and approved in writing by the Engineer. Intermixing of materials from different manufacturers will not be permitted.

All coating materials delivered to or received at the job site shall be in original unopened and sealed containers bearing manufacturer's name, type of designation, batch number and shelf life. All coatings shall be mixed in strict accordance with the manufacturer's written instructions, and thinning will not be permitted unless specified in those instructions.

All containers of coatings shall remain unopened until ready for use. The oldest of each kind of coating shall be used first. Containers, which have been opened, shall be used first.

Any coating material found not be in conformance with the specification shall be removed from the site, and from the structure, if already applied, at the Contractor's expense. If reapplication to a formerly coated surface is required, it shall be treated as if it had never been coated insofar as this Specification is concerned.

All coatings shall be stored in an area that is well-ventilated and free from excessive heat, sparks, flame, or the direct rays of the sun. The ambient temperature of the storage areas shall be maintained within the range specified in the Coating manufacturer's printed instruction, unless otherwise specified.

Coatings, which have livered, gelled, exceeded manufacturer's recommended shelf life, or otherwise deteriorated during storage shall not be used, and shall be removed promptly from the site.

Mixing of coatings shall be done in accordance with manufacturer's printed instructions. Power mixers may be used, but it should be noted that the heat generated could shorten the pot life of the coating.

Catalysts and/or thinners shall be added to the coatings strictly in accordance with the manufacturer's printed instructions. Uniform mixing shall be assured by checking for consolidated pigment remains.

If the coatings became thick in cool weather, they shall preferably be heated in the container by the use of paint heaters and not thinned by the addition of solvents. Deviations from manufacturers recommended storage temperature ranges will not be permitted without manufacturer's approval.

The Contractor shall furnish, to the Engineer, all information on materials and supplies utilized by the Contractor.

**Surface Preparation.** The Contractor shall be wholly responsible for finish of his work, and shall not commence any coating work until the surface to be coated has been properly prepared in accordance with the surface preparation portion of the Coating Schedule contained herein. Chemical contamination shall be removed by washing with clean water, steam, neutralizing solutions, detergents, or other methods recommended by the Coating manufacturer. Each designated surface area of each light tower to be painted shall be thoroughly washed clean using a sufficient number of cleaning cloths. The cloths shall be changed frequently to avoid using contaminated cleaning materials.

**Application of Coating Materials.** Coatings may be applied by brushes, roller, or paint mitt. All methods of application shall be in accordance with the best practice as recommended by the manufacturer.

When coatings are applied by brushing or rolling, the surface shall be cross-brushed or cross-rolled to secure uniformity of surface and the specified paint film thickness.

All surfaces shall be primed the same day as they are prepared. Finish coats shall be applied as soon as practicable after cleaning. If the surface becomes contaminated in the interim, it shall be refinished to the original cleanliness requirements.

Adequate ventilation must be assured, at all times, for proper drying. Film thickness of the coating being applied shall be periodically checked using a wet film thickness gauge. Dry film thickness shall be calculated from wet film thickness and volume solids and as recommended by the coating manufacturer. In addition, each coat shall have been visually inspected for holes and thin spots before the next coat is applied.

Surfaces, which have been coated, shall not be handled, worked on, or otherwise disturbed until the coating is completely set. Sufficient time shall elapse between coats to permit them to dry hard. All layers of coated surfaces shall be unscarred and completely integral at the time of application of all succeeding coats.

Each coat shall follow the preceding coat within the time limits set by the manufacturer. After the application of the scheduled number of coatings, the total dry film thickness (DFT) shall be within the range of the sum of the thickness of the coats as specified. The Contractor shall apply enough paint to adequately cover and to fulfill the DFT as specified in the Coating Schedule continued herein no matter how many coats are necessary.



All finished coating surfaces shall be uniform texture, free of any runs, drips, sags or other detrimental defects, and acceptable to the Owner.

Misplaced coating materials shall be promptly removed and the surface shall be made thoroughly clean and satisfactory to the Engineer.

Copies of manufacturer's application guides or printed instructions shall be conspicuously posted wherever materials are being prepared for application.

Cloths, cotton and waste material which might constitute a fire hazard, shall be placed in closed metal containers or removed from the working area at the end of each day's work.

The Contractor shall provide portable fire extinguishers of suitable type and sufficient number to permit placing at least one (1) extinguisher in any areas where coating with fume-creating or flammable products is in progress, and where coatings are stored and mixed. No smoking shall be permitted in these areas and the Contractor shall be responsible for policing the work.

All protective covers shall be removed upon completion of paint application.

**Testing.** The Engineer shall furnish to the Contract, upon the transmittal of the authorization of work, the required tests for the tower cleaning and painting.

Test Equipment to be furnished and used by the Contractor:

1. Surface Temperature Thermometer  
Part # PTC 312F
2. Sling Psychrometer  
Part # 127012
3. Weather Psychometric Tables  
Part # WB235
4. Dry and Wet Film Thickness Gauges

### **Light Tower Shaft**

**Surface Preparation.** The tower shall be spot abrasive blasted as required in accordance with SSPC SP-6 Commercial Blast Cleaning and/or Power Tool Cleaned to SSPC SP-3, depending on overall condition. The remaining surface shall then be hand tool cleaned in accordance with SSPC SP-2 to remove all loose corrosion and existing paint. All oil, grease, dirt, salt and other surface contaminants shall be removed in accordance with Steel Structures Painting Council's SSPC SP-1 Solvent Cleaning Specification.

### **Coating System.**

**Primer.** The primer shall be applied to the entire designated area of each tower and be a Keeler & Long Tri-Polar Primers KL6040 series or equivalent approved by the Engineer.

**Finish Coat:** The finish shall be applied to the entire designated area of each tower and be a Keeler & Long Anodic Self-Priming Paint KL4400 Series or equivalent approved by the Engineer.

### **Luminaire Ring Assembly and Hood**

**Surface Preparation.** All oil, grease, dirt, salt and other surface contaminants shall be removed in accordance with Steel Structures Painting Council's SSPC Sp-1 Solvent Cleaning. The surface shall then be Hand Tool Cleaned in accordance with SSPC SP-2 to remove all loose corrosion and existing paint.

**Coating System.** Same as finish coat listed above.

### **Cleats, Welds And Hand Hole Door Hardware Surfaces**

**Surface Preparation.** Prepare surfaces using the SSPC SP-11 power tool cleaning to bare metal to remove all rust and existing coating.

### **Coating System.**

**Prime Coat.** The prime coat shall be the same as the shaft prime coat described above.

**Finish Coat .** The finish coat shall be the same as the shaft finish coat described above.

**Documentation of Work.** The Contractor shall document testing information and provide the Engineer a weekly progress report on an Excel spreadsheet for each work authorization. Each tower shall be reported separately. The Contractor shall scan the Excel spreadsheet and the general billing logs to the Engineer daily (if requested by the Engineer) or weekly, for each authorization letter. The format of the spreadsheet shall be furnished to the Contractor upon the authorization of work.

**Method of Measurement.** The light tower length for payment of all work described herein shall be measured, in feet, in place, and shall be measured as the distance in feet from the top head frame assembly to shaft's base plate or any part thereof, spot blast clean and paint.

**Basis of Payment.** This item shall be paid at the contract unit price, per foot, of tower length for LIGHT TOWER, IN PLACE, CLEAN AND PAINT with applicable documentation, which shall be payment in full for all labor, materials and equipment required to complete the work as described herein.

## **LT04 LIGHT TOWER, REMOVE AND RE-ERECT**

**Description.** This item shall consist of removing an existing light tower for inspection and/or retrofitting and reinstalling the tower on the foundation all during the same work day as designated by the Engineer. This pay item shall also include the removal of towers found unsafe by IDOT inspectors. Clearing the site for safety, including the removal of damaged equipment, site restoration, and all appurtenant materials and work required for removing and reinstalling shall be included as part of this item. The retrofitting work as specified by the Engineer will be paid separately. The electric power cables shall be reconnected so that tower becomes operational that evening without interruption.

**General.** The existing light tower shall be disconnected and removed from the existing foundation by way of removing the anchor bolt nuts and lifting the light tower from the foundation. Any damage sustained to the light tower during removal operations shall be repaired, or replaced in kind, to the satisfaction of the Engineer at Contractor's own expense.

The light tower shall be reinstalled immediately after inspection and/or modification work the same day on the foundation.

All components shall be replaced upon re-installation of the tower. The anchor nuts shall be repainted. The nuts shall be tightened in compliance with torque specifications recommended by the manufacturer of the lighting unit.

As applicable, recently calibrated dynamometers shall be employed by the Contractor for measuring the applied force during final assembly.

The Contractor shall remove the stainless steel screening at the base of the tower, prior to the removal of the tower, and after re-erecting and plumbing the tower, shall reinstall the screening and tighten all anchor bolt nuts, to the satisfaction of the Engineer. The Contractor shall exercise care in the removal of the screening so it remains in a serviceable condition. Replacement screening shall be included in this pay item.

A penetrating oil shall be applied to all anchor bolt nuts prior to removing. The Contractor shall exercise extreme care in the removal of the anchor bolt nuts so that no damage occurs to the anchor bolt threads. If an anchor bolt nut cannot be easily removed, the Contractor shall consult the Engineer to determine the best method to be used to remove the anchor bolt nut.

Any anchor bolt nuts damaged in the removal process or which the Engineer determines should not be reused, shall be replaced with anchor bolt nuts meeting the requirements of Article 1070.03 of the Special Provisions for Road and Bridge Construction, current version, for Light Towers.

**Method of Measurement.** Light tower shall be counted, each, remove and re-erect.

**Basis of Payment.** This item shall be paid at the contract unit price each for LIGHT TOWER, REMOVE AND RE-ERECT, which shall be payment in full for performing the work as specified herein.

#### **LT05 LIGHT TOWER, INSTALL ONLY**

**Description.** This item shall consist of erecting a light tower as specified herein and as directed by the Engineer. Luminaire, lamp, lowering device and foundation shall be provided under separate pay items. This item shall be fully coordinated with the luminaire, lowering device, and foundation requirements. The light tower shall be paid separately.

**Installation.** Installation and shipment shall be in accordance with Article 835.04 of the Standard Specifications for Road and Bridge Construction, current version.

**Method of Measurement.** Light tower shall be counted, each, installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for LIGHT TOWER, INSTALL ONLY, which shall be payment in full for installing the item as specified herein.

#### **LU01 LUMINAIRE, EIGHT (8) FT. FLUORESCENT**

**Description.** This item shall consist of furnishing and installing a fluorescent luminaire up to twenty (20) feet mounting height for maintenance yard, sign shop or other facilities, with two eight (8) foot lamps, of the wattage and operating voltage as specified herein.

**Materials.** The housing shall be one piece constructed of die-formed cold rolled steel with longitudinal V-grooves in channel for strength. The channel cover shall be secured by latch for easy access to wire way. The luminaire shall be designed and constructed in accordance with the requirements of UL. The mounting accessories, hardware and brackets, shall be made out of steel for environmental conditions.

The finish shall be five stage iron phosphate permanent ensuring superior paint adhesion and corrosion resistance. Reflector and channel finished with a high gloss baked white enamel. Reflector is painted after fabrication.

The ballast shall be multi-voltage, thermally protected, resetting, class P, HPF, non-PCB, UL listed and CSA certified. The fluorescent fixture shall be equivalent to Lithonia Lighting model TEJS or better.

A decal, complying with the ANSI standard, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

Luminaire information submitted for approval shall include any recommendations of the manufacturer for storage as provided under this contract.

The packaging of the luminaires shall incorporate the provisions recommended by the manufacturer for storage.

**Installation.** The luminaires shall be installed in accordance with the plans as specified by the Engineer. The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Luminaire shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing a LUMINAIRE, FLUORESCENT EIGHT (8) FT., of the type indicated, wattage and operating voltage indicated or shown on the plan, which shall be payment in full for the item as specified herein.

## **LU02 LUMINAIRE, FOUR (4) FT. FLUORESCENT**

**Description.** This item shall consist of furnishing and installing a fluorescent luminaire up to twenty (20) feet mounting height for maintenance yard, sign shop or other facilities, with (up to) four, four (4) foot lamps , of the wattage and operating voltage as specified herein.

**Materials.** The housing shall be one piece constructed of die-formed cold rolled steel with longitudinal V-grooves in channel for strength. The channel cover shall be secured by latch for easy access to wire way. The luminaire shall be designed and constructed in accordance with the requirements of UL. The mounting accessories, hardware and brackets, shall be made out of steel for environmental conditions.

The finish shall be five stage iron phosphate permanent ensuring superior paint adhesion and corrosion resistance. Reflector and channel finished with a high gloss baked white enamel. Reflector is painted after fabrication.

The ballast shall be multi-voltage, thermally protected, resetting, class P, HPF, non-PCB, UL listed and CSA certified. The fluorescent fixture shall be equivalent to Lithonia Lighting model EJS or better.

A decal, complying with the ANSI standard, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

Luminaire information submitted for approval shall include any recommendations of the manufacturer for storage as provided under this contract.

The packaging of the luminaires shall incorporate the provisions recommended by the manufacturer for storage.

**Installation.** The luminaires shall be installed in accordance with the plans as specified by the Engineer. The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Luminaire shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing a LUMINAIRE, FLUORESCENT FOUR (4) FT., of the type indicated, wattage and operating voltage indicated or shown on the plan, which shall be payment in full for the item as specified herein.

### **LU03 LUMINAIRE, FLUORESCENT, HIGH BAY**

**Description.** This item shall consist of furnishing and installing a fluorescent luminaire high bay system for mounting height 15' – 40' for maintenance yard, sign shop or other facilities, with up to six (6), four (4) foot lamps, of the wattage and operating voltage as specified herein.

**Materials.** The housing shall be one piece constructed of die-formed cold rolled steel with longitudinal V-grooves in channel for strength. The channel cover shall be secured by latch for easy access to wire way. The luminaire shall be designed and constructed in accordance with the requirements of UL. The mounting accessories, hardware and brackets, shall be made out of steel for environmental conditions.

The finish shall be five stage iron phosphate permanent ensuring superior paint adhesion and corrosion resistance. Reflector and channel finished with a high gloss baked white enamel. Reflector is painted after fabrication.

The ballast shall be multi-voltage, thermally protected, resetting, class P, HPF, non-PCB, UL listed and CSA certified. The fluorescent fixture shall be equivalent to Lithonia Lighting model IBZ or better.

A decal, complying with the ANSI standard, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

Luminaire information submitted for approval shall include any recommendations of the manufacturer for storage as provided under this contract.

The packaging of the luminaires shall incorporate the provisions recommended by the manufacturer for storage.

**Installation.** The luminaires shall be installed in accordance with the plans as specified by the Engineer. The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Luminaire shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing a LUMINAIRE FLUORESCENT HIGH BAY, of the type indicated, wattage and operating voltage indicated or shown on the plan, which shall be payment in full for the item as specified herein.

#### **LU04 LUMINAIRE, FLUORESCENT, FOR WET LOCATIONS**

**Description.** This item shall consist of furnishing and installing, a fluorescent luminaire with lamp for the weigh station pit area, wash bay at the maintenance yard or buildings, as specified herein, at the wattage and at locations as designated by the Engineer.

**Materials.** The housing shall be one piece and refractor made out of durable polycarbonate to reduce vandalism. The luminaire shall be equal or better than Lithonia Lighting model series "FHE" and UL listed for wet locations.

The cover-reflector and socket-reflector junctions shall be sealed against the entry of moisture, dirt and insects with a thick, high density Dacron felt gasket, securely attached by mechanical means, such as a retaining clip, or by a wide-temperature permanent adhesive in a manner acceptable to the Engineer.

A decal, complying with the ANSI standard, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

The packaging of the luminaires shall incorporate the provisions recommended by the manufacturer to accommodate storage. The submittal shall include these recommendations.

**Installation.** Manufacturer's recommendations shall be followed during the installation process. The wiring connections shall be made as shown on the drawings and in accordance with the National Electrical Code. The Contractor shall test the luminaires with the lighting controller energized to assure that all the components are working in accordance with their specifications and carrying rated load.

Wall mounted luminaires shall be either attached to structures, such as a wall, as indicated on the plans or as directed by the Engineer.

All mounting hardware shall be corrosion resistant and shall be stainless steel unless otherwise indicated. The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Luminaire, fluorescent, shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing a LUMINAIRE, FLUORESCENT, FOR WET LOCATIONS, of the type, number of lamps and wattage indicated by the Engineer, which shall be payment in full for the item as specified herein.

#### **LU05 LUMINAIRE, HPS, FOR BUILDING ROOF**

**Description.** This item shall consist of furnishing and installing, a HPS, luminaire, with lamp and photocell, if specified, for flood lighting or roof mount, as specified herein. All boxes, recommended by the manufacturer for proper storage, shall be included in this item.

**Materials.** The housing shall be heavy duty, made of die cast aluminum. The luminaire shall meet NEMA specifications, high pressure sodium lamp, of specified wattage and voltage. The shield and other mounting accessories, as specified on the contract drawing, shall be included with the luminaire.

When closed, the optical assembly shall be sealed with a gasket against the entry of moisture, dirt and insects. The cover-reflector and socket-reflector joints shall be sealed against the entry of moisture, dirt and insects with a thick, high density Dacron felt gasket, securely attached by mechanical means, such as a retaining lip, or by a wide-temperature permanent adhesive in a manner acceptable to the Engineer. Submittal information shall include data relative to gasket thickness and density and the means of securing it in place. Any alternative gasket material may be approved by the Engineer. There shall be a provision for thermal breathing. A charcoal filter may be used, subject to approval by the Engineer.

A decal, complying with the ANSI standard, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

**Installation.** The installation shall be as indicated on the plans, or as directed by the Engineer. All mounting hardware shall be corrosion resistant and shall be stainless steel unless otherwise indicated. The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Luminaire shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing a LUMINAIRE, HPS, FOR BUILDING ROOF, of the wattage and operating voltage specified, which shall be payment in full for the item as specified herein.

#### **LU06 LUMINAIRE, HPS, FOR BUILDING WALL**

**Description.** This item shall consist of furnishing and installing, a wall mounted luminaire, with lamp, as specified herein. All boxes, recommended by the manufacturer for proper storage, shall be included in this item.



**Materials.** The housing shall be of aluminum construction consisting of a single piece extruded main frame and flat sheet back panel. Heavy-duty cast aluminum doorframe shall be hinged and latched by means of a single screw. The optical system shall be adjustable, with "sharp cutoff", reflector optical assembly consisting of a hydroformed, specular Alzak main reflector with both parabolic and cylindrical reflecting surfaces, auxiliary reflecting elements, and a support frame. Optical elements may be rotated to permit adjustment of cutoff over a range from 70 degrees through 86 degrees. The refractor shall be vandal resistant, injection molded, polycarbonate lens, UV stabilized, and complete with special UV inhibiting coating. The luminaire shall be UL listed for wet locations. The mounting accessories, hardware and brackets, shall be stainless steel, unless indicated otherwise.

The cover-reflector and socket-reflector junctions shall be sealed against the entry of moisture, dirt and insects with a thick, high density Dacron felt gasket, securely attached by mechanical means, such as a retaining lip, or by a wide-temperature permanent adhesive in a manner acceptable to the Engineer. It shall be an equivalent or better than the Paracyl luminaire.

A decal, complying with the ANSI standard, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

Luminaire information submitted for approval shall include any recommendations of the manufacturer for storage as provided under this contract.

The wattage and operating voltage as specified on the plan submitted shall be used as part of this pay item.

**Installation.** Wall mount luminaires shall be either attached to structures, such as a wall, as indicated or implied by the configuration on the plans, or as directed by the Engineer. The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Luminaire shall be counted, each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing a LUMINAIRE, HIGH PRESSURE SODIUM, FOR BUILDING WALL, of the wattage and operating voltage specified, which shall be payment in full for the item as specified herein.

#### **LU07 LUMINAIRE, KEEPER**

**Description.** This item shall consist of furnishing, delivering and installing a luminaire keeper of the type and construction, as shown in figure L-22, to secure the luminaire to the mast arm or davit arm in case of a failure of the luminaire mounts.

**Materials.** The cable used for the luminaire keeper shall be 3.18 mm (0.0125") stainless steel aircraft cable. The cable shall be secured at both ends, as shown on the drawing.

**Method of Measurement.** Luminaire keeper, shall be counted, each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing one, LUMINAIRE KEEPER, of the type and construction as specified, which shall be payment in full for the item specified herein.

#### **LU08 LUMINAIRE, NAVIGATION LED**

**Description.** This item shall consist of furnishing and installing a navigation LED light fixture including LED lamp, of the wattage as specified, conduit connection, wiring and all appurtenances mounted on fixed and moveable bridges, piers, abutment walls and dolphins.

**Materials.** The existing navigation light fixtures currently installed on the Department structures meet U.S. Coast Guard Bridge Lighting Regulations. Refer to Section 822 of the Standard Specifications for Road and Bridge Construction, current version.

Replacement fixtures of equipment required under this contract shall:

- Meet current U.S.C.G. regulations.
- Be mounted in the same location and manner as the original units.
- Match the Fresnel lens color and degree spread (either 180 degrees or 360 degrees) as the existing units.
- Be equipped with a shielding device for protection from flying debris and other spurious objects.

The existing equipment was manufactured by Security Products Division of Federal Signal Corporation and identified as follows:

TYPE	DESCRIPTION
Type 1 Pier light	180 Degree red lens, cast aluminum housing
Type 1-A Pier light	180 Degree red lens, cast aluminum housing
Type 1-P Pivot type Channel or Pier light	180 Degree red lens, cast aluminum housing
Type 2 Pivot type Bridge Light	1 Green and 1 Red 180 Degree lenses, cast aluminum housing
Type 6 Channel Marker	360 Degree green or red lens, cast aluminum housing
Type 6 PSU Pivot type Channel light	360 Degree green or red lens, cast aluminum housing
Type 11 Channel light	2-360 Degree green or red lenses, cast aluminum housing

**Installation.** The Contractor shall provide all equipment, transportation and labor necessary to furnish and install the equipment as specified. New wiring and conduit will be paid under separate contract pay items. The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Furnishing and installing each Navigation LED luminaire, as specified above and approved by the Engineer, shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for LUMINAIRE, NAVIGATION LED, which shall be payment in full for furnishing and installing, specified herein and as directed by the Engineer.

**LU09 LUMINAIRE, REMOVAL AND SALVAGE**

**Description.** This item shall consist of disconnecting, completely removing and transporting to the State’s storage facility, and unloading as salvage, a luminaire mounted on a wall, roof, or ceiling, in a maintenance yard, sign shop, weigh station, rest areas and other IDOT facilities , light pole, light tower, underpass, tunnel sign structure or navigation light fixture as specified herein. This pay item shall also include removal of the associated conduit, wire, disconnect switch and junction boxes. Proper documentation of the State’s salvage is required with this pay item.

**General.** Luminaire removal shall be in accordance with Section 841 of the Standard Specifications for Road and Bridge Construction, current version.

Prior to the removal of any equipment, the Contractor shall arrange an inventory inspection with the Engineer. All equipment shall be inspected and logged as to type, size and condition. No removal work shall be permitted until approved by the Engineer.

Unless otherwise indicated, luminaires shall be removed, boxed in containers approved by the Engineer and delivered and unloaded at the storage facility of the State, or as designated by the Engineer.

Any damage resulting from the removal and/or transportation of the luminaire shall be repaired to its original condition, or replaced in kind, at the Contractor's own expense, to the satisfaction of the Engineer.

Existing anchors for underpass or tunnel lighting fixture which have been attached improperly shall be left in place as removal would cause more damage to the beam than leaving the anchors in place.

**Method of Measurement.** Each luminaire, which is removed, boxed as approved, delivered to storage, unloaded, inspected, and documented properly, shall be counted as a unit for payment.

**Basis of Payment.** This item shall be paid at the contract unit price each for LUMINAIRE, REMOVAL AND SALVAGE, which shall be payment in full for the luminaire location as specified herein.

#### **LU10 LUMINAIRE, POLE, INSTALL ONLY**

**Description.** This item shall consist of retrieving from State's storage facility, loading, transporting and installing a luminaire on a light pole, complete with new lamp, of the wattage as specified by the Engineer, and all required hardware as specified herein. The luminaire and new lamp shall be paid separately.

**Installation.** Installation shall be as described in Section 821.04 of the Standard Specifications for Road and Bridge Construction, current version and with the Special Provisions, attached at the end of the luminaire pay items.

**Method of Measurement.** Luminaires shall be counted each, installed.

**Basis of Payment.** This item will be paid at the contract unit price each for LUMINAIRE, POLE, INSTALL ONLY, which shall be payment in full for the complete installation as specified herein.

#### **LU11 LUMINAIRE SHIELD, TOWER**

**Description.** This item shall consist of furnishing, delivering and installing a luminaire shield, for highway luminaires on light towers, at locations, as directed by the Engineer, to minimize off-highway light infringement.

**Materials.** The luminaire shields shall be 15" high, curved shield, GE Lighting Systems Model ELS-HMAA060, off-highway side luminaire shield, or approved equal. Highway side shields shall not be used.

**Method of Measurement.** Luminaire shield, tower, shall be counted, each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing one, LUMINAIRE SHIELD, TOWER, of the type and construction as specified, which shall be payment in full for the item specified herein.

#### **LU12 LUMINAIRE, TOWER, INSTALL ONLY**

**Description.** This item shall consist of retrieving from State's storage facility, loading, transporting and installing a luminaire on a light tower, complete with new lamp, of the wattage as specified by the Engineer, and all required hardware as specified herein. The luminaire and new lamp shall be paid separately.

**Installation.** Installation shall be as described in Section 821.05 of the Standard Specifications for Road and Bridge Construction, current version and with the Special Provisions, attached at the end of the luminaire pay items.

**Method of Measurement.** Luminaires shall be counted each, installed.

**Basis of Payment.** This item will be paid at the contract unit price each for LUMINAIRE, TOWER, INSTALL ONLY, which shall be payment in full for the complete installation as specified herein.

#### **LU13 LUMINAIRE, TWO LAMPS, FLUORESCENT, INSTALL ONLY**

**Description.** This item shall consist of retrieving from State's storage facility, loading, transporting, installing, connecting, and adjusting ready for operation, as specified herein and as shown on the plans.

**Installation.** The installation shall conform to Article 821.07 of the Standard Specifications for Road and Bridge Construction, current version. The Contractor shall provide all equipment, transportation and labor necessary to install the equipment as specified. All wiring, terminal blocks, and ballast shall be fully enclosed within the fixture so that none of the above parts are exposed when relamping. The mounting hardware, including the U-channel, fuse, and new lamps as specified are incidental to this pay item.

The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Installing each luminaire, complete in place, with integral ballast and lamps as specified and as shown on the plans, as provided for installing as stated above, and approved by the Engineer, shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for LUMINAIRE, FLUORESCENT, TWO LAMPS, INSTALL ONLY, complete in place, which shall be payment in full for the work as described herein.

#### **LU14 LUMINAIRE, WALL, CEILING, UNDERPASS OR TUNNEL, INSTALL ONLY**

**Description.** This item shall consist of retrieving from Owner's storage facility, loading, transporting, and installing a wall, ceiling, underpass or tunnel luminaire, complete with new lamp, of wattage as specified by the Engineer, and all required hardware, as specified herein.

**Installation.** Installation shall be as described in Section 821.06 of the Standard Specifications for Road and Bridge Construction, current version and with the Special Provisions, attached at the end of the luminaire pay items.

The mounting hardware, junction box, fuse, new lamp as specified and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

Unless otherwise indicated, attachment of underpass lighting appurtenances, including the placement of associated anchors, but not limited to underpass luminaires, identification brackets and conduit shall not be attached and/or drilled into precast, prestressed concrete beams. However, existing anchors, which have been installed improperly, shall be left in place, as removal may cause more damage to the beam than leaving it in place.

**Method of Measurement.** Luminaire shall be counted each, installed.

**Basis of Payment.** This item will be paid at the contract unit price each for LUMINAIRE, WALL, CEILING, UNDERPASS OR TUNNEL, INSTALL ONLY, which shall be payment in full for the complete installation as specified herein.

#### **LU15 LUMINAIRE, HPS, POLE**

**Description.** This item shall consist of furnishing and installing, a HPS, luminaire, with lamp and photocell, if specified, for light pole, as specified herein. All boxes, recommended by the manufacturer for proper storage, shall be included in this item.

**Materials.** The housing shall be heavy duty, made of die cast aluminum. The luminaire shall meet NEMA specifications, high pressure sodium lamp, of specified wattage and voltage. The shield and other mounting accessories, as specified on the contract drawing, shall be included with the luminaire.

When closed, the optical assembly shall be sealed with a gasket against the entry of moisture, dirt and insects. The cover-reflector and socket-reflector joints shall be sealed against the entry of moisture, dirt and insects with a thick, high density Dacron felt gasket, securely attached by mechanical means, such as a retaining lip, or by a wide-temperature permanent adhesive in a manner acceptable to the Engineer. Submittal information shall include data relative to gasket thickness and density and the means of securing it in place. Any alternative gasket material may be approved by the Engineer. There shall be a provision for thermal breathing. A charcoal filter may be used, subject to approval by the Engineer.

A decal, complying with the ANSI standard, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

**Installation.** The installation shall be as indicated on the plans, or as directed by the Engineer. All mounting hardware shall be corrosion resistant and shall be stainless steel unless otherwise indicated. The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Luminaire shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing a LUMINAIRE, HPS, FOR LIGHT POLE, of the wattage and operating voltage specified, which shall be payment in full for the item as specified herein.

## **LU16 LUMINAIRE, HPS, TOWER**

**Description.** This item shall consist of furnishing and installing, a HPS, luminaire, with lamp and photocell, if specified, for tower, as specified herein. All boxes, recommended by the manufacturer for proper storage, shall be included in this item.

**Materials.** The housing shall be heavy duty, made of die cast aluminum. The luminaire shall meet NEMA specifications, high pressure sodium lamp, of specified wattage and voltage. The shield and other mounting accessories, as specified on the contract drawing, shall be included with the luminaire.

When closed, the optical assembly shall be sealed with a gasket against the entry of moisture, dirt and insects. The cover-reflector and socket-reflector joints shall be sealed against the entry of moisture, dirt and insects with a thick, high density Dacron felt gasket, securely attached by mechanical means, such as a retaining lip, or by a wide-temperature permanent adhesive in a manner acceptable to the Engineer. Submittal information shall include data relative to gasket thickness and density and the means of securing it in place. Any alternative gasket material may be approved by the Engineer. There shall be a provision for thermal breathing. A charcoal filter may be used, subject to approval by the Engineer.

A decal, complying with the ANSI standard, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

**Installation.** The installation shall be as indicated on the plans, or as directed by the Engineer. All mounting hardware shall be corrosion resistant and shall be stainless steel unless otherwise indicated. The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Luminaire shall be counted each, furnished and installed.

**Basis of Payment.** This item shall be paid at the contract unit price each for furnishing and installing a LUMINAIRE, HPS, FOR TOWER, of the wattage and operating voltage specified, which shall be payment in full for the item as specified herein.

### **LU17 LUMINAIRE, METAL HALIDE**

**Description.** This item shall consist of removing the old fixture and furnishing and installing, a Metal Halide light fixture of the wattage specified, conduit connection wiring, and all appurtenances, mounted on location as specified by the Engineer, in facilities in District 1.

**Materials.** Materials shall be in accordance with Section 1067 of the Standard Specification for Road and Bridge Construction, current version, and with the Special Provisions, attached at the end of the luminaire pay items.

The wattage and operating voltage as specified on the plan submitted shall be used as part of this pay item.

**Installation.** The Contractor shall provide all equipment, transportation and labor necessary to furnish and install the Metal Halide light fixture as specified. New wiring and conduit up to 20' shall be included under this contract pay item, and will not be paid separately.

The mounting hardware, junction box and other appurtenances required are included as part of this pay item except the cable and conduit shall be paid under separate pay item.

**Method of Measurement.** Removing an old fixture, furnishing and installing each Metal Halide Light Fixture, as specified above and approved by the Engineer, shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for LUMINAIARE, METAL HALIDE, which shall be payment in full for the work, specified herein and as directed by the Engineer.

### **LU18 EMERGENCY OR EXIT LIGHT FIXTURE**

**Description.** Furnish and install one emergency/exit light fixture at the Maintenance Yards, Sign Shops, and other Department facilities in District 1, as directed by the Engineer. The fixture shall be a 2-lamp, 120 V, with a minimum two hour battery back up, totally enclosed industrial type fixture. Installation shall include all hardware, hangers, junction box, fuse, lamp as specified and other appurtenances. Removal of the existing fixture, if necessary, shall be included in this work. Conduit and wire installation shall be paid through other pay items, where needed.



**Method of Measurement.** Furnishing and installing, removing old fixture if necessary, as specified above and approved by the Engineer, shall be counted as a unit of payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for EMERGENCY/EXIT LIGHT FIXTURE, which shall be payment in full for furnishing, delivering, storing, installing and connecting the fixture, complete.

### **SPECIAL PROVISIONS FOR LUMINAIRES**

These special provisions apply to the luminaire pay items.

Revise the second paragraph, Article 1067.01(c) of the Standard Specifications:

“The reflector, the refractor or lens, and the entire optical assembly shall not develop any discoloration over the normal life span of the luminaire. An extended warranty over and above the normal warranty, shall be furnished by the manufacturer pertaining to the above said discoloration. The extended warranty shall be furnished in writing guaranteeing replacement, including cost of labor and shipment, free of charge to this contract and to the Owner, of any optical assembly, or any component parts thereof, which, as determined by the Engineer, would develop the aforesaid discoloration. The extended warranty shall accompany submittal information.”

Add the following to Article 1067.01(e). of the Standard Specifications:

“The ballast shall be a high power factor, low-loss, auto regulator type ballast.”

Delete Article 1067.01(e)(1) High Pressure Sodium Reactor ballast of the Standard Specifications

Revise Article 1067.01(e)(1) of the Standard Specifications to read:

“High Pressure Sodium Regulator. That ballast shall be a high power factor, constant wattage auto-regulator, lead type (CWA). The ballast shall be designed to furnish proper electrical characteristics for starting and operating a high pressure sodium vapor lamp of the specified rating at ambient temperatures of -29 degrees to +40 degrees C. The ballast windings shall be adequately impregnated and treated for protection against the entrance of moisture, insulated with Class H insulation, and able to withstand the NEMA standard dielectric test. The ballast shall include an electronic starting assembly.

The starting assembly shall be comprised of solid state devices capable of withstanding ambient temperatures of 85 degrees C. The starter shall provide timed pulsing with sufficient follow-through current to completely ionize and start all lamps. Minimum amplitude of the pulse shall be 2,500 volts, with a width of one (1) microsecond at 2,250 volts, and shall be applied within 20 electrical degrees of the peak of the open circuit voltage wave with a repetition rate as required by the lamp in accordance with ANSI for the 60 cycle wave. The lamp peak pulse current shall be a minimum of 0.2 amperes. Proper ignition shall be provided over a range of input voltage from 216 to 264 volts. The starter component shall be field replaceable and completely interchangeable with no adjustment necessary for proper operation. The starter component shall have push-on type electrical terminations to provide good electrical and mechanical integrity and ease of replacement. Terminal configuration shall preclude improper insertion of plug-in components. The starter circuit board shall be treated in an approved manner to provide a water and contaminant-resistant coating.

The ballast shall have an overall power factor of at least 0.9 when operated under rated lamp load. The ballast shall withstand a 2,500 volt dielectric test between the core and windings without damage to the insulation. The ballast shall not subject the lamp to a crest factor exceeding 1.8 and shall operate the lamp without affecting adversely the lamp life and performance.

The ballast shall be designed to ANSI Standards and shall be designed and rated for operation on a nominal 240 volt system. The ballast shall provide positive lamp ignition at the input voltage of 216 volts. It shall operate the lamp over a range of input voltages from 216 to 264 volts without damage to the ballast. It shall provide lamp operation within ANSI lamp specifications for rated lamp life at input design voltage range. All measurements shall be taken using a seasoned reference lamp conforming to ANSI test procedures. The reference lamp wattage shall not vary more that +/- 2% from the nominal wattage rating of the reference lamp.

Operating characteristics shall produce output regulation not exceeding the following values:

Nominal Ballast Wattage	Maximum Ballast Regulation
750	25%
400	25%
310	26%
250	22%
150	22%

For this measure, regulation shall be defined as the following:

$$\text{Percentage Ballast Regulation} = \frac{W_{LampH} - W_{lampL}}{W_{lampN}} \times 100$$

where:  $W_{LampH}$  = lamp watts at +10% line voltage (264v)

$W_{LampL}$  = lamp watts at - 10% line voltage (216v)

$W_{lampN}$  = lamp watts at line voltage (240v)

Ballast losses, based on cold bench tests, shall not exceed the following values:

Nominal Ballast Wattage	Maximum Ballast Losses
750	16.0%
400	16.0%
310	19.0%
250	17.5%
150	26.0%

Ballast losses shall be calculated based on input watts and lamp watts at nominal system voltage as indicated in the following equation:

$$\text{Percentage Ballast Losses} = \frac{W_{line} - W_{lamp}}{W_{lamp}} \times 100$$

where:  $W_{line}$  = line watts at 240v  
 $W_{lamp}$  = lamp watts at 240v

Revise the eighth paragraph of Article 1067.01 of the Standard Specifications to read:

“The testing performed shall include photometric and electrical testing. Photometric testing shall be in accordance with IES recommendations, in addition that the selected luminaire(s) shall be tested as manufactured without any disassembly or modification and, as a minimum shall yield an isofootcandle chart, with maximum candela point and half candela trace indicated, an isocandela diagram, maximum plane and cone plots of candela, a candlepower table (house and street side), a coefficient of utilization chart, a luminous flux distribution table, and complete calculations based on specified requirements and test results.”

Add the following to Article 1067.02(a)(1) of the Standard Specifications:

“The luminaire shall slip-fit on a two inch pipe arm, and shall have a barrier to limit the amount of insertion. The mounting clamp shall be concealed in the housing and provide a +5 degree vertical leveling adjustment. The slip-fit pipe entry shall be made by means of a flange internal to the cylinder and a round guide tube or other approved means which will provide a seal of the housing and minimum disruption of a smooth outside surface of the luminaire which will be compatible with the mounting arm.”

Add the following table(s) to Article 1067.01 of the Standard Specifications:

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE**

<b>GIVEN CONDITIONS</b>		
<b>ROADWAY DATA</b>	Pavement Width	m <hr style="width: 50%; margin-left: auto; margin-right: 0;"/> (ft)
	Number of Lanes	<hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
	I.E.S. Surface Classification	R3 <hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
	Q-Zero Value	.07 <hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
<b>LIGHT POLE DATA</b>	Mounting Height	m <hr style="width: 50%; margin-left: auto; margin-right: 0;"/> (ft)
	Mast Arm Length	m <hr style="width: 50%; margin-left: auto; margin-right: 0;"/> (ft)
	Pole Set-Back From Edge of Pavement	m <hr style="width: 50%; margin-left: auto; margin-right: 0;"/> (ft)
<b>LUMINAIRE DATA</b>	Lamp Type	HPS <hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
	Lamp Lumens	<hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
	I.E.S. Vertical Distribution	Medium <hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
	I.E.S. Control Of Distribution	Cutoff <hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
	I.E.S. Lateral Distribution	Type I <hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
	Total Light Loss Factor	<hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
<b>LAYOUT DATA</b>	Spacing	m <hr style="width: 50%; margin-left: auto; margin-right: 0;"/> (ft)
	Configuration	Single Sided <hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
	Luminaire Overhang over edge of pavement	m <hr style="width: 50%; margin-left: auto; margin-right: 0;"/> (ft)

**NOTE:** Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

<b>PERFORMANCE REQUIREMENTS</b>
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**NOTE:** These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

<b>ILLUMINATION</b>	Average Horizontal Illumination, $E_{AVE}$	Lux
	Uniformity Ratio, $E_{AVE}/E_{MIN}$	
<b>LUMINANCE</b>	Average Luminance, $L_{AVE}$	Cd/m <sup>2</sup>
	Uniformity Ratio, $L_{AVE}/L_{MIN}$	
	Uniformity Ratio, $L_{MAX}/L_{MIN}$	
	Max. Veiling Luminance Ratio, $L_V/L_{AVE}$	

**LW01 WASH HUBBARD’S CAVE TUNNEL WALLS**

**Description.** The tiled tunnel walls at highway lighting locations L0883, (Hubbard’s cave) shall be steam washed per paint and grout manufacturers’ recommended pressure and temperature. Both I/B and O/B sides shall be washed to remove dirt, dust or other foreign material. The Contractor shall inspect locations prior to bidding this item.

**Hubbard’s cave approximate dimensions:**

- Maximum Height: 14’
- Length (4 sides): 741’, each side
- Tile manufacturer: Buchtal
- Grout: Epoxy coated latex modified according to ANSI Standard A118.6.

**General.** Protect all surrounding painted surfaces and foliage to avoid damage from contact with washing solutions. Avoid wind drift onto passersby, vehicles or adjacent properties. Protect and/or divert pedestrian and auto traffic from the work area. Use a soft bristled brush or broom for washing, and rinse with sponge and water. Pressure water rinsing may improve cleaning results, but is not required.

**Materials.** The detergent, used for the Tile washing, shall be ONERESTORE, made by EaCo CHEM Inc., or equal. The Contractor shall follow all manufacturer instructions for application and use of the product.

The technical data is as follows:

Appearance: Liquid	Specific Gravity: 1.117
Color: Yellow to Amber	Solubility in Water: complete
Odor: Mild	Biodegradable: 100%
Flash Point: 212° F @ 760 mm Hg	Personal Protection: B*
	B* = Chemical Resistant and goggles

Test each type of surface before overall application to ensure suitability and desired results. Apply test areas according to the manufacturer's recommendations.

**Cleaning.** Protect all surrounding painted surfaces and foliage to avoid damage from contact with washing solutions. Avoid wind drift onto passersby, vehicles or adjacent properties. Protect and/or divert pedestrian and auto traffic from the work area. Block any and all drains where present and setup water recovery to recover waste water.

Use pressurized water to rinse the tiles, then spray the chemical detergent and scrub clean, high pressure wash surface until clean. use soft bristled brush or broom for extra washing as applicable, and rinse clean with a pressure water and recover waste water.

The Contractor shall recover waste water and detergent chemical, the recovered waste water shall be picked up after completion by an environmental vacuum truck and shall be disposed of in accordance with IEPA rules and guidelines as specified herein.

The Contractor shall provide the traffic control for lanes and ramps as per the Bureau of Traffic Expressway closure guidelines for Hubbard's cave and protection of workers and motorists. as part of this pay item.

**Method of Measurement.** Tiled tunnel walls, each installation, washed.

**Basis of Payment.** This item shall be paid at the contract unit price, each, for WASH HUBBARD'S CAVE TILED TUNNEL WALLS, WASH, as specified which shall be payment in full for all work specified herein.

## **LW02 WASH & RELAMP HUBBARD'S CAVE LUMINAIRES**

**Description.** This item shall consist of group washing and cleaning the glass inside and outside of the fixture using non-abrasive cleaning solution as per manufacturer specification and relamp as specified herein.

The Contractor shall wash lens inside and outside and replace the lamp in accordance with the luminaire manufacturer specifications. Work shall be documented on Log Form L-LR. Each fixture opened for washing shall be securely re-locked. If any decals are torn or missing, including the mounting bracket, they shall be replaced as part of this program.

- The Contractor (or Sub-Contractor) shall list all work scheduled on the Daily Agenda.
- The Contractor shall obtain lane closure and work approval from the IDOT Bureau of Traffic for expressway locations scheduled on the Daily Agenda. The Engineer may suspend work operations should a required lane or shoulder closure not be obtained, or if proper traffic plan control is not used.
- A work crew person shall use Form S-1 to record required information at the time of work. Re-copied or summarization of the original sheets in the office will not be accepted.
- The work crew foreman shall notify the IDOT Engineer on the day.

- While performing the group wash and relamp work, the crew shall also conduct an overall inspection of each installation to ensure that each installation is maintained in a safe and proper operating condition as originally designed or as subsequently modified by the Department. Items to be inspected include: the general condition of the fixture (i.e., mounting and ballast), lamp lenses and hinges, conduit and decals. All observed deficiencies shall be recorded on Log Form S-1. All signed original log forms shall be submitted with the respective invoice(s).

**Work Description.**

**Luminaire Cleaning.** Wash, rinse and wipe dry both sides of the reflector and clean any dirt and debris from on or around the fixture. Do not wash or tamper with the fixture refractor when washing the luminaire.

**Lamp Replacement.** Replace lamps in all fixtures with new lamps of the same type and wattage or an approved replacement. Close and lock each fixture after washing and lamp replacement.

**Miscellaneous Work.** All identification decals shall be cleaned or replaced if torn, non-legible or missing.

**Disposal.** All used lamps shall be disposed of in accordance with the U.S. Environmental Protection Agency (EPA) directives and through a certified EPA disposal company. The old lamps shall be collected and boxed according to the disposal agency's recommendations. The Contractor shall provide all documentation necessary for submittal to all applicable agencies for the disposal of the various types of lamps and their quantities.

The Contractor shall provide the traffic control for lanes and ramps as per the Bureau of Traffic Expressway closure guidelines for Hubbard's cave and protection of workers and motorists. as part of this pay item.

**Method of Measurement.** Luminaires shall be counted, each, fixture washed and relamped.

**Basis of Payment.** This item shall be paid at the contract unit price each for WASH AND RELAMP HUBBARD'S CAVE LUMINAIRES which shall be payment in full for all work specified herein.

**LWR2 WASH AND RELAMP, LPS LAMPS**

**Description.** The Contractor shall wash lens in accordance with the luminaire manufacturer specifications, remove existing lamp and replace with new lamp, at highway and maintenance yard facility lighting locations as designated by the Engineer. This item shall include moving lane closures and the price of the new lamp as specified. The Engineer will determine the quantities and locations where re-lamp work is to be authorized each year. Work shall be documented on Log Form L-LR. Submittals and work procedures will be discussed at a Contractor and Department procedures meeting.

The fixture reflector shall not be handled when washing glass or replacing lamp. Each fixture opened for washing shall be securely re-locked. If any decals are torn or missing, including the mounting bracket, they shall be replaced as part of this program.

- The Contractor shall provide an overall program work schedule for each period.
- Upon receipt of an authorized letter for an individual program, and prior to the beginning of work, the EMC shall provide documentation of the requisition of the lamps and the vendor invoice. The invoice should refer to the EMC Contract year.
- The Contractor (or Sub-Contractor) shall list all work scheduled for specific locations on the Daily Agenda.
- The Contractor shall obtain lane closure and work approval from the IDOT Bureau of Traffic for expressway locations scheduled on the Daily Agenda. The Engineer may suspend work operations should a required lane or shoulder closure not be obtained, or if proper traffic plan control is not used.
- The Contractor shall provide the traffic control for lanes and ramps as per the Bureau of Traffic Expressway closure guidelines and protection of workers and motorists. as part of this pay item.
- A work crew person shall use Form S-1 to record required information at each site location at the time of work. Re-copied or summarization of the original sheets in the office will not be accepted.
- After completing the FIRST DAY'S work on a new SECTION of highway lighting, the Foreman shall fax Form S-1 to the BEO Field Office for Engineer approval.
- The IDOT inspectors will randomly inspect work in progress and sign the ORIGINAL Log, Form S-1.
- The work crew foreman shall notify the IDOT Engineer on the day, when the work will be completed for a section of the highway; Ike, Kennedy, etc. The foreman shall fax the copy of the S-1 log, for the last location in that section, to the Engineer, advising the completion of that section and being ready for inspection.
- While performing the wash and relamp work, the crew shall also conduct an overall inspection of each installation to ensure that each installation is maintained in a safe and proper operating condition as originally designed or as subsequently modified by the Department. Items to be inspected include: the general condition of the fixture (i.e., mounting and ballast), lamp lenses and hinges, conduit and decals. All observed deficiencies shall be recorded on Log Form S-1. All signed original log forms shall be submitted with the respective invoice(s).
- The IDOT Inspector will approve work or prepare a corrective work list, noting work deficiencies that must be corrected prior to invoicing.

**Underpass, Wall and Roof Mounted Fixtures.** Wash, rinse, wipe dry both sides of the glassware and clean any dirt and debris from on or around the fixture and replace the old lamp with new one of the same type and wattage.



**Materials.** All fixtures scheduled for group wash and relamping all have lamps replaced with a new lamp of the same type and wattage. All lamps used for group replacement shall be subject to approval by the Engineer.

**Work Description.**

**Luminaire Cleaning.** Wash, rinse and wipe dry both sides of the reflector and clean any dirt and debris from on or around the fixture. Do not wash or tamper with the fixture refractor when washing the luminaire.

**Lamp Replacement.** Replace lamps in all fixtures with new lamps of the same type and wattage or an approved replacement. Close and lock each fixture after washing and lamp replacement.

**Miscellaneous Work.** All identification decals shall be cleaned or replaced if torn, non-legible or missing.

**Disposal.** All used lamps shall be disposed of in accordance with the U.S. Environmental Protection Agency (EPA) directives and through a certified EPA disposal company. The old lamps shall be collected and boxed according to the disposal agency's recommendations. The Contractor shall provide all documentation necessary for submittal to all applicable agencies for the disposal of the various types of lamps and their quantities.

**Method of Measurement.** Luminaires shall be counted, each, fixture washed, old lamp removed and new lamp replaced.

**Basis of Payment.** This item shall be paid at the contract unit price each for WASH AND RELAMP, LPS LAMPS which shall be payment in full for the types of lamps listed below, and all work specified herein.

## **LIGHTING CONTROLLER SPECIFICATIONS**

**Description.** The Contractor shall complete the work within the calendar year.

A copy of the record drawing for the lighting cabinet indicating the location of cabinet, service conduit size, and number of cables with size from ComEd pole or pad mount transformer shall be provided.

The Contractor is responsible for scheduling the work and for coordinating with the Engineer, an Engineer presence is required. The Contractor shall also advise the Engineer when each location is complete and shall provide a written documentation via e-mail or fax to that effect. The Engineer reserves the right to require a final inspection of the changeover at any or all of the locations documented as complete.

A corrective work list shall be prepared for deficiencies found during inspection. If progress of the work is inadequate, or if errors in complete work are repeatedly found, the Engineer may initiate withholding of Routine Maintenance payment. The Contractor shall provide a progress report in the monthly routine work submittal book.

The Contractor shall be responsible for all traffic control and temporary provisions required for the work, all at no additional cost to the contract. All materials and work shall be in conformance with the requirements of applicable contract specifications and Article 250 of the National Electrical Code.

The Contractor shall be responsible for coordination with the Electric Utility as necessary and shall be responsible for any and all modifications. The Contractor shall provide temporary backup power or service to maintain continued operation of the cabinet during transition.

The work shall include:

- New conduit and cable from the service disconnect to the controller if the existing cable doesn't meg.
- Restoration of ground with seed or sod
- New grounding of the service unless the existing grounding is adequate as witnessed by the Engineer
- Removing of the old cabinet and transferring into State Stock
- Replacing with new SCADA type cabinet with the same radio code
- Coordinating the RTU terminal and FIU configuration GUI modification
- Testing and documentation

**Foundation.** The foundation, if modified or replaced, shall be paid using non-routine pay items.

**Replace Electric Service Conductors.** The work shall include the removal of the existing service conductors if they do not meg, and shall include the furnishing and installing of new service conductors, based on the manner of the existing service.

**Provide New System Ground of Electric Service.** The work shall include the installation of a new system ground, using one or more grounding electrodes, or other means approved by the Engineer. The system ground shall have a resistance to earth not to exceed 10 ohms. The Contractor shall conduct a system ground resistance test, using the fall-off potential method, and it shall be witnessed and approved by the Engineer. Ground resistance readings shall be submitted on progress reports. Should more than one electrode be required, additional electrodes shall be connected to the grid, and the grid re-tested. All ground electrode connections shall be exothermically welded. Ground rods and grounding electrode conductors shall be as specified and detailed.

**Lighting Cabinet.** The Contractor shall furnish and install a roadway lighting controller, duplex console type with radio control and associated wiring for control of highway lighting controller, as specified herein.

**Materials.** Materials shall be according to Article 1068 of the Standard Specification for Road and Bridge Construction, current version, except as follows: First three paragraphs of Article 1068.01 (c) (2) to be eliminated.

**Surface Preparation.** The cabinet, doors and all other parts to be painted shall be submerged in each tank of a 3-step iron phosphate conversion technique. After phosphatizing the parts shall be passed through an oven and baked to eliminate any moisture.

**Finish Coat.** Shall be polyester powder paint applied electrostatically to a minimum thickness of 2 mils and baked at 375 degrees for 20 minutes.

Revise the first sentence of Article 1068.01 (e) (4) of the Standard Specifications to read: "Contactors shall be electrically operated, mechanically held as specified, with the number of poles required for the service and with operating coil voltage as indicated."

Add the following to Article 825 of the Standard Specifications:

**Radio Control Equipment – Receiver-Decoder.** The radio control module consists of a radio receiver, digital decoder, and an output interface which allows centralized remote radio control of the lighting controller turn-on and turn-off functions. The radio control module must be capable of operation consistent with the existing radio control system, a Motorola SCADA Central Station.

The existing control system currently operates over 250 discrete lighting controllers via a securely coded proprietary data scheme. For this reason, the control module must consist of a Motorola ACE 3600 Modular Remote Unit, model F 7563, (small housing), with no less than the following options:

Motorola Designation	Description
F 7563 (VHF), F 7564 (UHF)	ACE 3600 CPU **
V 245	Mixed I/O
V 261	240 VAC Power Supply w/charger
Z 857AA	Surge Protection

\*\* Includes (1) three slot frame, (1) ACE 3600 CPU plus firmware, (1) mixed I/O Module, (1) VHF\* or UHF\* CDM 750 Radio with FSK Radio Interface, port 3 (1) AC Power Supply with Charger, (1) 6.5 Ah battery, installed in a 15" X 15" X 8.26" NEMA 4X/IP 56 painted metal enclosure with instruction manual.

\* As directed by the Engineer

The manufacturer's designation by no means relieves the Contractor of providing a fully functional radio system as described herein.

The Radio Control Module shall be programmed for the following operational parameters:

- Transceiver Frequency: To be specified by the Engineer
- Receive Frequency: To be specified by the Engineer
- Communications Failure Preset: Normally Open
- Individual Station address: To be specified by the Engineer

**Antenna.** The antenna shall be thick mount up to 1/2" mounting surface mounted by screw adapter (no magnet mounts). The low profile antenna mount shall be equivalent to Antenex – MABT8XNSI antenna Mount Low Profile. Accompanying antenna shall be equivalent to Antenex – B132 (Broad Band – VHF/UHF 1/4 wave 150928 MHz. Accompanying cable shall be equivalent to Antenex-RG8X and conductor equivalent to Antenex – CN8X from Radio to Antenna and shall be of appropriate length and not longer than 8 ft.

**Installation of I/O Module.** All motherboard cards shall be configured and installed as per manufacturer's specifications and IDOT specification Lighting SCADA 397. Modules include but are not limited to; CPU, Mixed I/O. All digital inputs terminated on the Mixed I/O card shall be dry. Termination points for all digital input points will be reflected on power center wiring diagram or additional wiring schematic provided by the engineer. All digital outputs received from the Mixed I/O card shall be rated at 24 VAC 2A. All digital outputs shall be connected to interposing relays prior to being integrated into the power center wiring logic. The digital outputs shall maintain a momentary closure for approximately 2 seconds.

All wiring termination points shall be tagged using the nomenclature given on the wiring diagram. The alarms acknowledge button shall be implemented with a placard stating "Alarm Acknowledge". Site configuration, map implementation, screens tagging and other related software configurations shall be specified elsewhere herein.

The antenna shall be centered on the top of the control cabinet. The antenna cable shall be dressed and trimmed for minimal length, allowing sufficient slack of removal of the radio connection for replacement or testing without disruption to the installation. The antenna connector shall be properly soldered to the cable assembly. Great care shall be exercised in the assembly of the antenna connector, excessive heat will destroy the inner insulation, and insufficient heat will produce a cold solder connection on the outer shield.

Intra-Module wiring shall be 18 AWG stranded wire, color coded (American) consistent with battery polarity, and signal. The wire connection from terminal block (TB2) to the interpose relays shall be 14 AWG stranded. All wires connected to the radio modules shall be dressed and tinned prior to insertion, (crimp on connectors shall not be allowed for use in the radio system). Cost of all wire is inclusive within the scope of this work.

A terminal strip separate from the integral radio module and power supply shall be provided to interface power and signal conductors to the lighting controller. Terminals and wiring shall be labeled in accordance with the drawings, and dressed to allow service. The radio module shall be provided with constant 240 VAC power. The control power breaker shall provide power for the SCADA system. This is to allow the system to be energized at all times.

The SCADA system shall be tested in conjunction with the controller inspection, prior to field installation. The turn-on and turn-off function shall be tested ten (10) consecutive times utilizing actual signals originating from District 1 Headquarters. Any failures must be cleared before the controller is delivered to the job site.

Null covers shall be provided for the slots not used. All analog inputs shall be 4-20 mA. All I-O wiring including analog and digital shall be wired as per the enclosed table.

**SCADA System Control Relay Assembly.** The Contractor shall mount and wire four (4) relays in a box as shown in the wiring diagram. Two relays shall be 240 volts sealed type and two relays shall be 24 volts sealed type, unless otherwise indicated, shall have contacts rated at not less than 20 amperes at 240 volts. The power relay for activating the lighting contactors shall have contacts rated to handle the contactor inrush. The relays shall be wired to a marked terminal strip.

**Testing.** As part of final acceptance testing, all individual I/O points and internal status alarms shall be tested for proper operation and transmission. The transmission shall be confirmed at IDOT District 1 HQ and the Contractors dispatch facility. This full SCADA system start-up shall be completed with the Engineer present.

The SCADA radio system shall have the following items tested: VSWR, cable impedance, RSSI to the power center and confirmation that data sent from power center is received by the IDOT lighting system computers.

**Analog Inputs and Transducers.** The panel shall include one voltage transducer for monitoring the line voltage and one current transducer for monitoring the neutral current. Their outputs shall be 4-20 mA DC each and shall be wired to channels 1 and 2 of the Mixed I/O module as shown. The voltage transducer shall be Scientific Columbus Model # VT110 – PAN7 – A4-2 for 480/240 volt single phase systems. The current transducers shall be Mel Kirchler Technologies Model # AT2-420-24L-FT, with power supply, PS-240-24P-1A. Both analog inputs shall be wired using shielded cable. Both transducers shall also be calibrated so that the SCADA system reads the correct value.

**Testing of the Assembled Cabinet.** Prior to shipment of the completed control cabinet, the control cabinet shall be tested for load, short circuits and complete operation of the cabinet as specified herein and as shown on the plans. The test shall be made at the manufacturer's shop, by the manufacturer and shall be witnessed by the Engineer. The Contractor shall arrange the test date with the Engineer and so allow not less than seven (7) days advance notice. The cabinet shall not be delivered to the job site until inspected, tested and approved for delivery by the Engineer.

## **CONSTRUCTION REQUIREMENTS.**

**General.** The lighting controller shall be delivered to the storage facility located within District 1. Wood blocking or other supports and appurtenant items required for proper storage shall be included in this item.

**Staging.** Manufacturer recommendation is for all Central Configuration programming be completed prior to the initial check out/PM of the SCADA unit in the field. This is to assure/confirm 2 way radio communications from the field RTU the Central. Lighting controller information submitted for approval shall include any recommendations of the Manufacturer for storage as provided under this contract.

The packaging of the lighting controller shall incorporate the provisions recommended by the Manufacturer to accommodate storage.

TERM	MOSCAD DESTINATION	WIRE #	DESCRIPTION OF INPUT
32	Analog Input 1 (+)	TB2 B11	CABINET NEUTRAL CURRENT
33	Analog Input 1 (-)	TB2 B1	CABINET NEUTRAL CURRENT
34	Analog Input 2 (+)	TB2 A2	CABINET SERVICE VOLTAGE
35	Analog Input 2 (-)	TB2 B2	CABINET SERVICE VOLTAGE
40	P. Ground	TB2 A3	GROUND
1	Digital Input 1	TB2 B3	ALARM ACKNOWLEDGE
2	Digital Input 2	TB2 A4	DOOR OPEN
3	Digital input 3	TB2 A5	MAIN(S) BREAKER OPEN
4	Digital input 4	TB2 A7	CONTACTOR 1 OPEN
5	Digital Input 5	TB2 A8	CONTACTOR 2 OPEN
6	Digital input 6	TB2 A9	CABINET IN NON-AUTO
7	Digital input 7	TB2 A10	BACK-UP CLOCK OFF CALL
8	Digital Input 8	TB2 A11	BACK-UP CLOCK ON CALL
18	DI Common	*	COMMON
20	K1 NO	TB2 A12	LIGHTS ON CALL
21	K1 Com	TB2 B17	K1 COMMON
23	K2 NO	TB2 A13	LIGHTS OFF CALL
24	K2 Com	TB2 B17	K2 COMMON
17	24 V+	TB2 B13	24+ VDC

All analog inputs will be 4-20 mA only. Digital output relays will be electrically energized and momentarily held. Mixed I/O module model number V 245.

**Lighting SCADA RTU Terminal Configuration.**

**Description.** This work shall consist of having the SCADA system manufacturer design, implement and test a new RTU on the Lighting SCADA System on all system terminals.

**Materials.** All software work shall be completed by the manufacturer or approved factory licensed sales and service company for the SCADA equipment. All licensing shall be provided by the entity completing the work. Licenses are to be held by IDOT.

**Work.**

**SCADA RTU Configuration and Programming:**

1. Setup of CPU and accompanying modules
2. Setup of RTU site number, octal address, group call and All Call
3. Configure application alarm parameters (download config./application)
4. Development and implementation of control and alarm application from IDOT submitted telemetry requirements

Note: IDOT shall supply checklist listing I/O, telemetry, all call, group call and individual call data.

**SCADA Service/Client Wonderware Programming:**

1. Add RTU to Wonderware
2. Configure Wonderware to poll SCADA CPU for data on that specific RTU
3. Setup servers and clients for alarm notification and database I/O, for that specific RTU
4. Configure RTU polling
5. Activate RTU on FIU polling

**SCADA FIU CPU Programming:**

1. If RTU exists as an Intrac site, it will have to be setup as a MOSCAD site (MOSCAD CPU).
2. If RTU is a new site, it will have to be configured as a MOSCAD site (MOSCAD CPU).

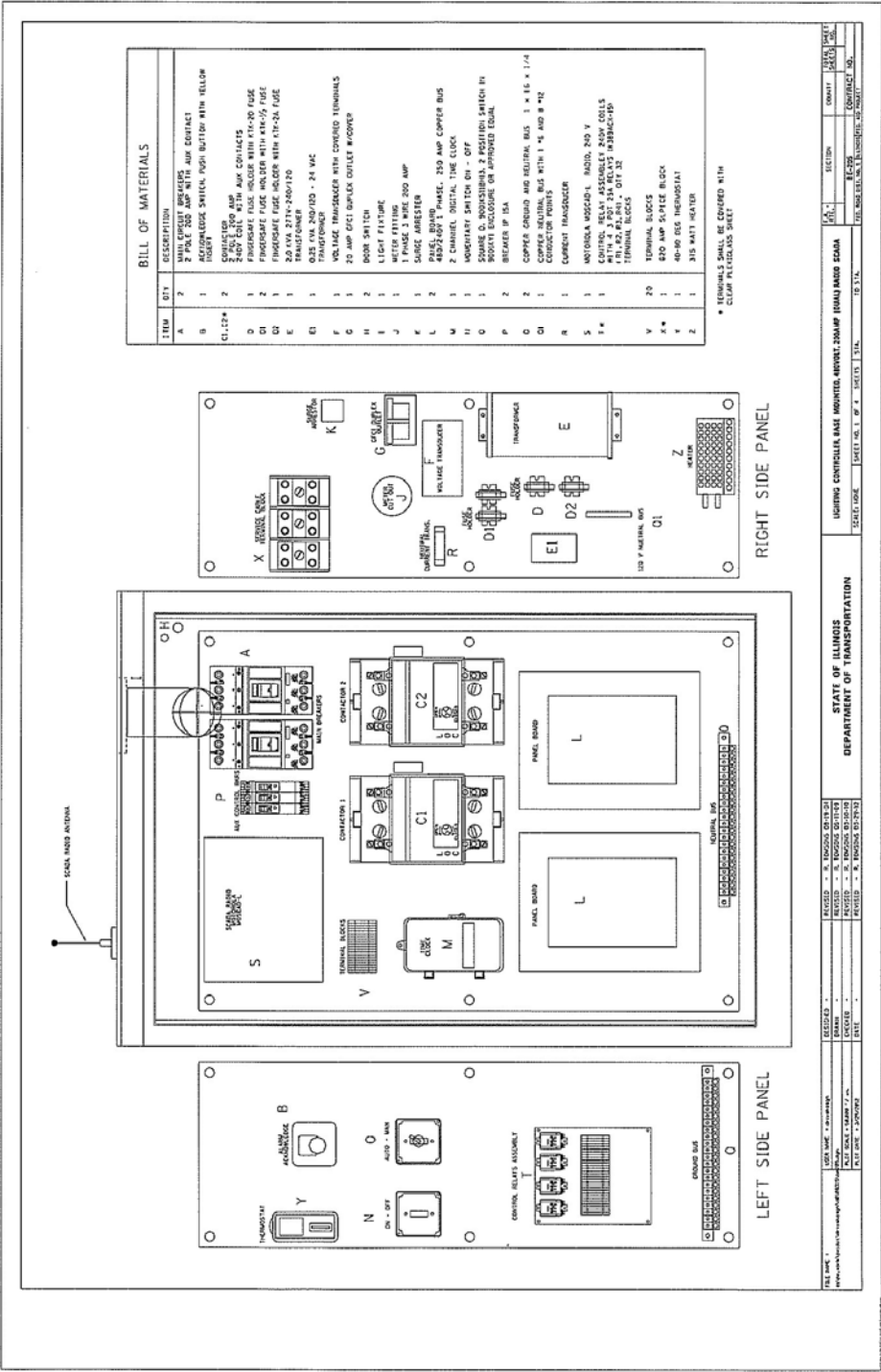
**Submittals.** The Motorola VAR shall submit ladder programming, quiescent telemetry and SCADA configuration files for approval by the IDOT Engineer. Submittal shall be reviewed by the Engineer and returned noting changes and/or comments.

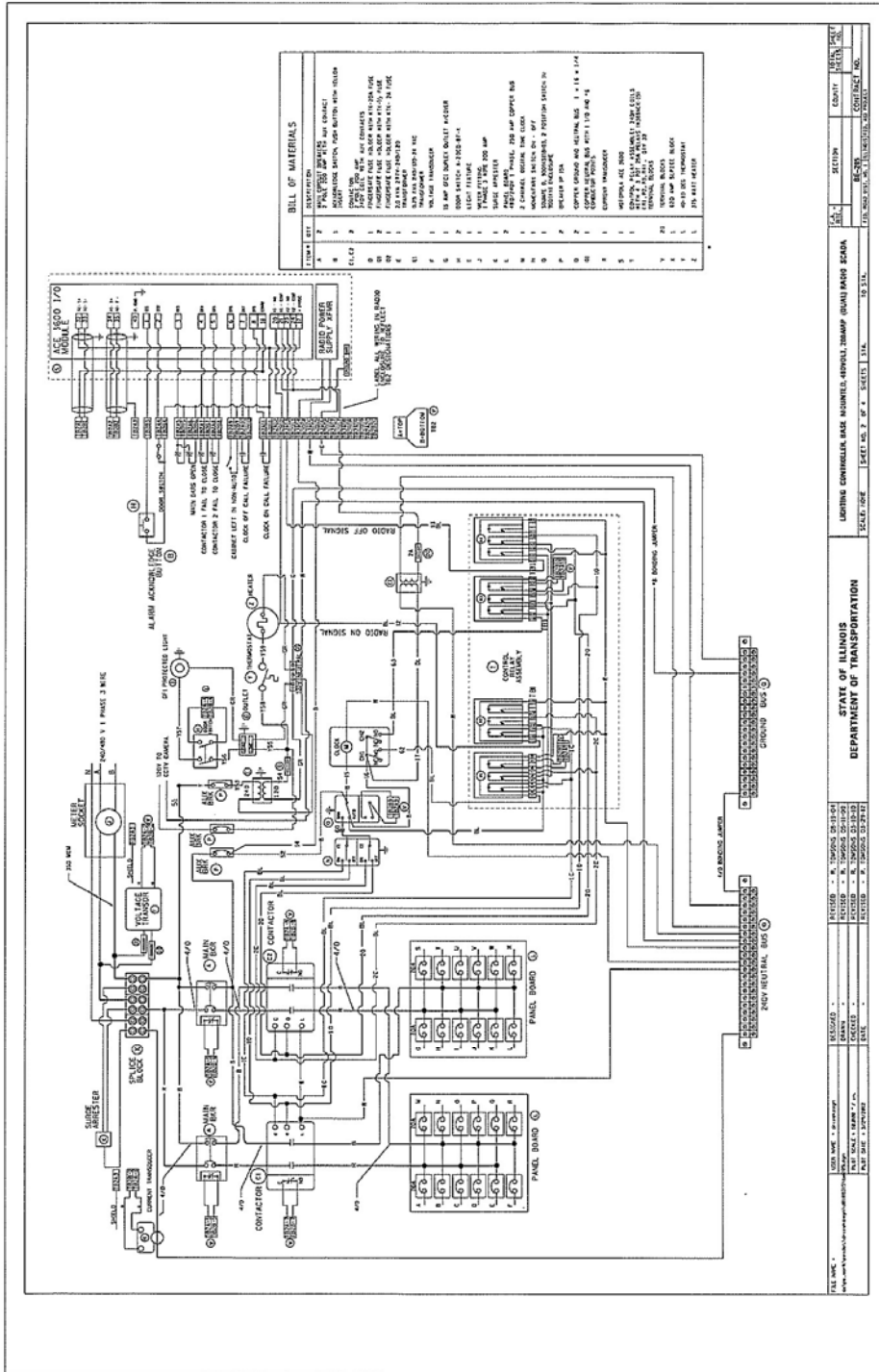
**Testing and Documentation.** As part of final acceptance testing, all individual I/O points and internal status (COS) alarms shall be tested for proper operation and transmission. The transmission shall be confirmed at IDOT Dist. HQ and the contractors dispatch facility. This full SCADA system start-up shall be completed with the Engineer present.

The control cabinet shall be tested for complete operation and the electrical load on each circuit shall be measured and documented on the Log form L-3. The ground resistance test shall be performed by the Contractor using the fall-of-potential method, with results recorded by the Contractor and witnessed by the Engineer. Ground continuity shall be tested using an approved low-impedance ohmmeter, to the farthest point of each circuit extension from the controller cabinet. Results shall be recorded by the Contractor and witnessed by the Engineer.

**Acceptance Transition.** After the appropriate testing has been completed and approved by the Engineer, the new SCADA equipment shall be monitored for up to 2 weeks for proper operation. If any problems are to arise, all configuration changes shall be completed at no extra cost.



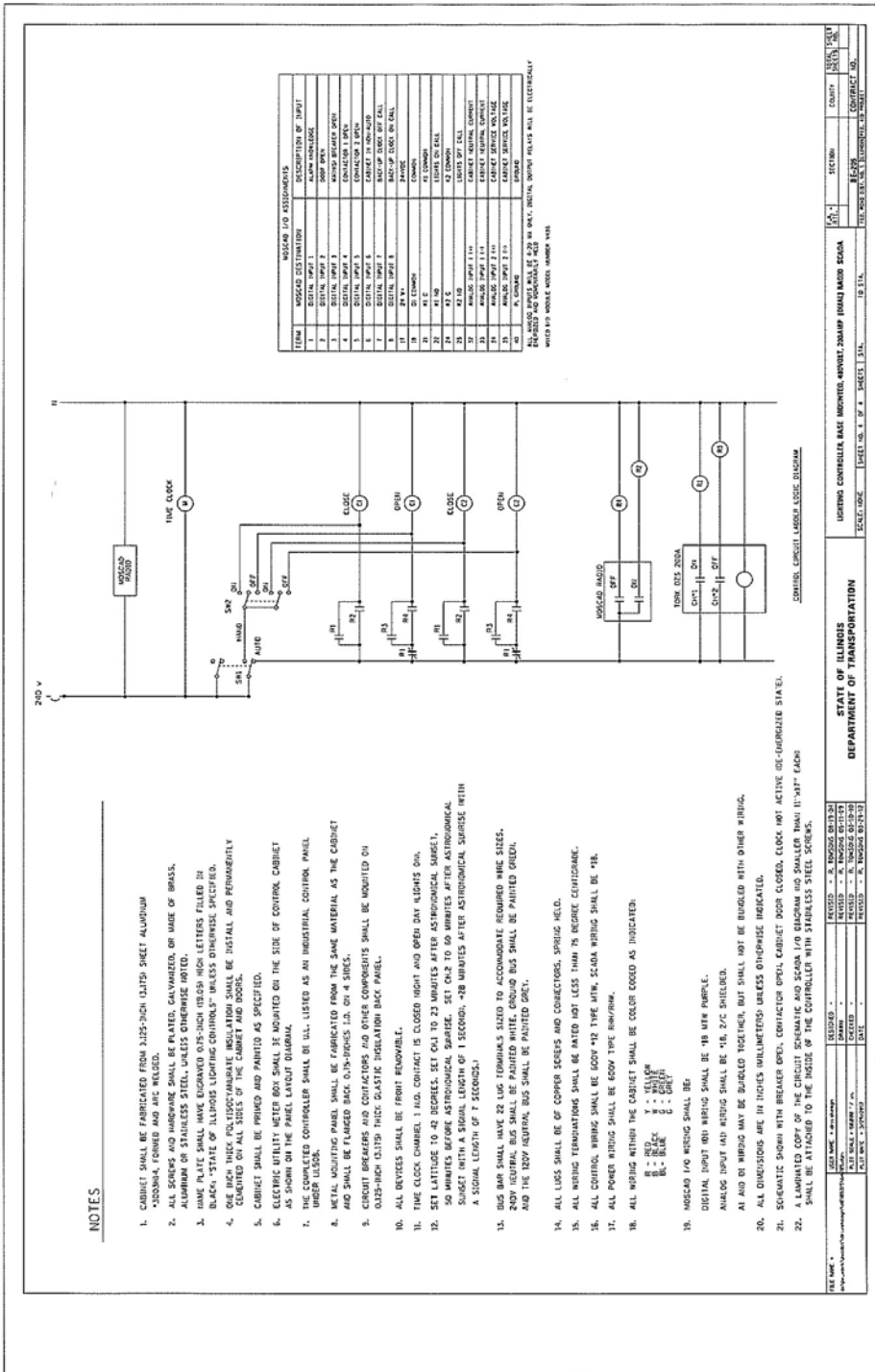




STATE OF ILLINOIS  
 DEPARTMENT OF TRANSPORTATION  
 LIGHTING CONTROL WIRING DIAGRAM, 48VOLT, 200AMP (DUAN) MARK SAGA  
 SCALE: 1/8" = 1'-0" SHEET NO. 7 OF 8 SHEETS 11/14/10 TO 21A

DESIGNED BY: M. TORRES 08-18-04  
 CHECKED BY: M. TORRES 08-18-04  
 DRAWN BY: M. TORRES 08-18-04  
 IN CHARGE BY: M. TORRES 08-18-04

FILE NO. 1  
 WORK NAME: 200AMP  
 SHEET NO. 7 OF 8 SHEETS 11/14/10 TO 21A



NOTES

1. CABINET SHALL BE FABRICATED FROM 1/2-INCH (12.7) SHEET ALUMINUM CHANNELS, FLOOR AND SIDING.
2. ALL SCREWS AND HARDWARE SHALL BE PLATED, GALVANIZED, OR MADE OF BRASS, ALUMINUM OR STAINLESS STEEL, UNLESS OTHERWISE NOTED.
3. NAME PLATE SHALL HAVE EMBOSSED OR 1/8-INCH (3.2) HIGH LETTERS FILLER IN BLACK, "STATE OF ILLINOIS LIGHTING CONTROLS" UNLESS OTHERWISE SPECIFIED.
4. ONE INCH THICK POLYESTER-AMBIATE INSULATION SHALL BE INSTALLED PERMANENTLY COMPLETED ON ALL SIDES OF THE CABINET AND DOORS.
5. CABINET SHALL BE PRIMED AND PAINTED AS SPECIFIED.
6. ELECTRIC UTILITY METER BOX SHALL BE MOUNTED ON THE SIDE OF CONTROL CABINET AS SHOWN ON THE PANEL LAYOUT DIAGRAM.
7. THE COMPLETED CONTROLLER SHALL BE LISTED AS AN INDUSTRIAL CONTROL PANEL UNDER UL508.
8. METAL MOUNTING PANEL SHALL BE FABRICATED FROM THE SAME MATERIAL AS THE CABINET AND SHALL BE FLANGED BACK 0.125-INCHES (3.2) ON 4 SIDES.
9. CIRCUIT BREAKERS AND CONTACTORS AND OTHER COMPONENTS SHALL BE MOUNTED ON OATS-HIGH (12.7) THICK GLASS-FIBER INSULATION BACK PANEL.
10. ALL DEVICES SHALL BE FRONT REMOVABLE.
11. TIME CLOCK CHANNEL 1 AND CONTACT IS CLOSED RIGHT AND OPEN DAY (LSD) ON.
12. SET LATITUDE TO 42 DEGREES. SET DAY TO 24 HOURS AFTER ASTRONOMICAL SUNSET. SET CONTACTS TO 50 MINUTES AFTER ASTRONOMICAL SUNSET WITH A SIGNAL LENGTH OF 1 SECOND, \*10 MINUTES AFTER ASTRONOMICAL SUNRISE WITH A SIGNAL LENGTH OF 7 SECONDS.
13. BUS BAR SHALL HAVE 22 LUG TERMINALS SIZED TO ACCOMMODATE REQUIRED WIRE SIZES. 200V NEUTRAL BUS SHALL BE PAINTED WHITE. GROUND BUS SHALL BE PAINTED GREEN. AND THE TOP SURFACE BUS SHALL BE PAINTED GREY.
14. ALL LUGS SHALL BE OF COPPER SECTORS AND CONNECTORS, SPRING FIELD.
15. ALL WIRING TERMINATIONS SHALL BE RATED NOT LESS THAN 75 PERCENT CONTINUOUS.
16. ALL CONTROL WIRING SHALL BE 600V \*12 TYPE MTR. SCADA WIRING SHALL BE \*18.
17. ALL POWER WIRING SHALL BE 600V TYPE RM/RMK.
18. ALL WIRING WITHIN THE CABINET SHALL BE COLOR CODED AS INDICATED:  
 B - RED  
 Y - YELLOW  
 W - WHITE  
 BK - BLACK  
 BL - BLUE  
 GR - GREEN
19. MOSCAD I/O WIRING SHALL BE:  
 DIGITAL INPUT (DI) WIRING SHALL BE \*18 VIEW PAPER.  
 ANALOG INPUT AND WIRING SHALL BE \*18, 27C SHIELDED.  
 ALL DI AND DI WIRING MAY BE BUNDLED TOGETHER, BUT SHALL NOT BE BUNDLED WITH OTHER WIRING.
20. ALL DIMENSIONS ARE IN INCHES (MILLIMETERS) UNLESS OTHERWISE INDICATED.
21. SCHEMATIC SHOWN WITH BREAKER OPEN, CONTACTOR OPEN, CABINET DOOR CLOSED, CLOCK NOT ACTIVE OR DEENERGIZED (S.A.E.).
22. A LAMINATED COPY OF THE CIRCUIT SCHEMATIC AND SCADA I/O DIAGRAM OR SMALLER THAN 11"X17" EACH SHALL BE ATTACHED TO THE INSIDE OF THE CONTROLLER WITH STAINLESS STEEL SCREWS.

ITEM	MOSCAD DESTINATION	DESCRIPTION OF INPUT
1	DIGITAL INPUT 1	DI1
2	DIGITAL INPUT 2	DI2
3	DIGITAL INPUT 3	DI3
4	DIGITAL INPUT 4	DI4
5	DIGITAL INPUT 5	DI5
6	DIGITAL INPUT 6	DI6
7	DIGITAL INPUT 7	DI7
8	DIGITAL INPUT 8	DI8
9	DIGITAL INPUT 9	DI9
10	DIGITAL INPUT 10	DI10
11	DIGITAL INPUT 11	DI11
12	DIGITAL INPUT 12	DI12
13	DIGITAL INPUT 13	DI13
14	DIGITAL INPUT 14	DI14
15	DIGITAL INPUT 15	DI15
16	DIGITAL INPUT 16	DI16
17	DIGITAL INPUT 17	DI17
18	DIGITAL INPUT 18	DI18
19	DIGITAL INPUT 19	DI19
20	DIGITAL INPUT 20	DI20
21	DIGITAL INPUT 21	DI21
22	DIGITAL INPUT 22	DI22
23	DIGITAL INPUT 23	DI23
24	DIGITAL INPUT 24	DI24
25	DIGITAL INPUT 25	DI25
26	DIGITAL INPUT 26	DI26
27	DIGITAL INPUT 27	DI27
28	DIGITAL INPUT 28	DI28
29	DIGITAL INPUT 29	DI29
30	DIGITAL INPUT 30	DI30
31	DIGITAL INPUT 31	DI31
32	DIGITAL INPUT 32	DI32
33	DIGITAL INPUT 33	DI33
34	DIGITAL INPUT 34	DI34
35	DIGITAL INPUT 35	DI35
36	DIGITAL INPUT 36	DI36
37	DIGITAL INPUT 37	DI37
38	DIGITAL INPUT 38	DI38
39	DIGITAL INPUT 39	DI39
40	DIGITAL INPUT 40	DI40

WIRING TO MOUNTING SHALL BE ELECTRICALLY IDENTIFIED BY COLOR AND LABELS AS SHOWN ON THE WIRING DIAGRAM.

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

LOCKING CONTROLLER BASE WIRING, 48V/120V/240V (R) (M) (N) (S) (A) (S) (C) (A)

SCALE: 1/8" = 1'-0" SHEET 1 OF 4 SHEET 1 OF 4

DESIGNED BY	REVISION	SECTION	DATE
DRAWN BY	NO. 1	11-1	11/11/11
CHECKED BY	NO. 2	11-1	11/11/11
APPROVED BY	NO. 3	11-1	11/11/11
PROJECT NO.	NO. 4	11-1	11/11/11
CONTRACT NO.	NO. 5	11-1	11/11/11

## **LUMINAIRE, LED**

Effective: July 1, 2015

**Description.** This work shall consist of furnishing and installing LED luminaire as shown on the plans, as specified herein.

**General.** The luminaire including the housing, driver and optical assembly shall be assembled in the U.S.A. The luminaire shall be assembled by and manufactured by the same manufacturer. The luminaire shall be in compliance with ANSI C136.37. LED light source(s) and driver(s) shall be RoHS compliant.

**Submittal Requirements.** The Contractor shall submit, for approval, an electronic version of all associated luminaire IES files, AGI32 files and the TM-21 or TM-28 calculator spreadsheet with inputs and reports associated with the project luminaires. The Contractor shall also provide (as a minimum) an electronic (PDF) version of each of the following manufacturer's product data for each type of luminaire:

1. Descriptive literature and catalogue cuts for luminaire, LED driver, and surge protection device.
2. LED drive current, total luminaire input wattage and total luminaire current at the system operating voltage or voltage range and ambient temperature of 25 C.
3. LED efficacy per luminaire expressed in lumens per watt (lpw).
4. Initial delivered lumens at the specified color temperature, drive current, and ambient temperature.
5. Computer photometric calculation reports as specified and in the luminaire performance table.
6. TM-15 BUG rating report.
7. Isofootcandle chart with max candela point and half candela trace indicated.
8. Documentation of manufacturers experience and verification that luminaires were assembled in the U.S.A. as specified.
9. Supporting documentation of compliance with ANSI standards as well as UL listing as specified.
10. Supporting documentation of laboratory accreditations and certifications for specified testing as indicated.
11. Thermal testing documents as specified.
12. IESNA LM-79, LM-80 (or LM-84) and TM-21 (or TM-28) reports as specified.

13. Salt fog test reports and certification as specified.
14. Vibration Characteristics Test Reports and certification as specified.
15. Ingress Protection Test Reports as specified.
16. Written warranty.
17. A sample luminaire shall be provided upon request of the Engineer. The sample shall be as proposed for the contract.

**Manufacturer Experience.** The luminaire shall be designed to be incorporated into a lighting system with an expected 20 year lifetime. The luminaire manufacturer shall have a minimum of 35 years' experience manufacturing HID roadway luminaires and shall have a minimum of seven (7) years' experience manufacturing LED roadway luminaires. The manufacturer shall have a minimum of 25,000 total LED roadway luminaires installed on a minimum of 100 separate installations, all within the U.S.A.

**Housing Material.** The luminaire shall be a single device not requiring on-site assembly for installation. The power supply for the luminaire shall be integral to the unit.

**Finish.** Painted or finished luminaire surfaces exposed to the environment shall exceed a rating of six, according to ASTM D1654, after 1000 hours of ASTM B117 testing. The coating shall exhibit no greater than 30% reduction of gloss, according to ASTM D523, after 500 hours of ASTM G154 Cycle 6 QUV® accelerated weathering testing.

Unless otherwise indicated in the plans, the luminaire color shall be grey.

The luminaire shall slip-fit on a mounting arm with a 2" diameter tenon (2.375" outer diameter), and shall have a barrier to limit the amount of insertion. The slip fitter clamp shall utilize four (4) bolts to clamp to the tenon arm. The luminaire shall be provided with a leveling surface and shall be capable of being tilted  $\pm 5$  degrees from the axis of attachment in 2.5 degree increments and rotated to any degree with respect to the supporting arm.

The housing shall be designed to prevent the accumulation of water, ice, dirt and debris and to ensure maximum heat dissipation.

The effective projected area of the luminaire shall not exceed 1.6 sq. ft.

The total weight of the luminaire(s) and accessories shall not exceed 75 pounds.

A passive cooling method with no moving, rotating parts, or liquids shall be employed for heat management.

The luminaire shall include a fully prewired, 7-pin twist lock ANSI C136.41-compliant receptacle. Unused pins shall be connected as directed by the Manufacturer and as approved by the Engineer. A shorting cap shall be provided with the luminaire.

**Vibration Characteristics.** All luminaires shall be vibration tested and pass ANSI C136.31 requirements. Luminaires shall be rated for “3G” peak acceleration. Vibration testing shall be run using the same luminaire in all three axes.

**Labels and Decals.** All luminaires shall have labels in accordance with ANSI C136.15 for an external label, and ANSI C136.22 for an internal label.

The luminaire shall be Listed for wet locations by a U.S. Occupational Safety Health administration (OSHA) Nationally Recognized Testing Laboratory (NRTL) and shall be in compliance with UL 8750 and UL 1598. It shall be identified as such by the NRTL tag/sticker on the inside of the luminaire.

**Hardware.** All hardware shall be stainless steel. Captive screws are required on any components that require maintenance after installation.

**Internal Luminaire Electrical Connections.** Quick connect/disconnect plugs shall be supplied between the discrete electrical components within the luminaire such as the driver, surge protection device and optical assembly for easy removal. The quick connect/disconnect plugs shall be operable without the use of tools while wearing insulated gloves.

Provisions for any future house-side external or internal shielding should be indicated along with means of attachment.

Circuiting shall be designed to minimize the impact of individual LED failures on the operation of the other LED's.

**Wiring.** Wiring within the electrical enclosure shall be rated at 600v, 105°C or higher.

**Driver.** The driver shall be integral to the luminaire. Integral driver components shall be mounted in the rear of the luminaire on the inside of a removable door or on a removable mounting pad. Driver wiring shall be connected by means of plugs. Upon unplugging the driver wiring the entire driver assembly shall remove for maintenance. The removable door or pad shall be secure when fastened in place and all individual components shall be secured upon the removable element. Each component shall be readily removable from the removable door or pad for replacement.

The plugs shall be keyed and shall be operable without the use of special tools by insulated, gloved hands

The driver shall be installed in a manner to keep it mechanically separated from the LED array heat sink.

The driver shall tolerate indefinite open and short circuit output conditions without damage.

**Ingress Protection.** The driver Ingress Protection (IP) rating as defined in the ANSI/IEC 60529 standard shall have an IP66 rating.

**Input Voltage.** The driver shall be suitable for operation over a range of 120 to 277 volts or 347 to 480 volts as required by the system operating voltage.

**Operating Temperature.** The driver shall have an operating ambient temperature range of -40°C to 70°C.

**Driver Life.** The driver shall provide a life time of 100,000 hours at 25° C ambient.

**Safety/UL.** The driver shall be UL Listed under standard UL 1012.

**Power Factor.** Drivers shall maintain a power factor of 0.9 or higher and total harmonic distortion of less than 20%.

**Driver efficiency.** Efficiency of the driver is defined by the ratio of output power and input power. The driver shall deliver a maximum efficiency of >90% at maximum load and an efficiency of >85% for the driver operating at 50% power.

**Electrical Interference.** The driver shall meet the Electromagnetic Compatibility (EMC) requirements per FCC Title 47 Code of Federal Regulations (CFR) Part 15 Class A.

**Thermal Fold Back.** The driver shall reduce the current to the LED module if the driver is overheating due to abnormal conditions.

**Dimming.** The driver shall have dimming capability. The driver shall accept a dimming control signal that is compliant with the 0-10V protocol.

**Leakage current.** The driver shall comply with safety standards in accordance with IEC 61347-1.

The Surge Protection Device shall be UL 1449 labeled as Type 4 and be an integral part of the luminaire. The SPD shall be compliant with ANSI C136.2-2014 (Draft).

**Thermal performance.** Thermal Testing shall be provided as defined by ANSI/UL 1598. The luminaire shall start and operate in the ambient temperature range specified in the driver section. The maximum rated case temperature of the driver, LEDs, and other internal components shall not be exceeded when the luminaire is operated in the ambient temperature range specified.

Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation. Testing shall be submitted (whenever is available) to show the maximum rated case temperature of the driver, LEDs, and other internal components are not exceeded when the luminaire is operated with the heat sink filled with debris.

**LED Optical Assembly.** The LED optical assembly shall be a scalable array consisting of discrete LED panels or modules. Each panel or module shall have a minimum IP rating of 66.

The optical assembly shall utilize high brightness, long life, minimum 70 CRI, 4,000K color temperature (+/-300K) LEDs binned in accordance with ANSI C78.377. Lenses shall be UV-stabilized acrylic or glass.

Lumen depreciation at 50,000 hours of operation shall not exceed 15% of initial lumen output at the specified LED drive current and an ambient temperature of 25° C.

The luminaire may or may not have a glass lens over the LED modules. If a glass lens is used, it must be a flat lens. Material other than glass will not be acceptable.

The assembly shall have individual serial numbers or other means for manufacturer tracking.

**Photometric Performance.** Luminaires shall be tested according to IESNA LM-79. This testing shall be performed by a test laboratory holding accreditation from the National Institute of Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) for the IESNA LM-79 test procedure.

Data reports as a minimum shall yield an isofootcandle chart, with max candela point and half candela trace indicated, maximum plane and maximum cone plots of candela, a candlepower table (house and street side), a coefficient of utilization chart, a luminous flux distribution table, spectral distribution plots, chromaticity plots, and other standard report outputs of the above mentioned tests.

Lumen maintenance shall be measured for the LEDs according to LM-80 or for the luminaires according to LM-84. The LM-80 report shall be based on a minimum of 6,000 hours, yet 10,000 hour reports shall be provided for luminaires where those tests have been completed.

**Lumen Maintenance Projection.** The luminaire shall have long term lumen maintenance documented according to IESNA TM-21 or IESNA TM-28. Ambient temperature shall be 25<sup>0</sup> C.

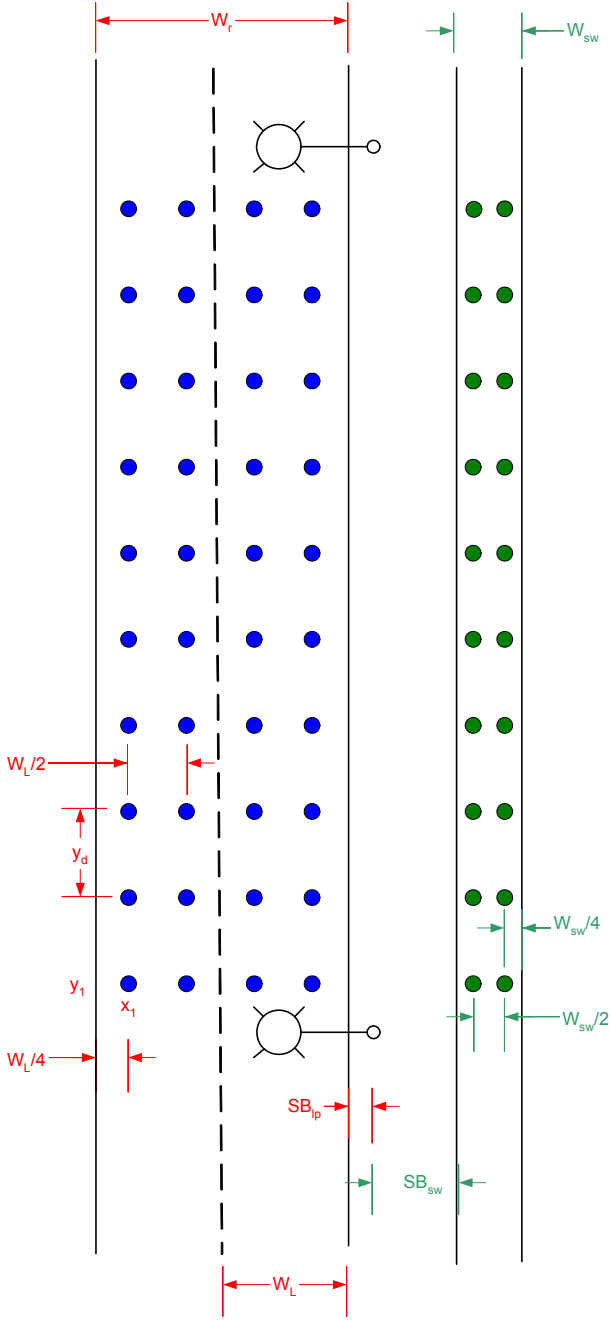
The submitted calculations shall incorporate the light loss factors as indicated the respective performance tables.

**Photometric Calculations.** Submitted report shall include a luminaire classification system graph with both the recorded lumen value and percent lumens by zone along with the BUG rating according to IESNA TM-15.

Complete point-by-point luminance and veiling luminance calculations as well as listings of all indicated averages and ratios as applicable shall be provided in accordance with IESNA RP-8 recommendations. Lighting calculations shall be performed using AGi32 software with all luminance calculations performed to two decimal places (i.e. x.xx cd/m<sup>2</sup>). Uniformity ratios shall also be calculated to two decimal places (i.e. x.xx:1). Calculation results shall demonstrate that the submitted luminaire meets the lighting metrics specified in the project Luminaire Performance Table(s). Values shall be rounded to the number of significant digits indicated in the luminaire performance table(s).

All photometry must be photopic. Scotopic or mesopic factors will not be allowed.





$W_r$  = Roadway Width  
 $W_L$  = Lane Width  
 $W_{sw}$  = Sidewalk Width  
 $SB_{lp}$  = Light Pole Set Back  
 $SB_{sw}$  = Sidewalk Set Back

TABLE and DIAGRAM

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE**

<b>GIVEN CONDITIONS</b>		
<b>ROADWAY DATA</b>	Pavement Width	_____ (ft)
	Number of Lanes	_____
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
<b>LIGHT POLE DATA</b>	Mounting Height	_____ (ft)
	Mast Arm Length	_____ (ft)
	Pole Set-Back From Edge of Pavement	_____ (ft)
<b>LUMINAIRE DATA</b>	Lumens	This is a range
	BUG Rating	_____
	I.E.S. Vertical Distribution	Medium
	I.E.S. Control Of Distribution	Cutoff
	I.E.S. Lateral Distribution	Type I
	Total Light Loss Factor	_____
<b>LAYOUT DATA</b>	Spacing	_____ (ft)
	Configuration	Single Sided
	Luminaire Overhang over edge of pavement	_____ (ft)

**NOTE:** Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

<b>PERFORMANCE REQUIREMENTS</b>
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**NOTE:** These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

<b>LUMINANCE</b>	Average Luminance, $L_{AVE}$	_____ Cd/m <sup>2</sup>
	Uniformity Ratio, $L_{AVE}/L_{MIN}$	_____ (Max)
	Uniformity Ratio, $L_{MAX}/L_{MIN}$	_____ (Max)
	Veiling Luminance Ratio, $L_V/L_{AVE}$	_____ (Max)

**Independent Testing.** When a contract has 30 or more luminaires of the same type (distribution type and lumen output/wattage), that luminaire type shall be independently tested, unless otherwise noted. The quantity of luminaires to be tested shall be as specified in the following table.

<b>Contract Quantity</b>	<b>Luminaire to be Tested</b>
1-29	0 (unless otherwise noted)
30-80	2
81-130	3
131-180	4
181-230	5
231-280	6
281-330	7

The Contractor shall coordinate the testing with the contract schedule taking into account submittal, manufacturing, testing, and installation lead-times and deadlines.

The Electrical Engineer shall select from all the project luminaires at the Contractor's or distributor's storage facility, within District 1, the luminaires for testing. In all cases, the selection of luminaires shall be a random selection from the entire completed lot of luminaires required for the contract. Selections from partial lots will not be allowed. An additional luminaire shall also be selected for physical inspection by the Engineer at the District Headquarters. This luminaire will be returned to the Contractor at a later date. This luminaire is in addition to the luminaire required as a part of the submittal process specified elsewhere.

Luminaires shall be tested at a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory approved for each of the required tests. All costs associated with luminaire testing shall be included in the bid price of the luminaire.

The selection of the proposed independent laboratory shall be presented with the information submitted for approval.

The testing performed shall include photometric and electrical testing.

Photometric testing shall be according to IES recommendations and as a minimum, shall yield an isofootcandle chart, with max candela point and half candela trace indicated, an isocandela diagram, maximum planned and maximum cone plots of candela, a candlepower table (House and street side), a coefficient of utilization chart, a luminous flux distribution table, BUG rating report, and complete calculations based on specified requirements and test results.

Electrical testing shall conform to NEMA and ANSI standards and, as a minimum shall include a complete check of wiring connections and a table of characteristics showing input amperes, watts, power factor, total harmonic distortion and LED drive current.

Two copies of the summary report and the test results (including CDROM) shall be certified by the test laboratory and shall be sent by certified mail directly to the Engineer.

To: District Engineer  
Attn: Bureau Chief of Traffic Operations  
The package shall state "luminaire test reports" and the contract number clearly.

A copy of this material shall be sent to the Contractor and the Resident Engineer at the same time.

Photometric performance shall meet or exceed that of the specified values. If the luminaire does not meet the specified photometric values, the luminaire has failed regardless of whether the test results meet the submitted factory data.

Should any of the tested luminaires of a given type, and distribution fail to satisfy the specifications and perform according to approved submittal information, the luminaire type of that distribution type and wattage shall be unacceptable and be replaced by alternate equipment meeting the specifications with the submittal and testing process repeated in their entirety; or corrections made to achieve required performance.

In the case of corrections, the Contractor shall advise the Engineer of the proposed corrections and shall request a repeat of the specified testing and, if the corrections are deemed reasonable by the Engineer, the testing process shall be repeated in its entirety.

The number of luminaires to be tested shall be the same quantity as originally tested as required in the above table.

Retesting, should it become necessary, shall not be grounds for additional compensation or extension of time

Submittal information shall include a statement of intent to provide the testing as well as a request for approval of the chosen laboratory.

**Installation.** Each luminaire shall be installed according to the luminaire manufacturer's recommendations.

Luminaires which are pole mounted shall be mounted on site such that poles and arms are not left unloaded. Pole mounted luminaires shall be leveled/adjusted after poles are set and vertically aligned before being energized. When mounted on a tenon, care shall be exercised to assure maximum insertion of the mounting tenon. Each luminaire shall be checked to assure compatibility with the project power system. When the night-time check of the lighting system by the Engineer indicates that any luminaires are mis-aligned, the mis-aligned luminaires shall be corrected at no additional cost.

No luminaire shall be installed before it is approved. Where independent testing is required, full approval will not be given until complete test results, demonstrating compliance with the specifications, have been reviewed and accepted by the Engineer.

Pole wiring shall be provided with the luminaire. Pole wire shall run from handhole to luminaire. Pole wire shall be sized No. 10, rated 600 V, RHW/USE-2, and have copper conductors, stranded in conformance with ASTM B 8. Pole wire shall be insulated with cross-linked polyethylene (XLP) insulation. Wire shall be trained within the pole or sign structure so as to avoid abrasion or damage to the insulation.

Pole wire shall be extended through the pole, pole grommet, luminaire ring, and any associated arm and tenon. The pole wire shall be terminated in a manner that avoids sharp kinks, pinching, pressure on the insulation, or any other arrangement prone to damaging insulation value and producing poor megger test results. Wires shall be trained away from heat sources within the luminaire. Wires shall be terminated so all strands are extended to the full depth of the terminal lug with the insulation removed far enough so it abuts against the shoulder of the lug, but is not compressed as the lug is tightened.

Included with the pole wiring shall be fusing located in the handhole. Fusing shall be according to Article 1065.01 with the exception that fuses shall be 6 ampere.

Each luminaire and optical assembly shall be free of all dirt, smudges, etc. Should the optical assembly require cleaning, a luminaire manufacturer approved cleaning procedure shall be used.

Horizontal mount luminaires shall be installed in a level, horizontal plane, with adjustments as needed to insure the optics are set perpendicular to the traveled roadway.

When the pole is bridge mounted, a minimum size stainless steel 1/4-20NC set screw shall be provided to secure the luminaire to the mast arm tenon. A hole shall be drilled and tapped through the tenon and luminaire mounting bracket and then fitted with the screw.

**Warranty.** The entire luminaire and all of its component parts shall be covered by a 10 year warranty. Failure is when one or more of the following occur:

1. Negligible light output from more than 10 percent of the discrete LEDs
2. Significant moisture that deteriorates performance of the luminaire
3. Driver that continues to operate at a reduced output due to overheating

The warranty period shall begin on the date of project final acceptance. A copy of the acceptance letter shall be sent to the luminaire manufacturer and luminaire manufacturer's representative by the Contractor upon final acceptance.

The replacement luminaire shall be of the same manufacturer, model, and photometric distribution as the original.

LED Luminaire classification shall be as follows:

Type	Min Lumens	Max Lumens
A	3,000	12,000
B	12,001	22,000
C	22,001	36,000
D	36,001	50,000

Where delivered lumens is defined as the initial delivered lumens at the specified color temperature. Luminaires above the stated maximums for the specified type will not be accepted

## **UNDERPASS LUMINAIRE**

Effective: August 1, 2014

Revised: April 1, 2015

Revise the first paragraph of Article 821.06 of the Standard specifications to read:

“821.06 Underpass Installation. When attached directly to a structure, the underpass luminaire shall have stainless steel brackets installed between the luminaire and the structure to create a gap of not less than 1 in. (25mm).”

Revise the third paragraph of Article 821.06 of the Standard Specifications to read:

“All mounting hardware, including the vibration dampers, shall be stainless steel.”

Revise Article 1067.04(a) of the Standard specifications to read:

“(a) Housing. The housing and lens frame shall be made of heavy duty die cast aluminum or 16 gauge (1.5mm) minimum thickness type 304 stainless steel. All seams in the housing enclosure shall be welded by continuous welds.

The housing shall have an opening for installation of  $\frac{3}{4}$  in. (19mm) diameter conduit.”

Revise the third sentence of the first paragraph of Article 1067.04(b) of the standard specifications to read:

“The lens frame shall be hinged with a continuous stainless steel piano type hinge for stainless steel housings.” Delete Article 106704© of the standard specifications.

## **LIGHT TOWER**

Effective: January 1, 2015

Revise the second paragraph of Article 106908(a) of the Standard Specifications to read:

“All tower shaft components shall be fabricated from high strength, low alloy, steel according to AASHTO M 270 (M 270); ASTM A 595 (A 595M), grade A or B; ASTM A 1011 (A 1011M); ASTM A 606 (A 606M); ASTM A 588 (A 588M), or ASTM A 871 (A 871M) Grade 65, with a minimum yield strength of 50,000 psi (345,000 KPa).”

Revise the first sentence of the seventh paragraph of the Article 1069.08(e) of the Standard specifications to read:

“The ring shall be equipped with an enclosed wire raceway and a stainless steel terminal box built according to NEMA type 4X requirements for wiring of the luminaires.”

Revise the eleventh paragraph of Article 1069.08(e) of the Standards Specifications to read:

“Ring designs that incorporate liquidtight flexible nonmetallic conduit to the terminal box shall use stainless steel conduit fittings. Liquidtight flexible nonmetallic conduit shall be according to Article 1088.01 (a)(4).”

Revise the third sentence of the seventh paragraph of Article 1069.08(f) of the Standard specification to read:

“Chains shall be stainless steel.”

Revise the first sentence of the first paragraph of Article 1069.08(g) of the Standard specification to read:

“Cables (wire rope) shall be manufactured from type 304 or type 302 stainless steel and shall be stranded assembly coated with a friction-limiting non-corrosive lubricant.”

Revise the second sentence of the second paragraph of Article 1069.08(g) of the Standard specification to read:

“Cables shall be manufactured and listed for compliance with military specification MIL-DTL-83420, Type 1, composition B.”

Revise the third paragraph of Article 1069.08(g) of the Standard specification to read:

“Cable terminal shall be stainless steel whenever possible, shall be compatible with the cable, and shall be as recommended by the cable manufacturer. The terminals, swaging, etc., shall meet the requirements of military specification MIL-DTL-781. Stainless steel oval sleeves shall be according to military specification MS51844.”

Revise the second and third sentence of the first paragraph of Article 1069.08(M) of the Standard specification to read:

“The tower main breaker and the motor breaker shall be housed in a stainless steel NEMA type 4 enclosure mounted on the side of the handhole pocket door. The main and motor breakers shall have an external position indicating, trip free operating handle having padlock provisions and shall be labeled by two color engraved nameplates clearly marking the “RESET”, “ON”, and “OFF” positions.”

Revise the second paragraph of Article 1069.08(m) of the Standard specification to read:

“The main and motor circuit breakers shall be molded case, 2-pole, thermal magnetic, bolt-on type having a UL-listed interrupting rating of not less than 14,000 rms symmetrical amps at 480 V. The main breaker shall be sized for the motor but shall be a minimum of 30 A.”

## **COATED GALVANIZED STEEL CONDUIT**

Effective: January 1, 2013

Revised: January 1, 2015

Revise Article 811.03(b) of the Standard specifications to read:

(b) Coated Galvanized Steel Conduit. In addition to the methods described in Article 810.05(a) the following methods shall be observed when installing coated conduit.

Coated conduit pipe vise jaw adapters shall be used when the conduit is being clamped to avoid damaging the coating.

Coated conduit shall be cut with a roller cutter or by other means approved by the conduit manufacturer.

After any cutting or threading operations are completed, the bare steel shall be touched up with conduit manufacturer's touch up compound."

## **COILABLE NONMETALLIC CONDUIT**

Effective: August 1, 2014

Revised: January 1, 2015

Revise Article 1088.01(c) of the Standard specifications to read:

(c) Coilable Nonmetallic conduit. The conduit shall be a high-density polyethylene duct which is intended for underground use can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties or performance. The conduit and its manufacturer shall be according to UL 651A for Schedule 40 conduit, except Schedule 80 shall be used under pavement, stabilized shoulder, paved median, paved driveway, curb and/or gutter and sidewalk.

**Performance Tests.** Testing procedure and test results shall meet the requirements of UL 651A. Certified copies of the test report shall be submitted to the Engineer prior to the installation of the conduit."

## **PUMP STATION SYSTEM – NON ROUTINE PAY ITEMS:**

### **PA01 ALARM, INTRUSION OVERRIDE KEY SWITCH**

**Description.** This item shall consist of furnishing, installing and interfacing an intrusion override key switch to the SCADA panel and existing intrusion alarm system as specified herein and indicated by the Engineer into an existing pumping station.



**Materials.** The pumping station existing intrusion override key switch shall be replaced with a new High Security Switch that provides a contact closure to the SCADA panel and a contact closure to the existing intrusion alarm system when the intrusion alarm system is armed. Only the "barrel" of the existing override key assembly shall be replaced. The override key switch shall be from MEDECO High Security Locks, five pin, double D mounting, two key pulls. The Contractor shall be responsible for coordinating IDOT authorization for the lock revisions.

All equipment furnished and installed under this item shall be appropriately identified with nameplates as specified under Basic Materials and Methods, elsewhere herein.

**Installation.** All intrusion override switches shall be mounted as indicated or directed by the Engineer, anchored as required and in conformance with the applicable specifications for Basic Materials and Methods, elsewhere herein.

**Method of Measurement.** Each intrusion override key switch as furnished, installed and approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the Contract unit price each for ALARM, INTRUSION OVERRIDE KEY SWITCH which shall be payment in full for the work as described herein.

## **PC02 COATING, CONCRETE SURFACE**

**Description.** This item shall consist of furnishing and applying paint coating to exterior and interior concrete surfaces and all attached conduits and fittings as specified herein.

**Materials.** The concrete and conduit surface will receive one coat of polyamide epoxy primer 2.5 to 6 MILS DFT (Dry Film Thickness) and one coat of urethane enamel 2 to 4 MILS DFT. Unless the moisture content is above 3 LB/SF use a acrylic latex paint 2-4 MILS DFT with an approved primer 1/1/2 – 2/1/2 MILS DFT.

**Application.** The concrete surfaces shall be prepared to SSPC SP-2 hand tool clean or SSPC SP-3 power tool clean to remove any peeled or failed coatings. A solvent cleaning and scraping necessary to remove dirt, grease and peeling paint shall be used to prepare the floor. A moisture content test shall be performed and results provided to the IDOT Engineer. All conduits, fittings, boxes and switches attached and or within one foot of the concrete surfaces shall be cleaned properly and painted. The contractor may have to apply multiple coats to obtain manufacturer's recommended thickness.

**Method of Measurement.** A square foot of coating applied to a pump station in accordance with manufacturer's specifications, and clean up of work site, as approved by the Engineer, shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price in square feet, for COATING, CONCRETE SURFACE, which shall be payment in full for the work described herein.

### **PC03 COATING, STEEL SURFACE**

**Description.** This item shall consist of furnishing, cleaning and applying a primer and final paint coating to steel surfaces as specified herein.

**Materials.** The coating shall be a tri-polar oil-alkyd primer 2-4 MILS DFT (Dry Film Thickness) and one finish coat of 20%-30% Copolymerized polysilicone enamel 1½ - 2 ½ MILS DFT. Steel located in dry pit or wet pits, where high humidity is present use Aluminum aromatic moisture cured urethane.

**Application.** The steel shall be prepared to SSPC SP-2 hand tool clean or SSPC SP-3 power tool clean to remove any rust, peeled or failed coatings.

**Method of Measurement.** A square foot of primer with final coating applied to a surface shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price in square feet, for COATING, STEEL SURFACE, which shall be payment in full for the work described herein.

### **PD01 DETECTION SYSTEM, FIRE**

**Description.** This work shall consist of furnishing labor, equipment and material to install a wall mounted fire alarm panel, and associated devices as specified herein and indicated by the Engineer.

**Materials.** Furnish a four zone fire alarm panel, class B/A with three photoelectric smoke detector with thermal, and two 12Volt @ 7 A.H. Gel battery.

**Work Description.** The contractor shall Install, commission, and perform testing on the fire alarm panel and associated devices. Commissioning shall be done by a qualified Fire Alarm Service Representative. The representative shall identify the location of the smoke and head detectors prior to installation. The output signal shall be connected to the SCADA and Aegis system. All conduit and wire necessary for complete installation in the pump station shall be paid under their respective pay items for conduit and wire. Submit all catalog cuts, shop drawings and pump station layout showing location of all devices for IDOT approval.

All equipment furnished, installed or mounted for this pay item shall conform to the applicable specifications for Basic Materials and Methods, elsewhere herein. The Contractor shall provide all submittals as specified above in this pay item including catalog cuts, design drawings and product data sheets for the Engineers approval prior to installation. Three complete sets of record drawings, catalog cuts and O&M manuals shall be provided upon completion for Engineers approval

**Method of Measurement.** Each Detection System, Fire, that is inspected, tested, and certified shall be counted as a unit for payment.

**Basis of Payment.** This work will be paid at the contract unit price, each, for DETECTION SYSTEM, FIRE, which will be payment in full for the work described herein.

#### **PG01 GAS SENSOR, REMOVE AND REPLACE**

**Description.** This item shall consist of the removal, Installation, calibration and function test of a new gas sensor by a factory trained sales and Service Company. The transmitter and controller shall remain in place and functional with only the gas sensor being replaced.

**Locations.** The list of pump stations with their corresponding gas detector system manufacturer, number of sensors and their respective locations is listed under pay item PGS1.

**Materials.** The furnished gas sensor shall be equivalent or superior in quality to the existing gas sensor and be rated and approved for its intended use by the national FM and CSA standards. The furnished gas sensor shall have the same sensing element as the existing SCOTT, MSA or Rexnord gas sensors to be replaced.

**Work Description.** The factory trained sales and Service Company, such as Automatic Suppression Systems Inc., or Engineer approved equivalent shall execute this work in conjunction with Pay Item PG6 Gas Detector System Inspection. The removal and reinstallation of the sensor shall comply with manufacturer specifications.

**Method of Measurements.** Each gas sensor that is furnished, installed, calibrated, tested and approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for GAS SENSOR, REMOVE AND REPLACE, which shall be payment in full for the work described herein.

#### **PI01 INSPECTION, AUTOMATIC BUS TRANSFER SYSTEM**

**Description.** The contractor shall supply a factory trained field service technician to perform preventive maintenance testing and inspection of the automatic bus transfer scheme at PS #22, 23, 26,35. A service sheet shall be filled out listing both the "as found" and "as left" condition of the system. Equipment for the preventive maintenance, testing and inspection, include Main-Tie-Main transfer scheme, with associated circuit breakers, controls and devices.

**Scope of Work.**

1. Physical inspection will include:
  - Overall enclosure inspection for structural integrity
  - Verification of proper door swing, hinge operation, latching and door interlocking
  
2. Insure proper operation of:
  - Pilot devices such as selector switches and pushbutton
  - Control and timing relays
  - Protective devices
  - Auxiliary electrical contacts
  - Circuit breakers and switches
  - Operating mechanisms and interlocks
  - Other safety interlocks and mechanisms
  - Review of all power cable terminations for tightness. Conductor fraying and clearances
  
3. Electrical inspection will include:
  - Inspection of control wiring terminations
  - Pull apart terminal blocks engagement
  - Wiring conformance to factory schematics
  - Compare instrument transformer ratios to meter scales
  - Electrical operation of all components
  - Main, tie, and main circuit breaker inspection and
  - Testing in accordance with air circuit breaker test report, P-7.
  - Installation conformance to specifications:
    - Ensure physical arrangement conforms to factory drawings
    - Ensure supplied features and options conform to factory drawings
    - Ensure all wiring conforms to factory specifications
    - Adherence to State and local codes
  
4. Record of inspection and test results will be kept. A check-off list will be used; detailing work performed and results obtained. The formal report produced will list equipment as found, technical service/assistance rendered final equipment settings and recommendations. A report copy shall be submitted.
  
5. This pay item includes simulating a power failure to see if the Automatic Transfer System main tie main will properly switch over and switch back to normal upon power restoration. The breakers shall be inspected to look for signs of arcing or pitting of the arcing contacts, and for uneven or premature wearing of the main contacts. All timing circuits will be tested and all connections will be checked for tightness.
  
6. The Electrical Maintenance Contractor shall be responsible for operation of the overall system and application. It is expected that the Contractor will have qualified personnel available with the necessary knowledge and authority regarding performance of the overall system and application so that the controller may be adjusted for optimum performance.

**Method of Measurement.** Each Service Automatic Bus Transfer System of each Pump Station as approved by IDOT Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for INSPECTION, AUTOMATIC BUS TRANSFER SYSTEM, which shall be payment in full for the work described herein.

## **PI02 INSPECTION, AUTO TRANSFER SWITCH**

**Description.** The Contractor shall provide a factory trained service representative and shall use factory authorized testing equipment for all testing procedures to complete a comprehensive transfer switch inspection. The inspection, testing and maintenance shall be as recommended by the Manufacturer.

**Scope of Work.** The Inspection shall consist of the following work:

1. Verify that all cabled connections are on the proper terminals and torque to the proper specifications
2. Inspect unit for debris and clean
3. Check and adjust all voltage and current sensors as necessary
4. Check phase rotation of both sources
5. Check all auxiliary contacts and accessories are connected properly and adjust to the proper specifications
6. Inspect main contacts
7. Check integrity of electrical hardware of control panel
8. Perform milli-volt drop test
9. Test all light bulbs and replace if necessary
10. Inspect all mechanical interlocks
11. Inspect all electrical interlocks
12. Lubricate necessary moving parts
13. Inspect all limit switches
14. Coordinate with Generator Inspection load test for generator output and timer settings and verify with, specifications
15. Exercise timer operation and control
16. Test unit and insure proper operation of all components

A report shall be submitted that includes the following:

1. Recorded values of all measurements taken such as voltage, amperage, frequency, milli-volt, etc.
2. Any adjustments made will be noted
3. Recommendations relative to repairs or upgrades
4. Note all options or features
5. Note the following per manufacturer recommendations:
  - "How to bypass unit"
  - "How to test unit"
  - "How to set times"

A record of inspection and test results will be kept. A check off list will be used detailing work performed and results obtained. The formal report produced will list equipment as found and final equipment settings and recommendations. The Contractor shall be responsible for operation of the overall system and application. It is expected that the Contractor will have qualified personnel available with the necessary knowledge and authority regarding performance of the overall system and applications so that the controller may be adjusted for optimum performance.

**Method of Measurement.** Each, for the Auto Transfer Switch Inspection of each pump station as approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price, each for INSPECTION, AUTO TRANSFER SWITCH, which shall be payment in full for the work described herein.

**PI03 INSPECTION, GAS DETECTOR SYSTEM**

**Description.** This item consists of furnishing a manufacturer approved factory-trained sales and Service Company to test and calibrate a gas detector system as specified herein for a pumping station.

**Locations.** The following is a list of pump stations with their corresponding gas detector system manufacturer, number of sensors and their respective locations.

PS 2	MSA 5100 with 2 sensors
PS 3	MSA 5100 with 2 sensors
PS 4	
PS 5	MSA 5300 with 6 sensors
PS 7	
PS 8	
PS 9	MSA 5100 with 2 sensors
PS 10	MSA 5300 with 2 sensors
PS 11	MSA 5100 with 2 sensors
PS 12	MSA 5100 with 2 sensors
PS 13	
PS 14	
PS 15	MSA 5100 with 2 sensors
PS 16	MSA 5100 with 2 sensors
PS 17	MSA 5300 with 2 sensors
PS 18	MSA 5100 with 2 sensors
PS 19	MSA 5100 with 2 sensors
PS 20	Rexnord System with 2 sensors
PS 21	Scott Quadraplex with 6 sensors
PS 22	Detronics 2000 with 6 sensors
PS 23	Detronics 2000 with 6 sensors
PS 24	MSA 5100 with 2 sensors
PS 25	MSA 5100 with 2 sensors
PS 26	MSA 5100 with 2 sensors

PS 27	MSA 5100 with 2 sensors
PS 28	MSA ULT System with 5 sensors
PS 29	
PS 30	MSA ULT System with 5 sensors
PS 31	MSA 5100 with 1 sensor
PS 32	
PS 33	
PS 34	MSA 5100 with 2 sensors
PS 35	
PS 36	
PS 37	
PS 38	
PS 39	Scott Quadraplex with 2 sensors
PS 40	
PS 41	MSA 5100 with 2 sensors
PS 42	
PS 43	MSA 5100 with 2 sensors
PS 44	MSA 5100 with 2 sensors
PS 46	MSA 5100 with 2 sensors
PS 47	MSA 5100 with 1 sensor
PS 48	
PS 50	
PS 51	MSA 5100 with 2 sensors
PS 52	MSA 5100 with 2 sensors

**Work Description.** The factory trained sales and Service Company shall furnish all tools and test equipment to complete the work as specified herein. The service company personnel shall be OSHA certified and equipped with proper safety equipment to enter areas where hazardous gases might be present. The Contractor shall provide access to the pumping station for the Service Company and assistance in reaching any difficult locations within the pumping station.

The Service Company shall complete the following procedures.

1. Clean all detectors and hydrophobic filters.
2. Check calibration of all detectors and adjust each, if required
3. Replace sensing element if calibration can no longer be properly performed. This work shall be completed at the time of testing but will be paid under separate contract unit price specified elsewhere herein.
4. Actual alarms of the detectors and sensors to ensure reliability.
5. Check gas detector internal and power supply wiring for grounds and shorts.
6. Check AEGIS and SCADA system for alarm acknowledgment.
7. Check all fans and dampers for start-up and/or shut down.

**Report.** A written report shall be submitted to the Engineer, which shall contain any pertinent recommendations for the system.

**Method of Measurement.** Each detector system that is tested, calibrated and has its accompanying report submitted and approved by the Engineer shall count as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for INSPECTION, GAS DETECTOR SYSTEM, which shall be payment in full for the work described herein.

#### **PI04 INSPECTION, SWITCHGEAR SYSTEM**

**Description.** This item shall consist of furnishing of services and equipment to inspect the 600-Volt class switchgear, including the circuit breakers, bus, structure, instrument transformers and other devices, at a pump station. The services shall be provided by a factory trained field service technician.

**Scope of Work.** Preventative maintenance testing and inspection shall be performed according to the following inspection and test procedures.

Switchgear and Switchboard Assemblies:

1. Visual and Mechanical Inspection
  - Inspect the assemblies for physical damage
  - Inspect bussing compartment. Check tightness of accessible bolted bus joints by torque wrench method. Check insulators for cracks and contamination.
  - Verify all electrical, Key, and mechanical interlock systems for correct operation
  - Make closure attempt on locked open devices. Make opening/withdrawal attempt on locked closed devices
  - Check mechanical operations of circuit breaker in cell and activate auxiliary devices
  - Check ease of operation, proper grounding and interlock
  - Inspect circuit breaker for contamination, physical damage
  - Verify all LED's are working when the system is operating



2. Electrical Tests

- Insulation resistance of each bus section is measured phase to phase and phase to ground
- Electrical operation of the circuit breaker is checked in the test and connected position
- The control power source is checked
- The circuit breaker control scheme is tested
- A phasing check is made on double-ended and/or emergency source switchgear at tie points to ensure correct bus phasing.

Circuit Breakers:

1. Visual and Mechanical Inspection

- Check mechanical operation
- Cell fit and element alignment are checked
- Check bolt torque levels are in accordance with manufacturers or U.S. Standards specifications
- Check arc chutes for foreign matter, cracks and secure installation
- Clean primary contact surfaces and lubricate if required

2. Electrical Tests

- Measure contact resistance
- Check insulation resistance at 1000 volts D.C. for one (1) minute from pole to pole and from each pole to ground and across open contacts for each phase.
- Determine minimum long-time pick-up current and delay time at 300% of pick-up by secondary injection
- Determine short-time pick-up and time delay by secondary injection
- Determine instantaneous pick-up current by secondary injection
- Determine ground fault pick-up current and time delay by secondary injection
- Trip unit reset characteristics are verified
- Final settings are made in accordance with Engineer's prescribed settings.
- Auxiliary devices, such as under voltage relays, blown main fuses detector, shunt close, shunt trip, spring charging motor and auxiliary contacts are activated to ensure operation as applicable
- All functions of the trip units shall be tested with test kits

Metering and Instrumentation:

- Verify meter connections in accordance with single line meter and relay diagram
- Inspect for physical damage
- Electrical tests
- Ammeter accuracy is checked using current injection.
- Voltmeter accuracy is checked

SY/MAX 50PLC:

- Visual and mechanical inspection
- Inspect programmable controller Installation for physical damage
- Inspect for proper grounding
- Check for power wiring
- Check all terminal wiring
- Check all I/O wiring
- Check LI/RI wiring
- Verify correct switch settings on all modules
- Electrical tests
- Inspect sequence of operation
- Verify power supply voltages
- Verify operation of selected I/Os
- Verify resistance of LI/RI cable
- Verify input voltages
- Verify resistance of system ground

Record of inspection and test results will be kept. A check-off list will be used, detailing work performed and results obtained. The formal report produced will list equipment as found, technical service/assistance rendered final equipment settings and recommendations. A report copy shall be submitted to IDOT engineer.

**Method of Measurement.** Lump sum for Switchgear System Inspection approved by IDOT Engineer for the pump station shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contact unit price lump sum for INSPECTION, SWITCHGEAR SYSTEM, which shall be payment in full for the work described herein.

**PI05 INSPECTION, MOTOR STARTER, SOFT START TYPE**

**Description.** The contractor shall supply a factory trained field service technician to perform preventive maintenance testing and inspection of the soft start type motor starter at PS #22. A service sheet for each starter shall be filled out listing both the "as found" and "as left" condition of the starters. All starters shall be inspected and tested under this pay item. Equipment included in the preventive maintenance, testing and inspection five (5) Soft start buckets with associated controls including devices associated with the transfer scheme.

**Scope of Work.**

1. Physical inspection will include:
  - Overall enclosure inspection for structural integrity
  - Verification of proper door swing, hinge operation, latching and door interlocking
2. Insure proper operation of:
  - Pilot devices such as selector switches and pushbuttons
  - Soft starters
  - Control and timing relays
  - Overload and protective devices
  - Auxiliary electrical contacts
  - Circuit breakers and switches
  - Operating mechanisms and interlocks
  - Other safety interlocks and mechanisms
  - Review of all power cable terminations for tightness conductor traying and clearances
3. Electrical inspection will include:
  - Inspection of control wiring terminations
  - Pull apart terminal blocks engagement
  - Wiring conformance to factory schematics
  - Compare instrument transformer ratios to meter scales
  - Electrical operation of all components
4. Installation conformance to specifications:
  - Ensure physical arrangement conforms to factory drawings
  - Ensure supplied features and options conform to factory drawings
  - Ensure all wiring conforms to factory specifications
  - Adherence to State and local codes
5. Record of inspection and test results will be kept. A check-off list will be used, detailing work performed and results obtained. The formal report produced will list equipment as found, technical service/assistance rendered final equipment settings and recommendations. A report copy shall be submitted.
6. Servicing the Motor Soft starters includes final controller adjustments to ensure maximum performance, efficiency and conformance to system limitations. Adjustments include current limit, current trip, minimum and maximum voltage, and controller stability settings as described in the instructions manual. If the adjustable voltage ramp option is provided, initial torque, and ramp times settings are adjusted. Operational features, such as jam/underload, extended start time and smooth stop, are checked and adjusted. The current calibration switch is checked for proper settings.

The Electrical Maintenance Contractor shall be responsible for operation of the overall system and application. It is expected that the Contractor will have qualified personnel available with the necessary knowledge and authority regarding performance of the overall system and application so that the controller may be adjusted for optimum performance.

**Method of Measurement.** Each for Servicing a Motor Starter, Soft Start Type, Inspection as approved by IDOT Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price, each for INSPECTION, MOTOR STARTER, SOFT START TYPE, which shall be payment in full for the work described herein.

#### **PI08 INSPECTION, BACKFLOW PREVENTER**

**Description.** This work shall consist of inspecting, and testing the backflow preventer as specified at Pump Station 10, 17, 23, 31, 39, 44, 46, and 52.

**Work Description.** Inspection, testing, and certification of the backflow preventer shall be performed in accordance with: State of Illinois, Rules and Regulations; Title 35: Environmental Protection; Subtitle F: Public Water Supplies; Chapter II: Environmental Protection Agency; Part 653: Design, Operation and Maintenance Criteria; Subpart H: Cross-Connections. After the inspection and testing are complete, records of the test shall be submitted to the local community public works department and the Engineer. In addition, the Contractor shall provide the Engineer with documentation of the receipt of the test records by the local community public works department.

**Method of Measurement.** Each backflow preventer device that is inspected, tested, and certified shall be counted as a unit for payment.

**Basis of Payment.** This work will be paid at the contract unit price, each, for INSPECTION, BACKFLOW PREVENTER, which will be payment in full for the work described herein.

#### **PI09 PUMP INSPECTION**

**Description.** This item shall consist of providing labor, equipment, and material to perform pump inspection at locations listed herein. The removal and re-installation of the main submersible pump for the purpose of inspection and testing as specified herein and conform to PR496 shall be paid for in this pay item.

**Work Description.** The contractor shall inspect the pump impellor, wear ring, volute, propeller, housing and cables for any damage and provide an assessment to the engineer. The inspectional shall include taking oil samples for testing, cleaning of the pump from debris and caked on material. The Contractor shall install the pump after inspection is completed and assure its operation by performing capacity testing. The Contractor shall procure quotes for the pump repair when damage is found as directed by the Engineer. The Engineer will evaluate the specialty service quotations and authorize and pay for work. This type of work will be applicable at Pump Stations 5, 21, 22, 23, 24, 26, 27, and 30.

The Contractor/Service Company shall furnish all equipment, transportation and labor necessary to perform the work as specified herein. This work shall include but not limited to the following items:

- Setting up for removal, Disconnect electric connections
- Remove the pump, inspect the condition of the housing, cable, volute, impellor and wear ring as per manufacturer's recommendation. Inspect oil chamber for fluid leakage (contaminant) or only light seepage out of the inner hole in the casing
- Drain all the leakage fluid, and refill with a sealing fluid as recommended by the manufacturer
- Inspect oil for water intrusion in the motor seal chamber
- Drain, flush and refill the seal chamber with new oil
- Loading and unloading of equipment that requires inspection and repair
- Re-install pump, test operation

This work will consist of removing and installing the submersible main pump only at the specified locations.

The above procedure is for information only, exact procedure necessary for removal and reinstallation of a complete operational pump is the responsibility of the Contractor/Service Company. This item shall also include the loading and unloading of pump parts and equipment.

Pump capacity, motor current readings shall be taken upon Installation of pump as applicable. The readings and tests shall conform to the pump and motor specifications or be approved by the Engineer.

**Method of Measurement.** Each Submersible pump removed, inspected and reinstalled as described above and approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for PUMP INSPECTION, which shall be payment in full for the work described herein.

#### **PM01 PUMP MOTOR BALANCING**

**Description.** This pay item consists of furnishing labor, material and equipment to balance a motor as specified herein and indicated by the Engineer at a designated pumping station.

**Materials.** Contractor shall provide all instruments for testing the motors and balancing. The instruments and equipment shall be calibrated before testing. Proof of calibration shall be presented at each pumping station prior to testing.

**Work Description.** This item shall consist of balancing a motor of a specified horsepower. The balancing shall be done in conjunction with the motor inspection tests. The Contractor shall record all test readings as identified in the motor inspection before and after balancing and with coupled and uncoupled drive shaft.

**Method of Measurement.** Each motor of a specified horsepower that is balanced in accordance with manufacturer's recommendations and approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for PUMP MOTOR BALANCING which shall be payment in full for the work described herein.

#### **PUMP REBUILD PROGRAM 496**

**Scope of Work.** There are six types of pump rebuilds. After the Engineer and Pump Station Specialist have analyzed the condition of each selected pump and agreed to the type of rebuild and work schedule, the Engineer will issue an authorization for that specific type of rebuild. The Electrical Maintenance Contractor shall provide all the services as required during each calendar year of the Contract. The rebuild program locations are based upon site inspection and operational data including historical data of the pump capacity and vibration analysis. The Contractor is advised that the Engineer may change the proposed list of locations for rebuild as circumstances warrant during the contract year(s). The Electrical Maintenance Contractor shall submit the recommendations for pump repair or replacement any time during each calendar year. All pump removal and reinstallation for repairs and rebuilds shall be documented in the pump station pump rebuild log sheet.

**Pump Station Specialist Requirements.** The Pump Station Specialist is responsible to oversee the work on each pump, including removal, disassembly, and re-Installation. The Specialist will be required to provide documentation on a detailed inventory which includes test measurements such as micrometer measurement of the shafts, bearings, total indicator readings, threads per inch, shaft length and size, shaft stick-up, impeller settings, and end play. He is responsible for properly identifying all existing IDOT inventory and any removed or replaced parts. All inventories shall be properly tagged to IDOT specifications. The Specialist shall also perform inspections on repaired or new equipment, record any discrepancies, and provide recommendations on any/all aspects of the pump rebuild program.

**Specialty Pump Repair Service Company.** A minimum of six potential vertical/submersible service repair companies, within the tri-state area of Illinois/Indiana/Wisconsin shall be submitted during the pre-construction meeting, for review and approval of the Engineer. The Contractor shall be responsible to provide repair quote from approved vendors. Transportation of pump equipment in the tri-state area is included in each of the pay items. Cost of transportation outside this region will be discussed with the Engineer and can be paid as a separate item.

**Specialty Pump Removal and Replacement Service Co.** The Electrical Maintenance Contractor shall contract with a Specialty Pump Removal and Replacement Service Company, to establish a contractual arrangement for selected on call services for the pump rebuild program as specified in Pay Items Types 1, 2, and 3. The Specialty Pump Service Contractor is necessary to supplement the contractor's forces for certain projects involving the rebuild of certain select pumps where because of the type of rebuild, factory trained personnel having special technical qualifications would be desirable to facilitate certain rebuild projects. The Service Co. also shall provide quality control and quality assurance for work performed on selected vertical axial flow pumps. The Service Co. shall furnish factory trained or certified personnel with a minimum of 15 years' experience and expertise in the removal and replacement of vertical mixed flow pumps. This Service Co. shall adhere to the above described Specialty Pump Repair Service Company requirements when providing a quote for repair or replacement and shall follow General pump rebuilding program procedures.

The Electrical Maintenance contractor's personnel shall coordinate with the Service Co.'s personnel on scheduling and performing removal, replacement, energizing, de-energizing and disconnection of any motor electrical splices at the junction boxes.

The following are the procedures by which a pump rebuild is executed. Charges for these items shall be paid through the following pay items:

- PRB1 Pump Rebuild Type 1
- PRB2 Pump Rebuild Type 2
- PRB3 Pump Rebuild Type 3
- PRB4 Pump Rebuild Type 4
- PRB5 Pump Rebuild Type 5
- PRB6 Pump Rebuild Type 6

**Pump Rebuild Program Procedures.** The pump rebuild program is primarily developed using operational data received by testing and inspecting pumps via various routine maintenance programs and periodic inspections. Each pump rebuild is normally executed when spare part(s) are available in Contract Spare Parts. Following is a step by step procedure for this program:

**General Procedures:**

- Pump is selected for the rebuild program.
- The Specialist is scheduled to be present for removal and reinstallation of the pump.
- An inspection report of the removal is completed and submitted to IDOT by the PS Specialist with their recommendations.

Case A: If pump/pump part is to be repaired:

1. The pump or its part shall be sent to the service Repair Company to be inspected.
2. The service co. shall solicit and obtain a quote(s) for pump repair(s).
3. The quote(s) are analyzed by the IDOT Engineer to determine which company shall be authorized to do the repair. The service co. shall be responsible to transport the pump (if necessary) to the selected company's facility for the repair as specified in the following pump rebuild pay items.
4. Following the repair(s) the pump/part(s) shall be inspected and approved by the PS Specialist. Before assembly by the repair facility, the PS Specialist for review and approval shall submit a corresponding inspection report to the Engineer.
5. The Engineer shall review the repair report and final re-assembly, and if found satisfactory shall approve the subsequent return of the repaired materials to the designated Pump Station.

Case B: If Contract Spare Parts Pump/Pump Part(s) are to be used as a replacement:

1. The Contract Spare Parts pump/pump part(s) shall be disassembled and inspected by the Engineer and the PS Specialist to determine satisfactory condition.
2. If the spare part(s) are determined (or suspected) to need reconditioning they shall be sent to a service company. The same procedure(s) should then be followed as in Case A above.

Case C: If Pump/Pump Part(s) are to be replaced:

1. The PS Specialist shall submit a report to the Engineer indicating the type, make, model and material specification for the pump replacement parts.
2. The PS Specialist and the Engineer shall review the manufacturer's pump/pump part(s) literature and test data.
3. The Engineer shall make arrangements to procure the selected pump/pump part(s) for replacement.
4. Following delivery of the new equipment, the PS Specialist shall inspect it and submit a report to the Engineer for approval.



## **PRB1 PUMP REBUILD, TYPE 1**

**Description.** This item shall consist of providing transportation within the Tri-State area, removal and re-Installation of a complete mixed flow pump assembly as a single unit not including the motor. The Pump Removal and Replacement Service Co. shall remove and install the pump as specified herein and conform to PR496. The service co. shall procure quotes for the pump repair as directed by the Engineer. The Engineer will evaluate the specialty service quotations and authorize work according to account PV. This type of work would be applicable for Pump Stations 25.

**Work Description.** As part of removal and re-installation the service co. shall provide all labor, tools, transportation and the use of a crane.

The work shall include but not be limited to the following items:

- De-coupling and removing the motor drive from the pump assembly
- Complete removal of the pump assembly including the discharge column, drive shafting, enclosing tube and bowl as a complete unit
- Loading and unloading of the complete unit on a flatbed truck
- Transportation of the complete pump assembly to the approved service company shop for repairs and delivery of the pump back to the station upon completion of work
- Re-Installation of the complete pump assembly includes the motor
- Provide all services for start-up and testing prior to putting the pump back in service.
- All work shall be accompanied with its respective warranties and guaranties.
- If test results are unsatisfactory, the Contractor shall be responsible for analyzing all operational problem(s) and resolving it to the Engineer's satisfaction.

The above information is for removal and for information only. Exact procedure necessary for removal and re-Installation of a complete operational pump is the responsibility of the Service co.. This item shall also include the loading and unloading of pump parts and equipment. Pump capacity, vibration tests, motor current and voltage readings shall be taken upon Installation of pump. The readings and tests shall conform to the pump and motor specifications, or be approved by the Engineer.

**Method of Measurement.** Each removal and re-Installation of a complete mixed flow pump assembly as a single unit including all connections and transportation as specified herein and approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for PUMP REBUILD, TYPE 1, which shall be payment in full for the work described herein.

## **PRB2 PUMP REBUILD, TYPE 2**

**Description.** This item shall consist of providing transportation within the Tri-State area for, removal and reinstallation of a pump bowl from the complete pump assembly as a single unit not including the motor. The pump removal and replacement service company. Shall remove and install the pump as specified herein and in conformance with PR496. The Service Company shall procure quotes for the pump repair as directed by the Engineer. The Engineer will evaluate the specialty service quotations and authorize work according to account PV. This type of work shall be applicable for Pump Stations 2, 3, 4, 29, 33 and 35.

**Materials.** This item shall require the furnishing of stainless steel bolts and oil for lubrication.

**Work Description.** The work within this item shall require the use of a crane and chain falls. The Service Company shall provide all equipment, transportation and labor necessary to work as described herein. The work shall include but not be limited to the following items:

- Disconnect breaker
- Uncouple motor coupling
- Lift motor and set aside
- Remove dresser coupling
- Set up chain fall on top of hatch or use a crane if required
- Lift pump and column assembly to allow space for removal of bowl assembly from bottom of column pipe. (that contains the discharge pipe, bowl and oil tube assembly including the shaft and motor stand)
- Brake loose tube tension unit
- Disconnect grease line from the assembly
- Drop bowl assembly
- Break loose the oil tube and shaft coupling
- Remove bowl
- Take out shafting and oil tube assembly

The above information is for removal and for information only. Exact procedure necessary for removal and re-Installation of a complete operational pump is the responsibility of the Service company. This item shall also include the loading and unloading of pump parts and equipment. Pump capacity, vibration, motor current and voltage readings shall be taken upon Installation of pump. The readings and tests shall conform to the pump and motor specifications or be approved by the Engineer.

**Method of Measurement.** Each bowl that is removed and reinstalled per pump as described herein and approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for PUMP REBUILD, TYPE 2, which shall be payment in full for the work described herein.

### **PRB3 PUMP REBUILD, TYPE 3**

**Description.** This item shall consist of providing transportation within the Tri-State area for, removal and reinstallation of a complete mixed flow pump assembly in stages and disassembly of the complete unit on pump station grounds. The pump removal and replacement Service Company shall remove and install the pump as specified herein and conform with PR496. The Service Company shall procure quotes for the pump repair as directed by the Engineer. The Engineer will evaluate the specialty service quotations and authorize work according to account PV. This type of work will be applicable for Pump Stations 2, 3, 4, 29, 33 and 35.

**Work Description.** The service company shall furnish all equipment, labor, transportation and material, including lifting crane to perform the work as specified herein. This work shall include but not be limited to the following items:

Disassembly of the pump into the following parts: motor, oil tube sections, shafting, coupling, bearing, bowl assembly, column pipes in sections, motor stand, and set-up for inspection by a service manufacturer for service and repairs and loading and unloading of equipment that requires inspection and repair.

The above information is for removal and for information only. Exact procedure necessary for removal and reinstallation of a complete operational pump is the responsibility of the Service Co.. This item shall also include the loading and unloading of pump parts and equipment.

Pump capacity, vibration tests, motor current and voltage readings shall be taken upon Installation of pump. The readings and tests shall conform to the pump and motor specification, or be approved by the Engineer.

**Method of Measurement.** Each pump that is removed and reinstalled per pump station, including all equipment, labor, transportation and approval of the Engineer shall be counted as an unit for payment.

**Basis of Payment.** This item shall be paid at the contract unit price each for PUMP REBUILD, TYPE 3, which shall be payment in full for the work described herein.

### **PRB4 PUMP REBUILD, TYPE 4**

**Description.** This item shall consist of providing transportation within the Tri-State area for, removal of wetpit/drypit submersible and side volute discharge pumps and their rotating assembly for service, repair and reinstallation. The Contractor shall remove and install the pump as specified herein and conform with PR496. The Contractor shall procure quotes for the pump repair as directed by the Engineer. The Engineer will evaluate the specialty service quotations and authorize and pay for work according to account PV. This type of work will be applicable for Pump Stations 2, 3, 5, 7, 8 - 24, 25, 26 - 32, 34, 36 - 44, 46 - 48, 50 and 51.

**Work Description.** The service company shall furnish all equipment, transportation and labor necessary to perform the work as specified herein. This work shall include but not be limited to the following items:

- Setting up for removal, Disconnect electric connections
- Disconnecting the drive shaft from the rotating assembly
- Close gate valve and provide a blind flange if necessary to stop water leaks
- Loosening the bolt of the rotating assembly from the volute
- Remove rotating assembly out from pump station
- Loading and unloading of equipment that requires inspection and repair.

This work will consist of removing and installing the open shaft and rotating assembly and setting up inspection for manufacturer's sales and service companies for service and repairs.

The above information is for removal and for information only. Exact procedure necessary for removal and reinstallation of a complete operational pump is the responsibility of the service company. This item shall also include the loading and unloading of pump parts and equipment.

Pump capacity, vibration tests, motor current readings shall be taken upon Installation of pump. The readings and tests shall conform to the pump and motor specifications or be approved by the Engineer.

**Method of Measurement.** Each side volute discharge pump and its rotating assembly that is removed and reinstalled as described above and approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for PUMP REBUILD, TYPE 4, which shall be payment in full for the work described herein.

#### **PRB5 PUMP REBUILD, TYPE 5**

**Description.** This item shall consist of removal of an existing side volute discharge pump and motor assembly and replace with a dry pit submersible pump as furnished elsewhere herein. This item will be applicable for Pump Stations 32.

**Materials.** The pump removal and replacement Service Company shall replace the gate valve of the removed pump and replace with a gate valve that is specified below.

- Gate valves shall have a CWP non-shock rating of 150 psi
- Gate valves shall be metal seated type, round, port design for high flow capacity
- Gate valve body shall be constructed of cast iron with an inner stainless steel lining. All wetted parts of the body, chest area and packing chamber shall be constructed of type 316 stainless steel for maximum corrosion resistance.

- The body shall be a wafer face-to-face design with supporting ribs between the raised face flange to provide additional valve strength. Flange bolt holes shall be drilled for through bolting, except where tapped as required in the chest area, to the ANSI class 125/150 standard.
- The gate shall be constructed of stainless steel and finish ground on both sides. The gate shall have a beveled, knife-like edge.
- The valve stem shall be constructed of stainless steel and shall have double-pitch threads. Gate guides and jams shall be provided for proper support and positive seating of the gate against a raised face seat.
- The gate valve packing shall be plastic coated for corrosion resistance. The packing chamber shall have a smooth-surface liner of uniform chamber width that shall accept extra ring type layers of packing material. Packing gland adjusting bolts shall be easily accessible.
- The gate valve superstructure shall be fabricated, angular steel. A bronze yoke sleeve shall be provided as part of the superstructure for ease of valve operation.
- Non-motorized gate valves shall be provided with bevel gear actuators to provide vertical mounting for a chain wheel actuator. The chain wheel actuator shall be as specified elsewhere herein.
- The gate valve shall be provided with chain wheel actuator for manual operation. The chain wheel shall be provided with rust-resistant chrome-plated operating chain of sufficient length to allow floor operation. The chain wheel shall be positioned 90 degrees relative to the valve/pipe center-line to assure floor operation.
- The gate valve shall be Dezurick Series L, ITT Fabri, or approved equal.

**Installation.** All equipment furnished, installed or mounted for this pay item shall conform with the applicable pump station reference specifications detailed elsewhere herein.

The Contractor shall furnish the labor to remove and install all electrical wiring, conduits, relays, fuses, circuit breakers, knife switch disconnects, starters, timers, and any other electrical appurtenances required. The electrical schematic diagram and piping layout shall be submitted for approval by the Engineer.

The pumps shall be installed in compliance with the manufacturer's recommendations.

The pump shall be removable through the pump access hatch. Provide a means to guide the draw-down pump into place when the pump is lowered into the dry pit through the pump hatch. Submit details to the Engineer for approval prior to Installation.

Each installed pump shall be complete with an inlet stand assembly, including anchoring flanges and an integral port suction elbow and clean out port with removable cover, this shall be indicated on submitted drawings.

Each installed pump shall be installed on a steel base support of the pump manufacturer's design and recommendation, designed to straddle the pump inlet port area for access to the pump suction pipe.

The base shall be of adequate strength and rigidity to prevent harmful vibration or deflection of the pump piping from the forces involved in the application. Data submitted for approval shall include calculations supporting an included manufacturer's certification of the adequacy of the base design. The base may be a combination of a steel frame and concrete pad, as required to properly join the pump with the new and/or existing piping as approved by the Engineer.

After assembly and Installation on the foundation, the pumping units shall be leveled, aligned, wedged in place and grouted with a non-shrink grout. Grouting shall not take place until after the initial fitting and alignment.

The manufacturer shall inspect the pump Installation and shall certify that the pumps have been installed properly. Information submitted for approval shall include a letter of intent to provide this certification.

In addition, the services of a qualified representative of the manufacturer shall be provided to supervise the testing of the equipment, make any necessary adjustments, place it in initial trouble-free operation, and instruct the operating personnel in its operation and maintenance.

**Testing.** After Installation of the pumping units and all accessory equipment, the units shall be subjected to running tests under actual operating conditions. The tests shall be made at the expense of the Contractor and conducted in the presence of the Engineer and the State of Illinois. The following items shall be specifically checked:

The units are installed according to plans and specifications and the manufacturer's instructions:

- There is no pipe strain on the pump units.
- The units are properly aligned.
- Vibration limits are with Hydraulic Institute Standards.
- There is no overheating of bearings or other parts.
- The full load current is not exceeding the nameplate rating.
- The units are properly grouted and secured.

The tests shall include a timed pump run and a field capacity check. If, in the judgment of the Engineer, pump performance, as measured in the field test, is not substantially true to published characteristics, modification, adjustment or replacement of the equipment shall be made to achieve specified performance results.

Due to the required continuous operation of the station the pumps may be installed and field tested progressively, as approved by the Engineer.

**Clean-Up and Safety.** The work site shall be maintained in a clean condition, free of hazards, all in conformance with the requirements of Article 107 of Standard Specifications. Special care shall be taken to assure that electrical systems are not left in an exposed or otherwise hazardous condition. All electrical boxes, cabinets, pole handholes, etc., which contain wiring either energized, or non-energized, shall be closed or shall have their covers in place and shall be locked when possible during off-work hours.

**Method of Measurement.** Each side volute discharge pump and motor assembly that is removed and replaced with a dry pit submersible pump as specified herein and approved by the manufacturer and the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for PUMP REBUILD, TYPE 5, which shall be payment in full for the work described herein.

### **PRB6 PUMP REBUILD, TYPE 6**

**Description.** This item shall consist of furnishing all material, transportation, labor and equipment for the removal of an existing side volute discharge pump and motor assembly and replace with a dry pit submersible pump as furnished elsewhere herein. This item will be applicable for Pump Station 14. This work includes the replacement of the pump discharge pipe to the first manhole about 16' away from the pump station.

**Materials.** The pump removal and replacement Service Company shall replace the gate valve of the removed pump and replace with a gate valve that is specified below.

- Gate valves shall have a CWP non-shock rating of 150 psi
- Gate valves shall be metal seated type, round, port design for high flow capacity.
- Gate valve body shall be constructed of cast iron with an inner stainless steel lining. All wetted parts of the body, chest area and packing chamber shall be constructed of type 316 stainless steel for maximum corrosion resistance.
- The body shall be a wafer face-to-face design with supporting ribs between the raised face flange to provide additional valve strength. Flange bolt holes shall be drilled for through bolting, except where tapped as required in the chest area, to the ANSI class 125/150 standard.
- The gate shall be constructed of stainless steel and finish ground on both sides. The gate shall have a beveled, knife-like edge.
- The valve stem shall be constructed of stainless steel and shall have double-pitch threads. Gate guides and jams shall be provided for proper support and positive seating of the gate against a raised face seat.

- The gate valve packing shall be plastic coated for corrosion resistance. The packing chamber shall have a smooth-surface liner of uniform chamber width that shall accept extra ring type layers of packing material. Packing gland adjusting bolts shall be easily accessible.
- The gate valve superstructure shall be fabricated, angular steel. A bronze yoke sleeve shall be provided as part of the superstructure for ease of valve operation.
- Non-motorized gate valves shall be provided with bevel gear actuators to provide vertical mounting for a chain wheel actuator. The chain wheel actuator shall be as specified elsewhere herein.
- The gate valve shall be provided with chain wheel actuator for manual operation. The chain wheel shall be provided with rust-resistant chrome-plated operating chain of sufficient length to allow floor operation. The chain wheel shall be positioned 90 degrees relative to the valve/pipe center-line to assure floor operation.
- The gate valve shall be Dezurick Series L, ITT Fabri, or approved equal.

The Contractor shall remove existing check valve at Pump Station 14. The Contractor shall furnish and install a TightFlex check valve or equivalent.

Quantity	Size
1	16 inch – TideFlex Series 39 Flanged Check Valve
1	14 inch – gate valve 125# flanged
1	Pump Section Elbow Flanged 20 ¾ inches Face to Face
1	16" 150# Flange X Plain end Ductile Iron Spool, 16' pipe
1	16" x 12" Concentric pipe Reducer
1	12 inch base elbow
1	16 inch Schedule 40 LR Elbow Flanged
2	16" Schedule 40, 10' pipe

The above quantities and lengths are approximate and are listed for information only. Exact quantities, dimensions and all other materials that may be necessary to render the new Installation complete for operation is the responsibility of the Service Company.

**Installation.** All equipment furnished, installed or mounted for this pay item shall conform to the applicable pump station reference specifications detailed elsewhere herein.

The Contractor shall furnish the labor to remove and install all electrical wiring, conduits, relays, fuses, circuit breakers, knife switch disconnects, starters, timers, and any other electrical appurtenances required. The electrical schematic diagram and piping layout shall be submitted for Engineer's approval.

The pumps shall be installed in compliance with the manufacturer's recommendations.



The pump shall be removable through the pump access hatch. Provide a means to guide the draw-down pump into place when the pump is lowered into the dry pit through the pump hatch. Submit details to the Engineer for approval prior to Installation.

Each installed pump shall be complete with an inlet stand assembly, including anchoring flanges and an integral port suction elbow and clean out port with removable cover, this shall be indicated on submitted drawings.

Each installed pump shall be installed on a steel base support of the pump manufacturer's design and recommendation, designed to straddle the pump inlet port area for access to the pump suction pipe.

The base shall be of adequate strength and rigidity to prevent harmful vibration or deflection of the pump piping from the forces involved in the application. Data submitted for approval shall include calculations supporting an included manufacturer's certification of the adequacy of the base design. The base may be a combination of a steel frame and concrete pad, as required to properly join the pump with the new and/or existing piping as approved by the Engineer.

After assembly and Installation on the foundation, the pumping units shall be leveled, aligned, wedged in place and grouted with a non-shrink grout. Grouting shall not take place until after the initial fitting and alignment.

The manufacturer shall inspect the pump Installation and shall certify that the pumps have been installed properly. Information submitted for approval shall include a letter of intent to provide this certification.

In addition, the services of a qualified representative of the manufacturer shall be provided to supervise the testing of the equipment, make any necessary adjustments, place it in initial trouble-free operation, and instruct the operating personnel in its operation and maintenance.

This work shall also include removing the discharge pipe and replacing it with an approved 16" discharge pipe at PS 14, coring of the wet pit concrete wall. Also installing a wall pipe leak seals shall be included as a part of the scope of work.

The Contractor shall coordinate Installation of the pump which includes Installation of the pump which includes the check valve, gate valve and appurtenances. Restoration of location to the original status is required before final acceptance.

**Testing.** After Installation of the pumping units and all accessory equipment, the units shall be subjected to running tests under actual operating conditions. The tests shall be made at the expense of the Contractor and conducted in the presence of the Engineer and the State of Illinois. The following items shall be specifically checked:

The units are installed according to plans and specifications and the manufacturer's instructions.

- There is no pipe strain on the pump units.
- The units are properly aligned.
- Vibration limits are with Hydraulic Institute Standards.
- There is no overheating of bearings or other parts.
- The full load current is not exceeding the nameplate rating.
- The units are properly grouted and secured.

The tests shall include a timed pump run and a field capacity shock. If, in the judgment of the Engineer, pump performance, as measured in the field test, is not substantially true to published characteristics, modification, adjustment or replacement of the equipment shall be made to achieve specified performance results.

Due to the required continuous operation of the station the pumps may be installed and field tested progressively, as approved by the Engineer.

**Clean-Up and Safety.** The work site shall be maintained in a clean condition, free of hazards, all in conformance with the requirements of Article 107 of Standard Specifications. Special care shall be taken to assure that electrical systems are not left in an exposed or otherwise hazardous condition.

All electrical boxes, cabinets, pole handholes, etc., which contain wiring either energized, or non-energized, shall be closed or shall have their covers in place and shall be locked when possible, during off-work hours.

**Method of Measurement.** Each side volute discharge pump and motor assembly that is removed and replaced with a dry pit submersible pump as specified herein and approved by the manufacturer and the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price each for PUMP REBUILD, TYPE 6, which shall be payment in full for the work described herein.

### **PS03 PUMP, VIBRATION TESTING AND ANALYSIS**

**Description.** The Contractor shall provide a Vibration and Analysis Testing Consultant who is a data analyst with a minimum of two years' experience in vibration data collection and spectrum analysis, and shall have a Level II certification by a vibration institute or equivalent.

The Consultant shall conduct the testing and start-up on all the pumps and including new and/or rebuild. The Consultant shall provide recommendations for pump motor inspection, balancing, repair or replacement of pumps and motors, maintenance and troubleshooting of all associated equipment. A strobe tachometer should also be used to verify motor speed.

The Contractor shall provide the Consultant with records of the type of pump, head design, manufacturer's performance curve, moisture resistance and megger test results and other pertinent data to the pump operation prior to start-up of the above inspections and testing.

The Contractor shall conduct the first vibration test with the capacity test.

The Consultant shall be equipped with required tools, transportation, equipment, instrumentation and supplies to perform the Pump Vibration and Analysis Testing Inspection.

The Vibration and Analysis Testing Consultant shall perform vibration analysis on all pumps, utilizing a Smart Meter Plus, Model 1330F or better which will include a copy of the associated software for IDOT and the electrical maintenance contractor use for the duration of the contract.

The Electrical Maintenance Contractor shall calibrate and maintain the IDOT vibration meter including all software and accessories. The first Testing shall be conducted at the same time as the Yearly Pump Station Inspection and Pump Capacity Test. The 2nd Testing shall be due November 30 of each contract year. All results shall be entered into the Log Book for each station, in Chart Z. Each inspection report shall be entered into the EMCMS System. Any deficiencies found on this inspection shall have appropriate EMCMS Tickets issued, and the numbers shall appear on the inspection report, Form P-5. A start-up testing on the Pump repair/replacement work shall be scheduled by the Consultant following completion of any necessary repair/replacement work.

The Consultant shall provide testing, analysis, database development, baseline data acquisition and problem identification and reporting, for all the pumping station equipment.

Full vibration signatures shall be acquired for all mechanical equipment included in the program. the baseline data is to be analyzed to determine baseline condition of all equipment. The analysis will result in a series of reports that:(1) identify specific problems, (2) provide specific corrective actions, and (3) establish a priority (based on the problem severity) for maintenance actions.

Monitoring and analysis of the operating condition of the pumps is an absolute requirement of the preventive maintenance program. Therefore, all pumps will be monitored twice per year, additional tests are required for the pumps that indicate potential problems.

**Problem Identification and Reporting.**

A report will be prepared each month that defines specific maintenance tasks that are required to correct incipient problems identified by the monthly data acquisition and analysis program. These reports will be submitted within five (5) working days following completion of the data acquisition. The format of the report should be designed to reduce the amount of paper work necessary to properly maintain accurate communication between the Consultant and IDOT. Each report is to provide a prioritized list of specific maintenance or inspection tasks that are required to verify or correct developing problems.

The Consultant shall notify IDOT and the Electrical Maintenance Contractor immediately when any deficiency is noted that could jeopardize equipment operation or personnel safety. Written reports will address all monitoring points, but will place a priority on "exception" reports describing problems that have been identified including a detailed evaluation of pump status and recommended maintenance actions.

- a. Tests must be conducted with a flooded suction so not to cause vortexing or cavitation. For data history purpose each test should be conducted with about the same amount of pump submergence as the previous test for that pump. The Electrical Maintenance Contractor shall store or provide water in order to conduct the proper test in accordance with normal operation of the pumps. Two vibration readings shall be taken at the thrust end of the motor (one should be parallel to the discharge pipe and one perpendicular to the discharge pipe), and two readings shall be taken at the coupling end of the motor and should be in the same plane. Finally, an axial reading should be taken. The transducer location shall be marked with different colors which will correspond to x and y-axis.
- b. The results of the tests shall be saved on intelli-cards or 3.5-inch floppy showing the velocity in inches per second (ips). In the event that the vibration exceeds 0.3 ips the Engineer may require that the motor be uncoupled from the pump and another test be conducted. Where motor speed is below 1000 RPM, the 0.3 ips velocity "evaluation point" shall be decreased by 10% for each 100 RPM below one-thousand. The worst-case reading shall be assumed to be the "true" reading.
- c. Readings shall be considered "abnormal" when the vibration exceeds 0.3 ips. The test card data shall be entered into the EMCMS System for each station, no later than 48 hours after the completion of the inspection of each station, with the entire inspection report and test cards to be received by the Engineer by June 30th and November 30th of each contract year. Note the location axis of the transducer, the pump manufacturer, model number and serial number of the associated pumps must be specified for each station. Any deficiencies found on this inspection shall have appropriate Tickets issued, and the numbers shall appear on the inspection report, Form P-5.

**Coordination with Contractor PS Specialist.**

The Vibration and Analysis Testing Consultant shall coordinate with the Contractor PS Specialist Consultant on all findings and results to develop an overall condition of the equipment.

**Method of Measurement.** This work shall be measured and paid on the basis of each pump tested in a pump station and analysis of results and reports delivered, as well as all labor costs, travel expenses, miscellaneous expenses, as specified in this pay item for each pumping station inspected.

**Basis of Payment.** This item shall be paid at the contract unit price each for PUMP, VIBRATION TESTING AND ANALYSIS of a pump that shall be payment in full for the work described herein.

## **PV01 VENDOR BUDGETARY ALLOWANCE FOR PUMP REPAIR SERVICES AND REPLACEMENT**

**Description.** This item is to establish a budget account to allocate funds for the payment of various types of repair services including replacement pumps, appurtenances, and miscellaneous system equipment required for the ongoing pump station system maintenance program but which are not accurately or completely identifiable at the time of bidding. When mentioned herein, Article 109.05 is modified whereas the Contractor shall be paid administrative costs of an amount equal to five (5) percent of the first \$10,000, and the Department shall allow an additional one (1) percent of any amount over \$10,000 of the total approved costs, on an individual work authorization.

Following is detailed information concerning each major category of work, which requires the allocation of funds for certain expenses:

1. Pump Repair Services

The annual pump rebuilding program involves many repairs for which the costs cannot be estimated or determined until the pumps are removed from operation and disassembled for examination. Most pump repairs cannot be performed by the General contractor's forces, and it is therefore necessary to have various service and/or pump manufacturing companies perform the necessary specialty service work. Specifically, the work consists of the repair of pump bowl assemblies, discharge column repairs, shafting and oil tube assembly overhaul, and other miscellaneous services.

2. Pump Bowl Replacement

The annual pump rebuilding program involves the necessity to replace certain major parts of the pump assembly called the pump suction bowl. Until the pumps are removed from operation, it is not known whether pumps suction bowl will need to be replaced with a completely new unit. When it becomes known, after disassembly of the pump that the pump bowl cannot be repaired, the Contractor is directed by the Engineer to obtain quotations for a new replacement unit.

3. Complete Pump Replacement

The annual pump rebuilding program involves the need to replace complete pump assemblies at certain pump stations because of the extent of their deteriorated conditions found at the time of removal. For these cases, the Contractor must obtain quotations for direct replacements from the same manufacturer and also sometimes from other pump manufacturers.

The Engineer will evaluate the specialty service quotations and purchase quotations and authorize work accordingly. The total estimated amount of the annual expenses incurred for the services performed by others, or expenses for the purchase of pump suction bowls or replacement pump assemblies and/or other appurtenances, which will be paid under Article 109.05 of the Standard Specifications as herein modified in Article 5.0, is \$200,000.00 as indicated for Pay Item PV01. For bidding purposes, this amount shall be used.

#### **PW01 WET PIT, CLEANING**

**Description.** This item shall include the removal of all debris from the designated pump station wet pit as described herein.

**Work Description.** The method by which the debris is removed from the wet pit shall include any traffic control, safety, transportation, and vacuum equipment and shall require the approval of the Engineer.

All removed material shall be disposed of outside the State right-of-way and in accordance with the local EPA rules and regulations.

Areas outside the bar screen(s)/trash rack(s) up to the inlet sewer shall be cleaned at the same time in accordance with Article 8.

**Method of Measurement.** Each square yard area of wet pit silt material that is cleaned and all refuse disposed of in accordance with the above specifications and approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This item shall be paid at the contract unit price per square yard for WET PIT, CLEANING, which shall be payment in full for the work described herein.

#### **PW02 WET PIT, POWER WASH**

**Description.** This item shall consist of providing all labor, material, and equipment to power wash and clean IDOT pumping station wet pits, walls, floors, beams, grating, railings, piping, ladders, and stairs. This work will be authorized in conjunction with pumping station wet pit cleaning paid under a separate pay item elsewhere herein.

**Equipment.** 10,000 PSI water blaster

**Method of Measurement.** Each power wash hour as approved by the Engineer shall be counted as a unit for payment.

**Basis of Payment.** This work shall be paid at the contract unit price for each hour of WET PIT, POWER WASH, which shall be payment in full for the work described herein.

#### **RMA1 BUDGETARY ROUTINE MAINTENANCE ALLOWANCE**

**Description.** This item is to establish a budget account to allocate funds for the payment of routine maintenance of equipment at locations to be covered in this contract and maintained as specified herein. The total estimated amount of the annual expenses for services performed which will be paid under this contract, is \$400,000 as indicated for Pay Item RMA1. For bidding purposes this amount shall be used.

## **RML1 ROUTINE MAINTENANCE LOCATION**

**Description.** This pay item provides a monthly payment for additional locations maintained that exceed the fixed monthly routine maintenance payment for locations maintained of 4500, such as the traffic, lighting, pump station and surveillance systems OFF/Proposed Maintenance locations under Construction and jurisdictional transfers. See Section 3 for partial list of locations. For REVLAC system see RMR1 Pay item.

**Method of Measurement.** The Contractor shall provide the Engineer monthly, an Excel spreadsheet listing of additional maintained locations that exceed 4500. Review Article 5.0 Monthly Routine Maintenance and Additional Non-Routine Payment.

**Basis of Payment** The work shall be paid at the Contract unit price, each, for ROUTINE MAINTENANCE LOCATION maintained during the past month that exceed 4500, which shall be payment in full for completing the work as described herein.

## **RMR1 ROUTINE MAINTENANCE, REVLAC**

**Description.** This pay item provides a monthly payment for REVLAC equipment and building locations maintained during the contract year. There are 256 equipment and building locations. See Section 3 for list of locations.

**Method of Measurement.** The Contractor shall provide the Engineer monthly, an Excel spreadsheet listing breakdown of equipment and buildings maintained locations under this contract. Review Article 5.0 Monthly Routine Maintenance and Additional Non-Routine Payment.

**Basis of Payment.** The work shall be paid at the Contract unit price, each, for ROUTINE MAINTENANCE LOCATION for REVLAC maintained during the past month, which shall be payment in full for completing the work as described herein.

## **SURVEILLANCE SYSTEMS NON-ROUTINE PAY ITEMS**

### **SAI1 ADDITIONAL SURVEILLANCE RAMP METERING INSPECTION AND CLEANING**

**Description.** The Contractor shall, upon request of the Engineer, provide an additional inspection and cleaning at S-1 locations within District One. The Contractor shall comply and perform each Ramp Metering Inspection as per details provided in Art. 9.0 Monthly Ramp Metering Cabinet Inspection. This additional request is not a substitute for the routine monthly maintenance as defined in Art 9.0 for S-1 locations but is an additional inspection. When this item is exercised the Routine S-1 inspection for that location shall be performed at least ten (10) days before the completion of this pay item work; additional inspection and cleaning.

**Method of Measurement.** This item shall be measured as each for additional inspections and cleanings performed.

**Basis of Payment.** This work shall be paid for at the contract unit price each for ADDITIONAL SURVEILLANCE RAMP METERING INSPECTION AND CLEANING which price shall be payment in full for all labor and materials necessary to complete the work as described herein.

### SC03 CABINET, TYPE 3, FOR SURVEILLANCE

**Description.** This item shall consist of furnishing and installing a new type 3 (III) cabinet at an existing surveillance installation and shall include wiring and re-installation of equipment from existing cabinet to a new cabinet.

The components of the expressway monitoring cabinet shall consist of where applicable a flasher controller. It shall be solid state. It shall consist of two components: A base, which is mounted on the ramp metering, control cabinet wall, and the flasher which plugs into and is secured to the base by a loading screw. A radio interference filter shall be supplied with the flasher controller.

The flashing beacons shall flash alternately at the rate of not less than fifty (50) nor more than sixty (60) flashes per minute. Ramp metering cabinet shall have a signal load relay installed. The signal load relay shall consist of two components, a base, which is mounted on the E.S.P. Type 3 cabinet wall, and a signal load relay which plugs into and is secured to the base by locking screw. The coil of this relay shall be connected to the mark output of the signal change tone receiver. The one set of contacts of the load relay shall be used to change the ramp signal and one set of contacts shall be used to key the mark input to the signal change transmitter. Telemetry mounting frame with frame mounting hardware. All cabinets shall be fitted with a fused thermostatically controlled fan. It shall be mounted at the top of the cabinet for a forced air fan system that has a screened air exhaust opening under roof overhang and no opening in top of cabinetry. The fan shall be capable of operating at 130 cfm. at .160" of water static pressure.

Cabinets shall be supplied in sizes with minimum inside dimensions listed below:

- TYPE           ESP 3
- HEIGHT           49 1/2
- WIDTH           30"
- DEPTH           17"
- THICKNESS   3/16"
- MATERIAL   Fabricated Aluminum

This cabinet shall be watertight. Doors shall be gasketed to provide a waterproof seal. Bases shall be caulked to obtain a moisture-proof bond, and replacement cabinets will be re-numbered with cabinet replacement numbers to match location.

Materials shall conform to controller cabinets as listed in the Standard Specifications for Road and Bridge items, 1085.47 except that the door shall not have any outside designation nor shall the cabinet door be equipped with a police door or louvers.

Installation shall conform to applicable portions of Section TSC T637#2 of the Traffic Surveillance Specifications.

Cabinets, shall be primed and painted in accordance with Section TSC T712#1 of the Traffic Surveillance Specifications. The final coat and color shall be as directed by the Engineer.



All cabinets shall be serviced by 117 volts AC power and a telecommunication system. Each cabinet shall be equipped with a 10 ampere circuit breaker, ground rod, 115 VAC RF1 filtering surge protector (SHP-6LC Surrrestor), 130 volt, 70 joules, 10 amp varistor lighting protection for each leg of the four (4) wire telecommunication system (SRA 64 C Surrrestor), 130 volt, 70 joules, 10 amp varistor, lighting protection for each loop (SRA-6LC Surrrestor), data line protection for each leg of the four (4) wire telecommunication system (SRA 64C Surrrestor).

It will also be equipped with Handy Boxes, with G.F.I. duplex outlet and a pull chain lampholder with an A.C. outlet.

No holes shall be drilled through the cabinet exterior for internal equipment mounting. Each wire entering a cabinet shall be terminated in a workmanlike manner at a terminal strip or switch. If more than one wire has a common terminal on a terminal strip, the adjacent strip shall be used and an appropriate jumpered connection shall be made.

All cables and wires entering a cabinet shall be dressed, harnessed, tied, laced and clamped to produce a workmanlike wiring installation.

A copper wire, combination grounding bus shall be mounted on the rear wall of the cabinets. All cabinets shall be furnished with a minimum of two (2) shelves per cabinet.

**Basis of Payment** This work shall be paid at the contract unit price each for CABINET, TYPE 3 (III), FOR SURVEILLANCE, which price shall be payment in full for furnishing and installing and all work as described herein and as directed by the Engineer.

### **SCC1 CLOSED CIRCUIT DOME VIDEO CAMERA, HIGH DEFINITION**

Effective: May 1, 2015

**Description.** This item shall consist of furnishing and installing an integrated High Definition Closed-Circuit Television (CCTV) Dome Camera Assembly and Network Surge Suppression Device as described herein and as indicated in the Plans.

#### **Materials.**

General:

The HD (High Definition) CCTV Dome Color Camera shall be a rugged, non-pressurized, outdoor surveillance domed camera system. The HD CCTV Dome Camera shall be designed to perform over a wide range of environmental and lighting conditions and automatically switches from color daytime to monochrome nighttime operation. The high definition camera shall be either a Bosch Autodome IP series 7000 HD, Axis, 6155, or a Pelco Spectra 1080P HD Series in compliance with the requirement herein. Each HD CCTV Color camera shall be supplied with a Network Surge Suppression Device.

Camera shall use a standard Web browser interface for remote administration and configuration of camera parameters. The browser interface shall provide PTZ control including preset and pattern and on-screen display (OSD) for access to camera programming.

All equipment and materials used shall be standard components that are regularly manufactured and utilized in the manufacturer's system.

The manufacturer shall be ISO 14001 Certified. The manufacturer's quality system shall be in compliance with the I.S./ISO 9001/EN 29001, QUALITY SYSTEM. The manufacturer shall provide a three year (3) warranty. The manufacturer shall pay inbound and outbound shipping charges during the warranty period for products returned as warranty claims. The manufacturer shall also provide an advance exchange program for warranty claims.

The warranty period shall begin on the date of final acceptance of the video distribution system. This warranty shall include repair or replacement of all failed components via a factory authorized repair facility. All items sent to the repair facility for repair shall be returned within two weeks of the date of receipt at the facility. The repair facility location shall be in the United States. Any extended warranty coverage required to comply with the specified warranty period shall be provided as a part of this pay item at no additional cost to the State.

Physical construction:

The CCTV Dome Camera shall be provided in a NEMA 4X or IP66 certified, rugged, weather-resistant package. The CCTV Dome Camera shall also comply with the following requirements:

<b>Environmental</b>	<b>Requirement</b>
IP Rating	IP 66
Weight (max.)	10 lbs
Overall Dimensions	10" dia. x 14"
Humidity	0 to 100%
Operating temperature	-40°C to 50°C
Mount	1 1/2" NPT

The CCTV dome camera shall be equipped with a fan and heater controlled by a thermostat. The heater shall prevent internal fogging of the lower dome throughout the operating temperature range of the camera.

An optional rugged clear dome bubble shall be available from the CCTV camera manufacturer. The rugged dome shall be made from 3mm thick polycarbonate, designed to meet stringent strength standards without compromising optical clarity. The dome, by itself, shall withstand a 100 foot-pound impact. This energy is equivalent to that of a 10 lb sledgehammer being dropped from a height of 10 feet. The dome, when installed in the CCTV camera, shall exceed the UL 1598 horizontal impact standard for lighting fixtures, by a factor of 10. The submittal needs to indicate compliance with this requirement.

**Power:**

The CCTV Dome Camera shall be designed to operate from a 120v power source. The appropriate power supply, if required for the CCTV Dome Camera to operate, shall be included as a part of this item. The power requirements for the camera shall comply with the following:

Item	Requirement		
Port	RJ-45 for 100Base-TX; Auto MDI/MDI-X;		
Cabling Type	Cat5 cable or better for 100Base-TX		
Input Voltage	18 to 32 VAC; 24 VAC nominal; 22 to 27 VDC; 24 VDC nominal		
Input Power	24 VAC nominal	25 VA nominal (without heater and blower);	
		75 VA nominal (with heater and blower)	
	24 VDC nominal	0.7 A nominal (without heater and blower); 3 A nominal (with heater and blower)	
	PoE	IEEE802.3af (without heater and blower)	

**Camera:**

The camera shall provide a minimum of two simultaneous video streams with a 2.1 megapixel (MPx) 1920 x 1080 resolution, auto iris with 30X optical, and 12X digital zoom. The CCTV Dome Camera shall incorporate:

Item	Requirement
Sensor Type	1/2.8-inch Type Exmor CMOS sensor
Optical Zoom	30X
Digital Zoom	12X
Maximum Resolution	1920 x 1080
Lens	f/1.6 - f/4.7, (4.3 mm - 129.0 mm optical)
Horizontal Angle of View	59° (wide) - 2° (tele)
Aspect Ratio	16:9
Light Sensitivity	Sensitivity in lux for 90% reflectance, f/1.6 (wide angle), 28 dB gain at 30 IRE (30% of signal level) with Sensitivity Boost OFF; 4X improvement to sensitivity with Sensitivity Boost ON
Color (33 ms)	0.65 lux
Color (250 ms)	0.07 lux
Mono (33 ms)	0.20 lux
Mono (250 ms)	0.015 lux
Day/Night Capabilities	Yes
IR Cut Filter	Yes
IR Trace	Curves 850 nm and 950 nm
Wide Dynamic Range	80dB
Iris Control	Auto iris with manual override
Backlight Compensation	Auto / Manual
Automatic Gain Control	Auto / Manual
Active Noise Filtering	Auto / Manual
Electronic Image	30X
Stabilization (EIS)	

**Video**

<b>Item</b>	<b>Requirement</b>
Video Encoding	H.264 in High, Main, or Base profiles and MJPEG
Video Streams	Up to 2 simultaneous streams, the second stream is variable based on the setup of the primary stream
Frame Rate	Up to 30, 25, 15, 12.5, 10, 8.333, 7.5, 6, 5,3, 2.5, 2, 1 (depending upon coding, resolution, and stream configuration)
Minimum Available Resolutions	1920 x 1080 1280 x 720 720 x 480
Supported Protocols	TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, IPv6, SNMP v2c/v3, QoS, HTTP, HTTPS, LDAP (client), SSH, SSL, SMTP, FTP, and 802.1x (EAP)
Security Access	Password protected
Software Interface	Web browser view and setup

**PTZ Mechanical**

<b>Item</b>	<b>Requirement</b>
Pan Movement	360° continuous pan rotation
Pan Speed	Variable between 400 per second continuous pan to 5.0° per second
Vertical Tilt	Unobstructed tilt of +1° to -90°
Manual Control Speed	Pan speed of 0.1° to 80° per second; tilt operation shall range from 0.5° to 40° per second.
Automatic Preset Speed	Pan speed of 280° and a tilt speed of 160° per second
Presets	255 positions
Tours	2 tours
Preset Accuracy	± 0.2°
Proportional Pan/Tilt Speed	Speed decreases in proportion to the increasing depth of zoom
Motor	Continuous duty and variable speed, operating at 18 to 32 VAC, 24 VAC nominal
Window Blanking	16 blanked windows
Auto Flip	Rotates dome 180° at bottom of tilt travel
Power Consumption	Nominal 45 VA (without heater and blower running)
	Nominal 75 VA (with heater and blower running)

The camera shall provide a freeze frame feature that freezes a camera image as a preprogrammed preset is called+, providing a live view once positioned. Selections for on/off shall be available through the embedded Web browser.

The camera shall provide image stabilization to compensate for vibration introduced into the camera.

The camera shall support IPv6 configurations in conjunction with IPv4.

### **Still Picture Capture**

The camera shall be capable of capturing a still image in JPEG format and automatically transferring this image to an FTP site. The resolution of the image shall be 1920 x 1080 pixels. The frequency of captures shall be user settable and shall as a minimum range from 1 picture every 30 seconds to 1 picture every five minutes.

### **Testing**

The Contractor shall test each CCTV Dome Camera Assembly in the presence of the Engineer after the camera is installed. This test may be done locally at the camera support structure.

### **Product Support.**

The manufacturer shall provide technical support via email, fax and toll-free telephone. The above forms of support shall be provided Monday through Friday, 8:00am to 8:00pm EST.

### **Installation**

The Contractor shall install the CCTV camera in accordance with manufacturer's instructions. The camera firmware shall be the latest stable release available at the time of installation.

**Network (IP-Video) Surge Protection Device (SPD).** The Network (IP-Video) SPD shall be modular in design to support multiple installation options e.g. Stand-alone or DIN rail mounting configuration. SPD shall be a single port unit to support industrial 1000/100/10-Base-T Ethernet and POE applications. SPD shall support shielded RJ45 connectors and comply with UL497B listed. SPD shall comply with the following standards: TIA/EIA-568-B.2-1, IEEE 802.3ab, IEEE 803.3af, and IEEE 803.3at.

The equipment shall be securely mounted on a mounting back panel or on a corrosion resistant DIN rail system

### **Documentation**

In addition to the initial submittal(s) prior to procurement, the Contractor shall provide installation and operation manuals, documentation of exact equipment model and serial numbers, software/firmware version numbers, in hardcopy and PDF formats on CDROM.

**Measurement.** Closed-Circuit Television (CCTV) Dome Cameras and Network Surge Suppression Devices shall be counted as each upon successful completion of the testing described herein for payment.

**Basis of Payment.** This item will be paid for at the contract unit price each for CLOSED CIRCUIT DOME VIDEO CAMERA, HIGH DEFINITION, Color, PTZ Control, which shall be payment in full for all material and work as specified herein.

## **SCC2 CAMERA AND CABINET CONTROL MAINTENANCE**

**Description.** This item shall consist cleaning a CCTV dome camera or fixed position camera and the cabinet for the video encoder and surge suppression. Contractor shall clean camera domes or glass on camera housing with glass cleaner and non-abrasive cloth. The cabinet shall be vacuumed and hand cleaned with biodegradable cleaner. All rodent debris shall be removed. Upon completion of cleaning the cabinet conduits shall be sealed with duct seal and steel wool. Contractor shall coordinate work as necessary to lower cameras on lighting towers for cleanings.

**Method of Measurement.** Contractor shall be paid per camera and cabinet cleaned.

**Basis of Payment.** This item shall be paid at the contract unit price, each, for CAMERA AND CABINET CONTROL MAINTENANCE.

## **SCC3 CAMERA LOWERING DEVICE**

**Description.** This item shall consist of furnishing and installing an external camera lowering device for camera poles up to eight (80) feet.

The camera lowering device shall be designed to support and lower an Ethernet/IP direct closed circuit television camera, lens, housing, PTZ mechanism, cabling, connectors and other supporting field components without damage or causing degradation of the camera operations.

The camera lowering system shall consist of a lower winch box, permanently mounted winch with crank, upper mounting box, suspension contact unit, divided support arm and camera connection box. The divided support arm and receiver brackets shall be designed to self-align the contact unit with the center line during installation and ensure the contact unit cannot twist under high wind conditions. For maximum arm strength, round support arms are not acceptable.

The construction of the camera lowering device shall be Model by MG squared CLDMG2-EXT-HYPIP-080 or an approved equal. The lowering device manufacturer shall furnish an authorized factory representative to oversee the first installation of the camera lowering device onto the existing structure.

The Contractor shall be trained by the manufacturer as to the installation, operation and safety features of the lowering device for the particular project.

**Basis of Payment.** This work shall be paid at the contract unit price each for CAMERA LOWERING DEVICE, each, which price shall be payment in full for furnishing and installing system as described herein.

#### **SCC4 CCTV CAMERA POLE**

**Description.** This item shall consist of furnishing and delivering to a Contract Spare Parts facility as directed by the Engineer or installing in the field, a CCTV camera pole, under 55 feet mounting height, complete with CCTV camera mounting brackets as manufactured by Union Metal Inc., or as approved by the Engineer, identical to the existing CCTV camera poles in use in District 1.

**Basis of Payment.** This work shall be paid at the contract unit price each for CCTV CAMERA POLE, which price shall be payment in full for furnishing and delivering to a Contract Spare Parts facility as directed by the Engineer or installing in the field, the item as specified herein.

#### **SD03 DETECTOR LOOP ROUND, SQUARE, OR RECTANGULAR**

**Description.** This item shall consist of furnishing, installing and testing an induction loop, of the dimensions shown on the plans or of the dimension from Table 1, at the locations shown. The induction loop shall be installed in accordance with all applicable portions of article 886 of the Standard Specifications for Road and Bridge. All saw cutting, cable installation, joint sealing, lead-ins and testing necessary to complete the installation shall conform with the following requirements.

**Materials.** The cable used for induction loop shall be IMSA 51-7, No 14-19 strand XHHW XLP-600V. Encased in orange Detect-duct tubing as manufactured by Kris-Tech Wire Company, or comparable. Lead-ins shall be Conoga 30003 or equal cable.

Joint sealer (Dozseal 230) shall have sufficient strength and resiliency to withstand stresses set up by vibrations and differences in expansion and contraction due to temperature changes. Adhesion to clean dry, oil-free Portland Cement concrete shall be at least equal to the tensile strength of the concrete. The joint sealer, with qualities described above, shall be capable of curing in a maximum time of 30 minutes at all temperatures. Curing shall be defined as the capability of withstanding normal traffic loads without degradation.

**Installation Details.** Slots in the pavement shall be cut with a concrete sawing machine in accordance with the applicable portions of Section 420.10 of the Standard Specifications for Road and Bridge Construction. The slot must be clean, dry, and oil-free. Wire shall be inserted in the pavement slot with a blunt tool which will not damage the insulation and wedges made of loop tubing "Deteca-duct" will be installed at eighteen (18) inch intervals to keep new loops from floating. Loops should not be installed at an outside temperature below 50F (10C) degrees unless directed by Engineer.

Plastic sleeving shall be used to insulate the wire where loop wire crosses cracks and joints in the pavement. The sleeving shall be properly sealed with electrical tape to prevent joint sealer from entering sleeves. Sleeving shall extend a minimum of 8 inches each side of joint.

All mainline loops shall be round, six(6) feet in diameter, and centered in traffic lanes unless designated otherwise by the Engineer.



The Contractor shall core drill a six foot diameter round induction loop. The width of the drill portion shall be .500", the depth shall be a maximum of 2.75". A saw cut (home run) .375 in width and the same depth as the drilled portion shall be cut to the core hole. The core hole will be a minimum 1 1/2" diameter and drilled to a depth to meet the installed P-duct. At the point where the 6' diameter loop intercepts the straight cut (home run) the wire leaving the loop will have a minimum of a 1.5" radius entering the straight cut. Interception point of home run slot and round loop shall not be cored.

Induction loops on exit and entrance ramps as well as speed/count stations shall be square or rectangular with edges perpendicular or parallel to traffic flow. Induction loops shall be centered on all ramps and in traffic lanes unless designated otherwise on the plans or by the Engineer. Traffic lanes shall be referred to by number and loop wire shall be color-coded and labeled accordingly.

A chart, which shows the coding for each installation, shall be included in each cabinet. No core holes shall be allowed at corner of any loop. Sawcuts for all induction loops and lead ins shall not be greater than 2.75 inches in depth.

All excess joint sealer shall be removed so that the level of the sealer in the saw cut is at the same level as the adjoining pavement.

All excess joint sealer shall be removed so that the level of the sealer in the saw cut is at the same level as the adjoining pavement.

All induction loops shall contain a minimum three (3) turns of No. 14 wire. Each induction loop shall have its own Canoga 30003 or equal home run or lead-in to the cabinet. Induction loops shall not be connected in series with other loops. This wire shall be free from kinks or any insulation abrasions. The loop lead-in shall be barrels sleeved, crimped, soldered and protected by heat shrinkable tubing to the loop #14 wire. Lead-ins shall be placed in such a manner that they take the most direct route to the cabinet.

Lead-in cable Canoga 30003 or equivalent will only be installed where the lead in length from point of interception to the point of termination exceeds 150 feet (45.75m). Where lead-in runs are less than 150 feet (45.75m), the loop wire will be utilized as lead-in to the point of termination w/o splices, being twisted 5 turns per foot (304.8mm). The loop wire will be paid as "lead-in" from last point of saw cut in pavement at dive hole to point of termination in cabinet.

Loop lead-ins placed in handholes shall be coiled, taped and hung from hooks on the sides of the handhole to protect against water damage. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged at the core hole, in each junction box it passes through and at the termination point in the cabinet.

Slots shall be cut so that no bends greater than 50 degrees is used. Diagonal saw cuts (a minimum of twelve (12) inches (304.8mm) in length) shall be used at all corners to conform with this specification. Core hole at corner or cracks shall not be allowed. The Engineer shall be contacted regarding proposed changes in loop locations necessitated by badly deteriorated pavement. The Engineer may relocate such loops.

Copper wire and lead-ins shall not be installed in the curb and gutter section or through the edge of pavement. A hole shall be drilled at least 12" (304.8mm) in from the edge of pavement through which the P-duct, loop wire and lead-in shall be installed. Saw cuts through shoulders to core hole shall not be allowed. loop lead-ins shall not be allowed in saw cuts in shoulders.

Ramp Loop Table (1)

<u>W (FT.) (m)</u>	<u>S (FT.) (m)</u>
12 3.7m	8 2.4m
13 4.0m	9 2.8m
14 4.3m	10 3.1m
15 4.6m	11 3.4m
16 4.9m	12 3.7m
17 5.2m	13 4.0m
18 5.5m	14 4.3m
19 5.8m	15 4.6m
20 6.1m	16 4.9m
21 6.4m	17 5.2m
22 6.7m	18 5.5m
23 7.0m	19 5.8m
24 7.3m	20 6.1m
25 7.6m	21 6.4m

\*EXAMPLE: Where lane width (W) is 12' (3.66m), loop width(s) shall be 8' (2.44m),

Length of loop shall be determined by location.

Should the induction loop and/or core hole for the induction loop and loop lead-in cable be paved over by other construction operations, it shall be the contractor's responsibility for locating and finding the induction loop and/or the core hole for the repair of a bad loop or lead-in or for the installation of a new loop or loop lead-in. The locating of the core hole and the induction loop shall be incidental to the cost of the induction loop lead-in installation.

In areas where a second loop is added in the lane of travel to create a speed trap/classification station the new loop where practical can utilize the existing loop dive for the second loop of the speed trap. If it is determined by the Engineer the existing loop dive cannot be utilized a second loop dive shall be installed for the speed trap loop. The cost for the new loop dive shall be paid for utilizing existing pay items for conduit and asphalt remove/replace.

**Traffic Systems Center - Loop Splicing Requirement**

<u>Mainline Loops</u>	<u>Metering Loops</u>	<u>Speed Count</u>
Lane 1 - Blue	Loop 1 - Green - Input Loop	Lane 1 - Blue Exit-Black
Lane 2 - Brown	Loop 2 - Yellow - Demand Loop	Lane 2 - Brown
Entrance-White		
Lane 3 - Orange	Loop 3 - Red - Passage loop	Lane 3 - Orange
Lane 4 - Violet		Lane 4 - Violet
Lane 5 - Slate		

Lane 1 being the left lane in direction of traffic flow for mainline and ramps.

When 2 or 3 loops are installed on an exit or entrance ramp the loop color code shall conform to the mainline loop color code and shall be marked as entrance or exit ramp loops.

Only Speed/Count Station loops both square and rectangle shall be color coded and tagged by lane per specific locations as noted on plans, or as directed by the Engineer.

In addition to color codes each loop shall be identified with a written label attached to the loop wire, or lead-in wire. The tags shall be Panduit #MP250W175-C or equivalent. All wires and cables shall be identified in each handhole or cabinet the cable passes through, or terminates in.

The labels shall be attached to the cable by use of two cable ties.

An electronic test instrument capable of measuring large values of electrical resistance such as a major megger, shall be used to measure the resistance of the induction loop and its lead-in shall be a minimum of 500 megohms above ground under any conditions of weather or moisture. The loop and the loop lead-in shall have an inductance between 50 microhenries and 1000 microhenries. The continuity test of the loop and loop lead-in shall not have a resistance greater than five (5) ohms. Testing shall be done with the required loop tester.

Loop wire and lead-ins shall not be installed in the curb and gutter section or through the edge of pavement. A hole, shall be drilled at least 12" in from the edge of pavement through which the 1" P-Duct, loop wire, and lead-in shall be installed.

**Method of Measurement.** A loop is considered by lineal feet plus lead-in into the dive hole.

**Basis of Payment.** This work shall be paid at the contract unit price per lineal foot for DETECTOR LOOP ROUND, SQUARE, OR RECTANGULAR of the size, number and type as specified, which shall be payment in full for the work described herein. The contract shall be paid lineal feet for the loop, plus the lineal footage for the home run straight cut to the core hole. The cost of the expressway lane closure shall be paid separately.

#### **SD04 DMS UPS INVERTER AND BATTERIES, SKYLINE DMS**

**Description.** The Contractor shall perform a UPS modification as specified herein and as directed by the Engineer.

**Work Description.** The Contractor is responsible for scheduling the work and for coordinating with the Engineer whenever Engineer-witness functions are required. The Contractors shall also advise the Engineer when each location is complete and shall provide a written certification to that affect. The Engineer reserves the right to require a final inspection of the modification at any or all of the locations certified as complete. Should deficiencies be found upon inspection, a corrective work list will be prepared.

The DMS sign location shall be kept operational at all times except when permitted by the Engineer. The Contractor shall be responsible for all traffic control and temporary provisions required for the work, all at no additional cost to the pay item. All cable, conduit, fittings and accessories shall be new. All materials and work shall be in conformance with the requirements of applicable contract specifications and the National Electrical Code.

The work will generally include;

- Replacement of the existing inverter, batteries, harnesses, and rack mounting
- Reuse of AC terminal blocks, Cabinet electronics circuit breakers, Cabinet environmental circuit breakers, harnesses connecting the inverter to the pole support board or controller, inverter disconnect switch, AC sense relay, fuses, fans, heaters, etc...
- Installation of a new Alfa FXM 2000 inverter or equal
- Alpha Cell 220GXL 109 AH batteries (8) or equal
- Alpha 8 foot 48 volt battery harness (2) or equal
- Alpha Battery cable y adaptor or equal
- Alpha Rack mount kit or equal
- Misc connectors and wiring

The new inverter shall be interfaced into the DMS 170/2070 controller to report back voltage and battery status. The UPS shall be capable of reporting in the same manner as the existing inverter. It shall report door alarm, AC sense, and battery voltage signal. Battery voltage signal is used by the Controller to estimate the signs run time on the battery backup.

All work shall be tested once complete. The new inverter shall be capable of operating the DMS as the original UPS was designed. Testing shall be as defined in the Skyline Battery Backup Technical Reference Manual 21ST-0001-026 Rev. B

**Method of Measurement.** Each modification performed at a location as specified and approved by the Engineer shall be counted as a unit each for payment.

**Basis of Payment.** This item shall be paid at the Contract unit price each for DMS UPS INVERTER AND BATTERIES, SKYLINE DMS UPS , which shall be payment in full for the work described herein.

#### **SD05 INDUCTIVE LOOP DETECTOR, RACK OR SHELF MOUNTED**

**Description.** This item shall conform with sections 885 and 1079.01 of the Standard Specifications for Road and Bridge Construction, District 1 Traffic Signal Specifications and the District 1 Standard Traffic Signal Design Details, except as revised herein.

**Installation.** The inductive loop detector shall be installed inside a surveillance controller cabinet. The detector shall be either card rack type or shelf-mounted type. The detector may be single-channel or two-channel as directed by the Surveillance Engineer.

Where replacing an existing 4 channel shelf mounted detector the Contractor shall remove the existing 4 channel harness and furnish and install the necessary single channel harnesses to complete the installation.

**Functions.** The inductive loop detector shall have a front panel multiline graphic Liquid crystal display which aids in the set up and can display operational parameters and diagnostic information for all channels simultaneously.

The inductive loop detector shall conform to TS1-1989, 170/2070 requirements, and TS2-2003. For Nema TS2 the two channel and 4 channel devices shall meet the requirements for type C and D configurations respectively.

The inductive loop detector shall have a minimum of 20 levels of sensitivity control and shall have sufficient sensitivity to detect the smallest motor vehicle, including motor bikes.

The inductive loop detector shall have directional logic built in for wrong way vehicle detection.

The inductive loop detector shall support 3 different inductive loop types; normal loop, point probe, and rail mode.

The inductive loop detector shall have solid state Optically Isolated Outputs.

**Materials.** Materials shall be according to Article 1079.01

**Basis of Payment.** This work will be paid for at the contract unit price each for INDUCTIVE LOOP DETECTOR, RACK OR SHELF MOUNTED which price shall include the necessary connections and adjustment for proper operation.

If the detector unit has more than one complete detection channel, each compound detection channel will be considered as a detector for payment.

#### **SE02 ELECTRICAL CABLE IN CONDUIT, 4C/ NO. 18 SHIELDED LOOP DETECTOR**

**Description.** This work shall consist of furnishing materials and labor for installation of shielded loop detector cables in conduit as specified herein and indicated by the Engineer, complete with all identification, terminating and testing.

**Materials.** Lead-ins shall be Conoga 30003 or equal cable. The jacket of high density polyethylene shall be rated to 600 volts in accordance with UL 83 Section 36.

All cables shall be UL listed.

Unless otherwise indicated all cable shall be rated 600 volts.

The cable shall be rated 90 degrees C. dry and 75 degrees C. wet and shall be suitable for installation in wet and dry locations, exposed to the weather, and shall be resistant to oils and chemicals.

The UL listing mark, cable voltage, insulation type and ratings, as well as the cable size shall all be clearly printed on the cable in a color contrasting with the insulation color.

**Conductors.** Conductors shall be #18 awg 7X.0152" un-coated copper. Conductors shall meet the requirements of ASTM Designation B-8 as applicable. Unless otherwise indicated, all conductors shall be stranded and twisted 4 turns per foot. The cable shall be an assembly of pairs of left hand lay twisted insulated conductors, with a core filled with a petroleum base flooding compound, overlapped conductive tape shield and a black high density polyethylene jacket overall. This cable shall meet the requirements of IEEE Standard 383.

**Insulation.** The conductors shall be coded as follows: black-red-white-green

Cable insulation shall incorporate polyvinyl chloride (PVC) with a clear nylon covering overall as specified and the insulation shall meet or exceed the requirements of ICEA S-61-402, NEMA Standard Publication No. WC-5, UL Standard 83, as applicable.

Unless otherwise indicated, cable conductors shall be solid full color coded via insulation color.

**Quality Control.** Submittal information shall include demonstration of compliance with all specified requirements.

All cables shall be delivered to the site in full reels. Cable on the reels shall be protected from damage during shipment and handling by wood lagging or other means acceptable to the Engineer. Reels shall be tagged or otherwise identified to show the UL listing.

**Installation.** The loop lead-in shall be a Canoga 30003 or equal cable. The loop lead-in shall be barrel sleeved, crimped, soldered and protected by heat shrinkable tubing to the loop #14 wire. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be brought into a cabinet or handhole at the time the induction loop is placed in the pavement. Loops located over 1000 feet from cabinet require four (4) turns of No. 14 wire.

Lead-in cable Canoga 30003 or equivalent will be installed where the lead in length from point of interception to the point of termination exceeds 150 feet.

Where lead in runs are less than 150 feet the loop wire will be utilized as lead in to the point of termination w/o splices, being twisted 5 turns per foot. The loop wire will be paid for as "lead in" from last point of sawcut in pavement at dive hole to point of termination.

Loop lead-ins placed in handholes shall be coiled, taped and hung from the side of the handhole to protect against water damage. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged in each handhole through which it passes. The loop lead-in shall be color coded and tagged at the core hole, in each junction box it passes through and at the termination point in the cabinet.

#### TRAFFIC SYSTEMS CENTER LOOP SPLICING REQUIREMENT

##### MAINLINE LOOPS

Lane 1 Blue

Lane 2 Brown

Lane 3 Orange

Lane 4 Violet

Exit Black

Entrance White

##### METERING LOOPS

Loop 1 Green

Loop 2 Yellow

Loop 3 Red

When 2 or 3 loops are installed on an exit or entrance ramp the loop color code shall conform to the mainline loop color code and shall be marked as entrance or exit ramp loops.

In addition to color codes each loop shall be identified with a written label attached to the loop wire, or lead-in wire. The tags shall be Panduit #MP250W175-C or equivalent. All wires and cables shall be identified in each handhole or cabinet the cable passes through, or terminates in. The labels shall be attached to the cable by use of two cable ties.

**Testing.** After installation, the cable shall be tested as approved by the Engineer. Cable failing to pass the test shall be replaced with new cable at no additional cost.

**Method of Measurement.** The cable shall be measured for payment in linear foot in place. Measurements shall be made in straight lines between changes in direction and to the centers of equipment. All vertical cable and permissible cable slack shall be measured for payment. A total of six (6) feet of slack shall be allowed for the end of a run terminating at a panel and four (4) feet will similarly be allowed when terminating at a wall-mounted panel. Additional vertical distance for the height of conduit risers, etc., as applicable, will be measured for payment for equipment so mounted.

**Basis of Payment.** This work shall be paid at the Contract unit price per linear foot furnish and installed for ELECTRICAL CABLE IN CONDUIT, 4/C NO. 18 SHIELDED LOOP DETECTOR.

### SE03 ETHERNET MEDIA CONVERTER

**Description.** The Contractor shall furnish and install a field hardened unmanaged Ethernet Media Converter, copper to fiber, at a CCTV, Surveillance or DMS cabinet as shown on the plans or directed by the Engineer. The Ethernet media converter shall be either a Rugged Com, Comnet, IFS, or Antaira unmanaged media converter. The contractor shall supply a match pair to connect devices which are 200 feet or more from the nearest Layer 2 or Layer 3 Ethernet Managed Switch. The contractor shall supply the Ethernet cat 5e patch cords as necessary to connect the field device to the Ethernet media converter and to the Ethernet managed switch.

**Basis of Payment.** This work shall be paid for at the contract unit price each for ETHERNET MEDIA CONVERTER and for which price shall be payment in full for all the labor and materials required to complete this work as described herein.

### SE04 ETHERNET MANAGED SWITCH

**Description.** The Contractor shall furnish and install a field hardened Ethernet Managed Switch at a Com Shelter, Pump House, DMS, CCTV, or Surveillance cabinet as shown on the plans or as directed by the Engineer.

**General Requirements.** The Ethernet switch shall be an environmentally hardened Ethernet switch compliant with IEEE 802.3 (1-Mbps) and IEEE 802.3u (100 Mbps). Acceptable manufactures are Rugged Com, Comnet, Control Rocket Lynx, and BCDVideo managed switches

**Operating Environment.** The Ethernet switch shall be capable of operating properly over an ambient temperature range of -40°C to +85°C without the use of internal or external cooling fans in accordance with IEC 60068-2-1 and 60068-2-2. The Ethernet switch shall be capable of operating properly in relative humidity conditions of 95% non- condensing at 55°C in accordance with IEC 60068-2-30. The Ethernet switch shall meet the environmental requirements of traffic control equipment in accordance with NEMA TS 2 (1998), Section 2: Environmental Requirements. Specifically NEMA TS 2 1998

(Section 2.2.8)

Vibration in each of the 3 mutually perpendicular planes. Vibration frequency sweep of 5 to 30 Hz  
Vibration strength = 0.5g

Duration = 3 hours, 1 hour at each plane



The Manufacturer shall provide evidence of independent testing verifying performance. In general, the Ethernet Switch shall comply with the environmental requirements outlined in Table 1. The Ethernet switch shall be capable of operating properly when exposed to radiated electric fields of up to 10 V/m continuously and magnetic fields of up to 40 A/m continuously. In general, the Ethernet switch shall comply with the EMI Immunity requirements given in IEC 61850-3 and IEEE1613. The Ethernet switch shall also pass the minimum EMC immunity requirements of EN61800-3. EN61800-3 A11 is the IEC standard for EMC emissions and immunity requirements for Adjustable Speed Power Drive Systems.

**Port Requirements.** The Ethernet switch shall have 8 - 10/100Base TX ports, 2 – 1000Base X fiber optic Gigabit Ethernet ports. All fiber optic link ports shall be capable of Multimode or Single mode. The Ethernet switch shall have the option of both small form pluggable (SFP) optics and fixed (soldered on) optics. Single mode optics shall support distances up to 70km. The Ethernet switch shall support the following requirements and options:

10/100Base TX ports:

RJ45 connectors

Cable type: Category 5, unshielded twisted pair (CAT 5 UTP) Segment Length: 100m

Auto-negotiation support (10/100Mbps) Auto MDIX crossover capability

TVS (Transient Voltage Suppression) between Line +/-, Line+/- ground, to protect the circuitry

Full Duplex operation (IEEE 802.3x) 1000 Base X Fiber Optic ports:

SFP pluggable optics shall support multiple connector types LC or SC, bi directional single strand fiber support, and longhaul optics which allow Gigabit distances up to 70 Km.

SFP 10km wavelength 1310, singlemode fiber 9/125 typical loss budget 17 db SFP 25km wavelength 1310, singlemode fiber 9/125 typical loss budget 19 db SFP 70km wavelength 1550, singlemode fiber 9/125 typical loss budget 25db

**Networking Requirements.** The Ethernet switch shall support automatic address learning of up to 8192 MAC addresses. The Ethernet switch shall support the following advanced layer 2 functions:

IEEE 802.1Q VLAN, with support for up to 255 VLANs and 4096 VLAN ID's. IEEE 802.1p priority queuing

IEEE 802.1w rapid spanning tree

IEEE 802.1Q-2005 MSTP (formerly 802.1s) IEEE 802.1Q-2005 standard GMRP

IEEE 802.3x flow control

IEEE 802.3ad-Link Aggregation IGMPv2 with 256 IGMP groups Port Rate Limiting

Configuration via test file which can be modified through standard text editor

Forwarding/filtering rate shall be 14,880 packets per second (PPS) for 10 Mps, 148,800 for 100Mps, 1,488,000 for 1000 Mps  
DHCP Option 82

**Network Management Functionality Requirements.**

The Ethernet switch shall provide the following network management functions:

SNMPv2, SNMPv3 RMON

GVRP

Port Mirroring 802.1x port security

SSL – Secure Socket Layer SSH – Secure Shell

TFTP

Network Time Protocol (SNTP)

Simple Network Time Protocol (SNTP) Management via web or Telnet

Built in Protocol analyzer which enables traces to be run from within the Ethernet switch operating system. Must be able to forward traces to an IP address or UDP port.

Traces for must include but not be limited to the following: STP, MAC, Link, IGMP, GVRP, PPP, Transport, DHCPRA, 802.1X, WEBS, SNMP, IP, TacPlus, Radius, FORW, IPASSIGN, TRANSPORT

Additionally, the Ethernet switch shall demonstrate to provide sub 15 ms failover per Ethernet switch hop in a ring topology.

**Programmable Critical Failure Relay.** The Ethernet switch shall provide a programmable critical failure out relay that may be configured to activate upon critical error detection such as loss of link or detection of critical system errors. This function shall be user enabled and programmable. The output contacts shall be available in a Form-C configuration with Max Current at 2A@250 VAC, .15A@125VDC, 2 @20VDC.

**Power Supply Requirements.** The Ethernet switch shall be supplied with provisions for operation at the following power supply inputs, 85 to 264 VAC (50/60Hz). The power supply shall be internal to the Ethernet switch. Power supply shall have two stage isolation accomplished via two transformers which step down from primary AC/DC to VDC. A power cord of not less than 5 feet in length shall be supplied as well. The Ethernet switch shall require no more than 15W of power.

**‘Hipot’ Testing in the field.** The Ethernet switch shall allow for dielectric strength (‘hipot’) tests in the field, in accordance with IEC 60255-5, by trained personnel. It shall be capable of enduring a test voltage of at least 2kVrms on power supply inputs above 60V and 0.5kVrms on power supply inputs below 60V. A removable grounding wire shall be provided to allow disconnecting of any transient suppression circuitry at the power supply input to allow for ‘hipot’ testing without activating the transient suppression circuitry.

**Mounting Requirement.** The Ethernet switch shall provide options for DIN Rail mounting or panel mounting via brackets.

**Warranty.** The Ethernet switch shall be warranted for defects in material and workmanship for five (5) years after shipment. The Warranty shall include software updates and 7 x 24 phone support for the 5 year warranty period.

**Environmental Requirements.** The Ethernet switch shall comply with the atmospheric, vibration, shock and bump requirements outlined in Table 1. This compliance shall be demonstrated by type withstands tests (i.e. ‘type tests’) as outlined in Table 1 and summarized in a Type Test Report per the test report requirements of each of the standards given in Table 1.

Table 1: Environmental Tests				
Test	Description		Test Level	Severity
IEC 60068-2-1	Cold Temp	Test Ad	-40°C, 16 hours	N/A
IEC 60068-2-2	Dry Heat	Test Bd	+85°C, 16 hours	N/A
IEC 60068-2-30	Humidity	Test Db	95% (non condensing), 55 deg. C, 6 cycles	N/A
IEC 60255-21-1	Vibration	Test Fc		Class 1
IEC 60255-21-2	Shock	Test Ea.		Class 1
IEC 60255-21-2	Bump	Test Eb		Class 1

**Safety Requirements/Agency Approvals.** The Ethernet switch shall comply with the following electrical safety requirements or equivalents: UL 60950 or CSA C22.2 No. 60950 (safety requirements for IT equipment). The Ethernet switch shall also have CE (Europe) qualification. The Ethernet switch shall also comply with FCC Par 15 Class A for EMI emissions.

Each Gigabit switch shall be furnished with the a SFP from the above list of SFP’s by the Engineer. The network will dictate the SFP used when installed in an existing system daisy chained Gigabit switches.

**Method of Measurement.** The Ethernet Managed Switch shall be measured each for payment when furnished, installed, configured, warranted, made fully operational, and tested as detailed herein.

**Basis of Payment.** This work will be paid for at the contract price, each, for ETHERNET MANAGED SWITCH, of the type specified, which shall be for the work as specified herein

### **SI01 INSPECTION, AUTOMATIC SUPPRESSION SYSTEM**

This item shall consist of scheduling a semi-annual inspection, functional test, and certification of the Automatic Suppression Alarm System located at the Traffic Systems Center.

All work shall be performed by a trained and certified fire alarm technician twice during each contract year in accordance with the manufactures recommendations, local code and national code.

The following procedure minimum shall be conducted during each inspection;

1. Clean smoke detectors
2. Calibrate of smoke detectors
3. Actual alarming of detectors and manual pull stations
4. Check control panel electrical wiring for grounds and shorts
5. Check control panel battery standby and charger
6. Check alarm devices such as bells and horns
7. Check Halon storage tanks weight and pressure
8. Test interlocking equipment for shut down
9. Check other specialized components as needed
10. Submit written reports to purchaser with recommendations for corrections, additions, deletions, or other changes to the system.

**Basis of Payment.** This item shall be paid at the contract unit price each for INSPECTION, AUTOMATIC SUPPRESSION SYSTEM, which price be payment in full for all work described herein and as directed by the Engineer.

### **SRR1 REVLAC RESTRAINING BARRIER TAPE CARTRIDGE, NEW**

**Description.** This item is for furnishing, and delivering to a Contract Spare Parts facility as directed by the Engineer or installing in the field, a new Energy Absorbing Tape Cartridge with tape assembly for use with the Vehicle Restraining Mechanisms for the Kennedy Expressway REVLAC System.

**Materials.** The energy absorbing tape cartridge assembly shall be Part No. EJ31256, Tape assembly and EJ41223, energy absorber, as manufactured by the Entwistle Company.

The energy absorbing device shall be model number MBF 4K-200-A as manufactured by The Entwistle Company. The following additional requirements shall be incorporated into the design of the barrier restraining mechanism:

The leading end of the energy absorbing device shall attach to one end of the restraining net with a removable connection. The mounting of the energy absorbing device shall not degrade its FHWA-Approved operating characteristics. The mounting of the energy absorbing device shall facilitate its replacement as a complete unit and also shall facilitate replacement only of the energy absorbing tape contained within its cartridge. In either case, replacement shall be from the ramp side of the unit.

**Basis of Payment.** This work shall be paid at the contract unit price each for REVLAC RESTRAINING BARRIER TAPE CARTRIDGE, NEW, which price shall be payment in full for the work as described herein.

**SRR2 REVLAC RESTRAINING BARRIER DRAGNET ASSEMBLY, FURNISH ONLY**

**Description.** This item shall consist of furnishing and delivering to a Contract Spare Parts facility as directed by the Engineer a complete restraining barrier dragnet assembly as manufactured by The Entwistle Company, compatible with the existing dragnet and barrier. The dragnet assembly shall be of the following type, as directed by the Engineer:

<b>RAMP</b>	<b>Entwistle Part No.</b>
OB Mainline	EJ41224-10
OB Ontario	EJ41224-20
IB Edens	EJ41224-20
IB JFK West Leg	EJ41224-30
OB Slip Ramp	EJ41225-10
IB Slip Ramp	EJ41225-20

The restraining net shall be the barrier Vendor's standard Highway Safety Net. The net shall consist of a minimum of two horizontal runs of stranded wire rope interlaced through a section of galvanized chain link fence or shall consist of a minimum of two horizontal runs of wire rope and wire rope vertical members spaced at approximately six-inch centers. The restraining net shall be provided with removable connectors and with vertical stays and tensioning devices to maintain proper net tension and deployment. The Barrier Vendor shall submit complete details of the restraining net construction including sized, materials, and rated capacities of all components used. The restraining net shall be compatible with the energy absorbing devices, be FHWA-Approved, and be approved by the Engineer.

The net shall have a reflective material of eight-inch-wide, alternating red and white, diagonal stripes adhered to a semi-rigid, conformable, panel fastened to the net. The panel shall be capable of repeated impact without splintering, fracturing, or permanently deforming. The panel shall not alter the performance characteristics of the vehicle restraining mechanism.

**Reflective Material for Restraining Net.** Reflective sheeting shall be used on both sides of the restraining barrier net as shown on the Contract Drawings. All sheeting requirements shall meet or exceed the standards as defined in AASHTO M 268-84, Retro reflective Sheeting for Traffic Control.

The sheeting shall be a minimum of Type III High Intensity with pre-coated pressure sensitive adhesive (Class 1), diagonal alternating red and silver white stripes as shown on the Contract Drawings, angling down at 45° from the left to the right. The sheeting shall be oriented to take advantage of the directional reflectivity of the material as defined by the supplier of the reflective sheeting.

The preferred material for this application shall be "Scotchlite" Reflective Sheeting Diamond Grade Series 3970G, as manufactured by 3M, or approved equal. The retro reflective sheeting shall be installed strictly according to the manufacturer's instructions. Special attention to surface preparation and mounting of sheeting for proper bonding and adhesion shall be rigidly followed.

**Basis of Payment.** This work shall be paid at the contract unit price each for REVLAC RESTRAINING BARRIER DRAGNET ASSEMBLY, FURNISH ONLY, of the location specified, which price shall be payment in full for furnishing and delivering the materials to a Contract Spare Parts facility as directed by the Engineer.

## **SS02 SIGNALING LOAD RELAY, MECHANICAL**

**Description.** This item shall consist of furnishing and installing a signal load relay, mechanical state, in a surveillance cabinet.

The load relay shall be able to switch 20 amperes for industrial use in multiple configuration and 30 amperes in multi-pole configuration at 120 VAC or 240 VAC, in a dust covered Jones plug. Relay shall be double pole, double throw.

The load relay shall have a mechanical life in excess of 100,000 operations at rated load, meet or exceed NEMA Standard TS 2-2003 and shall be Reno Flash transfer relay TR-200 or equal, a Signal Load Relay-Mechanical type mated with Cinch series 2400 socket.

The ramp metering cabinet shall have a signal load relay installed. The signal load relay shall consist of two components, a base which is mounted on the E.S.P. Type 3 cabinet wall and a signal load relay which plugs into and is secured to the base by a locking screw. The coil of this relay shall be connected to the mark output of the signal change tone receiver. The one set of contacts of the load relay shall be used to change the ramp signals and one set of contacts shall be used to key the mark input to the signal change transmitter.

**Basis of Payment.** This work shall be paid at the contract unit price each for SIGNALING LOAD RELAY, MECHANICAL, which price shall be payment in full for all work as described herein and as directed by the Engineer.

## **SSG1-SSG6 SWING GATE ARM, FURNISH ONLY**

**Description.** This item is for furnishing and delivering to a Contract Spare Parts facility as directed by the Engineer, swing gate arms with gate tips of various lengths for the Kennedy Expressway REVLAC System as specified herein.

**Materials.** The swing gate arm shall consist of an aluminum reflectorized area. The swing gate materials shall be compatible with swing gate controller Model Number HZ64B (Referenced drawing No. 0100DD0037 - latest version) as manufactured by B&B Electromatic, Norwood, Louisiana. The swing gate arms are constructed having the following standard lengths: 2 ft., 4 ft., 5 ft., 6 ft., 7 ft., 8 ft., 9 ft., 10 ft., 11 ft., 12 ft., 13 ft., 14 ft., 15 ft., 16 ft., 17 ft., 18 ft., 19 ft., 20 ft., 21 ft., 22 ft. and 23 ft.

**Swing Gate Arms.** Gate arms shall consist of an assembly of standardized design, standard length, segmented truss structures, connectors, brackets, and a three foot long flexible gate tip. Gate arm truss assemblies, as shown on the Contract Drawings and as specified, shall include both the gate arm truss segments and the gate tips.

Each gate arm truss segment shall be 12 Inches high and configured as generally shown on the Contract Drawings. The truss segments shall form a welded structural fabrication of 6061-T6 extruded seamless aluminum tubing having a minimum allowable yield strength of 40,000 pounds per square inch (psi). The segments shall be constructed to prevent accumulation of water within the structural tubes. The minimum allowable size of the materials shall be as shown on the Contract Drawings.

The truss segments shall be interchangeable to permit assembling the gate arms to the specified lengths. The segments shall be provided with the reflective sheeting on both sides of the truss and the stripes properly oriented to allow either side to face the traffic.

Each assembled gate arm shall be designed to resist the loads described herein and meet the following additional requirements:

The free end of the assembled gate arm shall not sag more than 0.75 inches, below horizontal, under its own weight.

The longest gate arm assembly, excluding the flexible gate tip, shall not deflect more than 36 inches, horizontally, in the specified wind loads.

The free end of the longest gate arm assembly shall not sag more than two inches, below horizontal, when covered with ice as described elsewhere herein.

The maximum allowable design stress of the gate arm shall be calculated as 60 percent of the yield strength of the material (6061-T6 extruded seamless aluminum tubing has a yield strength of 40,000 psi; therefore, the design stress of the arm shall not exceed 24,000 psi).

The gate arms shall be free of harmonics and standing wave vibrations. Should any such harmonics and vibrations develop, the Swing Gate Vendor shall make all necessary corrections at his own cost.

A gate arm truss shall be connected to its mounting bracket via an aluminum connector assembly. The connector shall be fabricated from the same material as the gate arm truss segment and shall be bolted to the mounting bracket with stainless steel bolts, nuts and washers as described below. The attachment bracket may be shimmed, if required, to adjust for deflection caused by the weight of the gate arm assembly. The Swing Gate Vendor shall supply a shim pack, as needed, for each arm assembly. Shimming of a gate arm is limited by the physical constraints of the gate arm recess formed in the barrier wall. Whether shimmed or not, all gate arms shall completely retract into the barrier wall recess. Rubber bumpers shall also be provided with each gate arm to prevent the gate arms from damage when they are retracted. A Teflon gasket shall also be provided for the gate arm to mounting bracket connection.

The use of exterior supports or attachments (such as guy wires) to remove sag from the gate or for any other reason is unacceptable.

Gate arms shall be connected, with an aluminum insert of the same material as the gate arm, as shown on the Contract Drawings. The insert shall be bolted to the truss segments with stainless steel bolts, nuts, and washers as described below.

The gate tip is furnished under this pay item. Flexible gate tips shall be connected to the end truss segment using the connector assembly as shown on the Contract Drawings. The assembly, truss segment, and gate tips shall be bolted together with 0.5 inch diameter stainless steel bolts, nuts, and washers. One washer shall be placed under the bolt head and a lock washer shall be placed under the nut. The nuts and bolts shall be hand tightened until snug and further tightened with a wrench a minimum of 1/2 turn of the nut.

**Reflective Materials for Gate Arms.** Both sides of each gate arm, including both the truss and the flexible end, shall be covered with retro-reflective sheeting. All sheeting requirements shall meet or exceed the standards as defined In AASHTO M 268-84, Retro-reflective Sheeting for Traffic Control.

The sheeting shall be a minimum of Type III High Intensity with pre-coated, pressure sensitive, adhesive (Class 1), diagonal alternating red and silver white stripes as shown on the Contract Drawings, angling down at 45° from left to right. The sheeting shall be oriented to take advantage of the directional reflectivity of the material as defined by the supplier of the reflective sheeting.

The material for this application shall be "Scotchlite" Reflective Sheeting Diamond Grade Series 3970G as manufactured by 3M, or approved equal. The sheeting shall be pre-stripped of appropriate size and width to match the application surface. The retro-reflective sheeting shall be installed strictly according to the manufacturer's instructions. Provide special attention to surface preparation and mounting of sheeting for proper bonding and adhesion.



**Basis of Payment.** This work shall be paid at the contract unit price each for complete SWING GATE ARM and tip, for the length specified:

SWING GATE ARM, (2 FT.) TO (4 FT.), FURNISH ONLY	(SSG1)
SWING GATE ARM, (5 FT.) TO (8 FT.), FURNISH ONLY	(SSG2)
SWING GATE ARM, (9 FT.) TO (12 FT.), FURNISH ONLY	(SSG3)
SWING GATE ARM, (13 FT.) TO (16 FT.), FURNISH ONLY	(SSG4)
SWING GATE ARM, (17 FT.) TO (20 FT.), FURNISH ONLY	(SSG5)
SWING GATE ARM, (21 FT.) TO (23 FT.), FURNISH ONLY	(SSG6)

which price shall be payment in full for furnishing and delivering to a Contract Spare Parts facility as directed by the Engineer, the materials as directed by the Engineer.

## **ST02 TELECOMMUNICATION CABLE INLINE CONNECTORS AND TERMINATION**

**Description.** This item shall consist of furnishing and installing U1B inline connectors and U1Y bridging inline connectors in a junction box type "J" in the expressway median barrier wall as directed, in writing, by the Engineer.

**Installation.** There is an existing 100C-No. 19 telecommunication cable in the expressway median barrier wall. This cable is "spliced" in junction box type "J" at each surveillance installation and every 1500 feet in the barrier wall. In the junction box type "J" the Contractor shall remove the existing S66 telephone type terminal blocks and the Plate bracket. The Contractor shall re-terminate the 100C-No. 19 cable the installation incoming 6C-No. 19 cable with Scotchlok Brand U1B inline, sealed, moisture resistant four wire (1 full pair) connector for solid copper (16-19 AWG) cable. The 100 C-No. 19 cable shall be joined bundle for bundle, cable pair or cable pair in the junction box type "J" with the U1B and U1Y connectors. A special crimping tool shall be required for installing the Scotchlok inline connectors. All cabling shall be tied and placed in the "J" box in a neat workmanlike manner. The Contractor shall clean the interior of the "J" box ensuring it is free of debris, water and any corrosion. The Contractor shall ensure that the shielding of both incoming cables are properly bonded together with 10 AWG wire and stainless steel clamps. Contractor shall be responsible for the cost of any and all expressway lane and/or shoulder closures required to complete the work in the median barrier wall. Miscellaneous hardware shall not be paid separately but considered as incidental to the cost of this item.

**Basis of Payment.** This work shall be paid at the contract unit price each, TELECOMMUNICATION CABLE INLINE CONNECTORS AND TERMINATION, which payment will be paid in full for all the work described herein.

## **ST03 TELECOMMUNICATION CABLE – NO. 19/6 PAIR**

**Description.** This item shall consist of furnishing and installing telephone cable intended for direct burial in P-duct or G.S. conduit. The number of conductors shall be twisted into pairs stranded into a cable core and enclosed in two polyethylene jackets, with a copper shield between the inner and outer jackets.

All No. 19 electric cable shall conform with these specifications and the current addition of the Rural Electrification Specification for fully color-coded, polyethylene or crystalline propylene/ethylene copolymer-insulated, double polyethylene copolymer-insulated, double polyethylene-jacketed telephone cables for direct burial PE 39 The No. 19 cables shall be installed in complete spans.

**Material and Testing.** No. 19 electric cable shall meet the requirement set forth in the REA Specification PE 39.

**Conductors.** Each conductor shall be a solid round wire of commercially pure annealed copper. Conductors shall meet the requirements of ASTM Designation B-3, latest issue, except that the requirements for dimensions and permissible variations are waived.

**Conductor Insulation.** Each conductor shall be insulated with colored insulating grade high density polyethylene or crystalline propylene/ethylene copolymer. The manufacturer shall have the option of using either of the above materials.

**Identification of Pairs.** The polyethylene or propylene copolymer compounds used for conductor insulation shall be colored so as to identify (1) the "tip" and "ring" conductor of each pair, and (2) each pair in the completed cable.

**Standards of Color.** The colors of insulated conductors supplied in accordance with this specification shall fall within the limits of standards of color as defined by the Munsell Color Notations specified in paragraph 4.031.

**Twisting of Pairs.** The insulated conductors shall be twisted into pairs.

In order to provide sufficiently high crosstalk losses at voice and carrier frequencies, the pair twists shall be designed to enable the cable to meet the pair-to-pair capacitance unbalance requirements and the crosstalk requirements.

**Core Covering.** The core shall consist of an inner jacket of polyethylene applied over the completed core, a metal shield, and an outer jacket of polyethylene.

**Shield.** A gopher-resistant corrugated shield of fully annealed copper shall be applied longitudinally over the inner jacket. The shield shall completely cover the inner jacket and shall be so constructed that the completed cable shall meet the bending requirements given in paragraph 9 of Rural Electrification Specification PE-54. The shield shall provide 100% electrical shielding plus resistance to gopher attack or other severe service conditions.

Mutual Capacitance. The average mutual capacitance of all pairs in any reel shall be in accordance with the following table:

Number of <u>Cable Pairs</u>	Average Mutual Capacitance <u>mf/mile (mf/km)</u>
3	0.083 plus or minus 0.010 (0.052 plus or minus 0.006)
6, 12	0.083 plus or minus 0.007 (0.052 plus or minus 0.004)
18 or more	0.083 plus or minus 0.004 (0.052 plus or minus 0.002)

Mutual capacitance is the effective capacitance between the two wires of a pair.

Capacitance Unbalance: (Pair to Pair): Pair-to-pair capacitance unbalances as measured on the completed cable at a frequency of 1000 plus or minus 100 Hz shall not exceed the following values:

Pair-to-Pair Capacitance Unbalance (Max) Number of <u>Cable Pairs</u>	<u>mmf/kf (mmf/km)</u> <u>Max. Individual</u>
Less than 12	100 (181.1)

Capacitance Unbalance - (Crosstalk Loss): The r.m.s. output-to-output far-end crosstalk loss as measured on the completed cable at a frequency of 150 kHz shall be not less than 73 db per 1,000 feet (67.8 db per kilometer) for cable sizes of 6 pairs and larger. The r.m.s. calculation shall be based on the combined total of all adjacent and alternate pair combinations within the same layer and center to first layer pair combinations.

Capacitance Unbalance - (Pair to Shield): Pair-to-shield direct capacitance unbalances as measured on the completed cable at a frequency of 1000 plus or minus 100 Hz shall not exceed the following values:

Number of <u>Cable Pairs</u>	Pair-to-Shield Capacitance Unbalance (Max) <u>mmf/kf (mmf/km)</u>
Less than 12	250 (820)

Conductor Resistance. The DC. resistance of any conductor as measured on the completed cable shall not exceed the following values when measured at or corrected to 20° C.

Maximum Resistance

<u>AWG</u>	<u>ohms/kf (ohms/km)</u>
19	8.7 (28.5)

**Basis of Payment.** This work will be paid for at the contract price per lineal foot for TELECOMMUNICATION CABLE - NO. 19/6 PAIR of the number of conductors specified, which price or prices shall be payment in full for furnishing all materials, making all electrical connection and installing the cable in place.

**SU01 UPS SYSTEM, INSPECTION**

**Description.** The Contractor shall furnish a factory sales and service company to complete an annual comprehensive UPS inspection as specified herein at the Traffic Systems Center.

**Location.** This work shall apply to the monitoring UPS system located at 445 W. Harrison St., Oak Park, IL 60304

**Work Description.** Eaton Power Ware Model #9390-100 Serial # EC515CBB07 with 80 batteries.

The inspection shall consist of but not be limited to the following items, which are described below:

1. Initial checks - System energized and carrying a customer's load.  
Verify initial, as found, voltage and current on the following:
  - a) Rectifier input
  - b) Rectifier output
  - c) Inverter output
  - d) Alternate line
2. System in bypass and de-energized - Customer's load on alternate line.  
Verify the following:
  - a) Bolted, screw and crimp connections for tightness
  - b) Relays, seated properly
  - c) Wiring, for electrical and physical damage
  - d) Capacitors, for bulging and/or leaking
  - e) Proper alignment of all sliding P.C. Boards
  - f) Plugs, for proper electrical and physical connection
  - g) P.C. Boards, for over-temperaturing
  - h) Vacuum system (if customer has vacuum available)

3. System in bypass and energized - Customer's load on alternate line.

Verify the following:

- a) All alarms and indicators for proper function and operation
- b) Measure and adjust all critical logic settings
- c) Battery Plant:
  1. measure Volts per cell
  2. visual inspection for leaks or bad cells
  3. spot check for connection torques
  4. visual inspection of interior and intercell connections

Conduct short term (2 Minute) discharge test using the inverter as the load to evaluate battery condition. (Only with customer prior approval)

Record all battery data recorded in site log book.

4. Final Checks - System energized and carrying customer's load.

Verify final voltage and current on the following:

- a) Rectifier input
- b) Rectifier output
- c) Inverter output
- d) Alternate line

5. Report - The service engineer shall provide a detail service report to the Engineer along with any service recommendations for additional service which they believe may be required but not covered under their service agreement.

**Method of Measurement.** Each inspection that is completed shall be recorded on vendor furnished forms, with all its corresponding deficiencies noted and the inspection report submitted to the Engineer. Any necessary repairs shall be paid on an as needed basis through vendor item.

**Basis of Payment.** This item shall be paid at the contract unit price each for the UPS SYSTEM, INSPECTION, which shall be payment in full for the work described above.

### **SVB1 BUDGETARY ALLOWANCE FOR RAMP GATES**

**Description.** This item is to establish a budget account to allocate funds for materials and/or repairs for motorist caused damage to ramp gates and attenuators.

The total estimated amount of the annual expenses for services performed which will be paid under Article 9.0, is \$70,000 as indicated for Pay Item SVB1. For bidding purposes this amount shall be used.

## SWD1 WIRELESS VEHICLE DETECTION SYSTEM

**Description.** This work shall consist of furnishing, installing, configuring and testing a Wireless Vehicle Detection System at the location identified in the Plans or as directed by the Engineer. All work will require close coordination with the IDOT TSC Electrical Engineer and the Engineer. This includes a pre-installation meeting with the IDOT TSC Electrical Engineer and Engineer.

Wireless In-Pavement Detectors, Layer 2 switches, media converters, and or cellular modems and service shall not be included as part of this pay item but supplied separately.

**Materials.** The Wireless Vehicle Detection System shall include the following elements and features:

Wireless In-Pavement Detector shall be a SENSYS Networks VSN240-F-2 Wireless Sensor including epoxy or equivalent as accepted by the Engineer. The Wireless In-Pavement Sensor shall be paid for through pay item SWD1:

- The Wireless Sensor shall transmit wireless vehicle detection and other output data to an Access Point Assembly or Repeater.
- The Wireless Sensor shall detect volume, occupancy and speed as shown in the plans and may be adjusted based on each deployment.
- The Wireless Sensor shall be designed for installation in pavement.
- The Wireless Sensor shall be battery powered with minimum battery life of 8 years.
- Firmware of the Wireless Sensor shall be capable of being upgraded through wireless connection
- The transmission range for a Wireless In-Pavement Detector shall meet the following requirements:

Height of Access Point or Repeater: Minimum 20 feet above pavement elevation

Distance Range to Detector: Maximum 150 feet with a minimum distance based on the mounting angle of the access point or repeater

- The Wireless In-Pavement Detector shall be NEMA 6P rated.
- The Wireless In-Pavement Detector shall operate within a temperature range of -40 o C to +85 o C (ambient).
- The sensor shall have the ability to provide and record pavement temperatures. Wireless Detector Access Point Assembly shall be a SENSYS Networks FLEX Control-M-E, or equivalent as accepted by the Engineer, including a mounting kit model KIT-MTG, surge protection device, FLEX APCC-ACC-1 Isolator, APCC-SPR Radio, and FLEX Control ACC-3 Power Supply.
- The Access Point Assembly shall receive wireless output from in-pavement detectors or Repeaters.
- The Access Point Assembly will utilize secure cellular communications or Ethernet communications over the IDOT fiber optic Network.
- The Access Point Assembly shall operate within the temperature range -40 o C to +80 o C (ambient).

- The Access Point Assembly shall be designed for rail mounting in the equipment cabinet specified herein as directed by the Engineer.
- The Access Point Assembly shall be powered by a single manufacturer approved 28V DC power supply.
- All required cabling and cabinet wiring needed from the FLEX Controller to the wireless modem shall be incidental to this item.

Access Point Assembly Equipment Cabinet shall be a NEMA 4X equipment cabinet with 2 DIN rails for mounting the Access Point Assembly and the CDMA modem for cellular communications or layer 2 switch/ fiber optic media converter for communications over the IDOT fiber optic network.

- The cabinet shall be of nominal 20"x16"x10" dimensions, Hoffman Enclosures Model A20H1610SS6LP, Electromate Enclosures Model E-20H1610SSLP, or approved equal.
- The cabinet shall have a 120V, 1-pole, 20 amp circuit breaker and two (2) duplex outlets.
- The cabinet shall also be equipped with a surge protection unit between the circuit breaker and the duplex outlets. The surge protection device shall be an Edco SHA 1250/SHA-1250-BASE-A 120VAC single phase modular filter (with base) or approved equal.

The cabinet shall be mounted to a proposed wood pole, aluminum light pole or as directed by the Engineer.

Layer 2 switch/media converter shall be as per pay item SE03 or SE04 and paid for separately.

The Wireless Cellular Modem (CDMA) shall be a Sierra Wireless MC7354 (Airlink Raven RV50) or equivalent, with an AC/DC power supply and will be mounted to the DIN rail in the equipment cabinet. The cellular provider shall be Verizon. Cellular modem and service shall be provided by the Department.

Wireless Repeater shall be a SENSYS Networks RP240-BH-LL-2 Solar Repeater and mounting kit model # KIT-MTG or equivalent as accepted by the Engineer:

- The Wireless Repeater shall be capable of transmitting data up to 1,000 feet from the Wireless In-Pavement Detector to another Wireless repeater or Wireless Detector Access Point Assembly as identified in the manufacturer's specifications.
- The Repeater shall have an operating temperature range -40 o C to +80 o C.
- The Repeater shall be powered by a Long-life 171Ah battery pack

The proposed equipment shall be integrated in to one of two existing Sensys Systems Manager Servers residing at the Traffic Systems Center in Oak Park. Contractor is responsible for the setup and integration as directed by the TSC Electrical Engineer and Engineer.

The proposed equipment shall be integrated into the existing INET ATMS. Each locations shall report Volume, Occupancy, and speed for all integrated locations.

## CONSTRUCTION REQUIREMENTS

Design locations of each sensor system component including Wireless in-pavement vehicle detectors, access points and repeater locations shall be field verified and recommended for construction by the contractor in the submittal described below:

The Contractor is responsible for the choice of communication channels for programming each wireless device.

Installation. Each device (AP, repeater and sensor) shall be first upgraded to the latest firmware version, then configured in the field by the contractor using SENSYS TrafficDOT software and its installation parameters documented on the installation record form attached.

The Contractor shall request IP addresses for Access Points from the IDOT TSC Electrical Engineer in writing a minimum of two weeks prior to installation.

The Contractor shall install sensor units in the pavement at locations shown in the plans following manufacturer recommended procedures for installation. The sensor units shall not extend above the top of pavement. Final in-pavement sensor location shall be approved by the Engineer prior to installation.

The Contractor shall mount the Wireless Access Point Assembly and the Wireless Repeater units to the structures indicated on the plans or other nearby locations as directed by the Engineer and as recommended by the manufacturer, using manufacturer approved brackets and/or bandings or mountings.

The Contractor shall configure appropriate RF channels and aim all repeaters and access points to provide a greater than -79dBm signal strength and greater than 92 LQI on all wireless RF path segments unless approved by the Engineer.

The Contractor shall coordinate with the IDOT TSC Electrical Engineer to ensure that the Wireless In-Pavement Vehicle Detector System can communicate back to the OAK Park TSC to the SENSYS System Manager server.

Acceptance Testing. The Contractor shall submit a detailed system acceptance test plan to the Engineer within 60 days following the Notice to Proceed for review and approval.

The Contractor acceptance test plan shall at a minimum consider the following:

- Local Field Test
- Subsystem Test
- 30-Day "Burn-in" Period
- Separate Checklists at each testing stage

The Contractor test plans shall test all areas of system functionality described herein and be in accordance with the various equipment manufacturer recommendations. The Contractor shall provide copies of all test results to the Engineer in a format to be determined by the IDOT TSC Electrical Engineer and Engineer.



**Local Field Test Requirements.** The Contractor shall perform Local Field Tests at each Wireless In-Pavement Vehicle Detector System field site in the presence of the IDOT TSC Electrical Engineer and the Engineer in accordance with the test procedures detailed herein, within the plan set, in the Contract, and as recommended by the various equipment manufacturers. This requirement is meant to confirm that all Wireless In-Pavement Vehicle Detector System site equipment has been installed, connected, and configured properly. The Contractor shall verify that physical construction has been completed as detailed herein, and the plans;

- Inspect the quality and tightness of ground connections;
- Check all power supply voltages and outputs;
- Connect devices to the power sources;
- Verify installation of specified cables, connections and wireless links between the Wireless In-Pavement Vehicle Detector System devices and the IDOT communications system
- Verify presence and quality of Wireless In-Pavement Vehicle Detector System device data through visual checks to verify volume, occupancy, speed, and classifications as determined by the required functionality. Use a local laptop running trafficdot software to verify that the AP is receiving vehicle detection data from each sensor.
- Connect the Access Point Cat 5e cable into the communication network's assigned switch port.
- Configure the System Manager to recognize and accept data from the AP.
- Configure each AP and sensor to achieve the accuracy specified below: A LIDAR gun shall be used to verify actual vehicle speed in each lane. A minimum sample of 50 cars shall be recorded on a data sheet along with the queue detection data as read from the System Manager server report. Counting error shall be no more than 5.0 percent. Speed error shall be no more than 5.0 percent.

**Subsystem Test Requirements.** Following the Local Field Test, the Contractor shall conduct a Subsystem Test in the presence of the Engineer. This requirement is meant to ensure that all data collected by the Wireless In-Pavement Vehicle Detector System stations are properly and accurately transmitted to the IDOT Oak Park TSC. The Subsystem Test shall be performed based on the Engineer approved Contractor testing schedule. The Contractor shall notify the Engineer in writing the scheduled date of the Subsystem Test 14 calendar days prior to the commencement of said test. The Subsystem Test shall not be performed without prior written approval from the Engineer.

The Subsystem Test shall be performed utilizing the installed Wireless In-Pavement Vehicle Detector System devices and ancillary components in conjunction with the wireless/wireline communications system.

The Contractor shall perform the Subsystem Test, which will involve personnel on-site at the Wireless In-Pavement Vehicle Detector System stations and at the IDOT Oak Park TSC to confirm that data collected by the Wireless In-Pavement Vehicle Detector System devices is being properly and accurately received by TIMS. During the Subsystem Test, the Contractor shall provide qualified personnel to support the diagnosing and repair of Wireless In-Pavement Vehicle Detector System devices and ancillary components. These personnel shall be available for this support within 24 hours of notification of the need for their services.

The APDIAG application shall be run by the Contractor once every 30 minutes over a 6 hour period and all available parameters shall be recorded on a test data sheet. The parameters include average RSSI, LQI, # of reboots (of each sensor), stuckHi, blips, and total counts by sensor, as well as average speed and deviation from average speed (if 3 sensors are installed in the lane). This speed data is to be compared with nearby RTMS data by the Contractor and any significant differences explained. The Subsystem Test Data Sheet and Test Report is to be delivered to the Engineer for approval prior to proceeding with the 30 day burn in test.

**30-Day "Burn-in" Period Requirements.** Following the Subsystem Test and before Final System Acceptance, the Contractor shall oversee a 30-Day Burn-in Period. This requirement is meant to demonstrate full monitoring capabilities of the Wireless In-Pavement Vehicle Detector System devices from the TIMS Center via the installed/existing communications channels as well as the functionalities of the Standalone Test, troubleshooting and diagnostics for a 30-day period. The 30-day Burn-In Period shall be conducted based on the Engineer and approved Contractor testing schedule. The Contractor shall notify the Engineer in writing the scheduled date of the 30-Day Burn-In Test 14 calendar days prior to the commencement of said test. The 30-Day Burn-in Period shall not be performed without prior written approval from the Engineer.

The Contractor shall produce daily reports from the System Manager and explain any anomalies noted by the IDOT TSC Engineer.

The Contractor shall correct any and all failures during the 30-Day Burn-in Test at no additional cost. The system may be shut down for purposes of testing and correcting identified deficiencies. For each period of system shut down, the scheduled 30-day Subsystem Test shall be extended for the same period of time plus 1 day unless otherwise directed by the Engineer. Shutdown of equipment that has been integrated into the IDOT Oak Park TSC network must be coordinated ahead of time as it may affect TSC operations.

**Final System Acceptance.** Final acceptance of the work associated with this project will be made after satisfactory completion of the required 30-Day "Burn-in" Test period and on the basis of the final inspection of the entire system. The final inspection of the entire system will be performed by the Engineer in the presence of a representative of the Contractor.

All "record" documents shall be submitted to the Engineer at the time of Final Acceptance and include an electronic computer file including a sketch of each Wireless In-Pavement Detector, Wireless Detector Access Point Assembly, and Wireless Repeater; listing each device's location, identification number, wireless channel information and GPS coordinates. The Contractor shall provide a copy of the operation and maintenance manuals for the wireless in pavement detection system.

Notification of Final Acceptance will be in writing from the Engineer.

**Warranty.** All equipment shall be warranted and guaranteed against defects and/or failure in design, materials and workmanship.

The Contractor shall submit the warranty terms as part of the shop drawing submittal for each material item.

System components shall be warranted against all defects and/or failure in design, materials and workmanship for a minimum of five (5) years from the date of Final Acceptance, as recorded by the Engineer.

The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be repaired or replaced with a new component by the manufacturer or representative within five (5) working days.

Any component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as unsuitable and shall be replaced by the manufacturer or representative with a new component of the same type at no additional cost. The unsuitable component shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards.

Any repairs made by a manufacturer or representative shall be documented and that documentation shall be returned with the warranty repaired units. This documentation shall include an explanation of the exact repairs made and identification of parts replaced by part number and circuit number.

The warranty period shall not begin until the date that the Engineer issues final acceptance to the project, as recorded by the Engineer.

**Method of Measurement.** Wireless Vehicle Detection System will be measured per each component completed in place and accepted.

**Basis of Payment.** This item shall be paid for at the contract unit price each for WIRELESS VEHICLE DETECTION SYSTEM, which prices shall be payment in full for the work described herein including all labor, patch cords, and any other materials necessary for the successful installation, testing, and integration as stated herein.

## **SWD2 WIRELESS VEHICLE DETECTION SOLAR REPEATER**

**Description.** This work shall consist of furnishing, installing, configuring and testing a Wireless Vehicle Detection Solar Repeater at the location identified in the Plans or as directed by the Engineer. All work will require close coordination with the IDOT TSC Electrical Engineer and the Engineer. This includes a pre-installation meeting with the IDOT TSC Electrical Engineer and Engineer.

**Materials.** The Wireless Vehicle Detection Solar Repeater shall include the following elements and features:

Wireless Repeater shall be a SENSYS Networks FLEX-RPT3-SLR FlexRepeat3 Solar Repeater, antennas, and mounting kit model # KIT-MTG or equivalent as accepted by the Engineer:

- The Wireless Repeater shall be a relay of radio communications.
  - To/From wireless sensors (downlink)
  - To/From access point (uplink)
  - To/From another repeater (uplink or downlink)
- The Wireless Repeater shall be capable of tandem operation to sensors and to another access point or another repeater.
- Maximum single hop range of approx. 2000 feet from supported access point or repeater with a long-range external antenna.
- Maximum single hop range of approx. 300 feet from supported sensors with long range external antenna.
- The Repeater shall have an operating temperature range -40 o C to +80 o C.
- The Repeater shall be powered by 2 Solar Panels (0.33 W each), a 3.6V, 2.2Ah rechargeable Lithium ion battery, and a 57AH Li-SOCL<sub>2</sub> 3.6V backup battery

**Method of Measurement:** Wireless Vehicle Detection Solar Repeater shall be measured per each component completed in place, accepted and operating.

**Basis of Payment:** This item shall be paid for at the contract unit price each for WIRELESS VEHICLE DETECTION SOLAR REPEATER, which prices shall be payment in full for the work described herein including all labor, antennas, mounting, and any other misc. materials necessary for the successful installation and testing as stated herein.

### **SWD3 WIRELESS IN PAVEMENT DETECTOR**

**Description.** This work shall consist of furnishing, installing, calibrating, and integration of a wireless in pavement detector into an existing Sensys Wireless Vehicle Detection system at the locations shown on the plans or as directed by the Engineer.

**Materials.** The wireless in pavement detector shall include the following elements and features:

Wireless In-Pavement Detector shall be a SENSYS Networks VSN240-F-2 Wireless Sensor including epoxy or equivalent as accepted by the Engineer:

- The Wireless Sensor shall transmit wireless vehicle detection and other output data to an Access Point Assembly or Repeater.
- The Wireless Sensor shall detect volume, occupancy and speed as shown in the plans and may be adjusted based on each deployment.
- The Wireless Sensor shall be designed for installation in pavement.
- The Wireless Sensor shall be battery powered with minimum battery life of 8 years.
- Firmware of the Wireless Sensor shall be capable of being upgraded through wireless connection
- The transmission range for a Wireless In-Pavement Detector shall meet the following requirements: Max. 150 feet with a minimum distance based on the mounting angle of the access point or repeater.
- The Wireless In-Pavement Detector shall be NEMA 6P rated.
- The Wireless In-Pavement Detector shall operate within a temperature range of -40 o C to +85 o C (ambient).
- The sensor shall have the ability to provide and record pavement temperatures.

### **CONSTRUCTION REQUIREMENTS**

- Pre-Procurement Documentation and Pre-Installation Approvals. Contractor shall submit catalog cut sheets for all system materials to the Engineer within 30 days of the date of the Notice to Proceed. The Contractor must obtain approval of the catalog cut sheets from the prior to purchasing the Wireless Vehicle Detection System and performing any installation accordingly.
- Design locations of each sensor system component including Wireless in-pavement vehicle detectors, access points and repeater locations shall be field verified and recommended for construction by the contractor in the submittal described below:
- The Contractor is responsible for the choice of communication channels for programming each wireless device.
- Installation. Each sensor shall be first upgraded to the latest firmware version, then configured in the field by the Contractor using SENSYS TrafficDOT software and its installation parameters documented on the installation record form attached.
- Notify Engineer in writing a minimum of two weeks prior to installation.

- The Contractor shall install sensor units in the pavement at locations shown in the plans following manufacturer recommended procedures for installation. The sensor units shall not extend above the top of pavement. Final in-pavement sensor location shall be approved by the Engineer prior to installation.
- The Contractor shall coordinate with the IDOT TSC Electrical Engineer to ensure that the Wireless In-Pavement Vehicle Detector System can communicate back to the OAK Park TSC to the SENSYS System Manager server.

#### **Local Field Test Requirements**

- Verify presence and quality of Wireless In-Pavement Vehicle Detector System device data through visual checks to verify volume, occupancy, speed, and classifications as determined by the required functionality. Use a local laptop running Trafficdot software to verify that the AP is receiving vehicle detection data from each sensor.
- Configure each AP and sensor to achieve the accuracy specified below: A LIDAR gun shall be used to verify actual vehicle speed in each lane. A minimum sample of 50 cars shall be recorded on a data sheet along with the queue detection data as read from the System Manager server report. Counting error shall be no more than 5.0 percent. Speed error shall be no more than 5.0 percent.

#### **Final System Acceptance**

- All “record” documents shall be submitted to the Engineer at the time of Final Acceptance and include an electronic computer file including a sketch of each Wireless In-Pavement Detector, Wireless Detector Access Point Assembly, and Wireless Repeater; listing each device’s location, identification number, wireless channel information and GPS coordinates. The Contractor shall provide a copy of the operation and maintenance manuals for the wireless in pavement detection system

#### **Warranty**

- All equipment shall be warranted and guaranteed against defects and/or failure in design, materials and workmanship. The Contractor shall submit the warranty terms as part of the shop drawing submittal for each material item.
- System components shall be warranted against all defects and/or failure in design, materials and workmanship for a minimum of five (5) years from the date of Final Acceptance, as recorded by the Engineer.
- The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be repaired or replaced with a new component by the manufacturer or representative within five (5) working days.

- Any component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as unsuitable and shall be replaced by the manufacturer or representative with a new component of the same type at no additional cost. The unsuitable component shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards.
- Any repairs made by a manufacturer or representative shall be documented and that documentation shall be returned with the warranty repaired units. This documentation shall include an explanation of the exact repairs made and identification of parts replaced by part number and circuit number.
- The warranty period shall not begin until the date that the Engineer issues final acceptance to the project, as recorded by the Engineer.

**Method of Measurement.** Wireless in Pavement Detector will be measured per each component completed in place, accepted and operating.

**Basis of Payment.** This item shall be paid for at the contract unit price each for WIRELESS IN PAVEMENT DETECTOR, which prices shall be payment in full for the work described herein including all labor, patch cords, and any other materials necessary for the successful installation and testing as stated herein.

### **TRAFFIC SIGNAL SYSTEM NON-ROUTINE PAY ITEMS**

All Traffic Signal System Non-Routine pay items shall conform with the current Standard Specifications for Road and Bridge Construction, District 1 Traffic Signal Special Provisions and the District 1 Standard Traffic Signal Design Details except as revised herein.

All equipment removed under Traffic Signal System Non-Routine pay items shall be salvaged or disposed in accordance with Article 3.6.5.9 at the direction of the Engineer. All costs associated with salvaging or disposing shall be included in the cost of the respective pay item.

All traffic control for Traffic Signal System Non-Routine pay items shall be in accordance with Article 701 of the Standard Specifications for Road and Bridge Construction and the Traffic Control Plans submitted under Article 3.12.2. All costs associated with Traffic Control required for the performance of the work associated with the respective Traffic Signal System Non-Routine pay items shall be included in the cost of the respective pay item.

### **TC01–TC02 FULL ACTUATED CONTROLLER IN CABINET**

**Description.** All equipment shall be NEMA TS 2 Type 1 unless otherwise approved by the Engineer. At the time this item is authorized, the Traffic Signal Engineer may indicate what brand of equipment is to be supplied for that authorization. Installation of controller and cabinet, including all testing and documentation shall be included in this item. The Contractor shall provide five (5) hard copies (11" x 17") of the cabinet wiring diagrams and in PDF format on a CD-ROM for the new cabinet location. Cable logs must be furnished indicating the number of each cable, the field termination point, and all cables must be tagged with an I.D. number corresponding with the cable log. Existing items such as UPS/Battery Back-up System, PTZ camera equipment, TSP/BRT and other devices may be designated by the Engineer as to be relocated to the new controller and cabinet and is considered included in this item. Removal and delivery of any existing controller, cabinet, and all other related equipment in the cabinet not being reused is considered included in this item. The Contractor shall deliver the removed equipment to the Contract Spare Parts storage location per the requirements within the contract. The salvage and/or disposal of equipment shall be at the discretion of the Engineer.

Installation of the controller and testing shall be included in this item. When installing the new controller into an existing system, the new controller shall contain all necessary telemetry modules, modems, circuit panels and wiring harnesses. All items necessary to enable the controller to communicate/operate within an existing closed loop system shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for FULL ACTUATED CONTROLLER IN CABINET of the type specified as described above, which price shall be paid in full for all work as described herein and includes furnishing, installing, delivery, handling and all appurtenances necessary for a complete and operational unit as directed/approved by the Traffic Signal Engineer.

TC01 Full Actuated Controller In Type IV Cabinet

TC02 Full Actuated Controller In Type V Cabinet

### **TC03 FULL ACTUATED CONTROLLER IN CABINET WITH RR EQUIPMENT**

**Description.** The controller and cabinet furnished is to be installed at an intersection which is interconnected with a railroad gate controller cabinet. Equipment shall be NEMA TS 2 Type 1 unless otherwise approved by the Engineer. At the time this item is authorized, the Traffic Signal Engineer may indicate what brand of equipment is to be supplied for that authorization. At all railroad locations which are not part of a closed loop system (stand alone), the controller and cabinet shall meet the following:

The controller cabinet shall contain a 56 kbps auto dial/auto answer modem. All equipment required for dial-in/dial-out capabilities shall be included in the item. The cabinet shall be provided with an outdoor network interface for the termination of the telephone service. It shall be mounted to the inside of the cabinet suitable to provide access for the termination of the telephone service and shall be equipped with a standard three electrode heavy duty gas tube surge arrestor. Installation of controller and cabinet, including all testing and documentation shall be included in this item.



The Contractor shall provide five (5) hard copies (11" x 17") of the cabinet wiring diagrams and in PDF format on a CD-ROM for the new cabinet location. Cable logs must be furnished indicating the number of each cable, the field termination point, and all cables must be tagged with an I.D. number corresponding with the cable log.

Existing items such as UPS/Battery Back-up System, PTZ camera equipment, TSP/BRT and other devices may be designated by the Engineer as to be relocated to the new controller and cabinet and is considered included in this item. Removal of any existing controller, cabinet, and all other related equipment in the cabinet is considered included in this item. The Contractor shall deliver the removed equipment to the Contract Spare Parts storage location per the requirements within the contract. The salvage and/or disposal of equipment shall be at the discretion of the Engineer.

Installation of the controller and testing shall be included in this item. When installing the new controller into an existing system, the new controller shall contain all necessary telemetry modules, modems, circuit panels and wiring harnesses. All items necessary to enable the controller to communicate/operate within an existing closed loop system shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for FULL ACTUATED CONTROLLER, IN TYPE IV or TYPE V CABINET WITH RAILROAD EQUIPMENT as described above, which price shall be paid in full for all work as described herein and includes furnishing, installing, delivery, handling and all appurtenances necessary for a complete and operational unit as directed/approved by the Traffic Signal Engineer.

#### **TC04 FULL ACTUATED CONTROLLER**

**Description.** Equipment shall be NEMA TS 2 Type 1 unless otherwise approved by the Engineer. At the time this item is authorized, the Traffic Signal Engineer may indicate what brand of equipment is to be supplied for that authorization. Removal of the existing controller and related items, if required, shall be considered included in this item. The Contractor shall deliver the existing equipment to the Contract Spare Parts storage location per the requirements within the contract. The salvage and/or disposal of equipment shall be at the discretion of the Engineer.

Installation of the controller and testing shall be included in this item. When installing the new controller into an existing system, the new controller shall contain all necessary telemetry modules, modems, circuit panels and wiring harnesses. All items necessary to enable the controller to communicate/operate within an existing closed loop system shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for FULL-ACTUATED CONTROLLER as described above, which price shall be paid in full for all work as described herein and includes furnishing, installing, delivery, handling and all appurtenances necessary for a complete and operational unit as directed/approved by the Traffic Signal Engineer.

### **TC05–TC06 INSTALL TRAFFIC SIGNAL CONTROLLER OR CONTROLLER AND CABINET FROM CONTRACT SPARE PARTS**

**Description.** The replacement and/or addition of controller harnesses, conflict monitor harnesses detector harnesses, all necessary telemetry modules, modems, circuit panels and any items necessary to enable the controller to communicate/operate within an existing closed loop system as required to install the Contract Spare Parts controller and/or cabinet at a location directed by the Traffic Signal Engineer shall be included in this pay item. The current controller software at time of field installation shall be included in this item. The cabinet shall be the type designated on the plans.

The Contractor shall provide five (5) hard copies (11" x 17") of the cabinet wiring diagrams and in PDF format on a CD-ROM for the new cabinet location. Cable logs must be furnished indicating the number of each cable, the field termination point, and all cables must be tagged with an I.D. number corresponding with the cable log. As included in this item, the Contractor shall transport the Contract Spare Parts equipment to the intersection and remove and transport the existing equipment to the Contractor's location for Contract Spare Parts storage. The salvage and/or disposal of equipment shall be at the discretion of the Engineer.

Existing items such as UPS/Battery Back-up System, PTZ camera equipment, TSP/BRT and other devices may be designated by the Engineer as to be relocated to the Contract Spare Parts controller and cabinet and is considered included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for INSTALL TRAFFIC SIGNAL CONTROLLER, OR CONTROLLER AND CABINET FROM CONTRACT SPARE PARTS as described above, which price shall be payment in full for all described herein and includes furnishing, installing, delivery, handling and appurtenances necessary for a complete and operational unit as directed/approved by the Traffic Signal Engineer.

TC05 INSTALL EXISTING TRAFFIC SIGNAL CONTROLLER

TC06 INSTALL EXISTING TRAFFIC SIGNAL CONTROLLER AND CABINET

### **TC07 CONTROLLER AND CABINET MODIFICATION**

**Description.** This work shall consist of controller and/or cabinet modifications as directed by the Engineer to provide additional phasing, phase overlaps, pedestrian movements or any cabinet and/or controller modifications to an existing traffic signal not included under the provisions of another pay item. This work to include but not limited to installing load switches, cabinet wiring, cabinet appurtenances, UPS wiring, reprogramming the controller per plans or as directed by the Engineer. All revisions to the existing documentation or providing new documentation including but not limited to the cabinet box print and cable log shall be included. Minor revisions can be marked on the existing documentation or complete new documentation provided at the discretion of the Engineer.

**Basis of Payment.** This work shall be paid for at the contract unit price each to provide CONTROLLER AND CABINET MODIFICATION as described above, which price shall be payment in full for all work as described herein and includes furnishing, installing, delivery, handling and all appurtenances necessary for a complete and operational unit as directed/approved by the Traffic Signal Engineer.

## **TC08 TRAFFIC SIGNAL MASTER CONTROLLER**

**Description.** Equipment shall be NEMA TS 2 Type 1 unless otherwise approved by the Engineer. The master controller may be installed in an existing controller cabinet replacing an existing master controller of the same, or different, manufacturer or at a new location. In all cases the Contractor shall furnish all necessary harnesses, relays, modems, transceivers, and telephone jack to place the proposed traffic signal master controller in operation. Locations where the master controller is installed within an existing system without the local traffic signal controllers being replaced, it shall be of the same manufacturer as the local controllers. The closed loop systems presently in use are manufactured by Siemens/Eagle Signal and Econolite Corporation. At the time this item is authorized, the Traffic Signal Engineer will indicate which manufacturer's equipment is to be supplied for that authorization.

At the completion of installing the proposed master controller the Contractor shall, if applicable, remove the existing master controller, harnesses, relays, modems, and transceivers that are not used and deliver them to the Contract Spare Parts storage location per the requirements within the contract. A telephone line and modem for proper communication if not pre-existing shall be paid for separately under the item "Install Telephone Line and Modem". The salvage and/or disposal of equipment shall be at the discretion of the Engineer.

**Basis of Payment.** This work shall be paid at the contract unit price each for TRAFFIC SIGNAL MASTER CONTROLLER as described above, which price shall be paid in full for all work as described herein and includes furnishing, installing, delivery, handling and all appurtenances necessary for a complete and operational unit as directed/approved by the Traffic Signal Engineer.

## **TC09 INSTALL TELEPHONE LINE AND MODEM**

**Description.** This work shall consist of providing a phone line to a traffic signal controller cabinet to provide working remote monitoring capabilities by the IDOT Traffic Signal Engineer in the Schaumburg office. The phone line shall be capable of providing regular or ISDN communication as required by the Engineer. The contractor shall provide an approved phone company junction box inside the controller cabinet, a 56K band modem as recommended by the equipment supplier, and all wiring necessary to the master controller or controller to provide proper communications. Cable and conduit from the telephone service connection to the cabinet phone junction box will be paid for separately.

The Contractor shall accomplish this work in the following process utilizing District 1 staff:

As soon as practical or within one week after authorization, the Contractor shall contact IDOT's Administrative Support Manager in the District One Business Services Section at (847) 705-4011 to request a phone line installation. A follow-up contact shall include all required information pertaining to the phone installation and should be made as soon as possible or within one week after the initial request has been made. A copy of this contact must be emailed by the Contractor to the Traffic Signal Engineer. The required information to be supplied shall include (but not be limited to): an E911 address for the new traffic signal controller (or nearby address); a nearby existing telephone number; what type of telephone service is needed; the name and number of the Contractor's employee for the telephone company to contact regarding site work and questions.

The usual time frame for the activation of the phone line will vary after the Business Services Section has received the Contractor's information and will depend on location and existing available facilities. It is, therefore, imperative that the phone line conduit and pull-string be installed by the Contractor as soon as possible. The Contractor shall provide the Administrative Support Manager with an expected installation date.

The telephone line shall be installed and activated one month before the system final inspection. All costs associated with the telephone line installation and activation (not including the Contract specified conduit installation between the point of telephone service and the traffic signal controller cabinet) shall be paid for by the District One Business Services Section (i.e., this will be an IDOT phone number not a Contractor phone number).

**Basis of Payment.** This work shall be paid for at the contract unit price each and to install a working INSTALL TELEPHONE LINE AND MODEM as described above, which price shall be paid in full for all work as described herein and directed/approved by the Traffic Signal Engineer.

#### **TC10 INSTALL UPDATED SOFTWARE OR PROM SET AT EXISTING LOCAL OR MASTER CONTROLLER**

**Description.** This item shall consist of installing the latest version of software, PROM or PROM Set in an existing traffic signal local or master controller. At locations that contain coordination modules, all PROMS in the controller module, telemetry module, and coordination module must be of the same version and revision. New system interface board shall be included in this item. Any modifications required for the completion of this work shall be included in the cost of this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for INSTALL UPDATED SOFTWARE OR PROM SET AT EXISTING LOCAL OR MASTER CONTROLLER, as described above, which price shall be paid in full for all work as described herein and includes furnishing, installing, testing, and all appurtenances necessary for a complete and operational unit as directed/approved by the Traffic Signal Engineer.

#### **TC11 UPS SYSTEM**

**Description.** This work shall consist of furnishing and installing an uninterruptible power supply (UPS) system as specified. Refer to the Traffic Signal Special provisions for exact requirements. A concrete apron, as indicated in the District One Standard Traffic Signal Design Details, including all excavation and restoration shall be included in the cost of this item. This specification sets forth the minimum requirements for a system that provides an uninterruptible power supply (UPS) for a signalized intersection.

**Basis of Payment.** This work shall be paid at the contract unit price each to install UPS SYSTEM as described above, which price shall be paid in full for all work as described herein and includes furnishing, installing, delivery, handling, replacement of any incandescent EVP confirmation beacon with LED type and all appurtenances necessary for a complete and operational unit as indicated on the drawings and as directed/approved by the Traffic Signal Engineer.

#### **TD01 DRILL EXISTING HANDHOLE**

**Description.** Refer to Section 879 of the Standard Specifications for Road and Bridge Construction.

**Basis of Payment.** This work shall be paid at the contract unit price each for DRILL EXISTING HANDHOLE as described above, which price shall be paid in full for all work as described herein and as directed/approved by the Traffic Signal Engineer.

#### **TE01–TE05 AND TEC1–TEC2 ELECTRIC CABLE**

**Description.** When a new cable is being installed to replace an existing cable, the removal of the existing cable shall be included in this item. This item shall be used for cable installed in a raceway, conduit or aerial suspended.

**Basis of Payment.** This work will be paid at the contract unit price per foot of ELECTRIC CABLE of the type, size, and number of conductors specified, which price shall be paid in full for all work as described herein and includes furnishing the material, making all electrical connections, and installing the cable complete and as directed/approved by the Traffic Signal Engineer.

The type specified will indicate whether it is shielded and the method of installation. For example:  
Electric Cable No. 14, 2/C Twisted, Shielded.

TE01 Electric Cable No. 14 2/C  
TE02 Electric Cable No. 14 3/C  
TE03 Electric Cable No. 14 5/C  
TE04 Electric Cable No. 14 7/C  
TE05 Electric Cable No. 14 2/C, Twisted Shielded

TEC1 Electric Cable in Conduit, Tracer No. 14 1/C  
TEC2 Electric Cable No. 14, 3/C, Railroad

#### **TF01–TF06 CONCRETE FOUNDATIONS**

**Description.** This work shall consist of furnishing and installing a concrete foundation as specified. Refer to the Traffic Signal Special provisions and District 1 Standard Traffic Signal Design Details for exact requirements. All excavation and restoration shall be included in the cost of this item.

**Basis of Payment.** This work will be paid at the contract unit price per foot of depth for CONCRETE FOUNDATION of the type specified, which price shall be paid in full for all necessary excavating or drilling, backfilling, disposal of unsuitable material, form work, site restoration and furnishing all materials within the limits of the foundation including anchor bolts and as directed/approved by the Traffic Signal Engineer. If rock excavation is required it will be paid in accordance with Article 109.04 of the Standard Specifications.

- TF01 Concrete Foundation, Type A
- TF02 Concrete Foundation, Type D
- TF03 Concrete Foundation, Type C
- TF04 Concrete Foundation, Type E 30 inch Diameter
- TF05 Concrete Foundation, Type E 36 inch Diameter
- TF06 Concrete Foundation, Type E 42 inch Diameter

#### **TF07 CONCRETE FOUNDATION, REBUILD/MODIFY, TYPE D**

**Description.** This item shall consist of the partial removal of an existing Type "D" Foundation at the location on the plans or as directed by the Traffic Signal Engineer. The existing foundation shall be removed to a depth of at least 2-feet below finished grade. The disposal of the concrete debris outside of the right-of-way shall be included in this item. The existing conduit shall remain in place and shall be carefully protected. The new conduits from the double handhole shall be installed, if required, as shown on the plans.

**Installation.** Upon completion of the above work, holes for steel dowels of the size indicated shall be drilled in the remaining concrete where indicated on the drawings.

The adjacent area shall be excavated and formed with anchor bolts and new conduit stubs to provide a concrete foundation for a Type IV cabinet as per the current Highway Standard, "Concrete Foundation Details". The Contractor shall follow the recommendations of the manufacturer, subject to approval of the Engineer.

Provide a 36" x 48" x 5" P.C.C. apron sidewalk on the side of the access door to the controller to facilitate servicing the controller.

Anchor bolts shall be new and shall meet all the requirements of sections 800 and 1000 of the Standard Specifications for Road and Bridge Construction.

**Basis of Payment.** This work shall be paid at the contract unit price each for CONCRETE FOUNDATION, REBUILD/MODIFY, TYPE D, which price shall be paid in full for all labor, materials, and equipment necessary to complete the work described above and as indicated on the drawings and as directed/approved by the Traffic Signal Engineer. The removal and reinstallation of the existing cabinet shall be included in this pay item, as well as the pulling and reinstalling of the existing cable from conduit.

### **TFB1 FLASHING BEACON, POST MOUNT, 1 FACE**

Description. This item shall conform with sections 800 and 1000 of the Standard Specifications for Road and Bridge Construction, District 1 Traffic Signal Special Provisions, and the current Highway standard, "Details of Spanwire Mounted Signals and Flashing Beacon Installation" except as revised herein. This item shall consist of installing a post mounted 12-inch L.E.D. single section red or yellow flashing beacon on a new or existing post as shown on the plans or as directed by the Traffic Signal Engineer. This item shall include furnishing and installing a flasher controller in an aluminum cabinet, or integrated within the head, service installation (post mounted), 12-inch L.E.D. red or yellow signal section with a dimmer if required by the Traffic Signal Engineer, and all other equipment necessary to complete the installation.

As directed by the Traffic Signal Engineer or if shown on the plans, the Contractor may be instructed to provide LED displays as opposed to standard incandescent signal sections. All lamps and LED modules are considered included in this item.

This item shall include the relocation the removal of existing post and relocation of existing signs, as applicable.

Basis of Payment. This work shall be paid at the contract unit price each to install FLASHING BEACON, POST MOUNT, 1 FACE as described above, which price shall be paid in full for all work and materials as described herein and includes furnishing, installing, delivery, handling and all appurtenances necessary for a complete and operational unit as indicated on the drawings and as directed/approved by the Traffic Signal Engineer.

### **TFB2 FLASHING BEACON, SOLAR, POST MOUNT, 1 FACE**

**Description.** This item shall conform with sections 800 and 1000 of the Standard Specifications for Road and Bridge Construction and District One Traffic Signal Special Provisions. This item shall consist of furnishing and installing a 12-inch single red or yellow flashing module on a new or existing post as shown on the plans or as directed by the Traffic Signal Engineer. This item shall include furnishing and installing a flasher controller that is integrated within the signal head, with discrete solar panels, LED module, battery, electronics, compact housing and capable of operating 24 hours, 7 days a week.

The flasher unit shall be installed on a standard wood or metal post. The flash pattern shall be MUTCD compliant and have alternate flash patterns available. The LED module shall be ITE VTCSH-STD Part-2 compliant.

The flasher unit shall operate over a temperature range of -40° F to 176° F.

The battery shall have a life span of a minimum of 5 years and be field replaceable. The battery and electronics may be located inside the solar panel housing or signal head.

The sections of the flasher unit shall be secured with tamper resistant stainless-steel hardware and, unless otherwise noted, the housing shall be black in color.

This item shall include the relocation the removal of existing post and relocation of existing signs, as applicable.

**Basis of Payment.** This work shall be paid for at the contract unit price each for FLASHING BEACON, SOLAR, POST MOUNT, 1 FACE, of the color LED as described above, which price shall be paid in full for all work and materials as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary for a complete and operational unit as indicated on the drawings and as directed/approved by the Traffic Signal Engineer.

### **TGS1 ADDITIONAL GROUNDING AND ELECTRIC SERVICE UPGRADE**

**Description.** The Contractor shall perform additional electric service and grounding upgrades as specified to the traffic signal locations as designated by the Engineer.

**Work Description.** The Contractor is responsible for scheduling the work and for coordinating with the Engineer whenever Engineer-witness functions are required. The contractors shall also advise the Engineer when each location is complete and shall provide a written certification to that effect. The Engineer reserves the right to require a final inspection of the modification at any or all of the locations certified as complete. Should deficiencies be found upon inspection, a corrective work list will be prepared.

The traffic signal installations being modified shall be kept operational at all times except as expressly allowed herein or otherwise permitted by the Engineer. The Contractor shall be responsible for all traffic control and temporary provisions required for the work, all at no additional cost to the pay item. All cable, conduit, fittings and accessories shall be new. All materials and work shall be in conformance with the requirements of applicable contract specifications and article 250 of the National Electrical Code.

The Contractor shall be responsible for coordination with the Electric Utility as necessary and shall be responsible for reporting any account modifications arising from the work to the Engineer in a timely manner. Although it is anticipated that all service agreements and accounts will remain as-is, if new agreements are required, the Contractor shall facilitate coordination between the Electric Utility and the Engineer, with the Department to sign any appropriate new agreements. Only momentary outage of a traffic signal location undergoing modification will be allowed, and the Contractor shall provide generator power or make temporary service connections as necessary to assure continuity of operations as modifications are made.

The work will generally include:

- Replacement of the electric service entrance equipment and cables
- New grounding of the service
- New feeder conductors from the service disconnect to the controller cabinet
- Cabinet grounding modifications
- Supplementary ground electrodes at handholes
- Extension of equipment ground wires to all poles, posts, handholes, etc.
- Bonding of equipment ground to all exposed metal parts
- Testing and documentation



**Replace Electric Service Entrance.** The work shall include the removal of the existing service disconnecting means and the service conductors and shall include the furnishing and installing a new pole-mounted service disconnecting means and new service conductors, based on the manner of the existing service. The new electric service disconnect, cables and the service connection shall be in accordance with details included herein, and Figure L-3A, as shown in Section 1, Article 7, unless specified otherwise by the Engineer to meet special requirements of certain locations, pedestrian traffic, etc.

**Provide New System Ground of Electric Service.** The work shall include the installation of a new system ground, connected to the ground bar of the service disconnect, using one or more ground rod grounding electrodes, or other means approved by the Engineer. The system ground shall have a resistance to earth not to exceed 10 ohms without connection to the additional electrodes established at poles or other points at the traffic signal location. The system ground resistance shall be verified by a contractor test, using the fall-of potential method and witnessed and approved by the Engineer, with a record of the test entered by the Contractor and signed by the Contractor and the Engineer. Should more than one electrode be required to establish a low enough resistance, additional electrodes shall be connected to the grid, with re-testing. All ground electrode connections shall be exothermically welded. Ground rods and grounding electrode conductors shall be as specified and detailed.

The service grounded circuit conductor (which may or may not be a system neutral) shall be bonded to the system ground at the service disconnect and shall be isolated from ground throughout the remainder of the electrical distribution.

**Extend New Conductors to Controller.** A new ground terminal bar shall be installed at the traffic signal control cabinet and this bar shall be bonded to the cabinet enclosure. The work shall include the replacement of the existing feeder and the extension of new feeder conductors from the service disconnect to the traffic signal control cabinet. The cable will be a multi-conductor jacketed cable as specified and it shall include a green-insulated ground wire to bond the service ground bar to the controller cabinet ground bar. The Contractor shall confirm the integrity of the existing feeder conduit run, and shall clean the run before installing the new feeder. If the size of the conduit is demonstrated to be inadequate for the new feeder cable or if it is demonstrated as not re-usable for some other reason and no other alternative is feasible, the Contractor shall use a new feeder conduit run, as part of this pay item, with all cable work remaining as the Contractor's responsibility at no additional cost to the pay item.

**Cabinet Grounding Modifications.** The Contractor shall confirm the presence of a terminal bar, with suitable terminals, for the grounded circuit conductor (white wire) at the controller cabinet and shall assure isolation of this bar from the cabinet enclosure and other grounded parts. If the existing bar is inadequate or is not isolated properly, the Contractor shall provide a new bar or otherwise correct the installation, removing any incorrect items. Similarly, the Contractor shall confirm the presence of a ground bar, with suitable terminals, which is bonded to the cabinet enclosure and grounded metal parts. If the existing ground bar is inadequate or is not bonded properly, the Contractor shall provide a new bar or otherwise correct the installation, removing any incorrect items, as included in this pay item.

**Supplementary Ground Electrodes.** A ground rod shall be driven at traffic signal handholes present at each corner of a location (but not within the roadway) except for handholes within 15 feet of the service ground electrode. The ground rods shall be as specified and all connections directly to the ground rods shall be exothermically welded.

**Extension of Equipment Ground.** The Contractor shall extend an equipment ground conductor from the ground bar in the controller cabinet to distributed elements of the system, bonding the equipment ground conductor to all handhole frames, metal poles and other enclosures, metal conduit, etc., including any existing supplemental ground rods that may be in place. The Contractor shall assure that good equipment ground continuity and a low-impedance ground return path is established throughout for all exposed metal parts of the installation.

It is not the intent of this work item to require re-cabling of the traffic signal load equipment to achieve grounding. In all cases, a green-insulated ground conductor shall be used whenever possible, and only if conduit space will not accommodate an insulated conductor will a bare conductor be allowed. A common conductor may be employed for multiple load circuit cables in a given conduit, but an equipment ground conductor shall be run with or shall encircle each set of circuit conductors extended from the controller cabinet.

Recognizing the intent to leave existing conductors in place and operational, the Contractor may choose from among identified and prioritized acceptable alternative to affect the grounding modifications:

If an existing conduit will accommodate the installation of a ground wire, the ground wire shall be installed within the conduit with the circuit conductors. Existing conductors should only be withdrawn from a conduit run to facilitate pulling of the ground wire if absolutely necessary.

If an existing metal conduit will not accommodate the required ground wire, and if the Contractor can identify end-to-end electrical continuity of the conduit, the Contractor may bond to the conduit externally in an approved manner to establish ground continuity, thus using the metal conduit as the equipment ground conductor.

If a given conduit run is demonstrated to be damaged and electrically discontinuous in the presence of the Engineer, and if no other alternative is feasible, the Engineer will authorize a new conduit run, to be paid under separate pay item, with all cable installation to remain part of the grounding modification work at no additional cost to the pay item. When a new conduit is installed, an insulated ground conductor must be installed within, together with the circuit conductors, regardless of the ground continuity of the new conduit, and the new conduit shall be appropriately bonded to the equipment ground.

**Bonding.** The Contractor shall establish equipment ground bonding to the cover frame of every handhole with an approved connection. The Contractor shall establish equipment ground bonding at every metal pole, post or other enclosure or device, also with an approved connecting. At poles or post bases, it may be possible to install washers, lugs, and extra nuts where extra anchor bolt protrusion allows it. Otherwise, poles may be drilled and tapped and fitted with appropriate ground lugs. Connections at poles and other enclosures shall be pigtailed from splices whenever more than one ground conductor is connected so that ground continuity is not dependent upon ground lug connection. Splices of ground conductors (in lieu of exothermic weld connectors) will be permitted at poles and other such connection point above grade, with splices to be made using suitable copper crimp sleeves and heat-shrink insulated caps as specified.

**Testing and Documentation.** As noted above, the system ground resistance to earth shall be tested, in isolation from equipment ground extensions from that point. Testing shall be performed by the contractor using the fall-of-potential method, with results recorded by the Contractor and witnessed by the Engineer. Ground continuity shall be tested using an approved low-impedance ohmmeter, to the farthest point of each circuit extension from the controller cabinet. Results shall be recorded by the Contractor and witnessed by the Engineer.

**Special Considerations.** Temporary signal installations and other span-wire installations shall be included in the scope of service and grounding modifications. For span-wire installations, the messenger wire shall be employed as an equipment ground conductor and taps shall be made to this wire to extend an equipment ground connection to appropriate exposed metal parts. A service grounding electrode shall be established at the electric service disconnect and a ground rod shall be installed and connected at one pole per quadrant.

**Method of Measurement.** Each traffic signal grounding modification and electric service upgrade as performed as specified and inspection report submitted and approved by the Engineers shall be counted as unit for payment.

**Basis of Payment.** This item shall be paid at the contract unit price each for TRAFFIC SIGNAL ADDITIONAL GROUNDING AND ELECTRIC SERVICE UPGRADE, which price shall be paid in full for all work as described herein and includes furnishing, installing, delivery, handling, testing, connections, bonding and all appurtenances necessary for a completely grounded system as indicated on the drawings and as directed/approved by the Traffic Signal Engineer.

## **TGS2 ELECTRIC SERVICE RELOCATION**

**Description.** This item shall conform with Section 805 of the Standard Specifications for Road and Bridge Construction, District 1 Traffic Signal Special Provisions and the District 1 Standard Traffic Signal Design Details, except as revised herein.

**Work Description.** The Contractor shall be responsible for coordination with the Electric Utility as necessary and shall be responsible for reporting any account modifications arising from the work to the Engineer in a timely manner. Although it is anticipated that all service agreements and accounts will remain as-is, if new agreements are required, the Contractor shall facilitate coordination between the Electric Utility and the Engineer, with the Department to sign any appropriate new agreements. Only momentary outage of a traffic signal location undergoing modification will be allowed, and the contractor shall provide generator power or make temporary service connections as necessary to assure continuity of operations as modifications are made.

The work will generally include relocation of the existing electric utility service and appurtenances as directed by the Traffic Signal Engineer.

The work shall include the removal/disconnection of the existing service disconnecting means and the service conductors and shall include relocation and installation of existing equipment at a different location as directed by the Traffic Signal Engineer. Any modifications or adjustments to the existing electric service shall be included in this item. All mounting hardware shall be new and shall be included in this pay item. Any modifications to mounting hardware shall be included in this item. Additional ground rod(s) shall be provided as necessary meeting resistance requirements.

**Basis of Payment.** This item shall be paid at the contract unit price each for ELECTRIC SERVICE RELOCATION, which price shall be paid in full for all work as described herein and includes furnishing, installing, delivery, handling, testing, connections, bonding and all appurtenances necessary for a complete operational system as indicated on the drawings and as directed/approved by the Traffic Signal Engineer.

## **TGS3 ELECTRIC SERVICE INSTALLATION, GROUND MOUNTED**

**Description.** This item shall conform with Section 805 of the Standard Specifications for Road and Bridge Construction, District 1 Traffic Signal Special Provisions and the District 1 Standard Traffic Signal Design Details, except as revised herein.

**Work Description.** The Contractor shall be responsible for coordination with the Electric Utility as necessary and shall be responsible for reporting any account modifications arising from the work to the Engineer in a timely manner. Although it is anticipated that all service agreements and accounts will remain as-is, if new agreements are required, the Contractor shall facilitate coordination between the Electric Utility and the Engineer, with the Department to sign any appropriate new agreements. Only momentary outage of a traffic signal location undergoing modification will be allowed, and the Contractor shall provide generator power or make temporary service connections as necessary to assure continuity of operations as modifications are made.

The work will generally include installation of new ground mounted electric service and installation/coordination of meter housing/meter as directed by the Traffic Signal Engineer.

Removal and disposal of existing electric service, conduit and cable, as applicable, shall be included in the cost of this item.

**Basis of Payment.** This item shall be paid at the contract unit price each for ELECTRIC SERVICE INSTALLTION, GROUND MOUNTED, which price shall be paid in full for all work as described herein and includes furnishing, installing, delivery, handling, testing, connections, bonding and all appurtenances necessary for a complete operational system as indicated on the drawings and as directed/approved by the Traffic Signal Engineer.

#### **TL01 INDUCTIVE LOOP DETECTOR**

**Description.** This work shall consist of furnishing and/or installing a vehicle or bicycle inductive loop detector, as directed by the Traffic Signal Engineer, according to Articles/Section 1079.01 of the Standard Specifications. The bicycle inductive loop detector shall differentiate bicycles from motorized vehicles.

The inductive loop detector shall be installed inside the traffic signal controller cabinet. The detector shall be either card rack type or shelf-mounted type. The detector may be single-channel, two-channel, or four-channel, as directed by the Traffic Signal Engineer. Any necessary connections and/or cabinet modifications required shall be including in this item.

**Basis of Payment.** This work will be paid for at the contract unit price each for INDUCTIVE LOOP DETECTOR, which price shall be paid in full for all work as described herein and includes the necessary connections and adjustments for proper operation and as directed/approved by the Traffic Signal Engineer.

If the detector unit has more than one complete detection channel, each compound detection channel will be considered as a detector for payment.

## TL02 DETECTOR LOOP

**Description.** This item shall conform with Sections 800 and 1000 of the Standard Specifications for Road and Bridge Construction, District 1 Traffic Signal Special Provisions and the District 1 Standard Traffic Signal Design Details, except as revised herein.

1. Asphalt Pavement  
Detector loop which is to be installed in the proposed asphalt pavement must be placed in the pavement below the surface coarse. The location of each dive hole shall be marked on the face of the curb or handhole with a saw cut.
2. Existing Asphalt Pavement  
Detector loop which is to be installed in an existing asphalt pavement shall be located to miss existing pavement cracks, if possible. The saw cut is to be filled with sealant to 3.0mm (one-eighth inch) below the surface of the pavement.
3. Concrete Pavement  
Detector loop which is to be installed in concrete pavement must be placed to miss pavement joints and cracks, if possible. The saw cut is to be filled with sealant to one-eighth inch below the surface of pavement.

**Loop Preparation.** All detector loop saw cuts shall be a minimum of one-and-one-half inches and a maximum of two inches, and the depth shall be equal to the saw cut. Saw cuts across the corners are NOT allowed. The saw cut shall be a minimum of five-sixteenths inches wide and cut in accordance with local and EPA dust control requirements. Detector loop(s) shall not be installed in wet conditions and the saw cuts must be free of debris and residue such as dust and water which is to be achieved by the use of compressed air, wire brushing and heat drying according to sealant manufacturer requirements. The detector wire shall be held in place by the use of form wedges of sufficient diameter and strength to hold the wire one inch below the surface of the pavement. Wedges shall be spaced no more than eighteen inches apart. The wire from the detector loop to the handhole shall have six twists per foot and have a separate unit duct raceway from the edge of pavement to the handhole. The unit duct shall be one foot into the pavement and loop under the curb and gutter. The unit duct shall be placed at a thirty inch depth.

**Contractor Loop Identification.** The loop detector wire shall be spliced in the handhole and each lead-in wire shall be labeled in the handhole using a Conduit 250W175C waterproof tag or approved equal secured to each wire with nylon ties. Each lead-in cable tag shall indicate the location of the loop, loop rotation (clockwise/counterclockwise), loop lead-in direction (in or out), loop cable number, location in cabinet, and number of turns in the detector loop using waterproof ink as indicated on the District 1 Loop Detail. The Contractor shall mark loop locations on as-built plans and present to the Engineer after final inspection.

Six foot round loop(s) may be substituted for six foot by six foot square loop(s) and shall be paid as 24 feet of detector loop.

Detector loop measurements shall include the saw cut and the length of the detector loop wire to the edge of pavement. The detector loop wire, including all necessary connections for proper operations, from the edge of pavement to the handhole, shall be included in the price of the detector loop. Unit duct (conduit, non-metallic, coilable), trench and backfill and drilling of pavement or handholes shall be included in detector loop quantities.

**Basis of Payment.** This work shall be paid at the contract unit price per foot for DETECTOR LOOP as described above, which price shall be paid in full for all work as described herein and as directed/approved by the Traffic Signal Engineer.

## **TMA1–TMA2 STEEL MAST ARM ASSEMBLY AND POLE**

**Description.** This item shall conform to the requirements of sections 877 of the Standard Specifications for Road and Bridge Construction, the District 1 Traffic Signal Special Provisions and the current Highway Standard, "Steel Mast Arm Assembly and Pole", except as revised herein.

Prior to the final acceptance of any Steel Mast Arm Assembly and Pole, Contractor must furnish to the Engineer a certified, notarized mill analysis of the material used in the Steel Mast Arm Assembly and Pole.

This item, when applicable, shall include the relocation of existing sign panels currently installed at the location.

If the proposed mast arm assembly is replacing an existing mast arm, the removal of the existing mast arm assembly shall be included in this item. The Contractor shall retain ownership of the existing mast arm assembly.

The mast arm shroud shall be included in this item and shall be galvanized steel or extruded aluminum for protection of the mast arm pole base plate similar to the dimensions detailed in the "District 1 Standard Traffic Signal Design Details." The shroud shall be of sufficient strength to deter pedestrian and vehicular damage. The shroud shall allow air to circulate throughout the mast arm but not allow manifestation of insects or critters. The shroud shall be constructed, installed, and designed not to be hazardous to probing fingers and feet. All mounting hardware shall be stainless steel.

Shroud shall fit any pole size supplied by the manufacturer with a maximum one quarter inch gap between the pole and shroud all around.

**Basis of Payment.** This work shall be paid at the contract unit price each for furnishing and installing a STEEL MAST ARM ASSEMBLY AND POLE as described above, which price shall be paid in full for all work and materials as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary for a complete assembly as directed/approved by the Traffic Signal Engineer.

TMA1 Steel Mast Arm Assembly and Pole 28 ft to 40 ft

TMA2 Steel Mast Arm Assembly and Pole 42 ft to 55 ft

**TMA3 RELOCATE OR INSTALL MAST ARM ASSEMBLY & POLE FROM CONTRACT SPARE PARTS**

**Description.** This item shall conform with sections 877 of the Standard Specifications for Road and Bridge Construction and District 1 Traffic Signal Special Provisions except as revised herein. The mast arm assembly and pole shall come from Contract Spare Parts or be relocated from one foundation to another foundation at the same intersection or another intersection as indicated on the plans. All transportation costs to move the mast arm assembly and pole from Contract Spare Parts to the intersection or from intersection to intersection are included in this item. Existing holes in the mast arm assembly and pole shall be plugged as directed by the Traffic Signal Engineer. If the existing mast arm has an existing galvanized metal shroud, it shall be relocated along with the mast arm as included in this item. If the existing mast arm does not have an existing shroud, the Contractor shall install stainless steel screening at the base of the mast arm in accordance with the Standard Specifications; or install a mast arm shroud as described in TMA1-2 in lieu of stainless steel screening, as directed by the Traffic Signal Engineer. The cost of furnishing and installing screening or a new shroud shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for RELOCATE OR INSTALL EXISTING MAST ARM ASSEMBLY AND POLE FROM CONTRACT SPARE PARTS, as described above, which price shall be paid in full for all work and materials as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary to relocate a mast arm pole assembly or install a mast arm assembly from Contract Spare Parts as directed/approved by the Traffic Signal Engineer.

**TPP1 PEDESTRIAN PUSH-BUTTON POST, GALVANIZED STEEL**

**Description.** This work shall consist of furnishing a nominal 4.5 inch diameter pedestrian push-button post and installing it on a base and concrete foundation as shown on the District One Traffic Signal detail sheets. The post diameter shall be as directed by the Traffic Signal Engineer and shall be coordinated with the base construction.

See Traffic Signal Post and Base, Article/Section 1077, Concrete Article/Section 1020 and IDOT District One details sheets.

The pedestrian push-button post shall be installed plumb on a round base and concrete foundation according to the details shown on the plans. The Contractor shall apply an anti-seize post compound on all nuts and bolts prior to assembly.

The foundation shall be made Class SI concrete.

**Basis of Payment.** This work will be paid for at the contract unit price each for PEDESTRIAN PUSH-BUTTON POST, GALVANIZED STEEL, which price shall be paid in full for all work and materials as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary as directed/approved by the Traffic Signal Engineer.



## **TPP2 PEDESTRIAN PUSH-BUTTON, LATCHING AND NON-LATCHING**

**Description.** This item shall conform with sections 888 and 1074 of the Standard Specifications for Road and Bridge Construction and District 1 Traffic Signal Special Provisions except as revised herein. The Pedestrian Push-button assembly shall be one piece cast aluminum alloy with momentary LED or latching type LED display, as directed by the Traffic Signal Engineer, such as the Campbell 4EVR 120 or Polara Bulldog type, or an approved equivalent and include pedestrian push button station, sign, and push button extension. See District One Traffic Signal Special Provisions for Pedestrian Station and Sign Requirements.

**Basis of Payment.** This work shall be paid at the contract unit price each for PEDESTRIAN PUSH-BUTTON, LATCHING AND NON-LATCHING as described above, which price shall be paid in full for all work and material as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary for a complete working unit as directed/approved by the Traffic Signal Engineer.

## **TPP3 RELOCATE EXISTING PEDESTRIAN PUSH-BUTTON**

**Description.** This work shall consist of relocating an existing pedestrian push-button as specified. Refer to the Traffic Signal Special provisions for exact requirements. Mounting/extension brackets shall be used to assure that the push button is accessible from a paved or concrete surface and is in full compliance with ADA. Mounting/extension brackets shall not be paid for separately but shall be included in the cost of the RELOCATE EXISTING PEDESTRIAN PUSH-BUTTON pay item.

**Basis of Payment.** This work shall be paid at the contract unit price each for RELOCATE EXISTING PEDESTRIAN PUSH-BUTTON as described above, which price shall be paid in full for all work and material as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary for a complete working unit as directed/approved by the Traffic Signal Engineer.

## **TSB1 TRAFFIC SIGNAL BACKPLATE, REFLECTIVE**

**Description.** Delete second sentence of the fourth paragraph of Article 1078.03 of the Standard Specifications.

Add the following to the fourth paragraph of Article 1078.03 of the Standard Specifications:

Reflective sheeting shall be Type ZZ according to Article 1091.03, 3-inches wide and applied in the manufacturer's preferred orientation for the maximum angularity according. The retro reflective sheeting shall be installed under a controlled environment at the manufacturer/supplier facilities before shipment for field installation. The backplate shall be prepared and cleaned, following recommendations of the retro reflective sheeting manufacturer. Removal/disposal of the existing backplate along with installation of new backplate, where applicable, shall be included in the cost of this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for TRAFFIC SIGNAL BACKPLATE, REFLECTIVE, which price shall be paid in full for all work and materials as described herein and as approved by the Traffic Signal Engineer.

#### **TSD1 LED SIGNAL DISPLAY**

**Description.** This item shall consist of installing a 12" LED display into an existing signal section or a new signal section. The LED display shall fit into the signal housing without any modifications to the housing and meet District 1 Traffic Signal Special Provisions. Removal of the existing lens and reflector shall be included in this item. The existing lens and reflector shall become the Contractor's property and the unit price should reflect the salvage value of these items.

**Basis of Payment.** This work shall be paid at the contract unit price each for LED SIGNAL DISPLAY, which price shall be paid in full for supplying and installing a display as described herein and as approved by the Traffic Signal Engineer.

#### **TSL1–TSL5 LED SIGNAL HEAD**

**Description.** These items shall conform with Section 880 of the Standard Specifications for Road and Bridge Construction, District 1 Traffic Signal Special Provisions, the current Highway Standard "Traffic Signal Mounting Details", Special Provision for Light Emitting Diode (LED) Signal Head, and District 1 Standard Traffic Signal Design Details, except as revised herein. All traffic signal sections shall have 300mm (twelve inch) lenses unless otherwise stated on the plans or as directed by the Traffic Signal Engineer. At locations where new signal heads are replacing existing signal heads, the removal of the existing signal heads and mounting hardware shall be included in this item and the Contractor shall retain ownership of the existing used signal heads.

All mounting hardware shall be new and shall be included in the pay item for signal head. The pay items listed below shall include either bracket mounts or mast arm mounts as required by the plans or directed by the Traffic Signal Engineer. Any modifications to mounting hardware shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for LED SIGNAL HEAD of the number of sections specified OR LED SIGNAL HEAD, OPTICALLY PROGRAMMED of the number of sections specified, which price shall be paid in full for all work as described herein and as approved by the Traffic Signal Engineer. Removal, salvage, or disposal of existing heads and related mounting hardware and backplates shall be included in these items.

- TSL1 LED Signal Head, 3 Section
- TSL2 LED Signal Head, 4 Section
- TSL3 LED Signal Head, 5 Section
- TSL4 LED Signal Head, Optically Programmed, 3 Section
- TSL5 LED Signal Head, Optically Programmed, 5 Section

#### **TSL8 LED PEDESTRIAN SIGNAL HEAD**

**Description.** This item shall conform with Section 881 of the Standard Specifications for Road and Bridge Construction, District 1 Traffic Signal Special Provisions, the current Highway Standard "Traffic Signal Mounting Details" and District 1 Standard Signal Design Details, except as revised herein. All LED pedestrian signal sections shall have 300mm (twelve inch) lenses unless stated on the plans or as directed by the Traffic Signal Engineer. At locations where new pedestrian signal head(s) or faces are replacing an existing pedestrian signal head(s) or faces the removal shall be included in this item and the Contractor shall retain the used existing pedestrian signal head(s) or faces.

All mounting hardware shall be new and shall be included in the pay item for signal head. The pay items listed below shall include either pole mounts or post mounts as required by the plans or directed by the Traffic Signal Engineer. Any modifications to mounting hardware shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for LED PEDESTRIAN SIGNAL HEAD, as described above, which price shall be paid in full for all work as described herein including mounting hardware and as approved by the Traffic Signal Engineer.

#### **TSL9 LED PEDESTRIAN SIGNAL HEAD, COUNTDOWN**

**Description.** This item shall conform with Section 881 of the Standard Specifications for Road and Bridge Construction, District 1 Traffic Signal Special Provisions, the current Highway Standard "Traffic Signal Mounting Details" and District 1 Standard Signal Design Details, except as revised herein. This work shall consist of furnishing and installing a pedestrian countdown signal head, with light emitting diodes (LED) of the type specified in the plan. At locations where new pedestrian signal head(s) or faces are replacing an existing pedestrian signal head(s) or faces, the removal shall be included in this item and the Contractor shall retain the used existing pedestrian signal head(s) or faces. Existing pedestrian push button signing shall be replaced with new count-down type signs (R10-3e, 9-inch x 15-inch) with associated sign station or housing at locations where existing push buttons are not being replaced.

All mounting hardware shall be new and shall be included in the pay item for signal head. The pay item listed below shall include either pole mounts or post mounts as required by the plans or directed by the Traffic Signal Engineer. Any modifications to mounting hardware shall be included in this item.

Pedestrian Countdown Signal Head, LED, shall be 16 inch (406mm) x 18 inch (457mm) and conform fully to the District 1 Traffic Signal Special Provisions.

**Basis of Payment.** This item shall be paid for at the contract unit price each for LED PEDESTRIAN SIGNAL HEAD, COUNTDOWN, which shall be paid in full for furnishing the equipment described above including LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition and as directed/approved by the Traffic Signal Engineer.

## **TSR1 REMOVE SIGNAL SECTION OR HEAD**

**Description.** This item shall conform with Section 895 of the Standard Specifications for Road and Bridge Construction and the District 1 Traffic Signal Special Provisions, except as revised herein.

This item shall consist of removing an existing traffic signal head or section at a location shown on the plans or as directed by the Traffic Signal Engineer. The removal of an existing traffic signal head or section will be paid only when its removal or relocation is not included in another pay item. The existing signal section(s) or head(s), when removed, shall become the property of the Contractor and the salvage value of the head(s) or section(s) is to be reflected in the unit bid price.

A traffic signal head with multiple faces and/or pedestrian signals mounted on the same traffic signal post, mast arm pole, or street lighting pole shall be considered a single unit and shall be paid at 1 each for the complete or partial removal. All remaining holes in the post or mast arm shall be plugged as directed by the Traffic Signal Engineer and any additional hardware necessary for any remaining sections shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each to REMOVE SIGNAL SECTION OR HEAD, as described above, which price shall be paid in full for all work as described herein and as directed/approved by the Traffic Signal Engineer.

## **TSR2 RELOCATE OR INSTALL EXISTING SIGNAL SECTION OR HEAD**

**Description.** This item shall conform with Sections 801 and 895 of the Standard Specifications for Road and Bridge Construction and the District 1 Traffic Signal Special Provisions except as revised herein. This item includes the relocation of traffic signal head(s) and pedestrian signal head(s). The combination of a traffic signal head and a pedestrian signal head mounted on the same traffic signal post, mast arm pole, or street lighting pole shall be considered a single unit and shall be paid as one (1) each relocate signal head. This item shall include removing a traffic signal head from one intersection, transporting it to another intersection and installing it at a new location or installing an existing signal head from Contract Spare Parts. Any modifications or adjustments to the existing signal head or programming of the existing signal head shall be included in this item.

All mounting hardware shall be new and shall be included in this pay item. The pay item listed below shall include either mast arm mounts, pole mounts or post mounts as required by the plans or directed by the Traffic Signal Engineer. Any modifications to mounting hardware shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each to RELOCATE OR INSTALL EXISTING SIGNAL HEAD, as described above, which price shall be paid in full for all work and material as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary for a complete working unit as directed/approved by the Traffic Signal Engineer.

**TT01 SPAN WIRE TRAFFIC SIGNAL INSTALLATION WITH ELECTRIC SERVICE AND UPS**

**Description.** This item shall conform with Section 890 of the Standard Specifications for Road and Bridge Construction, the District 1 Traffic Signal Special Provisions, and the current Highway Standard, "Temporary Traffic Signal", except as revised herein.

The span wire traffic signal installation when completed shall become the property of the State of Illinois. All equipment and material shall be new.

The controller shall be one of the approved District 1 Closed Loop brands and the display shall be menu driven. The controller and its associated equipment shall be housed in an aluminum traffic signal controller cabinet Type IV or Type V, as designated on the plans or by the Traffic Signal Engineer and mounted on an enclosed wood stand with a three feet by four feet by 5 inches thick and a concrete pad in front of the cabinet door. The cabinet shall contain all harnesses, load switches, flasher, conflict monitor, detector harnesses and related components required to provide the sequence of operations on the plans or as directed by the Traffic Signal Engineer.

Traffic signal heads furnished for the installation shall be LED type with expanded view and have twelve inch lenses with flat black faces and tunnel visors. Each approach to a signalized intersection must have a minimum of three (3) signal heads spaced a minimum of eight feet apart.

The Electric Service Installation and UPS, as described in the District One Traffic Signal Specification, shall be included in this item.

Pedestrian signal heads and push-button detectors, if required, will be paid separately. All vehicle detection, when required, as part of a span wire signal installation, will be paid separately. When possible, the Department will provide the detector amplifiers for the intersection from Contract Spare Parts. If necessary the Department shall authorize the installation of new amplifiers through a nonroutine work order.

The bottom of any span wire mounted signal head (or backplate if equipped) shall be no lower than 17-ft and the top of the signal head shall be no higher than 25-ft above the crown of the road, unless otherwise directed by the Traffic Signal Engineer.

Pavement marking, as indicated on the drawings, shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for SPAN WIRE TRAFFIC SIGNAL INSTALLATION WITH ELECTRIC SERVICE AND UPS, as described above, which price shall be paid in full for all work and material as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary for a complete working span wire traffic signal as approved by the Traffic Signal Engineer. Maintenance of the span wire traffic signal installation will be paid separately after the span wire signal is directed/approved for operation by the Department.

#### **TTP1 TRAFFIC SIGNAL POST, 10 FT TO 18 FT**

**Description.** This item shall conform with sections 875 of the Standard Specifications for Road and Bridge Construction, the District 1 Traffic Signal Special Provisions and District 1 Traffic Signal Design Details except as revised herein.

When the new post is being installed on an existing foundation to replace an existing post, the removal of the existing post shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for TRAFFIC SIGNAL POST, 10 FT TO 18 FT as described above, which price shall be paid in full for all work and material as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary for a complete unit as directed/approved by the Traffic Signal Engineer.

#### **TTP2 - TTP3 REMOVE TRAFFIC SIGNAL POST AND REMOVE MAST ARM ASSEMBLY AND POLE**

**Description.** These items consist of removing an existing traffic signal post or mast arm assembly and pole at a location shown on the plans or as directed by the Traffic Signal Engineer. The existing traffic signal post or existing mast arm assembly shall become the Contractor's property and the salvage value of the item shall be reflected in the unit price.

**Basis of Payment.** This work shall be paid at the contract unit price each for the pay items listed below and as described above, which price shall be paid in full for all work as described herein and as directed/approved by the Traffic Signal Engineer.

TTP2 Remove Traffic Signal Post

TTP3 Remove Mast Arm Assembly and Pole

#### **TTP4 RELOCATE EXISTING TRAFFIC SIGNAL POST, 10 FT TO 18 FT**

**Description.** This item shall conform with Sections 801 and 895 of the Standard Specifications for Road and Bridge Construction and the District 1 Traffic Signal Special Provisions except as revised herein.

The traffic post shall come from Contract Spare Parts or be relocated from one foundation to another foundation at the same intersection or another intersection as indicated on the plans. All transportation costs to move the traffic signal post from Contract Spare Parts to the intersection or from intersection to intersection are included in this item. Existing holes in the traffic signal post shall be plugged as directed by the Traffic Signal Engineer. This item includes the relocation of traffic signal head(s), pedestrian signal head(s), pedestrian signal pushbuttons or any other appurtenances mounted to the existing traffic signal post. Any modifications or adjustments to the existing signal head(s), pushbutton(s), appurtenances or programming of the existing signal head(s) shall be included in this item.

All mounting hardware shall be new and shall be included in this pay item. Any modifications to mounting hardware shall be included in this item.

**Basis of Payment.** This work shall be paid at the contract unit price each for RELOCATE EXISTING TRAFFIC SIGNAL POST, 10 FT TO 18 FT as described above, which price shall be paid in full for all work and material as described herein and includes furnishing, installing, delivery, handling and all appurtenances and mounting hardware necessary for a complete unit as directed/approved by the Traffic Signal Engineer.

## **TVD1-TVD2 VIDEO DETECTION SYSTEM, COMPLETE INTERSECTION OR SINGLE INTERSECTION APPROACH**

**Description:** This specification sets forth the minimum requirements for a system that monitors vehicles on a roadway via processing of video images and provides detector outputs to a traffic controller or similar device. This work shall consist of furnishing and installing an Autoscope Vision, Iteris Vantage Next or an approved equal video vehicle detection system for a single intersection approach or all approaches at one signalized intersection. This item includes vision/camera sensors, processing equipment and all necessary hardware, cable, and accessories necessary to complete the installation in accordance with the manufacturer's specifications. The system shall also include a 10-inch LCD in-cabinet monitor with BNC connector for video input. A multi-camera video switching unit shall be provided to select video input to the monitor.

The cameras are normally installed on top of the luminaire arm. However, occasionally overhead utility wires obstruct the camera's field of view and prevent proper detector placement. When this occurs, the camera shall be installed on a J-hook below the luminaire arm.

To protect the video detection cameras from electrical surges, the interface panel shall be grounded as follows:

1. The chassis sheet metal must be tied to ground with the supplied ground wire and stud.
2. All shield wires should be tied to the chassis ground stud.
3. Terminal position three (3) of each of the camera terminations shall be tied to the ground stud.
4. All extra/spare wires in the Autoscope MVP cable should be tied to ground.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The supplier of the video detection system shall supervise the installation and testing of the video detection system. A factory certified representative from the supplier shall be on-site during installation.

The video detection system shall come with a warranty from its supplier for a minimum of two (2) years with ongoing software support by the supplier and no-cost video sensor and supervisor software.

**Basis of Payment:** This item will be paid for at the contract unit price each for VIDEO DETECTION SYSTEM, COMPLETE INTERSECTION or SINGLE INTERSECTION APPROACH, which price shall be paid in full for all work and material as described herein and includes furnishing, installing, delivery, handling, testing, set-up and all appurtenances and mounting hardware necessary for a complete operating detection unit at one signalized intersection as directed/approved by the Traffic Signal Engineer.

TVD1 Video Detection System, Complete Intersection

TVD2 Video Detection System, Single Intersection Approach

## **TWD1-TWD2 RADAR DETECTION SYSTEM**

**Description.** This work shall consist of furnishing and installing a radar vehicle detection system as specified and/or as shown on the plan. This pay item shall include all necessary work and equipment required to have a fully operational system including but not limited to the detector unit/s, the interface unit and all the necessary hardware, cable and accessories required to complete the installation in accordance with the manufacturer's specifications.

The radar vehicle detection system shall work under all weather conditions, including rain, freezing rain, snow, wind, dust, fog, and changes in temperature and light. It shall work in an ambient temperature range of -34 to 74 degrees Celsius. It shall have a max power output of 75 watts or less.

The radar vehicle detection system shall be compatible with the District's approved traffic controller assemblies utilizing NEMA TS 1 or NEMA TS 2 controllers and cabinet components for full time operation. The radar vehicle detection system shall provide a minimum of one interface unit that has Ethernet connectivity, surge protection, and shall be capable of supporting a minimum of 4 detector units.

The far back radar detection shall have a detection range of 400 feet or better.

A representative from the supplier of the radar vehicle detection system shall supervise the installation and testing of the radar vehicle detection system and shall be present at the traffic signal turn-on inspection. Once the radar vehicle detection system is configured, it shall not need reconfiguration to maintain performance, unless the roadway configuration or the application requirements change.

The mounting location/s of the detector unit/s shall be per the manufacturer's recommendations. If an extension mounting assembly is needed, it shall be included in this item. All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The radar vehicle detection system shall be warrantied, free from material and workmanship defects for a period of two years from final inspection.



**Basis of Payment.** This work shall be paid at the contract unit price each for RADAR DETECTION SYSTEM, SINGLE APPROACH, STOP BAR DETECTION; RADAR VEHICLE DETECTION SYSTEM, SINGLE APPROACH, STOP BAR AND ADVANCE DETECTION, as described above, which price shall be paid in full for all work and material as described herein and includes furnishing, installing, delivery, handling, testing, set-up and all appurtenances and installation equipment necessary for a complete operating radar vehicle detection system as directed/approved by the Traffic Signal Engineer.

TWD1 Radar Detection System, Single Approach, Stop Bar Detection

TWD2 Radar Detection System, Single Approach, Stop Bar and Advanced Detection

## **TWI1 WIRELESS INTERCONNECT SYSTEM**

**Description.** The wireless interconnect system shall be compatible with Siemens/Eagle or Econolite controller closed loop systems. This item shall include all materials, labor and testing to provide the completely operational closed loop system between two (2) intersections as shown on the plans. The wireless interconnect system shall include the following components:

- a. Rack or Shelf Mounted RS-232 Frequency Hopping Spread Spectrum (FHSS) Radio
- b. Software for Radio Configuration (Configure Frequency and Hopping Patterns)
- c. Antennas (Omni Directional or Yagi Directional)
- d. Antenna Cables, LMR400, Low Loss. Max. 100-ft from controller cabinet to antenna
- e. Brackets, Mounting Hardware, and Accessories Required for Installation
- f. RS232 Data Cable for Connection from the radio to the local or master controller
- g. All other components required for a fully functional wireless interconnect system

All controller cabinet modifications and other modifications to existing equipment that are required for the installation of the wireless interconnect system components shall be included in this item.

The wireless interconnect system may operate at 900Mhz (902-928) or 2.4 Ghz depending on the results of a site survey. The telemetry shall have an acceptable rate of transmission errors, time outs, etc. comparable to that of a hardwire system.

The proposed master controller and telemetry module shall be configured for use with the wireless interconnect at a minimum rate of 9600 baud.

The wireless interconnect system shall include all other components required for a complete and fully functional telemetry system and shall be installed in accordance to the manufacturers recommendations.

**Basis of Payment.** This work shall be paid at the contract unit price each for WIRELESS INTERCONNECT SYSTEM, as described above, which price shall be paid in full for all work and material as described herein and includes furnishing, installing, delivery, handling, testing, set-up and all appurtenances and installation equipment necessary for a complete operating wireless interconnect system as directed/approved by the Traffic Signal Engineer.

**MAST ARM SIGN PANELS**

Effective: May 22, 2002  
720.01TS

Revised: July 1, 2015

Add the following to Article 720.02 of the Standard Specifications:

Sign stiffening channel systems shall be aluminum and meet the requirements of ASTM 6261-T5. Sign mounting banding, buckles and buckle straps shall be manufactured from AISI 201 stainless steel.

**SIGN SHOP DRAWING SUBMITTAL**

Effective: January 22, 2013  
720.02TS

Revised: July 1, 2015

Add the following paragraph to Article 720.03 of the Standard Specifications:

Shop drawings will be required, according to Article 105.04, for all Arterials/Expressways signs except standard highway signs covered in the MUTCD. Shop drawings shall be submitted to the Engineer for review and approval prior to fabrication. The shop drawings shall include dimensions, letter sizing, font type, colors and materials.

**TRAFFIC SIGNAL GENERAL REQUIREMENTS**

Effective: May 22, 2002  
800.01TS

Revised: July 1, 2015

These Traffic Signal Special Provisions and the "District One Standard Traffic Signal Design Details" supplement the requirements of the State of Illinois "Standard Specifications for Road and Bridge Construction." The intent of these Special Provisions is to prescribe the materials and construction methods commonly used for traffic signal installations.

- All material furnished shall be new unless otherwise noted herein.
- Traffic signal construction and maintenance work shall be performed by personnel holding current IMSA Traffic Signal Technician Level II certification. A copy of the certification shall be immediately available upon request of the Engineer.
- The work to be done under this contract consists of furnishing, installing and maintaining all traffic signal work and items as specified in the Plans and as specified herein in a manner acceptable and approved by the Engineer.

**Definitions of Terms.**

Add the following to Section 101 of the Standard Specifications:

101.56 Vendor. Company that sells a particular type of product directly to the contractor or the Equipment Supplier.

101.57 Equipment supplier. Company that supplies, represents and provides technical support for IDOT District One approved traffic signal controllers and other related equipment. The Equipment Supplier shall be located within IDOT District One and shall:

- Be full service with on-site facilities to assemble, test and trouble-shoot traffic signal controllers and cabinet assemblies.
- Maintain an inventory of IDOT District One approved controllers and cabinets.
- Be staffed with permanent sales and technical personnel able to provide traffic signal controller and cabinet expertise and support.
- Technical staff shall hold current IMSA Traffic Signal Technician Level III certification and shall attend traffic signal turn-ons and inspections with a minimum 14 calendar day notice.

**Submittals.**

Revise Article 801.05 of the Standard Specifications to read:

All material approval requests shall be submitted electronically through the District's SharePoint System unless directed otherwise by the Engineer. Electronic material submittals shall follow the District's Traffic Operations Construction Submittals guidelines. General requirements include:

1. All material approval requests shall be made prior to or no later than the date of the preconstruction meeting. A list of major traffic signal items can be found in Article 801.05. Material or equipment which is similar or identical shall be the product of the same manufacturer, unless necessary for system continuity. Traffic signal materials and equipment shall bear the U.L. label whenever such labeling is available.
2. Product data and shop drawings shall be assembled by pay item. Only the top sheet of each pay item submittal will be stamped by the Department with the review status, except shop drawings for mast arm pole assemblies and the like will be stamped with the review status on each sheet.
3. Original manufacturer published product data and shop drawing sheets with legible dimensions and details shall be submitted for review.
4. When hard copy submittals are necessary, four complete copies of the manufacturer's descriptive literatures and technical data for the traffic signal materials shall be submitted. For hard copy or electronic submittals, the descriptive literature and technical data shall be adequate for determining whether the materials meet the requirements of the plans and specifications. If the literature contains more than one item, the Contractor shall indicate which item or items will be furnished.
5. When hard copy submittals are necessary for structural elements, four complete copies of the shop drawings for the mast arm assemblies and poles, and the combination mast arm assemblies and poles showing, in detail, the fabrication thereof and the certified mill analyses of the materials used in the fabrication, anchor rods, and reinforcing materials shall be submitted.

6. Partial or incomplete submittals will be returned without review.
7. Certain non-standard mast arm poles and special structural elements will require additional review from IDOT's Central Office. Examples include ornamental/decorative, non-standard length mast arm pole assemblies and monotube structures. The Contractor shall account for the additional review time in his schedule.
8. The contract number or permit number, project location/limits and corresponding pay code number must be on each sheet of correspondence, catalog cuts and mast arm poles and assemblies drawings.
9. Where certifications and/or warranties are specified, the information submitted for approval shall include certifications and warranties. Certifications involving inspections, and/or tests of material shall be complete with all test data, dates, and times.
10. After the Engineer reviews the submittals for conformance with the design concept of the project, the Engineer will stamp the drawings indicating their status as 'Approved', 'Approved-As-Noted', 'Disapproved', or 'Incomplete'. Since the Engineer's review is for conformance with the design concept only, it is the Contractor's responsibility to coordinate the various items into a working system as specified. The Contractor shall not be relieved from responsibility for errors or omissions in the shop, working, layout drawings, or other documents by the Department's approval thereof. The Contractor must still be in full compliance with contract and specification requirements.
11. The Contractor shall secure approved materials in a timely manner to assure construction schedules are not delayed.
12. All submitted items reviewed and marked 'APPROVED AS NOTED', 'DISAPPROVED', or 'INCOMPLETE' are to be resubmitted in their entirety, unless otherwise indicated within the submittal comments, with a disposition of previous comments to verify contract compliance at no additional cost to the contract.
13. Exceptions to and deviations from the requirements of the Contract Documents will not be allowed. It is the Contractor's responsibility to note any deviations from Contract requirements at the time of submittal and to make any requests for deviations in writing to the Engineer. In general, substitutions will not be acceptable. Requests for substitutions must demonstrate that the proposed substitution is superior to the material or equipment required by the Contract Documents. No exceptions, deviations or substitutions will be permitted without the approval of the Engineer.
14. Contractor shall not order major equipment such as mast arm assemblies prior to Engineer approval of the Contractor marked proposed traffic signal equipment locations to assure proper placement of contract required traffic signal displays, push buttons and other facilities. Field adjustments may require changes in proposed mast arm length and other coordination.

**Marking Proposed Locations.**

Revise "Marking Proposed Locations for Highway Lighting System" of Article 801.09 to read "Marking Proposed Locations for Highway Lighting System and Traffic Signals."

Add the following to Article 801.09 of the Standard Specifications:

It shall be the contractor's responsibility to verify all dimensions and conditions existing in the field prior to ordering materials and beginning construction. This shall include locating the mast arm foundations and verifying the mast arms lengths.

**Inspection of Electrical Systems.**

Add the following to Article 801.10 of the Standard Specifications:

- (c) All cabinets including temporary traffic signal cabinets shall be assembled by an approved equipment supplier in District One. The Department reserves the right to request any controller and cabinet to be tested at the equipment supplier's facility prior to field installation, at no extra cost to this contract.

**Maintenance and Responsibility.**

Revise Article 801.11 of the Standard Specifications to read:

- a. Existing traffic signal installations and/or any electrical facilities at all or various locations may be altered or reconstructed totally or partially as part of the work on this Contract. The Contractor is hereby advised that all traffic control equipment, presently installed at these locations, may be the property of the State of Illinois, Department of Transportation, Division of Highways, County, Private Developer, Municipality or Transit Agency in which they are located. Once the Contractor has begun any work on any portion of the project, all traffic signals within the limits of this contract or those which have the item "Maintenance of Existing Traffic Signal Installation," "Temporary Traffic Signal Installation(s)" and/or "Maintenance of Existing Flashing Beacon Installation," shall become the full responsibility of the Contractor. The Contractor shall supply the Engineer, Area Traffic Signal Maintenance and Operations Engineer, IDOT ComCenter and the Department's Electrical Maintenance Contractor with two 24-hour emergency contact names and telephone numbers.
- b. Automatic Traffic Enforcement equipment such as red lighting running and railroad crossing camera systems are owned and operated by others and the Contractor shall not be responsible for maintaining this equipment.
- c. Regional transit, County and other agencies may also have equipment connected to existing traffic signal or peripheral equipment such as PTZ cameras, switches, transit signal priority (TSP and BRT) servers and other devices that shall be included with traffic signal maintenance at no additional cost to the contract.
- d. When the project has a pay item for "Maintenance of Existing Traffic Signal Installation," "Temporary Traffic Signal Installation(s)" and/or "Maintenance of Existing Flashing Beacon Installation," the Contractor must notify both the Area Traffic Signal Maintenance and Operations Engineer at (847) 705-4424 and the Department's Electrical Maintenance Contractor, of their intent to begin any physical construction work on the Contract or any portion thereof. This notification must be made a minimum of seven (7) working days prior to the start of construction to allow sufficient time for inspection of the existing traffic signal installation(s) and transfer of maintenance to the Contractor. If work is started prior to an inspection, maintenance of the traffic signal installation(s) will be transferred to the Contractor without an inspection. The Contractor will become responsible for repairing or replacing all equipment that is not operating properly or is damaged at no cost to the owner of the traffic signal. Final repairs or replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted.

- e. The Contractor is advised that the existing and/or temporary traffic signal installation must remain in operation during all construction stages, except for the most essential down time. Any shutdown of the traffic signal installation, which exceeds fifteen (15) minutes, must have prior approval of the Engineer. Approval to shut down the traffic signal installation will only be granted during the period extending from 10:00 a.m. to 3:00 p.m. on weekdays. Shutdowns shall not be allowed during inclement weather or holiday periods.
- f. The Contractor shall be fully responsible for the safe and efficient operation of the traffic signals and other equipment noted herein. Any inquiry, complaint or request by the Department, the Department's Electrical Maintenance Contractor or the public, shall be investigated and repairs begun within one hour. Failure to provide this service will result in liquidated damages of \$1000 per day per occurrence. In addition, the Department reserves the right to assign any work not completed within this timeframe to the Electrical Maintenance Contractor. All costs associated to repair this uncompleted work shall be the responsibility of the Contractor. Failure to pay these costs to the Electrical Maintenance Contractor within one month after the incident will result in additional liquidated damages of \$1000 per month per occurrence. Unpaid bills will be deducted from the cost of the Contract. The Department may inspect any signaling device on the Department's highway system at any time without notification.
- g. Any proposed activity in the vicinity of a highway-rail grade crossing must adhere to the guidelines set forth in the current edition of the Manual on Uniform Traffic Control Devices (MUTCD) regarding work in temporary traffic control zones in the vicinity of highway-rail grade crossings which states that lane restrictions, flagging, or other operations shall not create conditions where vehicles can be queued across the railroad tracks. If the queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.
- h. The Contractor shall be responsible to clear snow, ice, dirt, debris or other condition that obstructs visibility of any traffic signal display or access to traffic signal equipment.
- i. The Contractor shall maintain the traffic signal in normal operation during short or long term loss of utility or battery back-up power at critical locations designated by the Engineer. Critical locations may include traffic signals interconnected to railroad warning devices, expressway ramps, intersection with an SRA route, critical corridors or other locations identified by the Engineer. Temporary power to the traffic signal must meet applicable NEC and OSHA guidelines and may include portable generators and/or replacement batteries. Temporary power to critical locations shall not be for separately but shall be included in the contract.

**Damage to Traffic Signal System.**

Add the following to Article 801.12(b) of the Standard Specifications to read:

Any traffic signal control equipment damaged or not operating properly from any cause shall be replaced with new equipment meeting current District One traffic signal specifications and provided by the Contractor at no additional cost to the Contract and/or owner of the traffic signal system, all as approved by the Engineer. Final replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted. Cable splices are only allowed at the bases of post and mast arms.

Temporary replacement of damaged or knockdown of a mast arm pole assembly shall require construction of a full or partial span wire signal installation or other method approved by the Engineer to assure signal heads are located overhead and over traveled pavement. Temporary replacement of mast arm mount signals with post mount signals will not be permitted.

Automatic Traffic Enforcement equipment, such as Red Light Enforcement cameras, detectors, and peripheral equipment, damaged or not operating properly from any cause, shall be the responsibility of the municipality or the Automatic Traffic Enforcement company per Permit agreement.

**Traffic Signal Inspection (TURN-ON).**

Revise Article 801.15(b) of the Standard Specifications to read:

It is the intent to have all electric work completed and equipment field tested by the Equipment Supplier prior to the Department's "turn-on" field inspection. If in the event the Engineer determines work is not complete and the inspection will require more than two (2) hours to complete, the inspection shall be canceled and the Contractor will be required to reschedule at another date. The maintenance of the traffic signals will not be accepted until all punch list work is corrected and re-inspected.

When the road is open to traffic, except as otherwise provided in Section 850 of the Standard Specifications, the Contractor may request a turn-on and inspection of the completed traffic signal installation at each separate location. This request must be made to the Area Traffic Signal Maintenance and Operations Engineer at (847) 705-4424 a minimum of seven (7) working days prior to the time of the requested inspection. The Department will not grant a field inspection until written or electronic notification is provided from the Contractor that the equipment has been field tested and the intersection is operating according to Contract requirements. The Contractor must invite local fire department personnel to the turn-on when Emergency Vehicle Preemption (EVP) is included in the project. When the contract includes the item RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM, OPTIMIZE TRAFFIC SIGNAL SYSTEM, or TEMPORARY TRAFFIC SIGNAL TIMINGS, the Contractor must notify the SCAT Consultant of the turn-on/detour implementation schedule, as well as stage changes and phase changes during construction.

The Contractor must have all traffic signal work completed and the electrical service installation connected by the utility company prior to requesting an inspection and turn-on of the traffic signal installation. The Contractor shall be responsible to provide a police officer to assist with traffic control at the time of testing.

The Contractor shall provide a representative from the control equipment vendor's office who is knowledgeable of the cabinet design and controller functions to attend the traffic signal inspection for both permanent and temporary traffic signal turn-ons.

Upon demonstration that the signals are operating and all work is completed in accordance with the Contract and to the satisfaction of the Engineer, the Engineer will then allow the signals to be placed in continuous operation. The Agency that is responsible for the maintenance of each traffic signal installation will assume the maintenance upon successful completion of this inspection.

The District requires the following Final Project Documentation from the Contractor at traffic signal turn-ons in electronic format in addition to hard copies where noted. A CD/DVD shall be submitted with separate folders corresponding to each numbered title below. The CD/DVD shall be labelled with date, project location, company and contract or permit number. Record Drawings, Inventory and Material Approvals shall be submitted prior to traffic signal turn-on for review by the Department as described here-in.

Final Project Documentation:

1. Record Drawings. Signal plans of record with field revisions marked in red ink. One hard copy set of 11"x17" record drawings shall also be provided.
2. Inventory. Inventory of new and existing traffic signal equipment including cabinet types and devices within cabinets in an Excel spread sheet format. One hard copy shall also be provided.
3. Pictures. Digital pictures of a minimum 12M pixels of each intersection approach showing all traffic signal displays and equipment. Pictures shall include controller cabinet equipment in enough detail to clearly identify manufacture and model of major equipment.
4. Field Testing. Written notification from the Contractor and the equipment vendor of satisfactory field testing with corresponding material performance measurements, such as for detector loops and fiber optic systems (see Article 801.13). One hard copy of all contract required performance measurement testing shall also be provided.
5. Materials Approval. The material approval letter. A hard copy shall also be provided.
6. Manuals. Operation and service manuals of the signal controller and associated control equipment. One hard copy shall also be provided.
7. Cabinet Wiring Diagram and Cable Logs. Five (5) hard copies 11" x 17" of the cabinet wiring diagrams shall be provided along with electronic pdf and dgn files of the cabinet wiring diagram. Five hard copies of the cable logs and electronic excel files shall be provided with cable #, number of conductors and spares, connected device/signal head and intersection location.
8. Controller Programming Settings. The traffic signal controller's timings; backup timings; coordination splits, offsets, and cycles; TBC Time of Day, Week and Year Programs; Traffic Responsive Program, Detector Phase Assignment, Type and Detector Switching; and any other functions programmable from the keyboard. The controller manufacturer shall also supply a printed form, not to exceed 11" x 17" for recording that data noted above. The form shall include a location, date, manufacturer's name, controller model and software version. The form shall be approved by the Engineer and a minimum of three (3) copies must be furnished at each turn-on. The manufacturer must provide all programming information used within the controller at the time of turn-on.



9. Warrantees and Guarantees. All manufacturer and contractor warrantees and guarantees required by Article 801.14.
10. GPS coordinate of traffic signal equipment as describe in the Record Drawings section herein.

Acceptance of the traffic signal equipment by the Department shall be based upon inspection results at the traffic signal “turn on”, completeness of the required documentation and successful operation during a minimum 72 hour “burn-in” period following activation of the traffic signal. If approved, traffic signal acceptance shall be verbal at the “turn on” inspection followed by written correspondence from the Engineer. The Contractor shall be responsible for all traffic signal equipment and associated maintenance thereof until Departmental acceptance is granted.

All equipment and/or parts to keep the traffic signal installation operating shall be furnished by the Contractor. No spare traffic signal equipment is available from the Department.

All punch list work shall be completed within two (2) weeks after the final inspection. The Contractor shall notify the Electrical Maintenance Contractor to inspect all punch list work. Failure to meet these time constraints shall result in liquidated damage charges of \$500 per month per incident.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which the subject materials and signal equipment are paid, and no additional compensation will be allowed. Materials and signal equipment not complying with the above requirements shall be subject to removal and disposal at the Contractor's expense.

#### **Record Drawings.**

The requirements listed for Electrical Installation shall apply for Traffic Signal Installations in Article 801.16. Revise the 2<sup>nd</sup> paragraph of Article 801.16 of the Standard Specifications to read:

“When the work is complete, and seven days before the request for a final inspection, the reduced-size set of contract drawings, stamped “RECORD DRAWINGS”, shall be submitted to the Engineer for review and approval and shall be stamped with the date and the signature of the Contractor’s supervising Engineer or electrician. The record drawings shall be submitted in PDF format on CDROM as well as hardcopy for review and approval. If the contract consists of multiple intersections, each intersection shall be saved as an individual PDF file with TS# and location name in its file name.

In addition to the record drawings, copies of the final catalog cuts which have been Approved or Approved as Noted shall be submitted in PDF format along with the record drawings. The PDF files shall clearly indicate the pay item either by filename or PDF Table of Contents referencing the respective pay item number for multi-item PDF files. Specific part or model numbers of items which have been selected shall be clearly visible.”

As part of the record drawings, the Contractor shall inventory all traffic signal equipment, new or existing, on the project and record information in an Excel spreadsheet. The inventory shall include equipment type, model numbers, software manufacturer and version and quantities.

Add the following to Article 801.16 of the Standard Specifications:

“In addition to the specified record drawings, the Contactor shall record GPS coordinates of the following traffic signal components being installed, modified or being affected in other ways by this contract:

- All Mast Arm Poles and Posts
- Traffic Signal Wood Poles
- Rail Road Bungalow
- UPS
- Handholes
- Conduit roadway crossings
- Controller Cabinets
- Communication Cabinets
- Electric Service Disconnect locations
- CCTV Camera installations
- Fiber Optic Splice Locations
- Conduit Crossings

Datum to be used shall be North American 1983.

Data shall be provided electronically and in print form. The electronic format shall be compatible with MS Excel. Latitude and Longitude shall be in decimal degrees with a minimum of 6 decimal places. Each coordinate shall have the following information:

- File shall be named: TSXXX-YY-MM-DD (i.e. TS22157\_15-01-01)
- Each intersection shall have its own file
- Row 1 should have the location name (i.e. IL 31 @ Klausen)
- Row 2 is blank
- Row 3 is the headers for the columns
- Row 4 starts the data
- Column A (Date) – should be in the following format: MM/DD/YYYY
- Column B (Item) – as shown in the table below
- Column C (Description) – as shown in the table below
- Column D and E (GPS Data) – should be in decimal form, per the IDOT special provisions

Examples:

Date	Item	Description	Latitude	Longitude
01/01/2015	MP (Mast Arm Pole)	NEQ, NB, Dual, Combination Pole	41.580493	- 87.793378
01/01/2015	HH (Handhole)	Heavy Duty, Fiber, Intersection, Double	41.558532	- 87.792571
01/01/2015	ES (Electrical Service)	Ground mount, Pole mount	41.765532	- 87.543571
01/01/2015	CC (Controller Cabinet)		41.602248	- 87.794053
01/01/2015	RSC (Rigid Steel Crossing)	IL 31 east side crossing south leg to center HH at Klausen	41.611111	- 87.790222
01/01/2015	PTZ (PTZ)	NEQ extension pole	41.593434	- 87.769876
01/01/2015	POST (Post)		41.651848	- 87.762053
01/01/2015	MCC (Master Controller Cabinet)		41.584593	- 87.793378
01/01/2015	COMC (Communication Cabinet)		41.584600	- 87.793432
01/01/2015	BBS (Battery Backup System)		41.558532	- 87.792571
01/01/2015	CNCR (Conduit Crossing)	4-inch IL 31 n/o of Klausen	41.588888	- 87.794440

Prior to the collection of data, the contractor shall provide a sample data collection of at least six data points of known locations to be reviewed and verified by the Engineer to be accurate within 1 foot. Upon verification, data collection can begin. Data collection can be made as construction progresses, or can be collected after all items are installed. If the data is unacceptable the contractor shall make corrections to the data collection equipment and or process and submit the data for review and approval as specified.

**Accuracy.** Data collected is to be mapping grade. A handheld mapping grade GPS device shall be used for the data collection. The receiver shall support differential correction and data shall have a minimum 1 foot accuracy after post processing.

GPS receivers integrated into cellular communication devices, recreational and automotive GPS devices are not acceptable.

The GPS shall be the product of an established major GPS manufacturer having been in the business for a minimum of 6 years.”

Delete the last sentence of the 3<sup>rd</sup> paragraph of Article 801.16.

**Locating Underground Facilities.**

Revise Section 803 to the Standard Specifications to read:

IDOT traffic signal facilities are not part of any of the one-call locating service such as J.U.L.I.E or Digger. If this Contract requires the services of an Electrical Contractor, the Contractor shall be responsible at his/her own expense for locating existing IDOT electrical facilities prior to performing any work. If this Contract does not require the services of an Electrical Contractor, the Contractor may request one free locate for existing IDOT electrical facilities from the District One Electrical Maintenance Contractor prior to the start of any work. Additional requests may be at the expense of the Contractor. The location of underground traffic facilities does not relieve the Contractor of their responsibility to repair any facilities damaged during construction at their expense.

The exact location of all utilities shall be field verified by the Contractor before the installation of any components of the traffic signal system. For locations of utilities, locally owned equipment, and leased enforcement camera system facilities, the local Counties or Municipalities may need to be contacted: in the City of Chicago contact Digger at (312) 744-7000 and for all other locations contact J.U.L.I.E. at 1-800-892-0123 or 811.

**Restoration of Work Area.**

Add the following article to Section 801 of the Standard Specifications:

801.17 Restoration of work area. Restoration of the traffic signal work area shall be included in the related pay items such as foundation, conduit, handhole, underground raceways, etc. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be replaced in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded. All brick pavers disturbed in the work area shall be restored to their original configuration as directed by the Engineer. All damaged brick pavers shall be replaced with a comparable material approved by the Engineer. Restoration of the work area shall be included in the contract without any extra compensation allowed to the Contractor.

**Bagging Signal Heads.**

Light tan colored traffic and pedestrian signal reusable covers shall be used to cover dark/unenergized signal sections and visors. Covers shall be made of outdoor fabric with urethane coating for repelling water, have elastic fully sewn around the cover ends for a tight fit over the visor, and have a minimum of two straps with buckles to secure the cover to the backplate. A center mesh strip allows viewing without removal for signal status testing purposes. Covers shall include a message indicating the signal is not in service.

## **OPTIMIZE TRAFFIC SIGNAL SYSTEM**

Effective: May 22, 2002  
800.02TS

Revised: July 1, 2015

### **Description.**

This work shall consist of optimizing a closed loop traffic signal system.

OPTIMIZE TRAFFIC SIGNAL SYSTEM applies when a new or existing closed loop traffic signal system is to be optimized and a formal Signal Coordination and Timing (SCAT) Report is to be prepared. The purpose of this work is to improve system performance by optimizing traffic signal timings, developing a time of day program and a traffic responsive program.

After the signal improvements are completed, the signal system shall be optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as noted herein.

A listing of existing signal equipment, interconnect information, phasing data, and timing patterns may be obtained from the Department, if available and as appropriate. The existing SCAT Report is available for review at the District One office and if the Consultant provides blank a CD, copies of computer simulation files for the existing optimized system and a timing database that includes intersection displays will be made for the Consultant. The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) The following tasks are associated with OPTIMIZE TRAFFIC SIGNAL SYSTEM.

1. Appropriate signal timings and offsets shall be developed for each intersection and appropriate cycle lengths shall be developed for the closed loop signal system.
2. Traffic counts shall be taken at all intersections after the permanent traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday and on a Saturday or Sunday, as directed by the Engineer, to account for special traffic generators such as shopping centers, educational institutes and special event facilities. The turning movement counts shall identify cars, and single-unit and multi-unit heavy vehicles.
3. As necessary, the intersections shall be re-addressed and all system detectors reassigned in the master controller according to the current standard of District One.
4. A traffic responsive program shall be developed, which considers both volume and occupancy. A time-of-day program shall be developed for used as a back-up system.
5. Proposed signal timing plan for the new or modified intersection shall be forwarded to IDOT for review prior to implementation.

6. Consultant shall conduct on-site implementation of the timings and make fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations. The consultant shall respond to IDOT comments and public complaints for a minimum period of 90 days from date of timing plan implementation.
7. Speed and delay studies shall be conducted during each of the count periods along the system corridor in the field before and after implementation of the proposed timing plans for comparative evaluations. These studies should utilize specialized electronic timing and measuring devices.

(b) The following deliverables shall be provided for OPTIMIZE TRAFFIC SIGNAL SYSTEM.

<p>1. Consultant shall furnish to IDOT one (1) copy of a SCAT Report for the optimized system. The SCAT Report shall include the following elements:  <b>Cover Page in color showing a System Map</b></p>
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**Basis of Payment.**

The work shall be paid for at the contract unit each for OPTIMIZE TRAFFIC SIGNAL SYSTEM, which price shall be payment in full for performing all work described herein for the entire traffic signal system. Following the completion of traffic counts, 25 percent of the bid price will be paid. Following the completion of the Synchro analysis, 25 percent of the bid price will be paid. Following the setup and fine tuning of the timings, the speed-delay study, and the TRP programming, 25 percent of the bid price will be paid. The remaining 25 percent will be paid when the system is working to the satisfaction of the engineer and an approved report and CD have been submitted.

**RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM**

Effective: May 22, 2002  
800.03TS

Revised: July 1, 2015

**Description.**

This work shall consist of re-optimizing a closed loop traffic signal system according to the following Levels of work.

LEVEL I applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system. The purpose of this work is to integrate the improvements to the subject intersection into the signal system while minimizing the impacts to the existing system operation. This type of work would be commonly associated with the addition of signal phases, pedestrian phases, or improvements that do not affect the capacity at an intersection.

LEVEL II applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system and detailed analysis of the intersection operation is desired by the engineer, or when a new signalized or existing signalized intersection is being added to an existing system, but optimization of the entire system is not required. The purpose of this work is to optimize the subject intersection, while integrating it into the existing signal system with limited impact to the system operations. This item also includes an evaluation of the overall system operation, including the traffic responsive program.

For the purposes of re-optimization work, an intersection shall include all traffic movements operated by the subject controller and cabinet.

After the signal improvements are completed, the signal shall be re-optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as note herein.



A listing of existing signal equipment, interconnect information, phasing data, and timing patterns may be obtained from the Department, if available and as appropriate. The existing SCAT Report is available for review at the District One office and if the Consultant provides blank computer discs, copies of computer simulation files for the existing optimized system and a timing database will be made for the Consultant. The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) LEVEL I Re-Optimization

1. The following tasks are associated with LEVEL I Re-Optimization.
  - a. Appropriate signal timings shall be developed for the subject intersection and existing timings shall be utilized for the rest of the intersections in the system.
  - b. Proposed signal timing plan for the modified intersection(s) shall be forwarded to IDOT for review prior to implementation.
  - c. Consultant shall conduct on-site implementation of the timings at the turn-on and make fine-tuning adjustments to the timings of the subject intersection in the field to alleviate observed adverse operating conditions and to enhance operations. The consultant shall respond to IDOT comments and public complaints for a minimum period of 60 days from date of timing plan implementation.
2. The following deliverables shall be provided for LEVEL I Re-Optimization.
  - a. Consultant shall furnish to IDOT a cover letter describing the extent of the re-optimization work performed.
  - b. Consultant shall furnish an updated intersection graphic display for the subject intersection to IDOT and to IDOT's Traffic Signal Maintenance Contractor.

(b) LEVEL II Re-Optimization

1. In addition to the requirements described in the LEVEL I Re-Optimization above, the following tasks are associated with LEVEL II Re-Optimization.
  - a. Traffic counts shall be taken at the subject intersection(s) after the traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday and on a Saturday and/or Sunday, as directed by the Engineer, to account for special traffic generators such as shopping centers, educational institutes and special event facilities. The turning movement counts shall identify cars, and single-unit, multi-unit heavy vehicles, and transit buses.
  - b. As necessary, the intersection(s) shall be re-addressed and all system detectors reassigned in the master controller according to the current standard of District One.
  - c. Traffic responsive program operation shall be evaluated to verify proper pattern selection and lack of oscillation and a report of the operation shall be provided to IDOT.

2. The following deliverables shall be provided for LEVEL II Re-Optimization.
  - a. Consultant shall furnish to IDOT one (1) copy of a technical memorandum for the optimized system. The technical memorandum shall include the following elements:
    - (1) Brief description of the project
    - (2) Printed copies of the analysis output from Synchro (or other appropriate, approved optimization software file)
    - (3) Printed copies of the traffic counts conducted at the subject intersection
  - b. Consultant shall furnish to IDOT two (2) CDs for the optimized system. The CDs shall include the following elements:
    - (1) Electronic copy of the technical memorandum in PDF format
    - (2) Revised Synchro files (or other appropriate, approved optimization software file) including the new signal and the rest of the signals in the closed loop system
    - (3) Traffic counts conducted at the subject intersection(s)
    - (4) New or updated intersection(s) graphic display file for the subject intersection(s)
    - (5) The CD shall be labeled with the IDOT system number and master location, as well as the submittal date and the consultant logo. The CD case shall include a clearly readable label displaying the same information securely affixed to the side and front.

**Basis of Payment.**

This work shall be paid for at the contract unit price each for RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL I or RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL II, which price shall be payment in full for performing all work described herein per intersection. Following completion of the timings and submittal of specified deliverables, 100 percent of the bid price will be paid. Each intersection will be paid for separately.

**ELECTRIC SERVICE INSTALLATION**

Effective: May 22, 2002  
805.01TS

Revised: July 1, 2015

Revise Section 805 of the Standard Specifications to read:

**Description.**

This work shall consist of all materials and labor required to install, modify, or extend the electric service installation. All installations shall meet the requirements of the “District One Standard Traffic Signal Design Details”.

**General.**

The electric service installation shall be the electric service disconnecting means and it shall be identified as suitable for use as service equipment.

The electric utility contact information is noted on the plans and represents the current information at the time of contract preparation. The Contractor must request in writing for service and/or service modification within 10 days of contract award and must follow-up with the electric utility to assure all necessary documents and payment are received by the utility. The Contractor shall forward copies of all correspondence between the contractor and utility company to the Engineer and Area Traffic Signal Maintenance and Operations Engineer. The service agreement and sketch shall be submitted for signature to the IDOT's Traffic Operations Programs Engineer.

**Materials.**

- a. General. The completed control panel shall be constructed in accordance with UL Std. 508A, Industrial Control Panel, and carry the UL label. Wire terminations shall be UL listed.
- b. Enclosures.
  1. Pole Mounted Cabinet. The cabinet shall be UL 50, NEMA Type 4X, unfinished single door design, fabricated from minimum 0.080-inch (2.03 mm) thick Type 5052 H-32 aluminum. Seams shall be continuous welded and ground smooth. Stainless steel screws and clamps shall secure the cover and assure a watertight seal. The cover shall be removable by pulling the continuous stainless steel hinge pin. The cabinet shall have an oil-resistant gasket and a lock kit shall be provided with an internal O-ring in the locking mechanism assuring a watertight and dust-tight seal. The cabinet shall be sized to adequately house all required components with extra space for arrangement and termination of wiring. A minimum size of 14-inches (350 mm) high, 9-inches (225 mm) wide and 8-inches (200 mm) in depth is required. The cabinet shall be channel mounted to a wooden utility pole using assemblies recommended by the vendor.
  2. Ground Mounted Cabinet. The cabinet shall be UL 50, NEMA Type 3R unfinished single door design with back panel. The cabinet shall be fabricated from Type 5052 H-32 aluminum with the frame and door 0.125-inch (3.175 mm) thick, the top 0.250-inch (6.350 mm) thick and the bottom 0.500-inch (12.70 mm) thick. Seams shall be continuous welded and ground smooth. The door and door opening shall be double flanged. The door shall be approximately 80% of the front surface, with a full length tamperproof stainless steel .075-inch (1.91 mm) thick hinge bolted to the cabinet with stainless steel carriage bolts and nylocks nuts. The locking mechanism shall be slam-latch type with a keyhole cover. The cabinet shall be sized to adequately house all required components with extra space for arrangement and termination of wiring. A minimum size of 40-inches (1000 mm) high, 16-inches (400 mm) wide and 15-inches (375 mm) in depth is required. The cabinet shall be mounted upon a square Type A concrete foundation as indicated on the plans. The foundation is paid for separately.

3. All enclosures shall include a green external power indicator LED light with circuitry as shown in the Electrical Service-Panel Diagram detail sheet. For pole mounted service enclosures, the power indicator light shall be mounted as shown in the detail. For ground mounted enclosures, the power indicator light shall be mounted on the side of the enclosure most visible from the major roadway.
- c. Electric Utility Meter Housing and Riser. The electric meter housing and meter socket shall be supplied and installed by the contractor. Electric utility required risers, weather/service head and any other materials necessary for connection shall also be included in the pay item. Materials shall be in accordance with the electric utility's requirements. For ground-mounted service, the electric utility meter housing shall be mounted to the enclosure. Metered service shall not be used unless specified in the plans.
  - d. Surge Protector. Overvoltage protection, with LED indicator, shall be provided for the 120 volt load circuit by the means MOV and thermal fusing technology. The response time shall be <5n seconds and operate within a range of -40C to +85C. The surge protector shall be UL 1449 Listed.
  - e. Circuit Breakers. Circuit breakers shall be standard UL listed molded case, thermal-magnetic bolt-on type circuit breakers with trip free indicating handles. 120 volt circuit breakers shall have an interrupting rating of not less than 65,000 rms symmetrical amperes. Unless otherwise indicated, the main disconnect circuit breaker for the traffic signal controller shall be rated 60 amperes, 120 V and the auxiliary circuit breakers shall be rated 10 amperes, 120 V.
  - f. Fuses, Fuseholders and Power Indicating Light. Fuses shall be small-dimensional cylindrical fuses of the dual element time-delay type. The fuses shall be rated for 600 V AC and shall have a UL listed interrupting rating of not less than 10,000 rms symmetrical amperes at rated voltage. The power indicating light shall be LED type with a green colored lens and shall be energized when electric utility power is present.
  - g. Ground and Neutral Bus Bars. A single copper ground and neutral bus bar, mounted on the equipment panel shall be provided. Ground and neutral conductors shall be separated on the bus bar. Compression lugs, plus 2 spare lugs, shall be sized to accommodate the cables with the heads of the connector screws painted green for ground connections and white for neutral connections.
  - h. Utility Services Connection. The Contractor shall notify the Utility Company marketing representative a minimum of 30 working days prior to the anticipated date of hook-up. This 30 day advance notification will begin only after the Utility Company marketing representative has received service charge payments from the Contractor. Prior to contacting the Utility Company marketing representative for service connection, the service installation controller cabinet and cable must be installed for inspection by the Utility Company.

- i. Ground Rod. Ground rods shall be copper-clad steel, a minimum of 10 feet (3.0m) in length, and 3/4 inch (20mm) in diameter. Ground rod resistance measurements to ground shall be 25 ohms or less. If necessary additional rods shall be installed to meet resistance requirements at no additional cost to the contract.

**Installation.**

- a. General. The Contractor shall confirm the orientation of the traffic service installation and its door side with the engineer, prior to installation. All conduit entrances into the service installation shall be sealed with a pliable waterproof material.
- b. Pole Mounted. Brackets designed for pole mounting shall be used. All mounting hardware shall be stainless steel. Mounting height shall be as noted on the plans or as directed by the Engineer.
- c. Ground Mounted. The service installation shall be mounted plumb and level on the foundation and fastened to the anchor bolts with hot-dipped galvanized or stainless steel nuts and washers. The space between the bottom of the enclosure and the top of the foundation shall be caulked at the base with silicone.

**Basis of Payment.**

The service installation shall be paid for at the contract unit price each for SERVICE INSTALLATION of the type specified which shall be payment in full for furnishing and installing the service installation complete. The CONCRETE FOUNDATION, TYPE A, which includes the ground rod, shall be paid for separately. SERVICE INSTALLATION, POLE MOUNTED shall include the 3/4 inch (20mm) grounding conduit, ground rod, and pole mount assembly. Any charges by the utility companies shall be approved by the engineer and paid for as an addition to the contract according to Article 109.05 of the Standard Specifications.

**GROUNDING OF TRAFFIC SIGNAL SYSTEMS**

Effective: May 22, 2002  
806.01TS

Revised: July 1, 2015

Revise Section 806 of the Standard Specifications to read:

**General.**

All traffic signal systems, equipment and appurtenances shall be properly grounded in strict conformance with the NEC. This work shall be in accordance with IDOT's District One Traffic Signal Design Details.

The grounding electrode system shall include a ground rod installed with each traffic signal controller concrete foundation and all mast arm and post concrete foundations. An additional ground rod will be required at locations where measured resistance exceeds 25 ohms. Ground rods are included in the applicable concrete foundation or service installation pay item and will not be paid for separately.

Testing shall be according to Article 801.13 (a) (4) and (5).

- (a) The grounded conductor (neutral conductor) shall be white color coded. This conductor shall be bonded to the equipment grounding conductor only at the Electric Service Installation. All power cables shall include one neutral conductor of the same size.
- (b) The equipment grounding conductor shall be green color coded. The following is in addition to Article 801.04 of the Standard Specifications.
  - 1. Equipment grounding conductors shall be bonded to the grounded conductor (neutral conductor) only at the Electric Service Installation. The equipment grounding conductor is paid for separately and shall be continuous. The Earth shall not be used as the equipment grounding conductor.
  - 2. Equipment grounding conductors shall be bonded, using a UL Listed grounding connector, to all traffic signal mast arm poles, traffic signal posts, pedestrian posts, pull boxes, handhole frames and covers, conduits, and other metallic enclosures throughout the traffic signal wiring system, except where noted herein. Bonding shall be made with a splice and pigtail connection, using a sized compression type copper sleeve, sealant tape, and heat-shrinkable cap. A UL listed electrical joint compound shall be applied to all conductors' terminations, connector threads and contact points. Conduit grounding bushings shall be installed at all conduit terminations including spare or empty conduits.
  - 3. All metallic and non-metallic raceways shall have a continuous equipment grounding conductor, except raceways containing only detector loop lead-in circuits, circuits under 50 volts and/or fiber optic cable will not be required to include an equipment grounding conductor.
  - 4. Individual conductor splices in handholes shall be soldered and sealed with heat shrink. When necessary to maintain effective equipment grounding, a full cable heat shrink shall be provided over individual conductor heat shrinks.

The grounding electrode conductor shall be similar to the equipment grounding conductor in color coding (green) and size. The grounding electrode conductor is used to connect the ground rod to the equipment grounding conductor and is bonded to ground rods via exothermic welding, UL listed pressure connectors, and UL listed clamps.

## **COILABLE NON-METALLIC CONDUIT**

Effective: May 22, 2002  
810.01TS

Revised: July 1, 2015

### **Description.**

This work shall consist of furnishing and installing empty coilable non-metallic conduit (CNC).

### **General.**

The CNC installation shall be in accordance with Sections 810 and 811 of the Standard Specifications except for the following:

Add the following to Article 810.03 of the Standard Specifications:

CNC meeting the requirements of NEC Article 353 shall be used for detector loop raceways to the handholes.

Add the following to Article 811.03 of the Standard Specifications:

On temporary traffic signal installations with detector loops, CNC meeting the requirements of NEC Article 353 shall be used for detector loop raceways from the saw-cut to 10 feet (3m) up the wood pole, unless otherwise shown on the plans.

### **Basis of Payment.**

All installations of CNC for loop detection shall be included in the contract and not paid for separately.

## **UNDERGROUND RACEWAYS**

Effective: May 22, 2002  
810.02TS

Revised: July 1, 2015

Revise Article 810.04 of the Standard Specifications to read:

“Installation. All underground conduits shall have a minimum depth of 30-inches (700 mm) below the finished grade.”

Add the following to Article 810.04 of the Standard Specifications:

“All metal conduit installed underground shall be Rigid Steel Conduit unless otherwise indicated on the plans.”

Add the following to Article 810.04 of the Standard Specifications:

“All raceways which extend outside of a structure or duct bank but are not terminated in a cabinet, junction box, pull box, handhole, post, pole, or pedestal shall extend a minimum of 300 mm (12”) or the length shown on the plans beyond the structure or duct bank. The end of this extension shall be capped and sealed with a cap designed for the conduit to be capped.

The ends of rigid metal conduit to be capped shall be threaded, the threads protected with full galvanizing, and capped with a threaded galvanized steel cap.

The ends of rigid nonmetallic conduit and coilable nonmetallic conduit shall be capped with a rigid PVC cap of not less than 3 mm (0.125”) thick. The cap shall be sealed to the conduit using a room-temperature-vulcanizing (RTV) sealant compatible with the material of both the cap and the conduit. A washer or similar metal ring shall be glued to the inside center of the cap with epoxy, and the pull cord shall be tied to this ring.”

#### **ROD AND CLEAN EXISTING CONDUIT**

Effective: January 1, 2015  
810.03TS

Revised: July 1, 2015

##### **Description.**

This work shall consist of inserting a duct rod or electrical fish rod or tape of sufficient length and rigidity into an electrical conduit opening in one electrical handhole, and pushing the said rod through the conduit to emerge at the next or subsequent handhole in the conduit system at the location(s) shown on the plans. The duct rod may be inserted and removed by any standard construction method which causes no damage to the conduit. The size of the conduit may vary, but there shall be no differentiation in cost for the size of the conduit.

The conduit which is to be rodded and cleaned may exist with various amounts of standing water in the handholes to drain the conduit and to afford compatible working conditions for the installation of the duct rods and/or cables. Pumping of handholes shall be included with the work of rodding and cleaning of the conduit.

Any handhole which, in the opinion of the Engineer contains excessive debris, dirt or other materials to the extent that conduit rodding and cleaning is not feasible, shall be cleaned at the Engineer’s order and payment approval as a separate pay item.



Prior to removal of the duct rod, a duct cleaning attachment such as a properly sized wire brush or cleaning mandrel shall be attached to the duct rod, which by removal of the duct rod shall be pulled through the conduit to remove sand, grit, or other light obstructions from the duct to provide a clean, clear passage for the installation of cable. Whenever the installation of cables is not performed as an adjunct to or immediately following the cleaning of the duct, a light weight pulling line such as a 1/8" polyethylene line or conduit measuring tape shall be placed and shall remain in the conduit to facilitate future work. When great difficulty of either inserting the duct rod or removal of the cleaning mandrel is encountered, the duct may require further cleaning by use of a compressed air gun, or a low pressure water hose. In the case of a broken conduit, the conduit must be excavated and repaired. The existence and location of breaks in the conduit may be determined by rodding, but the excavation and repair work required will be paid for separately.

This work shall be measured per lineal foot for each conduit cleaned. Measurements shall be made from point to point horizontally. No vertical rises shall count in the measurement.

**Basis of Payment.**

This work shall be paid for at the contract unit price per lineal foot for ROD AND CLEAN EXISTING CONDUIT for the installation of new electric cables in existing conduits. Such price shall include the furnishing of all necessary tools, equipment, and materials required to prepare a conduit for the installation of cable.

**HANDHOLES**

Effective: January 01, 2002  
814.01TS

Revised: July 1, 2015

**Description.**

Add the following to Section 814 of the Standard Specifications:

All conduits shall enter the handhole at a depth of 30 inches (762 mm) except for the conduits for detector loops when the handhole is less than 5 feet (1.52 m) from the detector loop. All conduit ends should be sealed with a waterproof sealant to prevent the entrance of contaminants into the handhole.

Steel cable hooks shall be coated with hot-dipped galvanization in accordance with AASHTO Specification M111. Hooks shall be a minimum of 1/2 inch (13 mm) diameter with two 90 degree bends and extend into the handhole at least 6 inches (152 mm). Hooks shall be placed a minimum of 12 inches (305 mm) below the lid or lower if additional space is required.

Precast round handholes shall not be used unless called out on the plans.

The cover of the handhole frame shall be labeled "Traffic Signals" with legible raised letters.

Revise the third paragraph of Article 814.03 of the Standard Specifications to read:

"Handholes shall be constructed as shown on the plans and shall be cast-in-place, or precast concrete units. Heavy duty handholes shall be either cast-in-place or precast concrete units."

Add the following to Article 814.03 of the Standard Specifications:

“(c) Precast Concrete. Precast concrete handholes shall be fabricated according to Article 1042.17. Where a handhole is contiguous to a sidewalk, preformed joint filler of 1/2 inch (13 mm) thickness shall be placed between the handhole and the sidewalk.”

**Cast-In-Place Handholes.**

All cast-in-place handholes shall be concrete, with inside dimensions of 21-1/2 inches (546 mm) minimum. Frames and lid openings shall match this dimension.

For grounding purposes the handhole frame shall have provisions for a 7/16 inch (11 mm) diameter stainless steel bolt cast into the frame. The covers shall have a stainless steel threaded stint extended from the eye hook assembly for the purpose of attaching the grounding conductor to the handhole cover.

The minimum wall thickness for heavy duty hand holes shall be 12 inches (305mm).

**Precast Round Handholes.**

All precast handholes shall be concrete, with inside dimensions of 30 inches (762mm) diameter. Frames and covers shall have a minimum opening of 26 inches (660mm) and no larger than the inside diameter of the handhole.

For grounding purposes the handhole frame shall have provisions for a 7/16 inch (11 mm) diameter stainless steel bolt cast into the frame. For the purpose of attaching the grounding conductor to the handhole cover, the covers shall either have a 7/16 inch (11 mm) diameter stainless steel bolt cast into the cover or a stainless steel threaded stint extended from an eye hook assembly. A hole may be drilled for the bolt if one cannot be cast into the frame or cover. The head of the bolt shall be flush or lower than the top surface of the cover.

The minimum wall thickness for precast heavy duty hand holes shall be 6 inches (152 mm).

Precast round handholes shall be only produced by an approved precast vendor.

**Materials.**

Add the following to Section 1042 of the Standard Specifications:

“1042.17 Precast Concrete Handholes. Precast concrete handholes shall be according to Articles 1042.03(a)(c)(d)(e).”

**GROUNDING CABLE**

Effective: May 22, 2002  
817.01TS

Revised: July 1, 2015

The cable shall meet the requirements of Section 817 of the "Standard Specifications," except for the following:

Add the following to Article 817.02 (b) of the Standard Specifications:

Unless otherwise noted on the Plans, traffic signal grounding conductor shall be one conductor, #6 gauge copper, with a green color coded XLP jacket.

The traffic signal grounding conductor shall be bonded, using a UL Listed grounding connector to all proposed and existing traffic signal mast arm poles and traffic/pedestrian signal posts, including push button posts. The grounding conductor shall be bonded to all proposed and existing pull boxes, handhole frames and covers and other metallic enclosures throughout the traffic signal wiring system and noted herein and detailed on the plans. The grounding conductor shall be bonded to conduit terminations using rated grounding bushings. Bonding to existing handhole frames and covers shall be paid for separately.

Add the following to Article 817.05 of the Standard Specifications:

**Basis of Payment.**

Grounding cable shall be measured in place for payment in foot (meter). Payment shall be at the contract unit price for ELECTRIC CABLE IN CONDUIT, EQUIPMENT GROUNDING CONDUCTOR, NO. 6 1C, which price includes all associated labor and material including grounding clamps, splicing, exothermic welds, grounding connectors, conduit grounding bushings, and other hardware.

**FIBER OPTIC TRACER CABLE**

Effective: May 22, 2002  
817.02TS

Revised: July 1, 2015

The cable shall meet the requirements of Section 817 of the Standard Specifications, except for the following:

Add the following to Article 817.03 of the Standard Specifications:

In order to trace the fiber optic cable after installation, the tracer cable shall be installed in the same conduit as the fiber optic cable in locations shown on the plans. The tracer cable shall be continuous, extended into the controller cabinet and terminated on a barrier type terminal strip mounted on the side wall of the controller cabinet. The barrier type terminal strip and tracer cable shall be clearly marked and identified. All tracer cable splices shall be kept to a minimum and shall incorporate maximum lengths of cable supplied by the manufacturer. The tracer cable will be allowed to be spliced at handholes only. The tracer cable splice shall use a Western Union Splice soldered with resin core flux and shall be soldered using a soldering iron. Blow torches or other devices which oxidize copper cable shall not be allowed for soldering operations. All exposed surfaces of the solder shall be smooth. The splice shall be covered with a black shrink tube meeting UL 224 guidelines, Type V and rated 600V, minimum length 4 inches (100 mm) and with a minimum 1 inch (25 mm) coverage over the XLP insulation, underwater grade.

Add the following to Article 817.05 of the Standard Specifications:

**Basis of Payment.**

The tracer cable shall be paid for separately as ELECTRIC CABLE IN CONDUIT, TRACER, NO. 14 1C per foot (meter), which price shall include all associated labor and material for installation.

**MAINTENANCE OF EXISTING TRAFFIC SIGNAL AND FLASHING BEACON INSTALLATION**

Effective: May 22, 2002  
850.01TS

Revised: July 1, 2015

**General.**

1. Full maintenance responsibility shall start as soon as the Contractor begins any physical work on the Contract or any portion thereof. If Contract work is started prior to a traffic signal inspection, maintenance of the traffic signal installation(s) will be transferred to the Contractor without an inspection.
2. The Contractor shall have electricians with IMSA Level II certification on staff to provide signal maintenance. A copy of the certification shall be immediately available upon request of the Engineer.

3. This item shall include maintenance of all traffic signal equipment and other connected and related equipment such as flashing beacons, emergency vehicle pre-emption equipment, master controllers, uninterruptable power supply (UPS and batteries), PTZ cameras, vehicle detection, handholes, lighted signs, telephone service installations, communication cables, conduits to adjacent intersections, and other traffic signal equipment.
4. Regional transit, County and other agencies may also have equipment connected to existing traffic signal or peripheral equipment such as PTZ cameras, switches, transit signal priority (TSP and BRT) servers, radios and other devices that shall be included with traffic signal maintenance at no additional cost to the contract.
5. Maintenance shall not include Automatic Traffic Enforcement equipment, such as Red Light Enforcement cameras, detectors, or peripheral equipment. This equipment is operated and maintained by the local municipality and should be de-activated while on contractor maintenance.
6. The energy charges for the operation of the traffic signal installation shall be paid for by the Contractor.

**Maintenance.**

1. The Contractor shall check all controllers every two (2) weeks, which will include visually inspecting all timing intervals, relays, detectors, and pre-emption equipment to ensure that they are functioning properly. The Contractor shall check signal system communications and phone lines to assure proper operation. This item includes, as routine maintenance, all portions of emergency vehicle pre-emption equipment. The Contractor shall maintain in stock at all times a sufficient amount of materials and equipment to provide effective temporary and permanent repairs. Prior to the traffic signal maintenance transfer, the contractor shall supply a detailed maintenance schedule that includes dates, locations, names of electricians providing the required checks and inspections along with any other information requested by the Engineer.
2. The Contractor is advised that the existing and/or span wire traffic signal installation must remain in operation during all construction stages, except for the most essential down time. Any shutdown of the traffic signal installation, which exceeds fifteen (15) minutes, must have prior approval of the Engineer. Approval to shut down the traffic signal installation will only be granted during the period extending from 10:00 a.m. to 3:00 p.m. on weekdays. Shutdowns shall not be allowed during inclement weather or holiday periods.

3. The Contractor shall provide immediate corrective action when any part or parts of the system fail to function properly. Two far side heads facing each approach shall be considered the minimum acceptable signal operation pending permanent repairs. When repairs at a signalized intersection require that the controller be disconnected or otherwise removed from normal operation, and power is available, the Contractor shall place the traffic signal installation on flashing operation. The signals shall flash RED for all directions unless a different indication has been specified by the Engineer. The Contractor shall be required to place stop signs (R1-1-36) at each approach of the intersection as a temporary means of regulating traffic. When the signals operate in flash, the Contractor shall furnish and equip all their vehicles assigned to the maintenance of traffic signal installations with a sufficient number of stop signs as specified herein. The Contractor shall maintain a sufficient number of spare stop signs in stock at all times to replace stop signs which may be damaged or stolen.
4. The Contractor shall provide the Engineer with 2 (two) 24 hour telephone numbers for the maintenance of the traffic signal installation and for emergency calls by the Engineer.
5. Traffic signal equipment which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of the Standard Specifications and these special provisions.
6. The Contractor shall respond to all emergency calls from the Department or others within one (1) hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the Contractor shall replace it with new and identical equipment. The cost of furnishing and installing the replaced equipment shall be borne by the Contractor at no additional charge to the contract. The Contractor may institute action to recover damages from a responsible third party. If at any time the Contractor fails to perform all work as specified herein to keep the traffic signal installation in proper operating condition or if the Engineer cannot contact the Contractor's designated personnel, the Engineer shall have the State's Electrical Maintenance Contractor perform the maintenance work. The Contractor shall be responsible for all of the State's Electrical Maintenance Contractor's costs and liquidated damages of \$1000 per day per occurrence. The State's Electrical Maintenance Contractor shall bill the Contractor for the total cost of the work. The Contractor shall pay this bill within thirty (30) days of the date of receipt of the invoice or the cost of such work will be deducted from the amount due the Contractor. The Contractor shall allow the Electrical Maintenance Contractor to make reviews of the Existing Traffic Signal Installation that has been transferred to the Contractor for Maintenance.
7. Any proposed activity in the vicinity of a highway-rail grade crossing must adhere to the guidelines set forth in the current edition of the Manual on Uniform Traffic Control Devices (MUTCD) regarding work in temporary traffic control zones in the vicinity of highway-rail grade crossings which states that lane restrictions, flagging, or other operations shall not create conditions where vehicles can be queued across the railroad tracks. If the queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.

8. Equipment included in this item that is damaged or not operating properly from any cause shall be replaced with new equipment meeting current District One traffic signal specifications and provided by the Contractor at no additional cost to the Contract and/or owner of the traffic signal system, all as approved by the Engineer. Final replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted. Cable splices outside the controller cabinet shall not be allowed.
9. Automatic Traffic Enforcement equipment, such as Red Light Enforcement cameras, detectors, and peripheral equipment, damaged or not operating properly from any cause, shall be the responsibility of the municipality or the Automatic Traffic Enforcement Company per Permit agreement.
10. The Contractor shall be responsible to clear snow, ice, dirt, debris or other condition that obstructs visibility of any traffic signal display or access to traffic signal equipment.
11. The Contractor shall maintain the traffic signal in normal operation during short or long term loss of utility or battery back-up power at critical locations designated by the Engineer. Critical locations may include traffic signals interconnected to railroad warning devices, expressway ramps, intersection with an SRA route, critical corridors or other locations identified by the Engineer. Temporary power to the traffic signal must meet applicable NEC and OSHA guidelines and may include portable generators and/or replacement batteries. Temporary power to critical locations shall not be paid for separately but shall be included in the contract.
12. Temporary replacement of damaged or knockdown of a mast arm pole assembly shall require construction of a full or partial span wire signal installation or other method approved by the Engineer to assure signal heads are located overhead and over traveled pavement. Temporary replacement of mast arm mount signals with post mount signals will not be permitted.

**Basis of Payment.**

This work will be paid for at the contract unit price per each for MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION. Each intersection will be paid for separately. Maintenance of a standalone and or not connected flashing beacon shall be paid for at the contract unit price for MAINTENANCE OF EXISTING FLASHING BEACON INSTALLATION. Each flashing beacon will be paid for separately.

**TRAFFIC SIGNAL PAINTING**

Effective: May 22, 2002  
851.01TS

Revised: July 1, 2015

**Description.**

This work shall include surface preparation, powder coated finish application and packaging of new galvanized steel traffic signal mast arm poles and posts assemblies. All work associated with applying the painted finish shall be performed at the vendor's facility for the pole assembly or post or at a painting facility approved by the Engineer. Traffic signal mast arm shrouds and post bases shall also be painted the same color as the pole assemblies and posts.

**Surface Preparation.**

All weld flux and other contaminates shall be mechanically removed. The traffic mast arms and post assemblies shall be degreased, cleaned, and air dried to assure all moisture is removed.

**Painted Finish.**

All galvanized exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a dry film thickness of 2.0 mils. Prior to application, the surface shall be mechanically etched by brush blasting (Ref. SSPC-SP7) and the zinc coated substrate preheated to 450 °F for a minimum one (1) hour. The coating shall be electrostatically applied and cured by elevating the zinc-coated substrate temperature to a minimum of 400 °F.

The finish paint color shall be one of the vendor's standard colors and shall be as selected by the local agency responsible for paint costs. The Contractor shall confirm, in writing, the color selection with the local responsible agency and provide a copy of the approval to the Engineer and a copy of the approval shall be included in the material catalog submittal.

Painting of traffic signal heads, pedestrian signal heads and controller cabinets is not included in this pay item.

Any damage to the finish after leaving the vendor's facility shall be repaired to the satisfaction of the Engineer using a method recommended by the vendor and approved by the Engineer. If while at the vendor's facility the finish is damaged, the finish shall be re-applied at no cost to the contract.

**Warranty.**

The Contractor shall furnish in writing to the Engineer, the paint vendor's standard warranty and certification that the paint system has been properly applied.

**Packaging.**

Prior to shipping, the poles and posts shall be wrapped in ultraviolet-inhibiting plastic foam or rubberized foam.

**Basis of Payment.**

This work shall be paid for at the contract unit price each for PAINT NEW MAST ARM AND POLE, UNDER 40 FEET (12.19 METER), PAINT NEW MAST ARM AND POLE, 40 FEET (12.19 METER) AND OVER, PAINT NEW COMBINATION MAST ARM AND POLE, UNDER 40 FEET (12.19 METER), PAINT NEW COMBINATION MAST ARM AND POLE, 40 FEET (12.19 METER) AND OVER, or PAINT NEW TRAFFIC SIGNAL POST of the length specified, which shall be payment in full for painting and packaging the traffic signal mast arm poles and posts described above including all shrouds, bases and appurtenances.



**FULL-ACTUATED CONTROLLER (SPECIAL)**

Effective: September 26, 1995  
857.01TS

Revised: July 1, 2015

**Description.**

This work shall consist of furnishing and installing a(n) "\_\_\_\_\_" brand traffic actuated solid state digital controller meeting the requirements of the current District One Traffic Signal Special Provisions 857.02TS Full Actuated Controller and Cabinet, and 857.02TS Railroad, Full Actuated Controller and Cabinet . This pay item shall include furnishing and installing the controller complete including malfunction management unit, load switches and flasher relays, and all necessary connections for proper operation.

**Materials.**

Add the following to Article 857.02 of the Standard Specifications:

Controllers shall be NTCIP compliant, Econolite ASC/3S-1000 or Eagle/Siemens M50 unless specified otherwise on the plans or elsewhere on these specifications. A NTCIP compliant controller may be used at a traffic signal interconnected to railroad warning devices but only upon the approval of the Engineer. Only controllers supplied by one of the District One approved closed loop equipment supplier will be allowed. The controller shall be the most recent model and software version supplied by the equipment supplier at the time of the traffic signal TURN-ON and include data key. The traffic signal controller shall provide features to inhibit simultaneous display of a circular yellow ball and a yellow arrow display. Individual load switches shall be provided for each vehicle, pedestrian, and right turn over lap phase. The controller shall prevent phases from being omitted during program changes and after all preemption events.

**Basis of Payment.**

This work will be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER (SPECIAL).

**FULL-ACTUATED CONTROLLER AND CABINET**

Effective: January 1, 2002  
857.02TS

Revised: July 1, 2015

**Description.**

This work shall consist of furnishing and installing a traffic actuated solid state digital controller in the controller cabinet of the type specified, meeting the requirements of Section 857 of the Standard Specifications, as modified herein, including malfunction management unit, load switches and flasher relays, with all necessary connections for proper operation.

If the intersection is part of an existing system and/or when specified in the plans, this work shall consist of furnishing and installing a(n) "\_\_\_\_\_" brand traffic actuated solid state controller.

**Materials.**

Add the following to Article 857.02 of the Standard Specifications:

For installation as a stand-alone traffic signal, connected to a closed loop system or integrated into an advance traffic management system (ATMS), controllers shall be Econolite ASC/3S-1000 or Eagle/Siemens M52 unless specified otherwise on the plans or elsewhere on these specifications. Only controllers supplied by one of the District One approved closed loop equipment suppliers will be allowed. Unless specified otherwise on the plans or these specifications, the controller shall be of the most recent model and software version supplied by the equipment supplier at the time of the traffic signal TURN-ON. A removable controller data key shall also be provided. Individual load switches shall be provided for each vehicle, pedestrian, and right turn over lap phase. The controller shall prevent phases from being skipped during program changes and after all preemption events and shall inhibit simultaneous display of circular yellow and yellow arrow indications.

For integration into an ATMS such as Centrac, Tactics, or TransSuite, the controller shall have the latest version of NTCIP software installed. For operation prior to integration into an ATMS, the controller shall maintain existing close loop management communications.

Add the following to Article 1074.03 of the Standard Specifications:

- (a) (6) Cabinets shall be designed for NEMA TS2 Type 1 operation. All cabinets shall be pre-wired for a minimum of eight (8) phases of vehicular, four (4) phases of pedestrian and four (4) phases of overlap operation.
- (b) (1) Revise "conflict monitor" to read "Malfunction Management Unit"
- (b) (5) Cabinets – Provide 1/8" (3.2 mm) thick unpainted aluminum alloy 5052-H32. The surface shall be smooth, free of marks and scratches. All external hardware shall be stainless steel.
- (b) (6) Controller Harness – Provide a TS2 Type 2 "A" wired harness in addition to the TS2 Type 1 harness.
- (b) (7) Surge Protection – Shall be a 120VAC Single phase Modular filter Plug-in type, supplied from an approved vendor.
- (b) (8) BIU – shall be secured by mechanical means.
- (b) (9) Transfer Relays – Solid state or mechanical flash relays are acceptable.
- (b) (10) Switch Guards – All switches shall be guarded.
- (b) (11) Heating – One (1) 200 watt, thermostatically-controlled, electric heater.
- (b) (12) Lighting – One (1) LED Panel shall be placed inside the cabinet top panel and one (1) LED Panel shall be placed on each side of the pull-out drawer/shelf assembly located beneath the controller support shelf. The LED Panels shall be controlled by a door switch. The LED Panels shall be provided from an approved vendor.
- (b) (13) The cabinet shall be equipped with a pull-out drawer/shelf assembly. A 1 ½ inch (38mm) deep drawer shall be provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of accommodating one (1) complete set of cabinet prints and manuals. This drawer shall support 50 lbs. (23 kg) in weight when fully extended. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of available depth offered by the controller shelf and be a minimum of 18 inches (610mm) wide.

- (b) (14) Plan & Wiring Diagrams – 12” x 15” (305mm x 406mm) moisture sealed container attached to door.
- (b) (15) Detector Racks – Fully wired and labeled for four (4) channels of emergency vehicle pre-emption and sixteen channels (16) of vehicular operation.
- (b) (16) Field Wiring Labels – All field wiring shall be labeled.
- (b) (17) Field Wiring Termination – Approved channel lugs required.
- (b) (18) Power Panel – Provide a nonconductive shield.
- (b) (19) Circuit Breaker – The circuit breaker shall be sized for the proposed load but shall not be rated less than 30 amps.
- (b) (20) Police Door – Provide wiring and termination for plug in manual phase advance switch.

**Basis of Payment.**

This work will be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER AND TYPE IV CABINET; FULL-ACTUATED CONTROLLER AND TYPE V CABINET; FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET; FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET; FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL; FULL-ACTUATED CONTROLLER AND TYPE V CABINET, SPECIAL; FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET (SPECIAL); FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET (SPECIAL).

**RAILROAD, FULL-ACTUATED CONTROLLER AND CABINET**

Effective: January 1, 2002  
857.03TS

Revised: July 1, 2015

**Description.**

This work shall consist of furnishing and installing a traffic actuated solid state digital controller in the controller cabinet of the type specified, meeting the requirements of Section 857 of the Standard Specifications as modified herein and including conflict monitor, load switches and flasher relays, with monitoring and/or providing redundancy to the railroad preemptor and all necessary connections for proper operation.

If the intersection is part of an existing system and/or when specified in the plans, this work shall consist of furnishing and installing a(n) " \_\_\_\_\_ " brand traffic actuated solid state controller.

Controller and cabinet shall be assembled only by an approved IDOT District One traffic signal equipment supplier. The equipment shall be tested and approved in the equipment supplier's District One's facility prior to field installation.

**Materials.**

Add the following to Article 857.02 of the Standard Specifications:

For installation as a stand-alone traffic signal, connected to a closed loop system or integrated into an advance traffic management system (ATMS), controllers shall be Econolite ASC/3S-1000 or Eagle/Siemens M52 unless specified otherwise on the plans or elsewhere on these specifications. Only controllers supplied by one of the District One approved closed loop equipment supplier will be allowed. The controller shall be the most recent model and software version approved by IDOT for use with railroad intersections supplied by the equipment supplier at the time of the traffic signal TURN-ON unless specified otherwise on plans or this specification, and include a removable data key. Individual load switches shall be provided for each vehicle, pedestrian, and right turn over lap phase. The controller shall prevent phases from being omitted during program changes and after all preemption events and shall inhibit simultaneous display of circular yellow and yellow arrow indications.

For integration into an ATMS such as Centrats, Tactics, or TransSuite, the controller shall have the latest version of NTCIP software installed. For operation prior to integration into an ATMS, the controller shall maintain existing communications.

Controller shall comply with Article 1073.01 as amended herein.

Controller Cabinet and Peripheral Equipment shall comply with Article 1074.03 as amended in these Traffic Signal Special Provisions.

Add the following to Articles 1073.01 (c) (2) and 1074.03 (a) (5) (e) of the Standard Specifications:

Controllers and cabinets shall be new and NEMA TS2 Type 1 or NEMA TS2 Type 2 design.

Railroad interconnected controllers and cabinets shall be assembled only by an approved traffic signal equipment supplier. All railroad interconnected (including temporary railroad interconnect) controllers and cabinets shall be new, built, tested and approved by the controller equipment vendor, in the vendor's District One facility, prior to field installation. The vendor shall provide the technical equipment and assistance as required by the Engineer to fully test this equipment.

Add the following to Article 1074.03 of the Standard Specifications:

- (a) (6) Cabinets shall be designed for NEMA TS2 Type 1 or NEMA TS2 Type 2 operation. All cabinets shall be pre-wired for a minimum of eight (8) phases of vehicular, four (4) phases of pedestrian and four (4) phases of overlap operation.
- (b) (1) Revise "conflict monitor" to read "Malfunction Management Unit"
- (b) (5) Cabinets – Provide 1/8" (3.2 mm) thick unpainted aluminum alloy 5052-H32. The surface shall be smooth, free of marks and scratches. All external hardware shall be stainless steel.
- (b) (6) Controller Harness – Provide a TS2 Type 2 "A" wired harness in addition to the TS2 Type 1 harness.
- (b) (7) Surge Protection – Shall be a 120VAC Single phase Modular filter Plug-in type, supplied from an approved vendor.
- (b) (8) BIU – shall be secured by mechanical means.
- (b) (9) Transfer Relays – Solid state or mechanical flash relays are acceptable.
- (b) (10) Switch Guards – All switches shall be guarded.
- (b) (11) Heating – One (1) 200 watt, thermostatically-controlled, electric heater.
- (b) (12) Lighting – One (1) LED Panel shall be placed inside the cabinet top panel and one (1) LED Panel shall be placed on each side of the pull-out drawer/shelf assembly located beneath the controller support shelf. The LED Panels shall be controlled by a door switch. The LED Panels shall be provided from an approved vendor.
- (b) (13) The cabinet shall be equipped with a pull-out drawer/shelf assembly. A 1 ½ inch (38mm) deep drawer shall be provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of accommodating one (1) complete set of cabinet prints and manuals. This drawer shall support 50 lbs. (23 kg) in weight when fully extended. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of available depth offered by the controller shelf and be a minimum of 18 inches (610mm) wide.
- (b) (14) Plan & Wiring Diagrams – 12" x 15" (3.05mm x 4.06mm) moisture sealed container attached to door.
- (b) (15) Detector Racks – Fully wired and labeled for four (4) channels of emergency vehicle pre-emption and sixteen channels (16) of vehicular operation.
- (b) (16) Field Wiring Labels – All field wiring shall be labeled.
- (b) (17) Field Wiring Termination – Approved channel lugs required.
- (b) (18) Power Panel – Provide a nonconductive shield.
- (b) (19) Circuit Breaker – The circuit breaker shall be sized for the proposed load but shall not be rated less than 30 amps.
- (b) (20) Police Door – Provide wiring and termination for plug in manual phase advance switch.
- (b) (21) Railroad Pre-Emption Test Switch – Shall be provided from an approved vendor

**Installation.**

Add the following to Article 857.03 of the Standard Specifications:

The Contractor shall arrange to install a standard voice-grade dial-up telephone line and all equipment to dial into the controller and have the controller dial out to the RAILROAD, FULL-ACTUATED CONTROLLER AND CABINET as called for on the traffic signal installation plans. If the traffic signal installation is part of a traffic signal system, a telephone line is usually not required, unless a telephone line is called for on the traffic signal plans. The Contractor shall follow the requirements for the telephone service installation as contained in the current District One Traffic Signal Special Provision for Master Controller.

**Basis of Payment.**

This work will be paid for at the contract unit price each for RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE IV CABINET; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE V CABINET; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE V CABINET, SPECIAL; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET (SPECIAL) or RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET (SPECIAL).

**MASTER CONTROLLER**

Effective: May 22, 2002  
860.01TS

Revised: July 1, 2015

**General.**

This work shall consist of furnishing and installing a master controller, meeting the requirements of the current District One Traffic Signal Special Provisions 857.01TS FULL-ACTUATED CONTROLLER (SPECIAL), 857.02TS FULL-ACTUATED CONTROLLER AND CABINET, and 857.02TS RAILROAD, FULL-ACTUATED CONTROLLER AND CABINET, including all necessary connections for proper operation.

If the intersection is part of an existing system and/or when specified in the plans, this work shall consist of furnishing and installing a(n) " \_\_\_\_\_ " brand master controller.

**Materials and Installation.**

Revise Articles 860.02 and 860.03 of the Standard Specifications to read:

Only controllers supplied by one of the District approved closed loop equipment supplier will be allowed. Only NEMA TS 2 Type 1 Eagle/Siemens and Econolite closed loop systems shall be supplied. The latest model and software version of master controller shall be supplied.

Functional requirements in addition to those in Section 863 of the Standard Specifications include:

The system commands shall consist of, as a minimum, six (6) cycle lengths, five (5) offsets, three (3) splits, and four (4) special functions. The system commands shall also include commands for free or coordinated operation.

Traffic Responsive operation shall consist of the real time acquisition of system detector data, data validation, and the scaling of acquired volumes and occupancies in a deterministic fashion so as to cause the selection and implementation of the most suitable traffic plan.

Upon request by the Engineer, each master shall be delivered with up to three (3) complete sets of the latest edition of registered remote monitoring software with full manufacture's support. Each set shall consist of software on CD, DVD, or other suitable media approved by the Engineer, and a bound set of manuals containing loading and operating instruction. One copy of the software and support data shall be delivered to the Agency in charge of system operation, if other than IDOT. One of these two sets will be provided to the Agency Signal Maintenance Contractor for use in monitoring the system.

The approved manufacturer of equipment shall loan the District one master controller and two intersection controllers of the most recent models and the newest software version to be used for instructional purposes in addition to the equipment to be supplied for the Contract.

The Contractor shall arrange to install a standard voice-grade dial-up telephone line to the master controller. This shall be accomplished through the following process utilizing District One staff. This telephone line may be coupled with a DSL line and a phone filter to isolate the dial-up line. An E911 address is required.

The cabinet shall be provided with an Outdoor Network Interface for termination of the telephone service. It shall be mounted to the inside of the cabinet in a location suitable to provide access for termination of the telephone service at a later date.

Full duplex communication between the master and its local controllers is recommended, but at this time not required. The data rate shall be 1200 baud minimum and shall be capable of speeds to 38,400 or above as technology allows. The controller, when installed in an Ethernet topology, may operate non-serial communications.

The cabinet shall be equipped with a 9600 baud, auto dial/auto answer modem. It shall be a US robotics 33.6K baud rate or equal.

As soon as practical or within one week after the contract has been awarded, the Contractor shall contact Raymond Eaves, Administrative Support Manager in the District One Business Services Section at [Raymond.Eaves@illinois.gov](mailto:Raymond.Eaves@illinois.gov) or (847) 705-4011 to request a phone line installation. A follow-up contact shall include all required information pertaining to the phone installation and should be made as soon as possible or within one week after the initial request has been made. A copy of this contact must be emailed by the Contractor to the Traffic Signal Systems Engineer. The required information to be supplied shall include (but not limited to): An E911 address for the new traffic signal controller (or nearby address); a nearby existing telephone number; what type of telephone service is needed; the name and number of the Contractor's employee for the telephone company to contact regarding site work and questions.

The usual time frame for the activation of the phone line will vary after the Business Services Section has received the Contractor's information and will depend on location and existing available facilities. It is, therefore, imperative that the phone line conduit and pull-string be installed by the Contractor as soon as possible. The contractor shall provide the Administrative Support Manager with an expected installation date

The telephone line shall be installed and activated one month before the system final inspection.

All costs associated with the telephone line installation and activation (not including the Contract specified conduit installation between the point of telephone service and the traffic signal controller cabinet) shall be paid for by the District One Business Services Section (i.e., this will be an IDOT phone number not a Contractor phone number).

**Basis of Payment.**

This work will be paid for at the contract unit price each for MASTER CONTROLLER or MASTER CONTROLLER (SPECIAL).

**UNINTERRUPTABLE POWER SUPPLY, SPECIAL**

Effective: January 1, 2013  
862.01TS

Revised: July 1, 2015

This work shall be in accordance with section 862 of the Standard Specification except as modified herein

Add the following to Article 862.01 of the Standard Specifications:

The UPS shall have the power capacity to provide normal operation of a signalized intersection that utilizes all LED type signal head optics, for a minimum of 10 (ten) hours.

Add the following to Article 862.02 of the Standard Specifications:

Materials shall be according to Article 1074.04 as modified in UNINTERRUPTABLE POWER SUPPLY, SPECIAL.

Add the following to Article 862.03 of the Standard Specifications:

The UPS shall additionally include, but not be limited to, a battery cabinet, where applicable. For Super-P (Type IV) and Super-R (Type V) cabinets, the battery cabinet is integrated to the traffic signal cabinet, and shall be included in the cost for the traffic signal cabinet of the size and type indicated on the plans.

The UPS shall provide reliable emergency power to the traffic signals in the event of a power failure or interruption.



Revise Article 862.04 of the Standard Specifications to read:

**Installation.**

When a UPS is installed at an existing traffic signal cabinet, the UPS cabinet shall partially rest on the lip of the existing controller cabinet foundation and be secured to the existing controller cabinet by means of at least four (4) stainless steel bolts. The UPS cabinet shall be completely enclosed with the bottom and back constructed of the same material as the cabinet.

When a UPS is installed at a new signal cabinet and foundation, it shall be mounted as shown on the plans.

At locations where UPS is installed and an Emergency Vehicle Priority System is in use, any existing incandescent confirmation beacons shall be replaced with LED lamps in accordance with the District One Emergency Vehicle Priority System specification at no additional cost to the contract. A concrete apron shall be provided and be in accordance with Articles 424 and 202 of the Standard Specifications. The concrete apron shall also, follow the District 1 Standard Traffic Signal Design Detail, Type D for Ground Mounted Controller Cabinet and UPS Battery Cabinet.

This item shall include any required modifications to an existing traffic signal controller as a result of the addition of the UPS including the addition of alarms.

**Materials.**

Revise Article 1074.04(a)(1) of the Standard Specifications to read:

The UPS shall be line interactive or double conversion and provide voltage regulation and power conditioning when utilizing utility power. The UPS shall be sized appropriately for the intersection(s) normal traffic signal operating load. The UPS must be able to maintain the intersection's normal operating load plus 20 percent (20%) of the intersection's normal operating load. When installed at a railroad-interconnected intersection the UPS must maintain the railroad pre-emption load, plus 20 percent (20%) of the railroad preemption-operating load. The total connected traffic signal load shall not exceed the published ratings for the UPS.

The UPS shall provide a minimum of 10 (ten) hours of normal operation run-time for signalized intersections with LED type signal head optics at 77 °F (25 °C) (minimum 1000 W active output capacity, with 86 percent minimum inverter efficiency).

Revise the first paragraph of Article 1074.04(a)(3) of the Standard Specifications to read:

The UPS shall have a minimum of four (4) sets of normally open (NO) and normally closed (NC) single-pole double-throw (SPDT) relay contact closures, available on a panel mounted terminal block or locking circular connectors, rated at a minimum 120 V/1 A, and labeled so as to identify each contact according to the plans.

Revise Article 1074.04(a)(10) of the Standard Specifications to read:

The UPS shall be compatible with the District's approved traffic controller assemblies utilizing NEMA TS 1 or NEMA TS 2 controllers and cabinet components for full time operation.

Revise Article 1074.04(a)(17) of the Standard Specifications to read:

When the intersection is in battery backup mode, the UPS shall bypass all internal cabinet lights, ventilation fans, cabinet heaters, service receptacles, any lighted street name signs, any automated enforcement equipment and any other devices directed by the Engineer.

Revise Article 1074.04(b)(2)b of the Standard Specifications to read:

Batteries, inverter/charger and power transfer relay shall be housed in a separate NEMA Type 3R cabinet. The cabinet shall be Aluminum alloy, 5052-H32, 0.125-inch thick and have a natural mill finish.

Revise Article 1074.04(b)(2)c of the Standard Specifications to read:

No more than three batteries shall be mounted on individual shelves for a cabinet housing six batteries and no more than four batteries per shelf for a cabinet housing eight batteries.

Revise Article 1074.04(b)(2)e of the Standard Specifications to read:

The battery cabinet housing shall have the following nominal outside dimensions: a width of 25 in. (785 mm), a depth of 16 in. (440 mm), and a height of 41 to 48 in. (1.1 to 1.3 m). Clearance between shelves shall be a minimum of 10 in. (250 mm).

End of paragraph 1074.04(b)(2)e

The door shall be equipped with a two position doorstop, one a 90° and one at 120°.

Revise Article 1074.04(b)(2)g of the Standard Specifications to read:

The door shall open to the entire cabinet, have a neoprene gasket, an Aluminum continuous piano hinge with stainless steel pin, and a three point locking system. The cabinet shall be provided with a main door lock which shall operate with a traffic industry conventional No. 2 key. Provisions for padlocking the door shall be provided.

Add the following to Article 1074.04(b)(2) of the Standard Specifications:

- j. The battery cabinet shall have provisions for an external generator connection.

Add the following to Article 1074.04(c) of the Standard Specifications:

- (8) The UPS shall include a tip or kill switch installed in the battery cabinet, which shall completely disconnect power from the UPS when the switch is manually activated.
- (9) The UPS shall include standard RS-232 and internal Ethernet interface.
- (10) The UPS shall incorporate a flanged electric generator inlet for charging the batteries and operating the UPS. The generator connector shall be male type, twist-lock, rated as 15A, 125VAC with a NEMA L5-15P configuration and weatherproof lift cover plate. Access to the generator inlet shall be from a secured weatherproof lift cover plate or behind a locked battery cabinet police panel.
- (11) The bypass switch shall include an internal power transfer relay that allows removal of the battery back-up unit, while the traffic signal is connected to utility power, without impacting normal traffic signal operation.

Revise Article 1074.04(d)(3) of the Standard Specifications to read:

All batteries supplied in the UPS shall be either gel cell or AGM type, deep cycle, completely sealed, prismatic lead calcium based, silver alloy, valve regulated lead acid (VRLA) requiring no maintenance. All batteries in a UPS installation shall be the same type; mixing of gel cell and AGM types within a UPS installation is not permitted.

Revise Article 1074.04(d)(4) of the Standard Specifications to read:

Batteries shall be certified by the manufacturer to operate over a temperature range of -13 to 160 °F (-25 to + 71 °C) for gel cell batteries and -40 to 140 °F (-40 to + 60 °C) for AGM type batteries. Add the following to Article 1074.04(d) of the Standard Specifications:

- (9) The UPS shall consist of an even number of batteries that are capable of maintaining normal operation of the signalized intersection for a minimum of 10 (ten) hours. Calculations shall be provided showing the number of batteries of the type supplied that are needed to satisfy this requirement. A minimum of four batteries shall be provided.
- (10) Battery Heater mats shall be provided, when gel cell type batteries are supplied.

Add the following to the Article 1074.04 of the Standard Specifications:

- (e) Warranty. The warranty for an uninterruptable power supply (UPS) and batteries (full replacement) shall cover a minimum of 5 years from date the equipment is placed in operation.
- (f) Installation. Bypass switch shall completely disconnect the traffic signal cabinet from the utility provider.
- (g) The UPS shall be set-up to run the traffic signal continuously, without going to a red flashing condition, when switched to battery power unless otherwise directed by the Engineer. The Contractor shall confirm set-up with the Engineer. The continuous operation mode when switched to battery may require modification to unit connections and these modifications are included in the unit price for this item.

Revise Article 862.05 of the Standard Specifications to read:

**Basis of Payment.**

This work will be paid for at the contract unit price per each for UNINTERRUPTABLE POWER SUPPLY, SPECIAL or UNINTERRUPTABLE POWER SUPPLY AND CABINET, SPECIAL. Replacement of Emergency Vehicle Priority System confirmation beacons and any required modifications to the traffic signal controller shall be included in the cost of the UNINTERRUPTABLE POWER SUPPLY, SPECIAL or UNINTERRUPTABLE POWER SUPPLY AND CABINET, SPECIAL item. The concrete apron and earth excavation required shall be included in the cost of the UNINTERRUPTABLE POWER SUPPLY AND CABINET, SPECIAL item.

**UNINTERRUPTABLE POWER SUPPLY, GROUND MOUNTED**

Effective: January 1, 2012  
862.02TS

Revised: July 1, 2015

This item shall consist of furnishing and installing an uninterruptable power supply. This item shall meet the same requirements as the current District One Traffic Signal Special Provision 862.01TS UNINTERRUPTABLE POWER SUPPLY, SPECIAL.

Materials shall be according to Article 1074.04 as modified in UNINTERRUPTABLE POWER SUPPLY, SPECIAL.

**Installation.**

The UPS shall be mounted on its own Type A square concrete foundation. The concrete foundation shall extend 2 inch past each side of the UPS cabinet and the edges shall have a continuous 1 inch chamfer at a 45 degree angle.

At locations where UPS is to be installed and Emergency Vehicle Priority System is in use, any existing incandescent confirmation beacons shall be replaced with LED lamps in accordance with the District One Emergency Vehicle Priority System specification at no additional cost to the contract. A concrete apron shall be provided with a dimension of 36 inches in front of the UPS cabinet, 5 inches deep, and a width sized appropriately to the width of the concrete foundation. The concrete apron shall follow Articles 424 and 202 of the Standard Specifications.

This item shall include any required modifications to an existing traffic signal controller.

**Basis of Payment.**

This item will be paid for at the contract unit price each for UNINTERRUPTABLE POWER SUPPLY, GROUND MOUNTED. Replacement of Emergency Vehicle Priority System confirmation beacons and any required modifications to the traffic signal controller shall be included in the cost of the UNINTERRUPTABLE POWER SUPPLY, GROUND MOUNTED item. The concrete foundation, concrete apron and earth excavation required shall be included in the cost of the UNINTERRUPTABLE POWER SUPPLY, GROUND MOUNTED item.

**FIBER OPTIC CABLE**

Effective: May 22, 2002  
871.01TS

Revised: July 1, 2015

Add the following to Article 871.01 of the Standard Specifications:

The Fiber Optic cable shall be installed in conduit or as specified on the plans.

Add the following to Article 871.02 of the Standard Specifications:

The control cabinet distribution enclosure shall be 24 Port Fiber Wall Enclosure, unless otherwise indicated on plans. The fiber optic cable shall provide twelve fibers per tube for the amount of fibers called for in the Fiber Optic Cable pay item in the Contract. Fiber Optic cable may be gel filled or have an approved water blocking tape.

Add the following to Article 871.04 of the Standard Specifications:

A minimum of six multimode fibers from each cable shall be terminated with approved mechanical connectors at the distribution enclosure. Fibers not being used shall be labeled "spare." Fibers not attached to the distribution enclosure shall be capped.. A minimum of 13.0 feet (4m) of extra cable length shall be provided for controller cabinets. The controller cabinet extra cable length shall be stored as directed by the Engineer.

Add the following to Article 871.06 of the Standard Specifications:

The distribution enclosure and all connectors will be included in the cost of the fiber optic cable.

Testing shall be in accordance with Article 801.13(d). Electronic files of OTDR signature traces shall be provided in the Final project documentation with certification from the Contractor that attenuation of each fiber does not exceed 3.5 dB/km nominal at 850nm for multimode fiber and 0.4 bd/km nominal at 1300nm for single mode fiber.

**ELECTRIC CABLE**

Effective: May 22, 2002  
873.01TS

Revised: July 1, 2015

Delete "or stranded, and No. 12 or" from the last sentence of Article 1076.04 (a) of the Standard Specifications.

Add the following to the Article 1076.04(d) of the Standard Specifications:

Service cable may be single or multiple conductor cable.

**GROUNDING EXISTING HANDHOLE FRAME AND COVER**

Effective: May 22, 2002  
873.02TS

Revised: July 1, 2015

**Description.**

This work shall consist of all materials and labor required to bond the equipment grounding conductor to the existing handhole frame and handhole cover. All installations shall meet the requirements of the details in the "District One Standard Traffic Signal Design Details," and applicable portions of the Standard Specifications and District One Traffic Signal Special Provisions 806.01TS GROUNDING OF TRAFFIC SIGNAL SYSTEMS and 817.01TS GROUNDING CABLE.

The equipment grounding conductor shall be bonded to the handhole frame and to the handhole cover. Two (2) 1/2-inch diameter x 1 1/4-inch long hex-head stainless steel bolts, spaced 1.75-inches apart center-to-center shall be fully welded to the frame and to the cover to accommodate a heavy duty UL listed grounding compression terminal. The grounding compression terminal shall be secured to the bolts with stainless steel split-lock washers and nylon-insert locknuts.

Welding preparation for the stainless steel bolt hex-head to the frame and to the cover shall include thoroughly cleaning the contact and weldment area of all rust, dirt and contaminates. The Contractor shall assure a solid strong weld. The welds shall be smooth and thoroughly cleaned of flux and spatter. The grounding installation shall not affect the proper seating of the cover when closed.

The grounding cable shall be paid for separately.

**Method of Measurement.**

Units measured for payment will be counted on a per handhole basis, regardless of the type of handhole and its location.

**Basis of Payment.**

This work shall be paid for at the contract unit price each for GROUNDING EXISTING HANDHOLE FRAME AND COVER which shall be payment in full for grounding the handhole complete.

**EMERGENCY VEHICLE PRIORITY SYSTEM LINE SENSOR CABLE, NO. 20 3/C**

Effective: January 1, 2013  
873.03TS

Revised: July 1, 2015

This work shall consist of furnishing and installing lead-in cable for light detectors installed at existing and/or proposed traffic signal installations as part of an emergency vehicle priority system. The work includes installation of the lead-in cables in existing and/or new conduit. The electric cable shall be shielded and have (3) stranded conductors, colored blue, orange, and yellow with a stranded tinned copper drain wire. The cable shall meet the requirements of the vendor of the Emergency Vehicle Priority System Equipment.

**Basis of Payment.**

This work will be paid for at the contract unit price per foot for EMERGENCY VEHICLE PRIORITY SYSTEM LINE SENSOR CABLE, NO. 20 3/C, which price shall be payment in full for furnishing, installing and making all electrical connections necessary for proper operations.

**RAILROAD INTERCONNECT CABLE**

Effective: May 22, 2002  
873.04TS

Revised: July 1, 2015

The cable shall meet the requirements of Section 873 of the Standard Specifications, except for the following:

Add to Article 873.02 of the Standard Specifications:

- c) The railroad interconnect cable shall be three conductor stranded #14 copper cable in a clear polyester binder, shielded with #36 AWG tinned copper braid with 85% coverage, and insulated with .016" polyethylene (black, blue, red). The jacket shall be black 0.045 PVC or polyethylene.

Add the following to Article 873.06 of the Standard Specifications:

**Basis of Payment.**

This work shall be paid for at the contract unit price per foot (meter) for ELECTRIC CABLE IN CONDUIT, RAILROAD, NO. 14 3C, which price shall be payment in full for furnishing, installing, and making all electrical connections in the traffic signal controller cabinet. Connections in the railroad controller cabinet shall be performed by railroad personnel.

**TRAFFIC SIGNAL POST**

Effective: May 22, 2002  
875.01TS

Revised: July 01, 2015

Add the following to Article 1077.01 (c) of the Standard Specifications:

Washers for post bases shall be the same size or larger than the nut.

Revise the first sentence of Article 1077.01 (d) of the Standard Specifications to read:

All posts and bases shall be steel and hot dipped galvanized according to AASHTO M 111. If the Department approves painting, powder coating by the manufacturer will be required over the galvanization in accordance with 851.01TS TRAFFIC SIGNAL PAINTING Special Provisions.

**PEDESTRIAN PUSH-BUTTON POST**

Effective: May 22, 2002  
876.01TS

Revised: July 01, 2015

Revise the first sentence of Article 1077.02 (a) of the Standard Specifications to read:

The steel post shall be according to Article 1077.01. Washers for post bases shall be the same size or larger than the nut.

Revise the first sentence of Article 1077.02 (a) of the Standard Specifications to read:

All posts and bases shall be steel and hot dipped galvanized according to AASHTO M 111. If the Department approves painting, powder coating by the manufacturer will be required over the galvanization in accordance with 851.01TS TRAFFIC SIGNAL PAINTING Special Provisions.

**MAST ARM ASSEMBLY AND POLE**

Effective: May 22, 2002  
877.01TS

Revised: July 01, 2015

Revise the second sentence of Article 1077.03 (a)(3) of the Standard Specifications to read:

Traffic signal mast arms shall be one piece construction, unless otherwise approved by the Engineer.

Add the following to Article 1077.03 (a)(3) of the Standard Specifications:

If the Department approves painting, powder coating by the manufacturer will be required over the galvanization in accordance with 851.01TS TRAFFIC SIGNAL PAINTING Special Provisions.

**CONCRETE FOUNDATIONS**

Effective: May 22, 2002  
878.01TS

Revised: July 01, 2015

Add the following to Article 878.03 of the Standard Specifications:

All anchor bolts shall be according to Article 1006.09, with all anchor bolts hot dipped galvanized a minimum of 12 in. (300 mm) at the threaded end.

Foundations used for Combination Mast Arm Poles shall provide an extra 2-1/2 inch (65 mm) raceway.



No foundation is to be poured until the Resident Engineer gives his/her approval as to the depth of the foundation.

Add the following to the first paragraph of Article 878.05 of the Standard Specifications:

The price shall include a concrete apron in front of the cabinet and UPS as shown in the plans or as directed by the engineer.

### **REMOVE AND REPLACE ANCHOR BOLTS**

Effective: January 1, 2014  
878.02TS

Revised: July 1, 2015

This item shall consist of replacing anchor rods at existing concrete foundations for traffic signal posts. At locations specified on the plans for new traffic signal post installation, the Contractor shall inspect the existing post foundations prior to removing the existing traffic signal post. The Contractor shall verify that the pattern, spacing, and condition of the existing anchor bolts are acceptable for reuse with a new post. The Contractor shall replace unacceptable anchor bolts as approved by the Engineer.

Anchor bolts shall be according to Article 1006.09 and shall be hot dipped galvanized.

#### **Installation.**

Existing anchor bolts shall be cut flush with the top of concrete foundation.

The bolt circle of the new anchor bolts shall be rotated a minimum of 2.5-inches away from the existing anchor bolts. New anchor bolts shall be  $\frac{3}{4}$ -inch diameter with minimum 9-inch embedment into the existing concrete foundation and 3-inch threaded length above the top of foundation. New anchor bolts shall be installed using a HIT-RE 500 exposed adhesive anchoring system.

#### **Method of Measurement.**

The removal and replacement of anchor bolts will be measured for payment as per each foundation requiring anchor bolt replacement. This shall include all anchor bolts replaced, labor, equipment, and materials required for replacing anchor bolts at an existing foundation as specified herein.

#### **Basis of Payment.**

This item will be paid for at the contract unit price each for REMOVE AND REPLACE ANCHOR BOLTS.

**LIGHT EMITTING DIODE (LED) SIGNAL HEAD AND OPTICALLY PROGRAMMED LED SIGNAL HEAD**

Effective: May 22, 2002  
880.01TS

Revised: July 1, 2015

**Materials.**

Add the following to Section 1078 of the Standard Specifications:

1. LED modules proposed for use and not previously approved by IDOT District One will require independent testing for compliance to current VTCSH-ITE standards for the product and be Intertek ETL Verified. This would include modules from new vendors and new models from IDOT District One approved vendors.
2. The proposed independent testing facility shall be approved by IDOT District One. Independent testing must include a minimum of two (2) randomly selected modules of each type of module (i.e. ball, arrow, pedestrian, etc.) used in the District and include as a minimum Luminous Intensity and Chromaticity tests. However, complete module performance verification testing may be required by the Engineer to assure the accuracy of the vendor's published data and previous test results. An IDOT representative will select sample modules from the local warehouse and mark the modules for testing. Independent test results shall meet current ITE standards and vendor's published data. Any module failures shall require retesting of the module type. All costs associated with the selection of sample modules, testing, reporting, and retesting, if applicable, shall be the responsibility of the LED module vendor and not be a cost to this contract.
3. All signal heads shall provide 12" (300 mm) displays with glossy yellow or black polycarbonate housings. All head housings shall be the same color (yellow or black) at the intersection. For new signalized intersections and existing signalized intersections where all signals heads are being replaced, the proposed head housings shall be black. Where only selected heads are being replaced, the proposed head housing color (yellow or black) shall match existing head housings. Connecting hardware and mounting brackets shall be polycarbonate (black). A corrosion resistant anti-seize lubricant shall be applied to all metallic mounting bracket joints, and shall be visible to the inspector at the signal turn-on. Post top mounting collars are required on all posts, and shall be constructed of the same material as the brackets.
4. The LED signal modules shall be replaced or repaired if an LED signal module fails to function as intended due to workmanship or material defects within the first 7 years from the date of traffic signal TURN-ON. LED signal modules which exhibit luminous intensities less than the minimum values specified in Table 1 of the ITE Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement (June 27, 2005) [VTSCH], or applicable successor ITE specifications, or show signs of entrance of moisture or contaminants within the first 7 years of the date of traffic signal TURN-ON shall be replaced or repaired. The vendor's written warranty for the LED signal modules shall be dated, signed by a vendor's representative and included in the product submittal to the State.

(a) Physical and Mechanical Requirements

1. Modules can be manufactured under this specification for the following faces:
  - a. 12 inch (300 mm) circular, multi-section
  - b. 12 inch (300 mm) arrow, multi-section
2. The maximum weight of a module shall be 4 lbs. (1.8 kg).
3. Each module shall be a sealed unit to include all parts necessary for operation (a printed circuit board, power supply, a lens and gasket, etc.), and shall be weather proof after installation and connection.
5. The lens of the module shall be tinted with a wavelength-matched color to reduce sun phantom effect and enhance on/off contrast. The tinting shall be uniform across the lens face. Polymeric lens shall provide a surface coating or chemical surface treatment applied to provide abrasion resistance. The lens of the module shall be integral to the unit, convex with a smooth outer surface and made of plastic. The lens shall have a textured surface to reduce glare.
6. The use of tinting or other materials to enhance ON/OFF contrasts shall not affect chromaticity and shall be uniform across the face of the lens.
7. Each module shall have a symbol of the type of module (i.e. circle, arrow, etc.) in the color of the module. The symbol shall be 1 inch (25.4 mm) in diameter. Additionally, the color shall be written out in 1/2 inch (12.7mm) letters next to the symbol.

(b) Photometric Requirements

4. The LEDs utilized in the modules shall be AlInGaP technology for red and InGaN for green and amber indications, and shall be the ultra bright type rated for 100,000 hours of continuous operation from -40 °C to +74 °C.

(c) Electrical

1. Maximum power consumption for LED modules is per Table 2.
2. Operating voltage of the modules shall be 120 VAC. All parameters shall be measured at this voltage.
3. The modules shall be operationally compatible with currently used controller assemblies (solid state load switches, flashers, and conflict monitors).
4. When a current of 20 mA AC (or less) is applied to the unit, the voltage read across the two leads shall be 15 VAC or less.
5. The LED modules shall provide constant light output under power. Modules with dimming capabilities shall have the option disabled or set on a non-dimming operation.
6. LED arrows shall be wired such that a catastrophic loss or the failure of one or more LED will not result in the loss of the entire module.

(d) Retrofit Traffic Signal Module

1. The following specification requirements apply to the Retrofit module only. All general specifications apply unless specifically superseded in this section.
2. Retrofit modules can be manufactured under this specification for the following faces:
  - a. 12 inch (300 mm) circular, multi-section
  - b. 12 inch (300 mm) arrow, multi-section
3. Each Retrofit module shall be designed to be installed in the doorframe of a standard traffic signal housing. The Retrofit module shall be sealed in the doorframe with a one-piece EPDM (ethylene propylene rubber) gasket.
4. The maximum weight of a Retrofit module shall be 4 lbs. (1.8 kg).
5. Each Retrofit module shall be a sealed unit to include all parts necessary for operation (a printed circuit board, power supply, a lens and gasket, etc.), and shall be weather proof after installation and connection.
6. Electrical conductors for modules, including Retrofit modules, shall be 39.4 inches (1m) in length, with quick disconnect terminals attached.
7. The lens of the Retrofit module shall be integral to the unit, shall be convex with a smooth outer surface and made of plastic or of glass.

(e) The following specification requirements apply to the 12 inch (300 mm) arrow module only. All general specifications apply unless specifically superseded in this section.

1. The arrow module shall meet specifications stated in Section 9.01 of the Equipment and Material Standards of the Institute of Transportation Engineers (November 1998) [ITE Standards], Chapter 2 (Vehicle Traffic Control Signal Heads) or applicable successor ITE specifications for arrow indications.
2. The LEDs arrow indication shall be a solid display with a minimum of three (3) outlining rows of LEDs and at least one (1) fill row of LEDs.

(f) The following specification requirement applies to the 12 inch (300 mm) programmed visibility (PV) module only. All general specifications apply unless specifically superseded in this section.

1. The LED module shall be a module designed and constructed to be installed in a programmed visibility (PV) signal housing without modification to the housing.

**Basis of Payment.**

Add the following to the first paragraph of Article 880.04 of the Standard Specifications:

The price shall include furnishing the equipment described above, all mounting hardware and installing them in satisfactory operating condition.

Revise the second paragraph of Article 880.04 of the Standard Specifications to read:

If the work consists of retrofitting an existing polycarbonate traffic signal head with light emitting diodes (LEDs), it will be paid for as a SIGNAL HEAD, LED, RETROFIT, of the type specified, and of the particular kind of material, when specified. Price shall be payment in full for removal of the existing module, furnishing the equipment described above including LED modules, all mounting hardware, and installing them in satisfactory operating condition. The type specified will indicate the number of signal faces, the number of signal sections in each signal face and the method of mounting.

## **FLASHING BEACON INSTALLATION, RELOCATION AND REMOVAL**

Effective: January 1, 2007  
880.02TS

Revised: July 1, 2015

This work shall consist of furnishing and installing a new flashing beacon installation, solar powered flashing beacon installation, relocation of existing flashing beacon, and/or the removal of the existing flashing beacon installation as shown on the plans and as described herein. The energy charges for the operation of the flashing beacon installation shall be paid for by the Department unless otherwise directed by the Engineer.

The installation, relocation and removal of flashing beacon installation shall be according to the applicable portions of Sections 800 and 1000 of the Standard Specifications for Road and Bridge Construction and District 1 Flashing Beacon Installation Details except as revised herein. LED signal heads shall be as modified in 880.01TS LED SIGNAL HEAD AND OPTICALLY PROGRAMMED LED SIGNAL HEAD Special Provision.

- (a) Flashing Beacon Installation. This item shall consist of installing a post mounted 12 inch (300 mm) L.E.D. single section red or yellow flashing beacon on a new or existing post as shown on the plans or as directed by the Engineer. This item shall include furnishing and installing a flasher controller in an aluminum cabinet, or integrated within the signal head, 12 inch (300 mm) L.E.D. red or yellow signal section with a dimmer if required by the Engineer, and all other hardware necessary to complete the installation.
- (b) Solar Powered Flashing Beacon Installation. This item shall consist of installation of a solar powered flashing beacon, post mounted as shown on the plans or as directed by the Engineer. This item shall consist of furnishing and installing a 12 inch (300 mm) single red or yellow flashing module on a new or existing post as shown on the plans or as directed by the Engineer. This item shall included furnishing and installing a flasher controller that is integrated within the signal head, with discrete solar panels, LED module, battery, electronics, compact housing and be capable of operating 24 hours, 7 days a week. The flasher unit shall be installed on standard wood or metal posts. The flash pattern shall be MUTCD compliant and have alternate flash patterns available. The battery shall have a life span of a minimum of 5 years and be field replaceable. The battery and electronics may be located inside the solar panel housing or signal head. The sections of the flasher unit shall be secured with tamper resistant stainless steel hardware and unless otherwise noted, the housing shall be black in color.
- (c) Relocate Existing Flashing Beacon. Relocation of an existing flashing beacon installation, as shown on the plans or as directed by the Engineer, shall meet the above requirements. This work shall include the complete relocation of the existing flashing beacon installation, the backfilling of the holes created by the removal of the poles, restoration of the surface to match the adjoining area.

- (d) Remove Existing Flashing Beacon Installation Complete. Removal of an existing flashing beacon installation shall be as shown on the plans or as directed by the Engineer and shall be according to applicable portions of Section 895 of the Standard Specifications. This work shall include a complete removal of an existing flashing beacon installation, backfilling of the holes created by the removal of the poles and restoration of the surface to match the adjoining area. The flashing beacon installation will be removed only after the permanent signal installation is accepted for maintenance, or as directed by the Engineer.

**Basis of Payment.**

This work shall be paid for at the contract unit price each for FLASHING BEACON INSTALLATION; SOLAR POWERED FLASHING BEACON INSTALLATION; RELOCATE EXISTING FLASHING BEACON or REMOVE EXISTING FLASHING BEACON INSTALLATION COMPLETE. The price shall be payment in full for all labor and material necessary to complete the work described above.

**LIGHT EMITTING DIODE (LED) PEDESTRIAN SIGNAL HEAD**

Effective: May 22, 2002  
881.01TS

Revised: July 1, 2015

Add the following to the third paragraph of Article 881.03 of the Standard Specifications:

No mixing of different types of pedestrian traffic signals or displays will be permitted.

Add the following to Article 881.03 of the Standard Specifications:

(a) Pedestrian Countdown Signal Heads.

- (1) Pedestrian Countdown Signal Heads shall not be installed at signalized intersections where traffic signals and railroad warning devices are interconnected.
- (2) Pedestrian Countdown Signal Heads shall be 16 inch (406mm) x 18 inch (457mm), for single units with glossy yellow or black polycarbonate housings. All pedestrian head housings shall be the same color (yellow or black) at the intersection. For new signalized intersections and existing signalized intersections where all pedestrian heads are being replaced, the proposed head housings shall be black. Where only selected heads are being replaced, the proposed head housing color (yellow or black) shall match existing head housings. Connecting hardware and mounting brackets shall be polycarbonate (black). A corrosion resistant anti-seize lubricant shall be applied to all metallic mounting bracket joints, and shall be visible to the inspector at the signal turn-on.
- (3) Each pedestrian signal LED module shall be fully MUTCD compliant and shall consist of double overlay message combining full LED symbols of an Upraised Hand and a Walking Person. "Egg Crate" type sun shields are not permitted. Numerals shall measure 9 inches (229mm) in height and easily identified from a distance of 120 feet (36.6m).

**Materials.**

Add the following to Article 1078.02 of the Standard Specifications:

**General.**

1. The module shall operate in one mode: Clearance Cycle Countdown Mode Only. The countdown module shall display actual controller programmed clearance cycle and shall start counting when the flashing clearance signal turns on and shall countdown to "0" and turn off when the steady Upraised Hand (symbolizing Don't Walk) signal turns on. Module shall not have user accessible switches or controls for modification of cycle.
2. At power on, the module shall enter a single automatic learning cycle. During the automatic learning cycle, the countdown display shall remain dark.
3. The module shall re-program itself if it detects any increase or decrease of Pedestrian Timing. The counting unit will go blank once a change is detected and then take one complete pedestrian cycle (with no counter during this cycle) to adjust its buffer timer.
4. If the controller preempts during the Walking Person (symbolizing Walk), the countdown will follow the controller's directions and will adjust from Walking Person to flashing Upraised Hand. It will start to count down during the flashing Upraised Hand.
5. If the controller preempts during the flashing Upraised Hand, the countdown will continue to count down without interruption.
6. The next cycle, following the preemption event, shall use the correct, initially programmed values.
7. If the controller output displays Upraised Hand steady condition and the unit has not arrived to zero or if both the Upraised Hand and Walking Person are dark for some reason, the unit suspends any timing and the digits will go dark.
8. The digits will go dark for one pedestrian cycle after loss of power of more than 1.5 seconds.
9. The countdown numerals shall be two (2) "7 segment" digits forming the time display utilizing two rows of LEDs.
10. The LED module shall meet the requirements of the Institute of Transportation Engineers (ITE) LED purchase specification, "Pedestrian Traffic Control Signal Indications - Part 2: LED Pedestrian Traffic Signal Modules," or applicable successor ITE specifications, except as modified herein.
11. The LED modules shall provide constant light output under power. Modules with dimming capabilities shall have the option disabled or set on a non-dimming operation.
12. In the event of a power outage, light output from the LED modules shall cease instantaneously.
13. The LEDs utilized in the modules shall be AllnGaP technology for Portland Orange (Countdown Numerals and Upraised Hand) and GaN technology for Lunar White (Walking Person) indications.
14. The individual LEDs shall be wired such that a catastrophic loss or the failure of one or more LED will not result in the loss of the entire module.

**Basis of Payment.**

Add the following to the first paragraph of Article 881.04 of the Standard Specifications:

The price shall include furnishing the equipment described above, all mounting hardware and installing them in satisfactory operating condition.

Add the following to Article 881.04 of the Standard Specifications:

If the work consists of retrofitting an existing polycarbonate pedestrian signal head and pedestrian countdown signal head with light emitting diodes (LEDs), it will be paid for as a PEDESTRIAN SIGNAL HEAD, LED, RETROFIT, of the type specified, and of the particular kind of material, when specified. Price shall be payment in full for furnishing the equipment described above including LED modules, all mounting hardware, and installing them in satisfactory operating condition.

#### **TRAFFIC SIGNAL BACKPLATE**

Effective: May 22, 2002  
882.01TS

Revised: July 1, 2015

Delete 1<sup>st</sup> sentence of Article 1078.03 of the Standard Specifications and add "All backplates shall be louvered, formed ABS plastic".

Add the following to the third paragraph of Article 1078.03 of the Standard Specifications. The retroreflective backplate shall not contain louvers.

Delete second sentence of the fourth paragraph of Article 1078.03 the Standard Specifications.

Add the following to the fourth paragraph of Article 1078.03 of the Standard Specifications:

When retro reflective sheeting is specified, it shall be Type ZZ sheeting according to Article 1091.03 and applied in preferred orientation for the maximum angularity according to the vendor's recommendations. The retroreflective sheeting shall be installed under a controlled environment at the vendor/equipment supplier before shipment to the contractor. The formed plastic backplate shall be prepared and cleaned, following recommendations of the retroreflective sheeting manufacturer.

#### **DETECTOR LOOP**

Effective: May 22, 2002  
886.01TS

Revised: July 1, 2015

##### **Procedure.**

A minimum of seven (7) working days prior to the Contractor cutting loops, the Contractor shall mark the proposed loop locations and contact the Area Traffic Signal Maintenance and Operations Engineer (847) 705-4424 to inspect and approve the layout. When preformed detector loops are installed, the Contractor shall have them inspected and approved prior to the pouring of the Portland cement concrete surface, using the same notification process as above.



**Installation.**

Revise Article 886.04 of the Standard Specifications to read:

Loop detectors shall be installed according to the requirements of the "District One Standard Traffic Signal Design Details." Saw-cuts (homeruns on preformed detector loops) from the loop to the edge of pavement shall be made perpendicular to the edge of pavement when possible in order to minimize the length of the saw-cut (homerun on preformed detector loops) unless directed otherwise by the Engineer or as shown on the plan.

The detector loop cable insulation shall be labeled with the cable specifications.

Each loop detector lead-in wire shall be labeled in the handhole using a water proof tag, from an approved vender, secured to each wire with nylon ties.

Resistance to ground shall be a minimum of 100 mega-ohms under any conditions of weather or moisture. Inductance shall be more than 50 and less than 700 microhenries. Quality readings shall be more than 5.

- (a) Type I. All loops installed in new asphalt pavement shall be installed in the binder course and not in the surface course. The edge of pavement, curb and handhole shall be cut with a 1/4 inch (6.3 mm) deep x 4 inches (100 mm) saw cut to mark location of each loop cable.
- (b) Loop sealant shall be two-component thixotropic chemically cured polyurethane from an approved vender. The sealant shall be installed 1/8 inch (3 mm) below the pavement surface. If installed above the surface the excess shall be removed immediately.
- (c) Preformed. This work shall consist of furnishing and installing a rubberized or cross linked polyethylene heat resistant preformed traffic signal loop in accordance with the Standard Specifications, except for the following:
  - (d) Preformed detector loops shall be installed in new pavement constructed of Portland cement concrete using mounting chairs or tied to re-bar or the preformed detector loops may be placed in the sub-base. Loop lead-ins shall be extended to a temporary protective enclosure near the proposed handhole location. The protective enclosure shall provide sufficient protection from other construction activities and may be buried for additional protection.
  - (e) Handholes shall be placed next to the shoulder or back of curb when preformed detector loops enter the handhole. CNC, included in this pay item, shall be used to protect the preformed lead-ins from back of curb to the handhole.

- (f) Preformed detector loops shall be factory assembled with ends capped and sealed against moisture and other contaminants. The loop configurations and homerun lengths shall be assembled for the specific application. The loop and homerun shall be constructed using 11/16 inch (17.2 mm) outside diameter (minimum), 3/8 inch (9.5 mm) inside diameter (minimum) Class A oil resistant synthetic cord reinforced hydraulic hose with 250 psi (1,720 kPa) internal pressure rating or a similarly sized XLPE cable jacket. Hose for the loop and homerun assembly shall be one continuous piece. No joints or splices shall be allowed in the hose except where necessary to connect homeruns to the loops. This will provide maximum wire protection and loop system strength. Hose tee connections shall be heavy duty high temperature synthetic rubber. The tee shall be of proper size to attach directly to the hose, minimizing glue joints. The tee shall have the same flexible properties as the hose to insure that the whole assembly can conform to pavement movement and shifting without cracking or breaking. For XLPE jacketed preformed loops, all splice connections shall be soldered, sealed, and tested before being sealed in a high impact glass impregnated plastic splice enclosure. The wire used shall be #16 THWN stranded copper. The number of turns in the loop shall be application specific. Homerun wire pairs shall be twisted a minimum of four turns per foot. No wire splices will be allowed in the preformed loop assembly. The loop and homeruns shall be filled and sealed with a flexible sealant to insure complete moisture blockage and further protect the wire. The preformed loops shall be constructed to allow a minimum of 6.5 feet of extra cable in the handhole.

**Method of Measurement.**

Add the following to Article 886.05 of the Standard Specifications:

Preformed detector loops will be measured along the detector loop embedded in the pavement, rather than the actual length of the wire. Detector loop measurements shall include the saw cut and the length of the detector loop wire to the edge of pavement. The detector loop wire, including all necessary connections for proper operations, from the edge of pavement to the handhole, shall be included in the price of the detector loop. Unit duct, trench and backfill, and drilling of pavement or handholes shall be included in detector loop quantities.

**Basis of Payment.**

This work shall be paid for at the contract unit price per foot (meter) for DETECTOR LOOP, TYPE I or PREFORMED DETECTOR LOOP as specified in the plans, which price shall be payment in full for furnishing and installing the detector loop and all related connections for proper operation.

**DETECTOR LOOP REPLACEMENT AND/OR INSTALLATION (ROADWAY GRINDING, RESURFACING, & PATCHING OPERATIONS)**

Effective: January 1, 1985  
886.02TS

Revised: July 1, 2015

The following Traffic Signal Special Provisions and the "District 1 Standard Traffic Signal Design Details" supplement the requirements of the State of Illinois "Standard Specifications for Road and Bridge Construction" Section 886 and 1079.

The intent of this Special Provision is to prescribe the materials and construction methods commonly used to replace traffic signal detector loops and replace magnetic signal detectors with detector loops during roadway resurfacing, grinding and patching operations. Loop detector replacement will not require the transfer of traffic signal maintenance from the District Electrical Maintenance Contractor to this contract's electrical contractor. Replacement of magnetic detector will require wiring revisions inside the control cabinet and therefore the transfer of maintenance will be required. All material furnished shall be new. The locations and the details of all installations shall be as indicated on the Plans or as directed by the Engineer.

The work to be provided under this contract consists of furnishing and installing all traffic signal work as specified on the Plans and as specified herein in a manner acceptable and approved by the Engineer.

**Notification of Intent to Work.**

Contracts such as pavement grinding or patching which result in the destruction of traffic signal detection require a notification of intent to work and an inspection. A minimum of seven (7) working days prior to the detection removal, the Contractor shall notify the:

- Traffic Signal Maintenance and Operations Engineer at (847)705-4424
- IDOT Electrical Maintenance Contractor at (773) 287-7600

at which time arrangements will be made to adjust the traffic controller timing to compensate for the absence of detection.

Failure to provide proper notification may require the District's Electrical Maintenance Contractor to be called to investigate complaints of inadequate traffic signal timing. All costs associated with these expenses will be paid for by the Contractor at no additional expense to the Department according to Section 109 of the "Standard Specifications."

**Acceptance of Material.**

The Contractor shall provide:

1. All material approval requests shall be submitted a minimum of seven (7) days prior to the delivery of equipment to the job site, or within 30 consecutive calendar days after the contract is awarded, or within 15 consecutive calendar days after the preconstruction meeting, whichever is first.
2. Four (4) copies of a letter listing the vendor's name and model numbers of the proposed equipment shall be supplied. The letter will be reviewed by the Traffic Design Engineer to determine whether the equipment to be used is approved. The letters will be stamped as approved or not approved accordingly and returned to the Contractor.
3. One (1) copy of material catalog cuts.
4. The contract number, permit number or intersection location must be on each sheet of the letter and material catalog cuts as required in items 2 and 3.

**Inspection of Construction.**

When the road is open to traffic, except as otherwise provided in Section 801 and 850 of the Standard Specifications, the Contractor must request a turn-on and inspection of the completed detector loop installation at each separate location. This request must be made to the Traffic Signal Maintenance and Operations Engineer at (847)705-4424 a minimum of seven (7) working days prior to the time of the requested inspection.

Acceptance of the traffic signal equipment by the Department shall be based upon inspection results at the traffic signal "turn on." If approved, traffic signal acceptance shall be verbal at the "turn on" inspection followed by written correspondence from the Engineer. If this work is not completed in time, the Department reserves the right to have the work completed by others at the Contractor's expense.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid price, under which the subject materials and signal equipment are paid, and no additional compensation will be allowed. Materials and signal equipment not complying with the above requirements will be subject to removal and disposal at the Contractor's expense.

**Restoration of Work Area.**

Restoration of the traffic signal work area due to the detector loop installation and/or replacement shall be included in the cost of this item. All roadway surfaces such as shoulders, medians, sidewalks, pavement shall be replaced as shown in the plans or in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded.

**Removal, Disposal and Salvage of Existing Traffic Signal Equipment.**

The removal, disposal, and salvage of existing traffic signal equipment shall be included in the cost of this item. All material and equipment removed shall become the property of the Contractor and disposed of by the Contractor outside the State's right-of-way. No additional compensation shall be provided to the Contractor for removal, disposal or salvage expense for the work in this contract.

**DETECTOR LOOP REPLACEMENT.**

This work shall consist of replacing existing detector loops which are destroyed during grinding, resurfacing, or patching operations.

If damage to the detector loop is unavoidable, replacement of the existing detection system will be necessary. This work shall be completed by an approved Electrical Contractor as directed by the Engineer.

Replacement of the loops shall be accomplished in the following manner: The Engineer shall mark the location of the replacement loops. The Traffic Signal Maintenance and Operations Engineer shall be called to approve loop locations prior to the cutting of the pavement. The Contractor may reuse the existing coilable non-metallic conduit (CNC) located between the existing handhole and the pavement if it hasn't been damaged. All burrs shall be removed from the edges of the existing conduit which could cause damage to the new detector loop during installation. If the existing conduit is damaged beyond repair, if it cannot be located, or if additional conduits are required for each proposed loop; the Contractor shall be required to drill through the existing pavement into the appropriate handhole, and install 1" (25 mm) CNC. This work and the required materials shall not be paid for separately but shall be included in the pay item Detector Loop Replacement. Once suitable CNC raceways is established, the loop may be cut, installed, sealed and spliced to the twisted-shielded lead-in cable in the handhole.

All loops installed in new asphalt pavement shall be installed in the binder course and not in the surface course. The edge of pavement or the curb shall be cut with a 1/4" (6.3 mm) deep x 4" (100 mm) saw-cut to mark location of each loop lead-in.

A minimum of seven (7) working days prior to the Contractor cutting loops, the Contractor shall have the proposed loop locations marked and contact the Traffic Signal Maintenance and Operations Engineer (847)705-4424 to inspect and approve the layout.

Loop detectors shall be installed according to the requirements of the "District 1 Standard Traffic Signal Design Details." Saw-cuts from the loop to the edge of pavement shall be made perpendicular to the edge of pavement when possible in order to minimize the length of the saw-cut unless directed otherwise by the Engineer or as shown on the plan.

The detector loop cable insulation shall be labeled with the cable specifications.

Each loop detector lead-in wire shall be labeled in the handhole using a water proof tag, from an approved vender, secured to each wire with nylon ties. The lead-in wire, including all necessary connections for proper operation, from the edge of pavement to the handhole, shall be included in the detector loop pay item.

Loop sealant shall be a two-component thixotropic chemically cured polyurethane. The sealant shall be installed 1/8" (3 mm) below the pavement surface. If installed above the surface the excess shall be removed immediately.

Round loop(s) 6 ft (1.8 m) diameter may be substituted for 6 ft (1.8 m) by 6 ft (1.8 m) square loop(s) and shall be paid for as 24 feet (7.2 m) of detector loop.

Resistance to ground shall be a minimum of 100 mega-ohms under any conditions of weather or moisture. Inductance shall be more than 50 and less than 700 microhenries. Quality readings shall be more than 5.

Heat shrink splices shall be used according to the "District 1 Standard Traffic Signal Design Details."

Detector loop replacement shall be measured along the sawed slot in the pavement containing the loop cable up to the edge of pavement, rather than the actual length of the wire in the slot. Drilling handholes, sawing the pavement, furnishing and installing CNC to the appropriate handhole, cable splicing to provide a fully operable detector loop, testing and all trench and backfill shall be included in this item.

**Basis of Payment.**

Detector Loop Replacement shall be paid for at the contract unit price per foot (meter) of DETECTOR LOOP REPLACEMENT.

**MAGNETIC DETECTOR REMOVAL AND DETECTOR LOOP INSTALLATION.**

This work shall consist of the removal of existing magnetic detectors, magnetic detector lead-in cable and magnetic detection amplifiers and related control equipment wiring, installation of detector lead-in cable, detector loops, detector amplifiers and related equipment wiring. The detector loop, cable, and amplifier shall be installed according to the applicable portions of the "Standard Specifications" and the applicable portions of the Special Provision for "Detector Loop Replacement." All drilling of handholes, furnishing and installing CNC, cable splicing, trench and backfill, removal of equipment, and removing cable from conduit shall be included in this item.

**Basis of Payment.**

Magnetic Detector Removal and Detector Loop Installation shall be paid for at the contract unit price per foot (meter) for DETECTOR LOOP, TYPE I, per each for INDUCTIVE LOOP DETECTOR, and foot (meter) for ELECTRIC CABLE IN CONDUIT, LEAD-IN, NO. 14 1 PAIR.

**EMERGENCY VEHICLE PRIORITY SYSTEM**

Effective: May 22, 2002  
887.01TS

Revised: July 1, 2015

Revise Section 887 of the Standard Specifications to read:

It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle pre-emption equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of the equipment currently in use by the Agency.

All new installations shall be equipped with Confirmation Beacons as shown on the "District One Standard Traffic Signal Design Details." The Confirmation Beacon shall consist of a 6 watt Par 38 LED flood lamp with a 30 degree light spread, or a 7 watt Par 30 LED flood lamp with a 15 degree or greater spread, maximum 7 watt energy consumption at 120V, and a 2,000 hour warranty for each direction of pre-emption. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum or stainless steel. Holes drilled into signal poles, mast arms, or posts shall require rubber grommets. In order to maintain uniformity between communities, the confirmation beacons shall indicate when the control equipment receives the pre-emption signal. The pre-emption movement shall be signaled by a flashing indication at the rate specified by Section 4L.01 of the "Manual on Uniform Traffic Control Devices," and other applicable sections of future editions. The stopped pre-empted movements shall be signaled by a continuous indication.

All light operated systems shall include security and transit preemption software and operate at a uniform rate of 14.035 Hz  $\pm$ 0.002, or as otherwise required by the Engineer, and provide compatible operation with other light systems currently being operated in the District.

This item shall include any required modifications to an existing traffic signal controller as a result of the addition of the EMERGENCY VEHICLE PRIORITY SYSTEM.

**Basis of Payment.**

The work shall be paid for at the contract unit price each for furnishing and installing LIGHT DETECTOR and LIGHT DETECTOR AMPLIFIER. Furnishing and installing the confirmation beacon shall be included in the cost of the Light Detector. Any required modifications to the traffic signal controller shall be included in the cost of the LIGHT DETECTOR AMPLIFIER. The preemption detector amplifier shall be paid for on a basis of (1) one each per intersection controller and shall provide operation for all movements required in the pre-emption phase sequence.

**RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM, DETECTOR UNIT**

Effective: January 1, 2002  
887.02TS

Revised: July 1, 2015

This item shall consist of relocating the existing emergency vehicle priority system, detector unit (single channel or dual channel) from its existing location to a new traffic signal post or mast arm assembly and pole, and connecting it to an emergency vehicle priority system, phasing unit. If the existing Emergency Vehicle Priority System, Detector Unit Assembly includes a Confirmation Beacon, the Confirmation Beacon shall also be relocated and connected to the Emergency Vehicle Priority System, Detector Unit and shall be included at no cost in this item.

The emergency vehicle system is not to be inoperative for more than 8 hours and the Contractor must notify the Municipality or Fire Protection District 72 hours prior to the disconnection of the equipment.

**Basis of Payment.**

This item will be paid for at the contract unit price each for RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM, DETECTOR UNIT.

**RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM, PHASING UNIT**

Effective: January 1, 2002  
887.03TS

Revised: July 1, 2015

This item shall consist of relocating the existing emergency vehicle priority system phasing unit from an existing traffic signal controller cabinet to a new traffic signal controller cabinet, as indicated in the plans or as directed by the Engineer.

The work shall include disconnecting the emergency vehicle priority system phasing unit(s) and reconnecting it into the new traffic signal controller cabinet.

The emergency vehicle system is not to be inoperative for more than 8 hours and the Contractor must notify the Municipality or Fire Protection District 72 hours prior to the disconnection of the equipment. The Contractor must demonstrate to the satisfaction of the Engineer that the emergency vehicle system operates properly.

**Basis of Payment.**

This item will be paid for on a basis of one (1) each per intersection for RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM, PHASING UNIT.

**CONFIRMATION BEACON**

Effective: January 1, 2002  
887.04TS

Revised: July 1, 2015

This item shall consist of furnishing and installing a Traffic Signal Emergency Confirmation Beacon (single channel or dual channel) at the locations specified on the plans and as described as follows for intersections which have existing emergency preemption systems previously installed.

Confirmation Beacon, Single Channel - Where the light detector is used to detect a single direction of traffic, one LED lamp for only that direction shall be provided. In cases where the detector covers opposing directions of traffic and has a single output, a separate lamp for each direction shall be provided but they shall have identical indications.

Confirmation Beacon, Dual Channel - A separate LED lamp with appropriate separate indications for each direction shall be provided.

It shall be the Contractor's responsibility to verify the existing brand of emergency vehicle equipment at the intersection and the confirmation beacons must be completely compatible with all existing components. The Confirmation Beacon shall consist of a 6 watt Par 38 LED flood lamp with a 30 degree light spread, or a 7 watt Par 30 LED flood lamp with a 15 degree or greater spread, maximum 7 watt energy consumption at 120V, and a 2,000 hour warranty for each direction of pre-emption. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum or stainless steel. No new holes may be drilled into signal poles, mast arms, or posts. The Confirmation Beacon shall be mounted to the existing light detector hardware as shown on the mounting detail in the plans. In order to maintain uniformity between communities, the Confirmation Beacons shall indicate when the control equipment receives the pre-emption signal. The pre-emption movement shall be signaled by a flashing indication at the rate specified by Section 4L.01 of the "Manual on Uniform Traffic Control Devices," and other applicable sections of future editions. The stopped pre-empted movements shall be signaled by a continuous indication.

Any modification required to the existing light detector installation to meet the requirements of the mounting detail shown in the plans shall be included in this item.

**Basis of Payment.**

This work will be paid for at the contract unit price per each for CONFIRMATION BEACON.



## **PEDESTRIAN PUSH-BUTTON**

Effective: May 22, 2002  
888.01TS

Revised: July 1, 2015

### **Description.**

Revise Article 888.01 of the Standard Specifications to read:

This work shall consist of furnishing and installing a latching (single call) or non-latching (dual call) pedestrian push-button and a regulatory pedestrian instruction sign according to MUTCD, sign series R10-3e 9" x 15" sign with arrow(s) for a count-down pedestrian signal. The pedestrian station sign size without count-down pedestrian signals shall accommodate a MUTCD sign series R10-3b or R10-3d 9" x 12" sign with arrow(s).

### **Installation.**

Add the following to Article 888.03 of the Standard Specifications:

A mounting bracket and/or extension shall be used to assure proper orientation when two pedestrian push buttons are required for one post. The price of the bracket and/or extension shall be included in the cost of the pedestrian push button. The contractor is not allowed to install a push-button assembly with the sign below the push-button in order to meet mounting requirements.

### **Materials.**

Revise Article 1074.02(a) of the Standard Specifications to read:

The pedestrian push-button housing shall be constructed of aluminum alloy according to ASTM B 308 6061-T6 and powder coated yellow, unless otherwise noted on the plans. The housing shall be furnished with suitable mounting hardware.

Revise Article 1074.02(e) of the Standard Specifications to read:

Stations shall be designed to be mounted to a post, mast arm pole or wood pole. The station shall be aluminum and shall accept a 3 inch (75mm) round push-button assembly and a regulatory pedestrian instruction sign according to MUTCD, sign series R10-3e 9" x 15" sign with arrow(s) for a count-down pedestrian signal. The pedestrian station size without count-down pedestrian signals shall accommodate a MUTCD sign series R10-3b or R10-3d 9" x 12" sign with arrow(s).

Add the following to Article 1074.02 of the Standard Specifications:

- (f) Location. Pedestrian push-buttons and stations shall be mounted to a post, mast arm pole or wood pole as shown on the plans and shall be fully ADA accessible from a paved or concrete surface. See the District's Detail sheets for orientation and mounting details.

### **Basis of Payment.**

Revise Article 888.04 of the Standard Specifications to read:

This work will be paid for at the contract unit price per each for PEDESTRIAN PUSH-BUTTON or PEDESTRIAN PUSH-BUTTON, NON-LATCHING.

## **ACCESSIBLE PEDESTRIAN SIGNALS**

Effective: April 1, 2003  
888.02TS

Revised: July 1, 2015

### **Description.**

This work shall consist of furnishing and installing pedestrian push button accessible pedestrian signals (APS) type. Each APS shall consist of an interactive vibrotactile pedestrian pushbutton with speaker, an informational sign, a light emitting diode (LED) indicator light, a solid state electronic control board, a power supply, wiring, and mounting hardware. The APS shall meet the requirements of the MUTCD and Sections 801 and 888 of the Standard Specifications, except as modified herein.

### **Electrical Requirements.**

The APS shall operate with systems providing 95 to 130 VAC, 60 Hz and throughout an ambient air temperature range of -29 to +160 °F (-34 to +70 °C).

The APS shall contain a power protection circuit consisting of both fuse and transient protection.

### **Audible Indications.**

A pushbutton locator tone shall sound at each pushbutton with volume settings a maximum of 5 dBA louder than ambient sound.

If two accessible pedestrian pushbuttons are placed less than 10 ft (3 m) apart or placed on the same pole, the audible walk indication shall be a speech walk message.

A clear, verbal message shall be used to communicate the pedestrian walk interval. This message shall sound throughout the WALK interval only. The verbal message shall be modeled after: "Street Name." Walk Sign is on to cross "Street Name." No other messages shall be used to denote the WALK interval.

Where two accessible pedestrian pushbuttons are separated by at least 10 ft (3 m), the walk indication shall be an audible percussive tone. It shall repeat at 8 to 10 ticks per second with a dominant frequency of 880 Hz.

Automatic volume adjustments in response to ambient traffic sound level shall be provided up to a maximum volume of 100 dBA. Locator tone and verbal messages shall be no more than 5 dB louder than ambient sound.

### **Pedestrian Pushbutton.**

Pedestrian pushbuttons shall be at least 2 in. (50 mm) in diameter or width. The force required to activate the pushbutton shall be no greater than 3.5 lb (15.5 N).

A red LED indicator shall be located on or near the pushbutton which, when activated, acknowledges the pedestrians request to cross the street. The recorded messages and roadway designations shall be confirmed with the engineer and included with submitted product data.

**Signage.**

A sign shall be located immediately above the pedestrian pushbutton and parallel to the crosswalk controlled by the pushbutton. The sign shall be one of the following standard MUTCD designs: R10-3b, R10-3d, or R10-3e.



**Tactile Arrow.**

A tactile arrow, pointing in the direction of travel controlled by a pushbutton, shall be provided either on the pushbutton or its sign.

**Vibrotactile Feature.**

The pushbutton shall pulse when depressed and shall vibrate continuously throughout the WALK interval.

**Training.**

The Contractor shall provide APS onsite training for Department personnel and person(s) or group that requested the installation of the APS. APS features and operation shall be demonstrated during the training. The training shall be presented by the APS equipment supplier. Time, date, and location of the training and demonstration shall be coordinated with the Engineer.

**Basis of Payment.**

This work will be paid for at the contract unit price each for a pedestrian push button, ACCESSIBLE PEDESTRIAN SIGNALS type and shall include furnishing, installation, mounting hardware, message programming, and training.

**TEMPORARY TRAFFIC SIGNAL INSTALLATION**

Effective: May 22, 2002  
890.01TS

Revised: July 1, 2015

Revise Section 890 of the Standard Specifications to read:

**Description.**

This work shall consist of furnishing, installing, maintaining, and removing a temporary traffic signal installation as shown on the plans, including but not limited to temporary signal heads, emergency vehicle priority systems, interconnect, vehicle detectors, uninterruptable power supply, and signing. Temporary traffic signal controllers and cabinets interconnected to railroad traffic control devices shall be new. When temporary traffic signals will be operating within a county or local agency Traffic Management System, the equipment must be NTCIP compliant and compatible with the current operating requirements of the Traffic Management System.

**General.**

Only an approved controller equipment supplier will be allowed to assemble temporary traffic signal and railroad traffic signal cabinet. Traffic signal inspection and TURN-ON shall be according to 800.01TS TRAFFIC SIGNAL GENERAL REQUIREMENTS special provision.

**Construction Requirements.**

(a) Controllers.

1. Only controllers supplied by one of the District approved closed loop equipment supplier will be approved for use at temporary signal locations. All controllers used for temporary traffic signals shall be fully actuated NEMA microprocessor based with RS232 data entry ports compatible with existing monitoring software approved by IDOT District 1, installed in NEMA TS2 cabinets with 8 phase back panels, capable of supplying 255 seconds of cycle length and individual phase length settings up to 99 seconds. On projects with one lane open and two way traffic flow, such as bridge deck repairs, the temporary signal controller shall be capable of providing an adjustable all red clearance setting of up to 30 seconds in length. All controllers used for temporary traffic signals shall meet or exceed the requirements of Section 857 of the Standard Specifications with regards to internal time base coordination and preemption. All railroad interconnected temporary controllers and cabinets shall be new and shall satisfy the requirements of Article 857.02 of the Standard Specifications and as modified herein.
2. Only control equipment, including controller cabinet and peripheral equipment, supplied by one of the District approved closed loop equipment suppliers will be approved for use at temporary traffic signal locations. All control equipment for the temporary traffic signal(s) shall be furnished by the Contractor unless otherwise stated in the plans. On projects with multiple temporary traffic signal installations, all controllers shall be the same manufacturer brand and model number with the latest version software installed at the time of the signal TURN-ON.

(b) Cabinets. All temporary traffic signal cabinets shall have a closed bottom made of aluminum alloy. The bottom shall be sealed along the entire perimeter of the cabinet base to ensure a water, dust and insect-proof seal. The bottom shall provide a minimum of two (2) 4 inch (100 mm) diameter holes to run the electric cables through. The 4 inch (100 mm) diameter holes shall have a bushing installed to protect the electric cables and shall be sealed after the electric cables are installed.

(c) Grounding. Grounding shall be provided for the temporary traffic signal cabinet meeting or exceeding the applicable portions of the National Electrical Code, Section 806 of the Standard Specifications and shall meet the requirements of the 806.01TS GROUNDING OF TRAFFIC SIGNAL SYSTEMS special provision.

- (d) Traffic Signal Heads. All traffic signal sections shall be 12 inches (300 mm). Pedestrian signal sections shall be 16 inch (406mm) x 18 inch (457mm). Traffic signal sections shall be LED with expandable view, unless otherwise approved by the Engineer. Pedestrian signal heads shall be Light Emitting Diode (LED) Pedestrian Countdown Signal Heads except when a temporary traffic signal is installed at an intersection interconnected with a railroad grade crossing. When a temporary traffic signal is installed at an intersection interconnected with a railroad grade crossing, Light Emitting Diode (LED) Pedestrian Signal Heads shall be furnished. The temporary traffic signal heads shall be placed as indicated on the temporary traffic signal plan or as directed by the Engineer. If no traffic staging is in place or will not be staged on the day of the turn on, the temporary traffic signal shall have the signal head displays, signal head placements and controller phasing match the existing traffic signal or shall be as directed by the engineer. The Contractor shall furnish enough extra cable length to relocate heads to any position on the span wire or at locations illustrated on the plans for construction staging. The temporary traffic signal shall remain in operation during all signal head relocations. Each temporary traffic signal head shall have its own cable from the controller cabinet to the signal head.
- (e) Interconnect.
1. Temporary traffic signal interconnect shall be provided using fiber optic cable or wireless interconnect technology as specified in the plans. The Contractor may request, in writing, to substitute the fiber optic temporary interconnect indicated in the contract documents with a wireless interconnect. The Contractor must provide assurances that the radio device will operate properly at all times and during all construction staging. If approved for use by the Engineer, the Contractor shall submit marked-up traffic signal plans indicating locations of radios and antennas and installation details. If wireless interconnect is used, and in the opinion of the engineer, it is not viable, or if it fails during testing or operations, the Contractor shall be responsible for installing all necessary poles, fiber optic cable, and other infrastructure for providing temporary fiber optic interconnect at no cost to the contract.
  2. The existing system interconnect and phone lines are to be maintained as part of the Temporary Traffic Signal Installation specified for on the plan. The interconnect, including any required fiber splices and terminations, shall be installed into the temporary controller cabinet as per the notes or details on the plans. All labor and equipment required to install and maintain the existing interconnect as part of the Temporary Traffic Signal Installation shall be included in the cost of TEMPORARY TRAFFIC SIGNAL INSTALLATION. When shown in the plans, temporary traffic signal interconnect equipment shall be furnished and installed. The temporary traffic signal interconnect shall maintain interconnect communications throughout the entire signal system for the duration of the project. Any temporary signal within an existing closed loop traffic signal system shall be interconnected to that system using similar brand control equipment at no additional cost to the contract.

3. Temporary wireless interconnect. The radio interconnect system shall be compatible with Eagle or Econolite controller closed loop systems. This work shall include all temporary wireless interconnect components, at the adjacent existing traffic signal(s) to provide a completely operational closed loop system. This work shall include all materials, labor and testing to provide the completely operational closed loop system as shown on the plans. The radio interconnect system shall include the following components:
  - a. Rack or Shelf Mounted RS-232 Frequency Hopping Spread Spectrum (FHSS) Radio
  - b. Software for Radio Configuration (Configure Frequency and Hopping Patterns)
  - c. Antennas (Omni Directional or Yagi Directional)
  - d. Antenna Cables, LMR400, Low Loss. Max. 100-ft from controller cabinet to antenna
  - e. Brackets, Mounting Hardware, and Accessories Required for Installation
  - f. RS232 Data Cable for Connection from the radio to the local or master controller
  - g. All other components required for a fully functional radio interconnect system

All controller cabinet modifications and other modifications to existing equipment that are required for the installation of the radio interconnect system components shall be included in the cost of TEMPORARY TRAFFIC SIGNAL INSTALLATION.

The radio interconnect system may operate at 900Mhz (902-928) or 2.4 Ghz depending on the results of a site survey. The telemetry shall have an acceptable rate of transmission errors, time outs, etc. comparable to that of a hardware system.

The proposed or existing master controller and telemetry module shall be configured for use with the radio interconnect at a minimum rate of 9600 baud. The radio interconnect system shall include all other components required for a complete and fully functional telemetry system and shall be installed in accordance to the vendors recommendations.

- (f) Emergency Vehicle Pre-Emption. All emergency vehicle preemption equipment (light detectors, light detector amplifiers, confirmation beacons, etc.) as shown on the temporary traffic signal plans shall be provided by the Contractor. It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle preemption equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of the equipment currently in use by the Agency. All light operated systems shall operate at a uniform rate of 14.035 hz  $\pm$ 0.002, or as otherwise required by the Engineer, and provide compatible operation with other light systems currently being operated in the District. All labor and material required to install and maintain the Emergency Vehicle Preemption installation shall be included in the item Temporary Traffic Signal Installation.

- (g) Vehicle Detection. All temporary traffic signal installations shall have vehicular detection installed at all approaches of the intersection and as directed by the Engineer. Pedestrian push buttons shall be provided for all pedestrian signal heads/phases as directed by the Engineer. Microwave vehicle sensors or video vehicle detection system shall be approved by IDOT prior to Contractor furnishing and installing. The Contractor shall install, wire, and adjust the alignment of the microwave vehicle sensor or video vehicle detection system in accordance to the manufacturer's recommendations and requirements. The Contractor shall be responsible for adjusting the alignment of the microwave vehicle sensor or video vehicle detection system for all construction staging changes and for maintaining proper alignment throughout the project. An equipment supplier shall be present and assist the contractor in setting up and maintaining the microwave vehicle sensor or video vehicle detection system. An in-cabinet video monitor shall be provided with all video vehicle detection systems and shall be included in the item Temporary Traffic Signal Installation.
- (h) Uninterruptable Power Supply. All temporary traffic signal installations shall have Uninterruptable Power Supply (UPS). The UPS cabinet shall be mounted to the temporary traffic signal cabinet and shall be according to the applicable portions of Section 862 of the Standard Specifications and as modified in 862.01TS UNINTERRUPTABLE POWER SUPPLY, SPECIAL Special Provision.
- (i) Signs. All existing street name and intersection regulatory signs shall be removed from existing poles and relocated to the temporary signal span wire. If new mast arm assembly and pole(s) and posts are specified for the permanent signals, the signs shall be relocated to the new equipment at no extra cost. Any intersection regulatory signs that are required for the temporary traffic signal shall be provided as shown on the plans or as directed by the Engineer. Relocation, removing, bagging and installing the regulatory signs for the various construction stages shall be provided as shown on the plans or as directed by the Engineer. If Illuminated Street Name Signs exist they shall be taken down and stored by the contractor and reflecting street name signs shall be installed on the temporary traffic signal installation.
- (j) Energy Charges. The electrical utility energy charges for the operation of the temporary traffic signal installation shall be paid for by others if the installation replaces an existing signal. Otherwise charges shall be paid for under 109.05 of the Standard Specifications.
- (k) Maintenance. Maintenance shall meet the requirements of the Standard Specifications and 850.01TS MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION Special Provisions. Maintenance of temporary signals and of the existing signals shall be included in the cost of the TEMPORARY TRAFFIC SIGNAL INSTALLATION pay item. When temporary traffic signals are to be installed at locations where existing signals are presently operating, the Contractor shall be fully responsible for the maintenance of the existing signal installation as soon as he begins any physical work on the Contract or any portion thereof. In addition, a minimum of seven (7) days prior to assuming maintenance of the existing traffic signal installation(s) under this Contract, the Contractor shall request that the Resident Engineer contact the Bureau of Traffic Operations (847) 705-4424 for an inspection of the installation(s).

- (l) Temporary Traffic Signals for Bridge Projects. Temporary Traffic Signals for bridge projects shall follow the State Standards, Standard Specifications, Special Provisions and any plans for Bridge Temporary Traffic Signals included in the plans. The installation shall meet the Standard Specifications and all other requirements in this TEMPORARY TRAFFIC SIGNAL INSTALLATION specification. In addition all electric cable shall be aerially suspended, at a minimum height of 18 feet (5.5m) on temporary wood poles (Class 5 or better) of 45 feet (13.7 m) minimum height. The signal heads shall be span wire mounted or bracket mounted to the wood pole or as directed by the Engineer. The Controller cabinet shall be mounted to the wood pole as shown in the plans, or as directed by the Engineer. Microwave vehicle sensors or video vehicle detection system may be used in place of detector loops as approved by the Engineer.
- (m) Temporary Portable Traffic Signal for Bridge Projects.
1. Unless otherwise directed by the Engineer, temporary portable traffic signals shall be restricted to use on roadways of less than 8000 ADT that have limited access to electric utility service, shall not be installed on projects where the estimated need exceeds ten (10) weeks, and shall not be in operation during the period of November through March. The Contractor shall replace the temporary portable traffic signals with temporary span wire traffic signals noted herein at no cost to the contract if the bridge project or Engineer requires temporary traffic signals to remain in operation into any part of period of November through March. If, in the opinion of the Engineer, the reliability and safety of the temporary portable traffic signal is not similar to that of a temporary span wire traffic signal installation, the Contractor shall replace the temporary portable traffic signals with temporary span wire traffic signals at no cost to the contract.
  2. The controller and LED signal displays shall meet the applicable Standard Specifications and all other requirements in this TEMPORARY TRAFFIC SIGNAL INSTALLATION special provision.
  3. Work shall be according to Article 701.18(b) of the Standard Specifications except as noted herein.
  4. General.
    - a. The temporary portable bridge traffic signals shall be trailer-mounted units. The trailer-mounted units shall be set up securely and level. Each unit shall be self-contained and consist of two signal heads. The left signal head shall be mounted on a mast arm capable of extending over the travel lane. Each unit shall contain a solar cell system to facilitate battery charging. There shall be a minimum of 12 days backup reserve battery supply and the units shall be capable of operating with a 120 V power supply from a generator or electrical service.
    - b. All signal heads located over the travel lane shall be mounted at a minimum height of 17 feet (5m) from the bottom of the signal back plate to the top of the road surface. All far right signal heads located outside the travel lane shall be mounted at a minimum height of 8 feet (2.5m) from the bottom of the signal back plate to the top of the adjacent travel lane surface.
    - c. The long all red intervals for the traffic signal controller shall be adjustable up to 250 seconds in one-second increments.



- d. As an alternative to detector loops, temporary portable bridge traffic signals may be equipped with microwave sensors or other approved methods of vehicle detection and traffic actuation.
- e. All portable traffic signal units shall be interconnected using hardwire communication cable. Radio communication equipment may be used only with the approval of the Engineer. If radio communication is used, a site analysis shall be completed to ensure that there is no interference present that would affect the traffic signal operation. The radio equipment shall meet all applicable FCC requirements.
- f. The temporary portable bridge traffic signal system shall meet the physical display and operational requirements of conventional traffic signals as specified in Part IV and other applicable portions of the currently adopted version of the Manual on Uniform Traffic Control Devices (MUTCD) and the Illinois MUTCD. The signal system shall be designed to continuously operate over an ambient temperature range between -30 °F (-34 °C) and 120 °F (48 °C). When not being utilized to inform and direct traffic, portable signals shall be treated as nonoperating equipment according to Article 701.11.
- g. Basis of Payment. This work will be paid for according to Article 701.20(c).

**Basis of Payment.**

This work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL INSTALLATION, TEMPORARY BRIDGE TRAFFIC SIGNAL INSTALLATION, or TEMPORARY PORTABLE BRIDGE TRAFFIC SIGNAL INSTALLATION, the price of which shall include all costs for the modifications required for traffic staging, changes in signal phasing as required in the Contract plans, microwave vehicle sensors, video vehicle detection system, any maintenance or adjustment to the microwave vehicle sensors/video vehicle detection system, the temporary wireless interconnect system, temporary fiber optic interconnect system, all material required, the installation and complete removal of the temporary traffic signal, and any changes required by the Engineer. Each intersection will be paid for separately.

**TEMPORARY TRAFFIC SIGNAL TIMING**

Effective: May 22, 2002  
890.02TS

Revised: July 1, 2015

**Description.**

This work shall consist of developing and maintaining appropriate traffic signal timings for the specified intersection for the duration of the temporary signalized condition, as well as impact to existing traffic signal timings caused by detours or other temporary conditions.

All timings and adjustments necessary for this work shall be performed by an approved Consultant who has previous experience in optimizing Closed Loop Traffic signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants.

The following tasks are associated with TEMPORARY TRAFFIC SIGNAL TIMING.

- (a) Consultant shall attend temporary traffic signal inspection (turn-on) and/or detour meeting and conduct on-site implementation of the traffic signal timings.
- (b) Consultant shall be responsible for making fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.
- (c) Consultant shall provide monthly observation of traffic signal operations in the field.
- (d) Consultant shall provide on-site consultation and adjust timings as necessary for construction stage changes, temporary traffic signal phase changes, and any other conditions affecting timing and phasing, including lane closures, detours, and other construction activities.
- (e) Consultant shall make timing adjustments and prepare comment responses as directed by the Area Traffic Signal Operations Engineer.
- (f) Return original timing plan once construction is complete.

**Basis of Payment.**

The work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL TIMING, which price shall be payment in full for performing all work described herein per intersection. When the temporary traffic signal installation is turned on and/or detour implemented, 50 percent of the bid price will be paid. The remaining 50 percent of the bid price will be paid following the removal of the temporary traffic signal installation and/or detour.

**LED INTERNALLY ILLUMINATED STREET NAME SIGN**

Effective: May 22, 2002  
891.02TS

Revised: January 1, 2015

**Description.**

This work shall consist of furnishing and installing a LED internally illuminated street name sign.

**Materials.**

The illuminated street name sign shall be as follows.

(a) Description.

The LEDs shall be white in color. The LED internally illuminated street name sign shall display the designated street name clearly and legibly in the daylight hours without being energized and at night when energized. White translucent reflective sheeting sign faces with the street name applied in transparent green shall be installed on the street sign acrylic panels which shall be affixed to the interior of the sign enclosure. Hinged door(s) on the side of the sign shall be provided for easy access to perform general cleaning and maintenance operations. Illumination shall occur with LED Light Engine as specified.

(b) Environmental Requirements.

The LED lamp shall be rated for use in the ambient operating temperature range of -40 to +50°C (-40 to +122°F) for storage in the ambient temperature range of -40 to +75°C (-40 to +167°F).

(c) General Construction.

1. The LED components, power supply, and wiring harness shall be arranged as to allow for maintenance, up to and including the replacement of all three components, by the local Agency where the sign is installed. The LED Light Engine shall be mounted in the top and/or bottom of the sign housing and no components of the light source shall sit between the sign faces.
2. The assembly and manufacturing processes of the LED Light Engine shall be designed to ensure that all LED and electronic components are adequately supported to withstand mechanical shocks and vibrations in compliance with the specifications of the ANSI, C136.31-2001 standards.

(d) Mechanical Construction.

1. The sign shall be constructed using a weatherproof, aluminum housing consisting of an extruded aluminum with the maximum sign dimensions of 30" in height, 96" in length, 10.75" in depth (including the drip edge) and shall not weight more than 92 pounds. All corners are continuous TIG (Tungsten Inert Gas) welded to provide a weatherproof seal around the entire housing.
2. Two corners are continuous TIG welded with the other two screwed together to make one side of the door removable for installation of the sign face. The door is fastened to the housing on the bottom by a full length stainless steel hinge. The sign shall also be fabricated in a way to ensure that no components fall out while a technician is opening or working inside the sign enclosure. The door shall be held secure onto a 1" wide by 5/32" thick neoprene gasket by an appropriate number of quarter-turn fasteners to form a watertight seal between the door and the housing.
3. The sign face shall be constructed of .125" white translucent polycarbonate or acrylic. Sign legend shall be according to D1 Mast Arm Mounted Street Name Sign detail and MUTCD. The sign face legend background shall consist of translucent DG<sup>3</sup> white diamond grade sheeting (ASTM Type 9) and transparent green acrylic EC (electronic cut-able) film applied to the front of the sign face. The legend shall be framed by a white border. A logo symbol and/or name of the community may be included with approval of the Engineer.
4. All surfaces of the sign shall be powder coated.
5. All fasteners and hardware shall be corrosion resistant stainless steel. No special tools shall be required for routine maintenance.
6. All wiring shall be secured by insulated wire compression nuts or barrier type terminal blocks.
7. A wire entrance junction box shall be supplied with the sign assembly. The box may be supplied mounted to the exterior or interior of the sign and provide a weather tight seal.
8. A photoelectric switch shall be mounted in the control cabinet to control lighting functions for day and night display. Each sign shall be individually fused.
9. Brackets and Mounting: LED internally illuminated street name signs will be factory drilled to accommodate mast arm two-point support assembly mounting brackets.

(e) Electrical.

1. Photocell shall be rated 105-305V, turn on at 1.5 fcs. with a 3-5 second delay. A manufacturer's warranty of six (6) years shall be provided. Power consumption shall be no greater than 1 watt at 120V.
2. The LED Light Engine shall operate from a 60 +/- 3 cycle AC line power over a voltage range of 80 to 135 Vac rms. Fluctuations in line voltage over the range of 80 to 135 Vac shall not affect luminous intensity by more than +/- 10%.
3. Total harmonic distortion induced into the AC power line by the LED Light Engine, operated at a nominal operating voltage, and at a temperature of +25°C (+77°F), shall not exceed 20%.
4. The LED Light Engine shall cycled ON and OFF with a photocell as shown on the detail sheet and shall not exceed 120 Watts. The signs shall not be energized when traffic signals are powered by an alternate energy source such as a generator or uninterruptable power source (UPS). The signs shall be connected to the generator or UPS bypass circuitry.

(f) Photometric Requirements.

1. The entire surface of the sign panel shall be evenly illuminated. The average maintained luminous intensity measured across the letters, operating under the conditions defined in Environmental Requirements and Wattage Sections shall be of a minimum value of 100 cd/m<sup>2</sup>.
2. The manufacturer shall make available independent laboratory test results to verify compliance to Voltage Range and Luminous Intensity Distribution Sections.
3. LED shall have a color temperature of 5200k nominal, CRI of 80 with a life expectancy of 75,000 hrs.

(g) Quality Assurance.

The LED Light Engine shall be manufactured in accordance with a vendor quality assurance (QA) program. The production QA shall include statistically controlled routine tests to ensure minimum performance levels of the LED Light Engine build to meet this specification. QA process and test result documentations shall be kept on file for a minimum period of seven (7) years. The LED Light Engine that does not satisfy the production QA testing performance requirements shall not be labeled, advertised, or sold as conforming to these specifications. Each LED Light Engine shall be identified by a manufacturer's serial number for warranty purposes. LED Light Engines shall be replaced or repaired if they fail to function as intended due to workmanship or material defects within the first sixty (60) months from the date of acceptance. LED Light Engines that exhibit luminous intensities less than the minimum value specified in Photometric Section within the first thirty-six (36) months from the date of acceptance shall be replaced or repaired.

**Installation.**

The sign can be mounted on most steel mast arm poles. Mounting on aluminum mast arm pole requires supporting structural calculations. Some older or special designed steel mast arm poles may require structural evaluation to assure that construction of the mast arm pole is adequate for the proposed additional loading. Structural calculations and other supporting documentation as determined by the Engineer shall be provided by the contractor for review by the Department.

The sign shall be located on a steel traffic signal mast arm no further than 8-feet from the center of the pole to the center of the sign at a height of between 16 to 18-feet above traveled pavement. Mounting hardware shall be from an approved vendor, utilizing stainless steel components.

Signs shall be installed such that they are not energized when traffic signals are powered by an alternate energy source such as a generator or uninterruptable power supply (UPS). The signs shall be connected to the generator or UPS bypass circuitry.

**Basis of Payment.**

This work will be paid for at the contract unit price each for LED INTERNALLY ILLUMINATED STREET NAME SIGN, of the length as specified in the contract plans which shall be payment in full for furnishing and installing the LED internally illuminated street name sign, complete with circuitry and mounting hardware including photo cell, circuit breaker, fusing, relay, connections and cabling as shown on the plans for proper operation and installation.

**MODIFY EXISTING CONTROLLER CABINET**

Effective: May 22, 2002  
895.01TS

Revised: July 1, 2015

The work shall consist of modifying an existing controller cabinet as follows:

- (a) Uninterruptable Power Supply (UPS). The addition of uninterruptable power supply (UPS) to an existing controller cabinet could require the relocation of the existing controller cabinet items to allow for the installation of the uninterruptable power supply (UPS) components inside the existing controller cabinet as outlined under Sections 862 and 1074.04 of the Standard Specifications and the wiring of UPS alarms.
- (b) Light Emitting Diode (LED) Signal Heads, Light Emitting Diode (LED) Optically Programmed Signal Heads and Light Emitting Diode (LED) Pedestrian Signal Heads. The contractor shall verify that the existing load switches meet the requirements of Section 1074.03(b)(2) of the Standard Specifications and the recommended load requirements of the light emitting diode (LED) signal heads that are being installed at the existing traffic signal. If any of the existing load switches do not meet these requirements, they shall be replaced, as directed by the Engineer.
- (c) Light Emitting Diode (LED), Signal Head, Retrofit. The contractor shall verify that the existing load switches meet the requirements of Section 1074.03(b)(2) of the Standard Specifications and the recommended load requirements of light emitting diode (LED) traffic signal modules, pedestrian signal modules, and pedestrian countdown signal modules as specified in the plans. If any of the existing load switches do not meet these requirements, they shall be replaced, as directed by the Engineer.
- (d) This item shall include the upgrade of all non-railroad controller software to the latest version available at the time of the signal TURN-ON.

**Basis of Payment.**

Modifying an existing controller cabinet will be paid for at the contract unit price per each for MODIFY EXISTING CONTROLLER CABINET. This shall include all material and labor required to complete the work as described above, the removal and disposal of all items removed from the controller cabinet, as directed by the Engineer. The equipment for the Uninterruptable Power Supply (UPS) and labor to install it in the existing controller cabinet shall be included in the pay item Uninterruptable Power Supply, Special or Uninterruptable Power Supply, Ground Mounted.

**REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT**

Effective: May 22, 2002  
895.02TS

Revised: July 1, 2015

Add the following to Article 895.05 of the Standard Specifications:

The traffic signal equipment which is to be removed and is to become the property of the Contractor shall be disposed of outside the right-of-way at the Contractor's expense.

All equipment to be returned to the State shall be delivered by the Contractor to the State's Traffic Signal Maintenance Contractor's main facility. The Contractor shall contact the State's Electrical Maintenance Contractor to schedule an appointment to deliver the equipment. No equipment will be accepted without a prior appointment. All equipment shall be delivered within 30 days of removing it from the traffic signal installation. The Contractor shall provide one hard copy and one electronic file of a list of equipment that is to remain the property of the State, including model and serial numbers, where applicable. The Contractor shall also provide a copy of the Contract plan or special provision showing the quantities and type of equipment. Controllers and peripheral equipment from the same location shall be boxed together (equipment from different locations may not be mixed) and all boxes and controller cabinets shall be clearly marked or labeled with the location from which they were removed. If equipment is not returned according to these requirements, it will be rejected by the State's Electrical Maintenance Contractor. The Contractor shall be responsible for the condition of the traffic signal equipment from the time Contractor takes maintenance of the signal installation until the acceptance of a receipt drawn by the State's Electrical Maintenance Contractor indicating the items have been returned in good condition.

The Contractor shall safely store and arrange for pick up or delivery of all equipment to be returned to agencies other than the State. The Contractor shall package the equipment and provide all necessary documentation as stated above.

Traffic signal equipment which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of these Specifications at no cost to the contract.

**MODIFY EXISTING TYPE "D" FOUNDATION**

Effective: January 1, 2002  
895.03TS

Modified: July 1, 2015

This item shall consist of the partial removal of an existing Type "D" Foundation at the location shown on the plans, or as directed by the Engineer. The existing foundation shall be removed to a depth of at least twelve (12) inches below finished grade. All concrete debris shall be disposed of outside the right-of-way. The existing conduit shall remain in place and shall be carefully protected. The new conduits from the double handhole shall be installed, if required, as shown on the plans.

The removal of the existing traffic signal controller and cabinet shall be included in this pay item, as well as the removing and reinstalling of the existing cable(s) from conduit.

Upon completion of the above work, holes for steel dowels of the size indicated shall be drilled in the remaining concrete where indicated on the drawings.

The adjacent area shall be excavated and forming with anchor bolts and new conduit stubs provided to provide a concrete foundation for a Type IV or Type V cabinet. The Contractor shall follow the recommendations of the vendor, subject to approval of the Engineer, in forming and constructing the foundation.

Provide a three (3) foot by four (4) foot wide Portland cement concrete apron sidewalk, five (5) inches thick, on the side of the access door to the controller to facilitate servicing the controller and cabinet.

Anchor bolts shall be new and shall meet all the requirements of Section 1006.09 of the Standard Specifications.

**Basis of Payment.**

This work shall be paid for at the contract unit price each for MODIFY EXISTING TYPE "D" FOUNDATION.

**REBUILD EXISTING HANDHOLE**

Effective: January 1, 2002  
895.04TS

Revised: July 1, 2015

This item shall consist of rebuilding and bringing to grade a handhole at a location shown on the plans or as directed by the Engineer. The work shall consist of removing the handhole frame and cover and the walls of the handhole to a depth of eight (8) inches below the finished grade.

Upon completion of the above work, four (4) holes, four (4) inches in depth and one half (1/2) inch in diameter, shall be drilled into the remaining concrete; one hole centered on each of the four handhole walls. Four (4) #3 steel dowels, eight (8) inches in length, shall be furnished and shall be installed in the drilled holes with a masonry epoxy.

All concrete debris shall be disposed of outside the right-of-way.

The area adjacent to each side of the handhole shall be excavated to allow forming. All steel hooks, handhole frame, cover, and concrete shall be provided to construct a rebuilt handhole according to applicable portions of Section 814 of the Standard Specification and as modified in 814.01TS HANDHOLES Special Provision. The existing frame and cover shall be replaced if it was damaged during removal or as determined by the Engineer.

**Basis of Payment.**

This work shall be paid for at the contract unit price each for REBUILD EXISTING HANDHOLE, which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above and as indicated on the drawings.

**REBUILD EXISTING HANDHOLE TO HEAVY-DUTY HANDHOLE**

Effective: January 1, 2002  
895.05TS

Revised: July 1, 2015

This item shall consist of partial removal of an existing concrete traffic signal handhole, reconstruction to the specifications of heavy duty handhole including new frame and cover, and bringing it to grade at location(s) shown in the plans or as directed by the Engineer. This work shall consist of removing the existing handhole frame and cover and the walls of the handhole to a depth of fifteen (15) inches below the finished grade.

Upon completion of the above work, four (4) holes, four (4) inches in depth, and one-half (1/2) inch in diameter shall be drilled into the top of the remaining concrete; one hole centered into each of the four handhole walls. Four (4) #3 steel dowels eight inches in length, shall be furnished and installed in the drilled holes with a masonry epoxy.

All concrete debris shall be disposed of outside the right-of-way.

Any pavement or asphalt surface removal required to install the new concrete shall have straight and neat edges using a method approved by the Engineer. Care shall be taken to protect the existing traffic signal cable. Any cable damage shall be reported immediately and repaired as directed by the Area Traffic Signal Engineer.

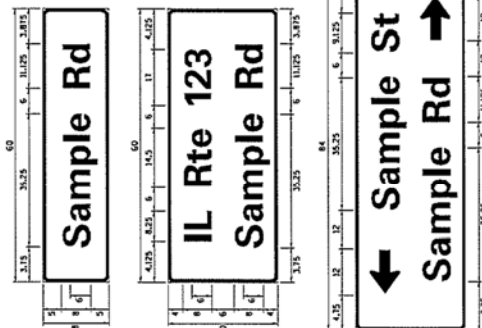
All steel hooks, handhole frame, cover, and concrete shall be provided to construct a rebuilt heavy duty handhole according to applicable portions of Section 814 of the Standard Specification and as modified in 814.01TS HANDHOLES Special Provision.

**Basis of Payment.**

This work shall be paid for at the contract unit price each for REBUILD EXISTING HANDHOLE TO HEAVY-DUTY HANDHOLE.



SIGN PANEL - TYPE 1 OR TYPE 2



DESIGN AREA	SIGN PANEL SHEETING REQUIRED	WHITE SHEETING REQUIRED
1 OR 2	1	2
3	2	2

ALL DIMENSIONS ARE IN INCHES EXCEPT NOTED OTHERWISE

COMMON STREET NAME ABBREVIATIONS AND WIDTHS

NAME	ABBREVIATION	SERIES "C" WIDTH (INCH)	SERIES "D" WIDTH (INCH)
AVENUE	AV	18,000	18,250
BOULEVARD	BL	11,125	13,000
COURT	CT	6,250	6,475
DRIVE	DR	18,375	18,625
HIGHWAY	HWY	18,375	18,625
ILLINOIS	IL	1,000	8,250
LANE	LN	11,125	11,375
PARKWAY	Pkwy	23,375	23,625
PLACE	PL	1,125	1,750
ROAD	RD	11,125	11,375
STREET	ST	8,000	9,125
TERRACE	TR	12,125	14,625
UNITED STATES	US	10,375	12,250

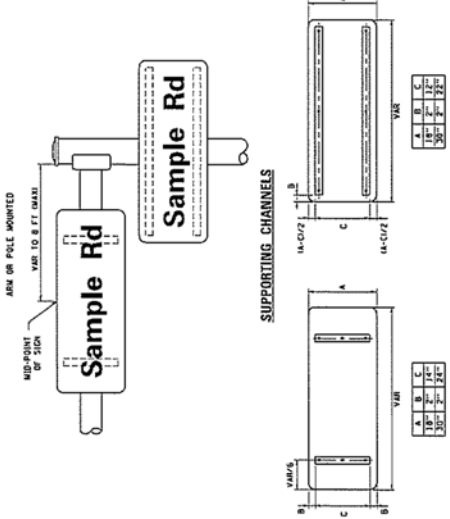
GENERAL NOTES

- WHERE MAST ARM MOUNTED STREET NAME SIGNS ARE SPECIFIED, THE MAST ARM ASSEMBLY AND POLES SHALL BE APPROXIMATELY 10 FEET TO 12 FEET HIGH. THE SIGNS SHALL BE MOUNTED ON THE MAST ARM AND BE POSITIONED AS SHOWN IN THE SIGN MANUAL AND BIDDING DOCUMENTS. THE SIGNS SHALL BE MOUNTED ON THE MAST ARM AND BE POSITIONED AS SHOWN IN THE SIGN MANUAL AND BIDDING DOCUMENTS. THE SIGNS SHALL BE MOUNTED ON THE MAST ARM AND BE POSITIONED AS SHOWN IN THE SIGN MANUAL AND BIDDING DOCUMENTS.
- ALL SIGNS SHALL CONSIST OF A WHITE LEGEND AND BORDER TYPE 2Z SHEETINGS ON A GREEN BACKGROUND (TYPE 2Z SHEETING).
- THE SIGN LENGTH SHALL BE IN INCH INCREMENTS, BUT THE OVERALL LENGTH SHALL NOT EXCEED 8'-0". ALL BORDERS SHALL BE 7/8" WIDE. CORNER RADII SHALL BE 1/4". THE SPACING BETWEEN THE WORDS SHOULD BE 6" BETWEEN THE WORDS AND THE RIGHT AND LEFT EDGES OF THE SIGN.
- A PREFERRED METHOD FOR THE SIGN DESIGN IS TO USE SERIES "D" LETTER ON A ONE-LINE SIGN OR "B" IN HEIGHT AND A MAXIMUM OF 8'-0" IN WIDTH. IF SERIES "D" DOES NOT FIT ON A 8'-3" SIGN, THEN SERIES "C" SHOULD BE USED. IF THE SIGN IS TO BE MOUNTED ON A MAST ARM, THEN SERIES "C" SHOULD BE USED. IF THE SIGN IS TO BE MOUNTED ON A MAST ARM, THEN SERIES "C" SHOULD BE USED. IF THE SIGN IS TO BE MOUNTED ON A MAST ARM, THEN SERIES "C" SHOULD BE USED.
- LED ILLUMINATED STREET NAME SIGNS CAN BE USED IN PLACE OF REGULAR SIGN PANELS BUT ANY SPECIAL WIRING SHALL BE PROVIDED BY THE CONTRACTOR. GENERAL DESIGN REQUIREMENT AS LISTED ABOVE. COLOR, FONT, SIZE, ETC. MUST BE FOLLOWED.
- SIGNIFY ALUMINUM CHANNEL FRAMING SYSTEM SHALL BE USED FOR ALL SIGNS ATTACHED TO SIGNAL POLES AND POSTS.

- LOCAL SUPPLIERS:
- WESTERN SIGN COMPANY, INC. - WESTMONT, VA.
  - WESTERN SIGN COMPANY, INC. - WESTMONT, VA.
  - WESTERN SIGN COMPANY, INC. - WESTMONT, VA.

OTHER BRANDS OF MOUNTING HARDWARE ARE ACCEPTABLE, BASED UPON THE DEPARTMENT'S APPROVAL AND COMPATIBILITY WITH THE CHANNEL/BRAKET OF THE ABOVE PRODUCT.

MOUNTING LOCATION



STANDARD ALPHABETS SPACING CHART

18" UPPER CASE AND 18" LOWER CASE

CHARACTER	FIMA SERIES "C"		FIMA SERIES "D"	
	LEFT WIDTH (INCH)	RIGHT WIDTH (INCH)	LEFT WIDTH (INCH)	RIGHT WIDTH (INCH)
A	0.240	0.512	0.240	0.512
B	0.240	0.512	0.240	0.512
C	0.240	0.512	0.240	0.512
D	0.240	0.512	0.240	0.512
E	0.240	0.512	0.240	0.512
F	0.240	0.512	0.240	0.512
G	0.240	0.512	0.240	0.512
H	0.240	0.512	0.240	0.512
I	0.240	0.512	0.240	0.512
J	0.240	0.512	0.240	0.512
K	0.240	0.512	0.240	0.512
L	0.240	0.512	0.240	0.512
M	0.240	0.512	0.240	0.512
N	0.240	0.512	0.240	0.512
O	0.240	0.512	0.240	0.512
P	0.240	0.512	0.240	0.512
Q	0.240	0.512	0.240	0.512
R	0.240	0.512	0.240	0.512
S	0.240	0.512	0.240	0.512
T	0.240	0.512	0.240	0.512
U	0.240	0.512	0.240	0.512
V	0.240	0.512	0.240	0.512
W	0.240	0.512	0.240	0.512
X	0.240	0.512	0.240	0.512
Y	0.240	0.512	0.240	0.512
Z	0.240	0.512	0.240	0.512
a	0.240	0.512	0.240	0.512
b	0.240	0.512	0.240	0.512
c	0.240	0.512	0.240	0.512
d	0.240	0.512	0.240	0.512
e	0.240	0.512	0.240	0.512
f	0.240	0.512	0.240	0.512
g	0.240	0.512	0.240	0.512
h	0.240	0.512	0.240	0.512
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j	0.240	0.512	0.240	0.512
k	0.240	0.512	0.240	0.512
l	0.240	0.512	0.240	0.512
m	0.240	0.512	0.240	0.512
n	0.240	0.512	0.240	0.512
o	0.240	0.512	0.240	0.512
p	0.240	0.512	0.240	0.512
q	0.240	0.512	0.240	0.512
r	0.240	0.512	0.240	0.512
s	0.240	0.512	0.240	0.512
t	0.240	0.512	0.240	0.512
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v	0.240	0.512	0.240	0.512
w	0.240	0.512	0.240	0.512
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z	0.240	0.512	0.240	0.512

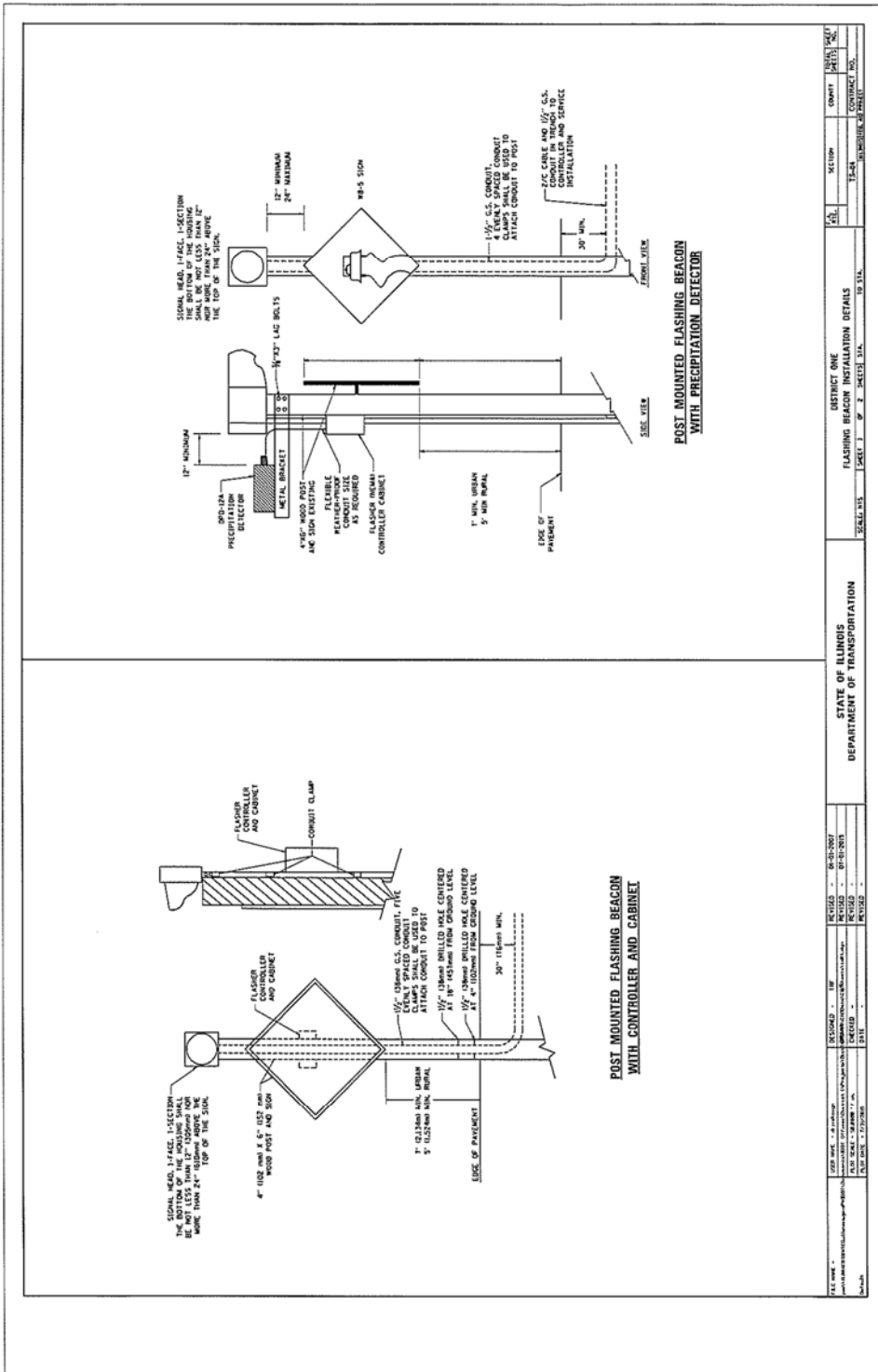
STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

DESIGN NO. 10-11-2020  
SHEET 1 OF 1

DISTRICT ONE  
MAST ARM MOUNTED STREET NAME SIGNS

SCALE: AS SHOWN

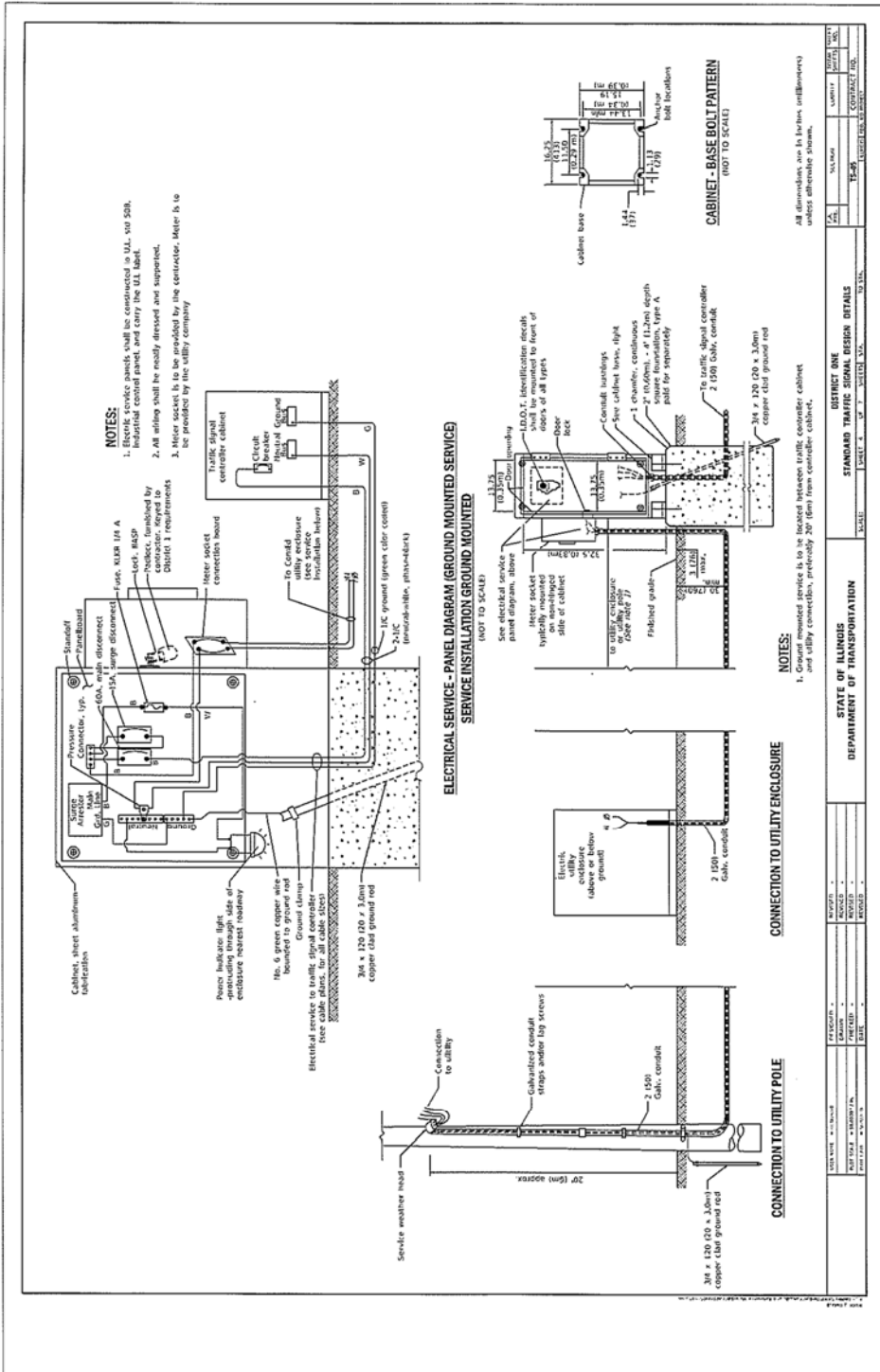
SECTION 15-1  
CONTRACT NO. 62F52

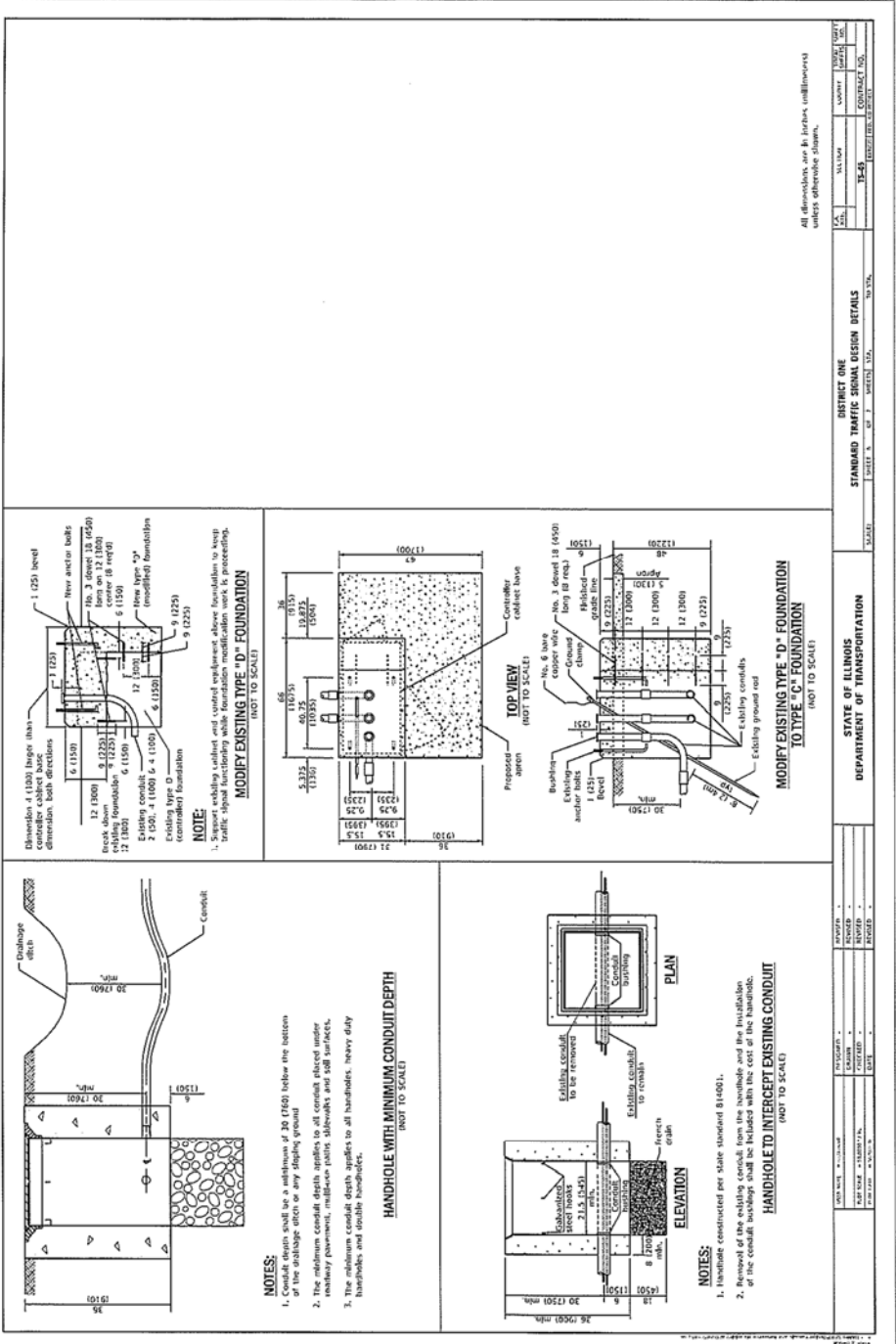


FILE NAME	DESIGNED	BY	REVISED	DATE	BY	DATE
POST-MOUNTED FLASHING BEACON WITH PRECIPITATION DETECTOR	06-01-2007	06-01-2007	06-01-2007	06-01-2007		
DESIGNED	BY	REVISED	DATE	BY	DATE	
06-01-2007	06-01-2007	06-01-2007	06-01-2007			
FILE NAME	DESIGNED	BY	REVISED	DATE	BY	DATE
POST-MOUNTED FLASHING BEACON WITH PRECIPITATION DETECTOR	06-01-2007	06-01-2007	06-01-2007	06-01-2007		
DESIGNED	BY	REVISED	DATE	BY	DATE	
06-01-2007	06-01-2007	06-01-2007	06-01-2007			

STATE OF ILLINOIS  
 DEPARTMENT OF TRANSPORTATION  
 DISTRICT ONE  
 FLASHING BEACON INSTALLATION DETAILS  
 SCALE: 3/16" = 1'-0"  
 SHEET 3 OF 3 SHEETS  
 CONTRACT NO. 62F52





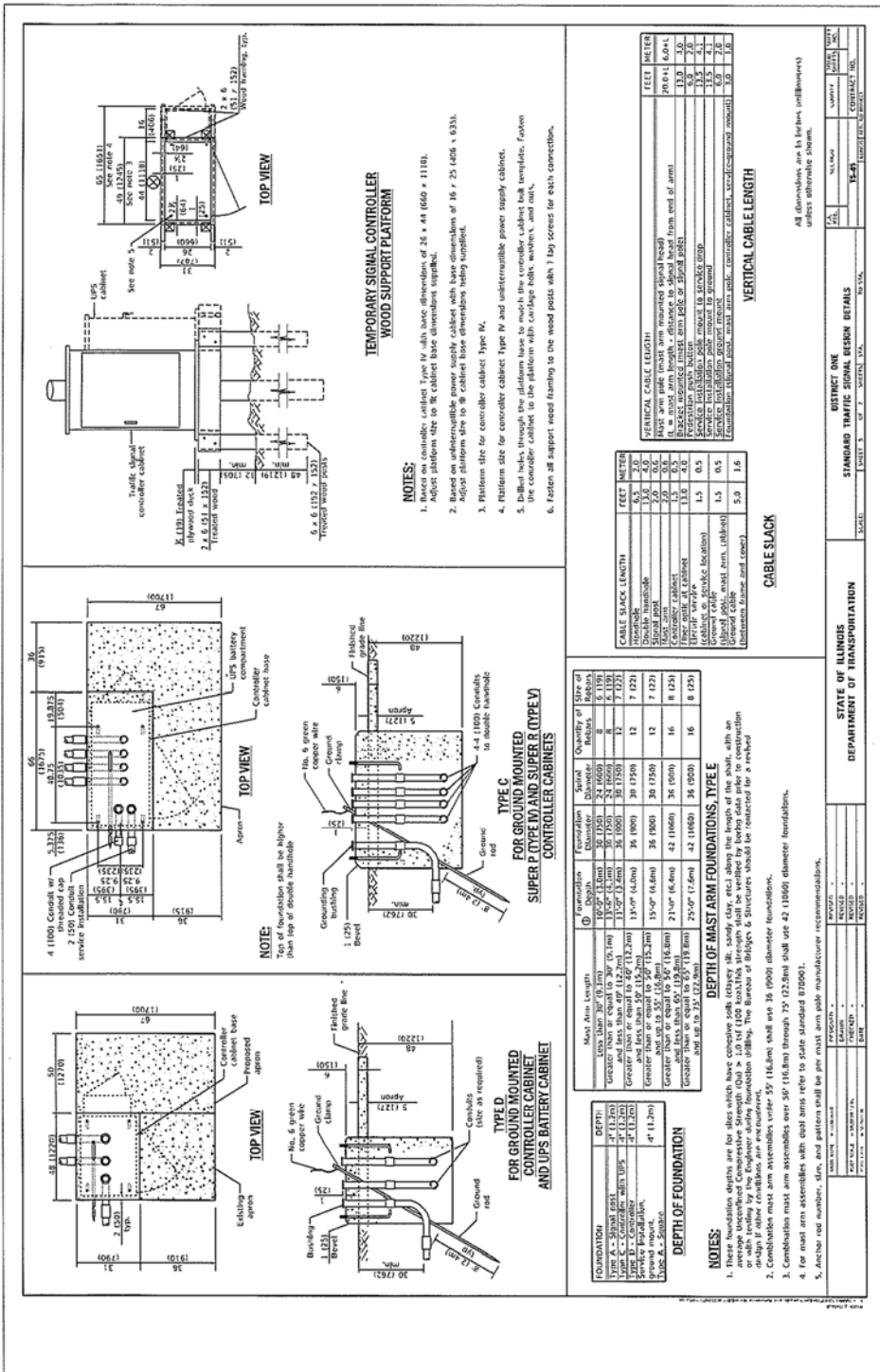


All dimensions are in inches, unless otherwise noted.

DISTRICT ONE  
STANDARD TRAFFIC SIGNAL DESIGN DETAILS  
SHEET 5 OF 7  
NO. 314

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

NO.	DATE	BY	CHKD.	APP'D.	REVISION
1	08/18/17	JL	MS	MS	ISSUED FOR BIDDING
2	08/18/17	JL	MS	MS	REVISION
3	08/18/17	JL	MS	MS	REVISION
4	08/18/17	JL	MS	MS	REVISION
5	08/18/17	JL	MS	MS	REVISION
6	08/18/17	JL	MS	MS	REVISION
7	08/18/17	JL	MS	MS	REVISION
8	08/18/17	JL	MS	MS	REVISION
9	08/18/17	JL	MS	MS	REVISION
10	08/18/17	JL	MS	MS	REVISION



**SECTION 3**

**LIST OF LOCATIONS TO BE MAINTAINED UNDER ROUTINE MAINTENANCE**

The list of locations and description of items provided herein Section 3 are for bidding purposes only. This list provides bidders locations maintained by the State's Electrical Maintenance Contractor as of May 1, 2018.

Actual quantities and equipment to be maintained is the responsibility of the Contractor as of January 1, 2019. The Contractor will be provided on January 1, 2019 the list of current locations to be maintained.

Locations go ON and OFF Maintenance continually, and this list combined with the Planned Maintenance Locations (locations currently under construction or have contract lettings scheduled) provides a good estimate of locations to be maintained by the Contractor during the Contract years of 2019 through 2021.

Review Article 2.0 Schedule of Prices for bidding information.

**LIGHTING SYSTEM -  
Pay Code L-1  
Expressway Lighting**

Loc. #	Cab.	Main Route	Cross Street	Co.	Qty.
0103	A	I 55 Stev	Martin Luther King Dr	CO	1
0105	B	I 55 Stev	Michigan Rd	CO	2
0110	C	I 55 Stev	Wentworth Ave	CO	3
0115	D	I 55 Stev	Stewart Ave	CO	4
0120	E	I 55 Stev	Loomis St	CO	5
0123	E1	I 55 Stev Incl Nav Ltg	Ashland Ave	CO	6
0125	F	I 55 Stev	Damen Ave	CO	7
0130	G	I 55 Stev	California Ave	CO	8
0133	G1	I 55 Stev	Kedzie Ave	CO	9
0135	H	I 55 Stev	Pulaski Rd Crawford Ave	CO	10
0137	H1	I 55 Stev	Pulaski Rd Tunnel	CO	11
0140	I	I 55 Stev	IL 50 Cicero Ave	CO	12
0155	J	I 55 Stev	Central Ave	CO	13
0160	K	I 55 Stev	Austin	CO	14
0165	L	I 55 Stev	IL 43 Harlem Ave	CO	15
0173	M	I 55 Stev Incl Nav Ltg	IL 171 1st Ave	CO	16
0175	N	I 55 Stev Incl Nav Ltg	IL 171 1st Ave	CO	17
0180	O	I 55 Stev	85th Ave 8500W	CO	18
0184	P	I 55 Stev	91st Ave	CO	19
0187	R	I 55 Stev	US 12 20 45 LaGrange Rd	CO	20
0188	R1	I 55 Stev	US 12 20 45 SB Ramp	CO	21

Various Routes  
Section 2017-033-I  
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0190	S	I 55 Stev	Wolf Rd I 294 Tlwy	CO	22
0193	S1	I 55 Stev	I 294 Tlwy SB to EB Joliet Rd	CO	23
0195	T	I 55 Stev	County Line Rd	CO	24
0403	A	I 57	99th St	CO	25
0405	B	I 57	Racine Ave	CO	26
0410	C	I 57	107th Pl	CO	27
0415	D	I 57	112th St	CO	28
0420	E	I 57	120th St	CO	29
0425	F	I 57	127th St	CO	30
0430	G	I 57	Vermont St	CO	31
0435	H	I 57	138th St	CO	32
0440	I	I 57	Spaulding Ave 138th	CO	33
0445	J	I 57	147th St	CO	34
0450	K	I 57	Kedzie Ave	CO	35
0453	K1	I 57	150th St	CO	36
0455	L	I 57	US 6 159th St NB	CO	37
0465	M	I 57	159th SB	CO	38
0470	N	I 57	167th St WB	CO	39
0475	O	I 57	167th St EB	CO	40
0480	T	I 57	175th St	CO	41
0485	U	I 57	I 80	CO	42
0489	V	I 57	Flossmoor Rd	CO	43
0492	W	I 57	Vollmer Rd	CO	44
0495	X	I 57	US 30 Lincoln Hwy	CO	45
0497	Y	I 57	Sauk Trail Rd	CO	46
0499	Z	I 57	Steger Rd	CO	47
0603	A	I 80 94	Burnham Ave	CO	48
0605	B	I 80 94	Torrence Ave	CO	49
0610	E	I 80	169th St	CO	50
0615	F	I 80	Crawford Ave Pulaski Rd	CO	51
0618	F1	I 80	175th St	CO	52
0620	G	I 80	Central Ave Wolf	CO	53
0625	H	I 80	Ridgeland Ave East of Harlem	CO	54
0810	C	I 190	Mannheim Rd SB Soo Line	CO	55
0815	D	I 190	DesPlaines River Rd	CO	56
0820	D1	I 90 Kenn	East River Rd	CO	57
0825	E	I 90 Kenn	Cumberland Ave	CO	58
0830	F	I 90 Kenn	Canfield Oriole Ave	CO	59
0835	G	I 90 Kenn	Sayer Ave	CO	60
0840	H	I 90 Kenn	Moody Ave Near Nagle	CO	61
0845	I	I 90 Kenn	Edmunds St	CO	62
0847	J	I 90 Kenn	Lawrence Ave	CO	63



Various Routes  
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0850	K	I 90 94 Kenn	Kedvale Ave	CO	64
0853	L	I 90 94 Kenn	Kimball Ave	CO	65
0855	M	I 90 94 Kenn	California Ave	CO	66
0857	N	I 90 94 Kenn	Leavitt St	CO	67
0860	O	I 90 94 Kenn	Cortland St	CO	68
0863	P	I 90 94 Kenn	Blackhawk St	CO	69
0865	R	I 90 94 Kenn	Augusta Blvd	CO	70
0867	S	I 90 94 Kenn	Grand Ave	CO	71
0870	S1	I 90 94 Kenn	Ontario St Ohio St	CO	72
0873	S2	I 90 94 Kenn	Erie St Tunnel LTG	CO	73
0875	W	I 90 94 Kenn	Hubbard St	CO	74
0883	T	I 90 94 Kenn	Hubbard St Cave	CO	75
0886	U	I 90 94 Kenn	Washington Blvd WB	CO	76
0888	V	I 90 94 Kenn	Washington Blvd EB	CO	77
0890	Z	I 90 94 Kenn	Van Buren St	CO	78
0903	N	I 94 Ryan	99th St Tunnel	CO	79
0905	O	I 94 Ryan	91st St	CO	80
0910	P	I 94 Ryan	81st St	CO	81
0915	R	I 94 Ryan	73rd St	CO	82
0917	R1	I 90 94 Ryan	67th St	CO	83
0920	S	I 90 94 Ryan	63rd St	CO	84
0925	T	I 90 94 Ryan	57th St	CO	85
0927	T1	I 90 94 Ryan	55th St	CO	86
0930	U	I 90 94 Ryan	48th St	CO	87
0935	V	I 90 94 Ryan	Root St	CO	88
0940	W	I 90 94 Ryan	35th St	CO	89
0945	X	I 90 94 Ryan	27th St	CO	90
0950	Y	I 90 94 Ryan	Normal Ave	CO	91
0955	Z	I 90 94 Ryan	Wallace St	CO	92
0960	A	I 90 94 Ryan	21st Pl Incl Nav Ltg	CO	93
0965	B	I 90 94 Ryan	17th St	CO	94
0970	C	I 90 94 Ryan	Maxwell St	CO	95
0975	D	I 90 94 Ryan	Polk St	CO	96
1003	A	IL 394 Ford	Sauk Trail Rd	CO	97
1004	N	IL 394 Ford	US 30 Lincoln Hwy	CO	98
1005	B	IL 394 Ford	Glenwood Dyer Rd	CO	99
1008	D1	IL 394 Ford	Thornton Lansing Rd	CO	100
1010	C	I 94 Ford	I 80 North	CO	101
1015	D	I 94 Ford	I 80 South	CO	102
1017	E1	I 94 Ford	172th St	CO	103
1020	E1	I 94 Ford	165th St	CO	104

Various Routes  
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1025	F	I 94 Ford	159th St	CO	105
1030	G	I 94 Ford	Michigan City Rd	CO	106
1032	G1	I 94 Ford	147th St Sibley Blvd	CO	107
1035	H	I 94 Ford	Dolton Ave	CO	108
1040	X	I 94 Ford	137th St	CO	109
1046	V	I 94 Ford	130th St E	CO	110
1047	W	I 94 Ford	130th St W	CO	111
1050	J	I 94 Ford	119th St	CO	112
1055	K	I 94 Ford	111th St	CO	113
1060	Y	I 94 Ford	115th St	CO	114
1065	L	I 94 Ford	103rd St	CO	115
1070	M	I 94 Ford	100th St	CO	116
1075	P	I 94 Ford	Stoney Is 105th St	CO	117
1080	R	I 94 Ford	Stoney Island NB 103rd St	CO	118
1085	S	I 94 Ford	Stoney Is 98th St	CO	119
1090	T	I 94 Ford	Stoney Is 99th St	CO	120
1203	A	I 94 Edens	Wilson Ave ( north of )	CO	121
1205	B	I 94 Edens	Foster Ave	CO	122
1210	C	I 94 Edens	US 14 Caldwell Peterson	CO	123
1215	D	I 94 Edens	Pratt Ave	CO	124
1220	E	I 94 Edens	Touhy Ave	CO	125
1225	F	I 94 Edens	Niles Center Rd	CO	126
1230	G	I 94 Edens	Lincoln Ave	CO	127
1235	H	I 94 Edens	IL 58 Dempster St	CO	128
1240	J	I 94 Edens	Golf Rd	CO	129
1245	K	I 94 Edens	Glenview Rd	CO	130
1250	L	I 94 Edens	Lake Ave	CO	131
1255	M	I 94 Edens	Winnetka Rd	CO	132
1260	N	I 94 Edens	Willow Rd	CO	133
1265	O	I 94 Edens	Tower Rd	CO	134
1270	P	I 94 Edens	IL 68 Dundee Rd ( south of )	CO	135
1275	R	I 94 Edens	IL 68 Dundee Rd	CO	136
1280	S	I 94 Edens	Lake Cook Rd	CO	137
1303	A	I 290 IKE	Wacker Dr	CO	138
1315	D	I 290 IKE	Lower Wacker Dr Exit Ramp	CO	139
1320	E	I 290 IKE	Lower Wacker Dr Ent Ramp	CO	140
1325	F	I 290 IKE	Canal St	CO	141
1330	G	I 290 IKE	Racine Ave	CO	142
1335	H	I 290 IKE	Western Ave	CO	143
1340	I	I 290 IKE	Kedzie Ave	CO	144
1345	J	I 290 IKE	Pulaski Ave Crawford Ave	CO	145

Various Routes  
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1350	K	I 290 IKE	IL 50 Cicero Ave	CO	146
1355	L	I 290 IKE	Central Ave	CO	147
1360	M	I 290 IKE	Oak Park Ave	CO	148
1365	N	I 290 IKE	Des Plaines Ave	CO	149
1370	O	I 290 IKE	IL 171 1st Ave	CO	150
1375	P	I 290 IKE	17th Ave	CO	151
1380	R	I 290 IKE	25th Ave	CO	152
1385	S	I 290 IKE	Westchester Blvd	CO	153
1386	W	I 290 IKE	US 12 20 45 Mannheim	CO	154
1387	X	I 290 IKE	Wolf Rd Exit Ramp	CO	155
1388	Y	I 290 IKE	Orchard Ave	CO	156
1390	T	I 290 IKE	Laverne Ave Wolf Rd	CO	157
1391	Z	I 290 IKE	W of I 88 Split	CO	158
1393	U	I 290 IKE	Roosevelt Rd Exit Ramp	CO	159
1397	V	I 290 IKE	Arthur Ave	CO	160
1504	S	I 290 IL 53	Biesterfield Rd	CO	161
1505	M	I 290 IL 53	Schaumburg Rd	CO	162
1510	N	I 290 IL 53	IL 72 Higgins Rd ( south of )	CO	163
1515	O	I 290 IL 53	IL 72 Higgins Rd	CO	164
1520	P	I 290 IL 53	IL 58 Golf Rd	CO	165
1525	R	I 290 IL 53	IL 62 Algonquin Rd	CO	166
1535	U	I 290 IL 53	Euclid St	CO	167
1540	V	I 290 IL 53	US 14 Northwest Hwy	CO	168
1545	W	I 290 IL 53	Palatine Rd	CO	169
1550	X	I 290 IL 53	US 12 Rand Rd	CO	170
1580	Y	I 290 IL 53	IL 68 Dundee Rd	CO	171
1590	Z	I 290 IL 53	Lake Cook Rd	CO	172

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0203	A	I 55 Stev	Madison St	DU	1
0205	B	I 55 Stev	IL 83 Kingery Hwy SB	DU	2
0210	C	I 55 Stev	IL 83 Kingery Hwy NB	DU	3
0215	D	I 55 Stev	Cass Ave	DU	4
0220	E	I 55 Stev	Kearney Rd	DU	5
0225	F	I 55 Stev	Lemont Rd	DU	6
0230	G	I 55 Stev	Woodward Ave	DU	7
1405	W	I 290	St Charles Rd	DU	8
1410	X	I 290	IL 64 North Ave	DU	9
1415	Y	I 290	York Rd	DU	10
1420	A	I 290	Grand Ave	DU	11
1425	B	I 290	IL 83 Villa Ave	DU	12
1430	C	I 290	IL 83 NB Elmhurst Rd	DU	13
1435	D	I 290	IL 83 SB Elmhurst Rd	DU	14
1440	E	I 290	Addison Rd	DU	15
1445	F	I 290	Mill Rd	DU	16
1450	G	I 290	Itasca Rd	DU	17
1455	H	I 290	I 290 IKE I 355 & Central	DU	18
1458	I	I 290	US 20 Lake St	DU	19
1460	J	I 290	IL 19 Irving Park Rd	DU	20
1468	L	I 290 IL 53	Devon Ave	DU	21
1471	L1	I 290 IL 53	Thorndale ( south of )	DU	22
1495	T	I 290 I 355	Army Trail Rd	DU	23

1103	T	I 94 Edens US 41	Clavey Rd	LA	1
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0305	H	I 55 Stev	Joliet Rd ( near I 355 )	WI	1
0307	H1	I 55 Stev	International Dr	WI	2
0310	I	I 55 Stev	IL 53	WI	3
0313	I1	I 55 Stev	IL 53 ( west of )	WI	4
0315	K2	I 55 Stev	Naperville Rd ( east of )	WI	5
0316	K1	I 55 Stev	Weber Rd EB	WI	6
0317	K	I 55 Stev	Weber Rd NB	WI	7
0321	L	I 55 Stev	IL 126 Essington	WI	8
0328	M	I 55 Stev	US 30 Lincoln Hwy	WI	9
0335	N	I 55 Stev	US 52 Jefferson St	WI	10
0343	O	I 55 Stev	IL 59 Brookforest Ave	WI	11
0345	P	I 55 Stev	I 80	WI	12
0352	R	I 55 Stev	US 6	WI	13
0355	S	I 55 Stev	Bluff Rd	WI	14
0360	T	I 55 Stev	WS Arsenal Frontage Rd	WI	15

Various Routes  
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Various Counties  
Contract No. 62F52

0363	A	I 55 Stev	Arsenal Rd	WI	16
0365	U	I 55 Stev	Wilmington Rd	WI	17
0370	V	I 55 Stev	Lorenzo Rd	WI	18
0375	X	I 55 Stev	IL 129	WI	19
0380	Y	I 55 Stev	IL 113	WI	20
0385	Z	I 55 Stev	Reed Rd	WI	21
0510	A	I 57	Stuenkel Rd	WI	22
0515	B	I 57	Dralle Rd	WI	23
0525	M	I 57	Manhattan Monee Rd	WI	24
0535	D	I 57	Bruns Rd to Pauling Rd	WI	25
0540	E	I 57	Pauling Rd	WI	26
0560	Y	I 57	Wilmington Peotone Rd	WI	27
0703	I	I 80	IL 43 Harlem Ave	WI	28
0707	B	I 80	80th Ave WB	WI	29
0713	D	I 80	88th Ave WB	WI	30
0715	F	I 80	US 45 Lagrange Rd 96th Ave	WI	31
0717	G	I 80	104th Ave EB	WI	32
0724	K	I 80	I 355 Tlwy	WI	33
0728	N	I 80	US 30 Lincoln Hwy	WI	34
0730	P	I 80	Briggs St	WI	35
0735	R	I 80	Richard St NB	WI	36
0740	S	I 80	Richard St SB	WI	37
0750	U	I 80	IL 53 Chicago St	WI	38
0755	V	I 80	Water St	WI	39
0760	W	I 80	E Center St	WI	40
0765	X	I 80	W Center St	WI	41
0770	Y	I 80	Larkin Ave	WI	42
0775	Z	I 80	Houbolt Rd	WI	43

**LIGHTING SYSTEM -  
Pay Code L-2 Arterial  
Lighting**

Loc. #	Cab.	Main Route	Cross Street	Co.	Qty.
0150	X	Central Ave	39th St	CO	1
0170	Y	IL 43 Harlem Ave	Portage Trail Rd	CO	2
0171	V	IL 171 1St Ave	55th St	CO	3
0177	Z	IL 171 1St Ave	47th St	CO	4
0460	P	Crawford Ave Pulaski Rd	159th St	CO	5
0803	A	US 12 45 Mannheim Rd	Devon Ave	CO	6
0805	B	US 12 45 Mannheim Rd	Lawrence Ave	CO	7
1362	M1	IL 43 Harlem Ave	Jackson Blvd	CO	8
1603	AD	US 12 Rand Rd	US 12 45 Lee St	CO	9
1604	XC	US 12 Rand Rd	IL 68 Dundee Rd	CO	10
1605	AR	US 12 Rand Rd	Euclid St	CO	11
1607	XI	US 12 Rand Rd	Lake Cook Rd	CO	12
1610	AA	US 14 NW Hwy	Baldwin Rd	CO	13
1615	AM	US 14 Dempster St	IL 21 Milwaukee Ave	CO	14
1617	XH	US 14 Dempster St	IL 43 Waukegan Rd	CO	15
1626	XL	US 14 Dempster St	I 294 Tlwy	CO	16
1627	XM	Busse Hwy	I 294 Tlwy	CO	17
1628	XN	Oakton St	I 294 Tlwy	CO	18
1629	XR	Touhy Ave	I 294 Tlwy	CO	19
1630	AC	US 20 Lake St	IL 59	CO	20
1635	AY	US 20 Lake St	Shales Pkwy Bluff City Rd	CO	21
1637	RB	IL 43 Waukegan Rd	I 94 Tollway Spur	CO	22
1640	AX	US 45 DesPlaines River	IL 21 Milwaukee Ave	CO	23
1641	AO	US 45 Des Plaines River	IL 58 Golf Rd	CO	24
1645	AV	US 45 IL 21 Milwaukee	Hintz Rd	CO	25
1647	AK	US 45 IL 21Milwaukee	Lake Cook Rd	CO	26
1650	AH	IL 59 Sutton Rd	IL 58 Golf Rd	CO	27
1653	RG	IL 58 Golf Rd	Roselle Rd	CO	28
1656	RH	IL 58 Golf Rd	Highland Blvd	CO	29
1657	RE	IL 58 Golf Rd	IL 72 Higgins Rd	CO	30
1658	RI	IL 58 Golf Rd	Gannon Dr	CO	31
1659	RJ	IL 58 Golf Rd	Southbridge Ln	CO	32
1662	AW	IL 59 Sutton Rd	IL 72 Higgins Rd	CO	33
1663	AZ	IL 59 Sutton Rd	Shoe Factory Rd	CO	34
1664	AF	I 90 Tlwy Ent Ext Algonquin Rd	Arlington Hts Rd	CO	35

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1668	XK	IL 72 Higgins Rd	Barrington Rd	CO	36
1673	RD	IL 72 Higgins Rd	Spring Mill Dr	CO	37
1674	RF	IL 72 Higgins Rd	Church Hill Rd	CO	38
1675	AG	US 14 NW Hwy	IL 68 Dundee Rd	CO	39
1677	RC	IL 72 Higgins Rd	Roselle Rd	CO	40
1678	XF	IL 72 Higgins Rd	Morningside Dr ( by Plum Grove Rd )	CO	41
1680	AL	IL 72 Higgins Rd	Touhy Ave Lee St	CO	42
1683	AS	IL 83 Elmhurst Rd	Palatine Rd	CO	43
1685	AB	Busse Highway	Oakton St	CO	44
1691	XD	Willow Rd	I 294 Tollway	CO	45
1695	AN	IL 72 Higgins Rd	I 90 Tlwy	CO	46
1696	XV	Elmhurst Rd	I 90 Tlwy	CO	47
1698	AQ	Wolf Rd	I 90 Tlwy	CO	48
1703	BA	US 12 20 45 LaGrange	IL 171 NE Ramp	CO	49
1705	BL	US 12 20 45 LaGrange	IL 171 SW Ramp	CO	50
1706	BK	US 12 20 45 LaGrange	Chicago Sanitary & Ship Canal	CO	51
1707	YA	IL 38 Roosevelt Rd	Boeger St	CO	52
1708	YB	IL 38 Roosevelt Rd	US 12 20 45 Mannheim Rd	CO	53
1710	BD	US 12 45 Mannheim Rd	IL 19 Irving Park Rd	CO	54
1713	BZ	US 34 Ogden Ave	26th St	CO	55
1714	BY	US 34 Ogden Ave	IL 50 Cicero Ave	CO	56
1716	BW	US 34 Ogden Ave	Wolf Rd	CO	57
1730	BX	IL 43 Harlem Ave	66th St	CO	58
1732	BG	IL 64 North Ave	IL 171 1st Ave	CO	59
1735	BC	22nd St Cermak Rd	IL 171 1st Ave	CO	60
1760	YV	Damen Ave	Webster Ave	CO	61
1762	YX	Western Ave	Logan Blvd	CO	62
1763	YY	Sacramento Ave	Wellington Ave	CO	63
1764	YZ	Kostner Ave	Berteau Ave	CO	64
1802	CV	US 12 20 45 96th Ave	87th St	CO	65
1803	CW	US 12 20 45 96th Ave	US 12 20 96th St	CO	66
1804	CX	US 45 LaGrange Rd	107th St	CO	67
1805	CY	US 45 LaGrange Rd	111th St	CO	68
1810	CB	US 12 20 95th St	IL 43 Harlem Ave	CO	69
1825	CE	US 45 LaGrange Rd	IL 83 Cal Sag Rd	CO	70
1827	CH	IL 50 Cicero Ave	127th St	CO	71
1830	CK	IL 1 Halsted Ave	I 80 I 294 Tlwy	CO	72
1835	CA	IL 1 Halsted Ave	Ridge Rd	CO	73
1837	CN	IL 43 Harlem Ave	143rd St	CO	74
1845	CC	IL 83 Kingery Hwy	IL 171 Archer Ave NB	CO	75

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1850	CD	IL 83 Kingery Hwy	IL 171 Archer Ave SB	CO	76
1860	CF	111th St	Austin Ave	CO	77
1861	CG	111th St	Laramie Ave	CO	78
1877	ZA	IL 83 147th St	Sacramento	CO	79
1885	CT	US 6 159th St	Leavitt St	CO	80
1886	CJ	US 6 159th St	CN RR Lincoln Ave	CO	81
1887	CL	US 6 159th St	Myrtle Ave	CO	82
1888	CM	US 6 159th St	Woodbridge Ave	CO	83
2660	RN	IL 19 Irving Park Rd	IL 390 Tlwy	CO	84

1905	DB	US 34 Ogden Ave	IL 59	DU	1
1910	DA	US 34 Ogden Ave	IL 83 Kingery Hwy	DU	2
1912	DH	IL 38 Roosevelt Rd	York Rd	DU	3
1913	DU	IL 38 Roosevelt Rd	IL 83 NB Ramp	DU	4
1914	DV	IL 83 Kingery Hwy	IL 56 EB Ramp	DU	5
1922	DS	IL 53	I 88	DU	6
1925	DM	IL 53	IL 56 Butterfield Rd	DU	7
1931	UF	IL 59	I 88 Tlwy	DU	8
1935	DD	IL 56 Butterfield Rd	IL 59	DU	9
1940	DJ	IL 56 Butterfield Rd	Highland Ave	DU	10
1942	DP	IL 56 Butterfield Rd	22 <sup>nd</sup> St Cermak Rd	DU	11
1959	DU	IL 64 North Ave	IL 83 Kingery Hwy	DU	12
1960	DE	IL 64 North Ave	Main St ( in Lombard )	DU	13
1962	PY	IL 64 North Ave	Kramer Ave	DU	14
1963	PZ	IL 64 North Ave	Ardmore ave	DU	15
1964	PH	IL 64 North Ave	Swift Rd	DU	16
1965	PI	IL 64 North Ave	Main St Glen Ellyn Rd	DU	17
1966	PJ	IL 64 North Ave	Evergreen Ave	DU	18
1967	PK	IL 64 North Ave	Linda Ave	DU	19
1968	PL	IL 64 North Ave	Schmale Rd	DU	20
1969	PM	IL 64 North Ave	Gary Ave	DU	21
1970	PN	IL 64 North Ave	Kuhn Rd	DU	22
1971	PO	IL 64 North Ave	Morton Rd	DU	23
1972	PP	IL 64 North Ave	St. Charles Rd	DU	24
1973	PR	IL 64 North Ave	Prince Crossing Rd	DU	25
1974	PS	IL 64 North Ave	Woodcrest Dr	DU	26
1975	DL	IL 83 Kingery Hwy	55th St	DU	27
1980	DI	IL 83 Kingery Hwy	Bluff Rd	DU	28
1986	DO	IL 83 Kingery Hwy	22 <sup>nd</sup> St Cermak Rd	DU	29
1990	PC	IL 64 North Ave	Conte Parkway	DU	30
1991	PD	IL 63 North Ave	Powis Rd	DU	31



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1992	PE	IL 64 North Ave	Kautz Rd	DU	32
2903	UZ	IL 83 Kingery Hwy	IL 390 Tlwy	DU	33
2905	UV	IL 53	IL 390 Tlwy	DU	34
2910	UI	Meacham Rd Medinah Rd	IL 390 Tlwy	DU	35
2920	P	US 20 Lake St	IL 390 Tlwy	DU	36

2002	KB	IL 47	US 20 IL 72 South	KA	1
2003	KS	US 20	IL 47 IL 72 North	KA	2
2005	KI	US 20 Lake St	Mclean Blvd	KA	3
2010	KX	US 20 Lake St	Randall Rd	KA	4
2012	KF	US 30	IL 31	KA	5
2015	KG	IL 47	US 30 & IL 56	KA	6
2045	KO	IL 38 Roosevelt Rd	IL 47	KA	7
2048	KA	IL 47	I 90 Tlwy	KA	8
2050	KE	IL 47	Big Timber Rd	KA	9
2055	KP	IL 47	Plank Rd	KA	10
2060	KV	IL 47	Galena Rd	KA	11
2065	KR	IL 56 Butterfield Rd	Kirk Rd	KA	12
2070	KT	IL 72 Higgins Rd	Randall Rd	KA	13
2075	KZ	IL 56 Butterfield Rd	Galena Rd	KA	14

2103	EA	US 30 Briarcliff Rd	US 34 Owesgo Rd	KE	1
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2203	LX	US 12 IL 59	IL 134 Long Lake Rd	LA	1
2205	LS	IL 22 Half Day Rd	I 94	LA	2
2207	LA	Deerfield Rd	Northland Ave	LA	3
2211	LE	US 41 Skokie Hwy	Deerfield Rd	LA	4
2215	LR	US 41 Skokie Hwy	IL 60 Town Line Rd	LA	5
2217	LB	US 41 Skokie Hwy	IL 120 Belvidere Rd	LA	6
2220	LG	US 41 Skokie Hwy	IL 132 Grand Ave	LA	7
2221	LU	US 41 Skokie Hwy	IL 173 Rosecrans Rd	LA	8
2222	VG	IL 173 Rosecrans Rd	I 94 Tlwy	LA	9
2227	LL	US 41 Skokie Hwy	Russell Rd	LA	10
2230	LD	US 41 Skokie Hwy	Washington St	LA	11
2235	VA	IL 120 Belvidere Rd	Cohasset Ct	LA	12
2236	VB	IL 120 Belvidere Rd	Greenleaf St	LA	13
2237	VC	IL 120 Belvidere Rd	IL 43 Waukegan Rd	LA	14
2239	VD	IL 120 Belvidere Rd	Lakehurst Rd	LA	15
2243	LP	US 41 Skokie Hwy	West Park Ave	LA	16
2245	LF	IL 21 Milwaukee Ave	IL 120 Belevidere Rd	LA	17

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2247	LC	IL 21 Milwaukee Ave	I 94 Tollway	LA	18
2250	LM	IL 21 Milwaukee Ave	IL 137 Buckley Rd	LA	19
2255	LN	IL 43 Waukegan Rd	IL 137 Buckley Rd	LA	20
2256	LK	IL 59	Grass Lake Rd	LA	21
2267	VE	IL 60 Town Line Rd	Riverwoods Rd	LA	22
2268	VF	IL 60 Town Line Rd	Saunders Rd	LA	23
2270	LY	IL 131 Green Bay Rd	IL 137 Buckley Rd	LA	24
2274	LJ	IL 137 Buckley Rd	I 94 Tlwy	LA	25
2276	LQ	IL 137 Sheridan Rd	MLK Jr Dr	LA	26
2280	B	Amstutz Hwy	Grand Ave	LA	27
2285	A	Amstutz Hwy	Greenwood Ave	LA	28
2287	VH	IL 83	Rollins Rd Hook Dr	LA	29

2305	MA	US 14 Northwest Hwy	IL 31	MC	1
2307	MB	IL 31	IL 62 Algonquin Rd	MC	2
2310	MC	US 14 Northwest Hwy	IL 47	MC	3
2313	MD	IL 31 Main St	Greenwood Ct Meyer Dr	MC	4
2315	MZ	US 14	IL 176	MC	5

2402	WZ	US 6 Southwest Hwy	I 355 Tlwy	WI	1
2404	WA	US 30 Plainfield Rd	Larkin Ave	WI	2
2415	WD	US 30 Cass St	Stevens St	WI	3
2420	WW	US 45	US 52	WI	4
2428	WY	IL 7 159th St	I 355 Tlwy	WI	5
2430	WB	IL 7 Renwick Rd	IL 53 Broadway St	WI	6
2435	WG	IL 50 Cicero Ave	Governors Hwy	WI	7
2442	HD	IL 53 Chicago St	US 52 Doris Ave	WI	8
2445	WP	IL 53 Independence Ave	Joliet Rd	WI	9
2448	WQ	IL 171 Archer Ave	I 355 Tlwy	WI	10
2452	HB	IL 113 Main St	IL 53 Front & IL129 Washington	WI	11
2455	WK	IL 394	Bemes Rd	WI	12
2460	WL	IL 394	Faithorn Rd Burville Rd	WI	13
2465	WM	IL 394	Cottage Grove Ave	WI	14
2470	WT	IL 394	Elms Court Rd	WI	15
2475	WO	IL 394	Exchange St	WI	16
2478	WV	IL 394	IL 1	WI	17
2480	WU	IL 394	Goodnow Rd	WI	18
2490	WS	IL 394	Steger Rd	WI	19

**LIGHTING  
SYSTEM -  
Pay Code L-  
3 Small  
Arterial  
Lighting**

Loc. #	Cab.	Main Route	Cross Street	Co.	Qty.
1655	AJ	IL 58 Golf Rd	Wolf Rd CN RR	CO	1
1660	AI	IL 59 Sutton Rd	IL 68 Dundee Rd	CO	2
1670	AP	IL 62 Algonquin Rd	Palatine Rd	CO	3
1687	AT	Palatine Rd	Wheeling Rd	CO	4
1690	AU	Palatine Rd	Schoenbeck Rd	CO	5
1709	BF	US12 20 45 Mannheim	22nd St Cermak Rd	CO	6
1712	YD	US12 45 Mannheim Rd	Proviso RR Bridge	CO	7
1717	BB	IL 38 Roosevelt Rd	I 294 Tlwy	CO	8
1815	CP	US 30 Lincoln Highway	IL 43 Harlem Ave	CO	9
1820	CR	US 30 Lincoln Highway	Governors Hwy Crawford Ave	CO	10
1823	CS	US 30 Lincoln Highway	Torrence Ave	CO	11
1903	DW	US 20 Lake St	Walnut St	DU	1
1920	PF	IL 38 Roosevelt Rd	Gary's Mill Rd	DU	2
1930	DR	IL 53	BNSF RR Bridge	DU	3
1951	PG	IL 59	Gary's Mill Rd	DU	4
1985	DT	IL 83 Kingery Hwy	St. Charles Rd	DU	5
2020	KH	IL 31 State St	W Big Timber Rd	KA	1
2025	KJ	IL 31 State St	E Big Timber Rd	KA	2
2030	KM	IL 31 2nd St State St	Indian Mounds Rd	KA	3
2035	KL	IL 31 State St	Judson Collage Entrance	KA	4
2040	KK	IL 31 State St	River Rd	KA	5
2105	EB	US 30	IL 47	KE	1
2224	LV	US 41 Skokie Highway	Kelly Rd	LA	1
2260	LH	IL 120 Belevidere Rd	Mill Rd Wildwood Rd	LA	2
2265	LO	IL 120 Belevidere Rd	O'Plaine Rd	LA	3
2275	LW	IL 137 Sheridan Rd	Wadsworth Rd	LA	4
2290	LZ	IL 22 Lake Zurich Rd	Ela Rd	LA	5

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2330	MS	IL 47	S IL 176 Terra Cotta Ave	MC	1
2335	MN	IL 47	N IL 176 Terra Cotta Ave	MC	2
2405	WN	Il 126 Lockport Rd	Wallin Dr	WI	1
2410	WC	US 30 Cass St	Pilcher Park Entrance	WI	2
2425	WF	IL 1 Halsted St	Union	WI	3
2440	WH	IL 53 Broadway St	EJE RR	WI	4
2450	WJ	IL 171 Archer Ave	EJE RR	WI	5
2485	WR	IL 394	Richton Rd	WI	6

**LIGHTING  
SYSTEM -  
Pay Code L-  
4  
Navigational  
Lighting**

Loc. #	Main Route & Cross St	River Mile	Co.	Qty.
127TH	Cal Sag @ 127th	314.2 River Mile	CO	1
ASH	Cal Sag @ Ashland	318.9-319.0 River Mile	CO	2
CENT	Cgo San Ship @ Central	316.2 River Mile	CO	3
CICE	Cal Sag @ IL 50 Cicero	314.9 River Mile	CO	4
FORD	Little Cal Riv @ I 94 Bishop Ford	324.6 River Mile	CO	5
HALS	Little Cal Riv @ IL 1 Halsted St	320.1 River Mile	CO	6
HARL	Cal Sag @ IL 43 Harlem Ave	311.5 River Mile	CO	7
IL43	Cgo San Ship @ IL 43 Harlem Ave NB	313.9- 314.0 River Mile	CO	8
IL83	Cal Sag @ IL 83 Kingery Hwy	304.1 River Mile	CO	9
KEDZ	Cal Sag @ Kedzie Ave	316.9 River Mile	CO	10
KING	Cgo San Ship @ IL 83 Kingery Hwy	304.1 River Mile	CO	11
LAG	Cgo San Ship @ US 12 20 45	309.4 River Mile	CO	12
LEM	Cgo San Ship @ Lemont Rd State St	300.5 River Mile	CO	13
SWH	Cal Sag @ IL 7 Southwest Hwy	310.7 River Mile	CO	14
US45	Cal Sag @ US 45 96th Ave	308.4 River Mile	CO	15
WEST	Cal Sag @ Western Ave	318.0 River Mile	CO	16
WSR	Cgo San Ship @ Willow Springs Rd	307.9 River Mile	CO	17
I80	DesPI Riv @ I 80	287.0 River Mile ( access by boat)	WI	18
9TH	Cgo San Ship @ IL 7 9th St	292.7 River Mile	WI	19
STEV	DesPI Riv @ I 55 Stev	277.9 River Mile	WI	20

**LIGHTING  
SYSTEM -  
Pay Code L-  
5 Lighting at  
Maintenance  
Yards**

Loc. #	Main Route	Address	Co.	Qty.
57Y	I 57 Yard	16010 S Crawford Ave	CO	1
ALSY	Alsip Yard	11801 S Ridgeland Ave	CO	2
ARLY	Arlington Heights Yard	210 E Noyse	CO	3
BFY	Bishop Ford Yard	16915 Van Dam Rd	CO	4
DRY	Dan Ryan Yard	6543 S Wentworth Ave	CO	5
EDY	Edens Yard	2 Happ Rd	CO	6
HARY	Harvey Yard	16738 S Lathrop Ave	CO	7
HILY	Hillside Yard	East Ave & May St	CO	8
IKEY	Eisenhower Yard	5201 W Flournoy St	CO	9
KENY	Kennedy Yard	5027 N Central Ave	CO	10
LANY	Landscape Yard	1260 W Augusta Blvd	CO	11
NBY	Northbrook Yard	1916 Techny Rd	CO	12
NSY	Northside Yard	4051 N Harlem Ave	CO	13
RODY	Rodenburg ComCenter Yard	1480 Rodenburg Rd	CO	14
STY	Stevenson Yard	Joliet Rd & 1 <sup>st</sup> Ave	CO	15
NAPY	Naperville Yard	28 W 731 Ogden Ave	DU	16
OAKY	Oakbrook Yard	17 W 125 Butterfield Rd	DU	17
STCY	St Charles Yard	38 W 027 IL 38	KA	18
GRAY	Grayslake Yard	219 N Baron Blvd	LA	19
GURY	Gurnee Yard	3516 W Washington St	LA	20
WDY	Woodstock Yard	11916 Catalpa Lane	MC	21
55Y	I 55 Yard	151 E South Frontage Rd	WI	22
BBY	Birds Bridge Yard	I 55 & US 6	WI	23
JOLY	Joliet Yard	Caton Farm Rd & IL 53	WI	24
NLY	New Lenox Yard	I 80 & US 30	WI	25

**LIGHTING  
SYSTEM -  
Pay Code L-  
6 Weigh  
Station  
Lighting**

<b>Loc. #</b>	<b>Main Route</b>	<b>Address</b>	<b>Co.</b>	<b>Qty.</b>
30WS	Weigh Station Chicago Hts	US 30 Torrence ( east of )	CO	1
83WS	Weigh Station Elmhurst	IL 83 & St Charles	DU	2
41IBWS	Weigh Station Rosecrans	US 41 IB @ Rosecrans	LA	3
41OBWS	Weigh Station Wadsworth	US 41 OB @ Wadsworth	LA	4
12WS	Weigh Station Richmond	US 12 & Burlington Rd	MC	5
14WS	Weigh Station Harvard	US 14 & Crowley Rd	MC	6
55IBWS	Weigh Station Bolingbrook IB	I 55 IB ( west of IL 53 )	WI	7
55OBWS	Weigh Station Bolingbrook OB	I 55 OB ( west of IL 53 )	WI	8
57IBWS	Weigh Station Peotone IB	I 57 ( north of US 52 )	WI	9
57OBWS	Weigh Station Peotone OB	I 57 ( north of US 52 )	WI	10
80IBWS	Weigh Station Frankfort IB	I 80 IB ( east of Townline Rd )	WI	11
80OBWS	Weigh Station Frankfort OB	I 80 OB ( east of Townline Rd )	WI	12

**LIGHTING  
SYSTEM -  
Pay Code L-  
7 Facility  
and Other  
Lighting**

Loc. #	Cab.	Main Route	Cross Street	Co.	Qty.
1767	YE	Sign Lake Shore Dr LSD	31st St	CO	1
190		HAR I 190 IB	I 294	CO	2
290A		HAR I 290 IB	Ashland Ave	CO	3
290E		HAR I 290 OB	Westchester	CO	4
290T		HAR I 290 IB	Thorndale Ave	CO	5
290W		HAR I 290	Wells St	CO	6
294		HAR I 55	I 294 Tlwy	CO	7
394		HAR IL 394	186th St	CO	8
80E		HAR I 80 EB	Lincoln Oasis	CO	9
ACS		Addison Ave Cold Storage	US 12 20 Mannheim Rd ( under )	CO	12
BBO		Biesterfield Bridge Office	1101 Biesterfield Rd	CO	13
DRO		Dan Ryan Field Office	DesPlaines @ Taylor	CO	14
EDENS		HAR I 94 IB	Tower Rd	CO	15
ETP		ETP	3501 Normal Ave Cgo	CO	16
KENN		HAR I 90 IB	Nagle Ave	CO	17
MAT		IDOT Material Lab	101 Center Ct Schaumburg	CO	18
NSS		Northside Sign Shop	7151 Forest Preserve Dr	CO	19
RYAN		HAR I 94 OB	159th St	CO	20
SSS		Southside Sign Shop	15940 Pulaski Rd	CO	21
1998		IL 64 North Ave	I 290 ( east of )	DU	22
2098	D5E	Sign US 30	IL 47 ( west of )	KA	23
ESS		Elgin Sign Shop	595 S State St Elgin	KA	24
ISP		Illinois State Police District 2	777 S State St Elgin	KA	25
SPS		Shales Pkwy Storage	525 Shales Pkwy	KA	26
LZSS		Lake Zurich Sign Shop	700 S Ela Rd Lake Zurich	LA	27
57IBRA		Prairieview Rest Area	I 57 IB @ Peotone	WI	28
57OBRA		Prairieview Rest Area	I 57 OB @ Peotone	WI	29
MSY		Monee Storage Yd	IL 50 & US 6 Monee	WI	36
NLSS		New Lenox Sign Shop	I 80 & US 30	WI	37



**PUMP STATION SYSTEM - Pay Code - P-1**

Loc. #	Type	Main Route	Cross Street	Co.	Qty.
02	PS-L	I 94	Winnetka Rd	CO	1
03	PS-L	I 94	Caldwell Peterson	CO	2
04	PS-L	I 290	1st Ave ( east of )	CO	3
05	PS-L	I 290	Des Plaines Ave	CO	4
07	PS-L	I-290	Well St	CO	5
08	PS-S	US 14 NW Hwy	US 12 45 ( 1/2 mile east )	CO	6
09	PS-L	US 45 Mannheim	US 20 Lake St	CO	7
10	PS-L	US 14 Dempster	IL 21 Milwaukee Ave	CO	8
11	PS-S	IL 50 Cicero Ave	158th St	CO	9
12	PS-S	IL 64 North Ave	25th Ave ( west of )	CO	10
13	PS-S	US 41 Skokie Blvd	Oakton St ( south of )	CO	11
14	PS-S	Ashland Ave	138th & Wood St	CO	12
15	PS-S	79th St	Kedzie Ave	CO	13
16	PS-S	IL 72 Higgins Rd	US 12 45 ( east of )	CO	14
17	PS-S	IL 58 Golf Rd	US 45 River Rd	CO	15
18	PS-S	US 6 159th St	Park Ave	CO	16
19	PS-S	US 6 159th St	IL 50 Cicero Ave	CO	17
20	PS-S	I 290	Wolf Rd ( west of )	CO	18
21	PS-L	I 94	72nd St	CO	19
22	PS-L	I 90 94	Fulton Ave	CO	20
23	PS-L	I 90 94	Roscoe St	CO	21
24	PS-L	I 190	Mannheim Rd ( east of )	CO	22
25	PS-L	US 12 20 95th St	IL 43 Harlem Ave	CO	23
26	PS-L	I 90 94	Roosevelt Rd	CO	24
27	PS-L	I 94 FORD	110th St	CO	25
28	PS-L	IL 50 Cicero Ave	US 34 Ogden Ave	CO	26
29	PS-L	I 90 94	Wallace St	CO	27
30	PS-L	I 55	Homan Ave	CO	28
31	PS-L	111th St	Central Ave	CO	29
32	PS-S	IL 64 North Ave	1st Ave	CO	30
33	PS-L	Palatine Rd	IL 21 Milwaukee Ave	CO	31
34	PS-L	I 290	Emroy Ave	DU	32
35	PS-L	I 57	127th St	CO	33
36	PS-L	IL 43 Harlem Ave	176th St	CO	34
37	PS-S	US 41 Skokie Hwy	IL 176 Rockland Rd	LA	35
38	PS-S	US 41 Skokie Hwy	Deerpath Ave	LA	36
39	PS-L	IL 60 Kennedy Rd	US 41 Skokie ( west of )	LA	37
40	PS-L	US 45 Lake Ave	IL 60 Towne Line ( north of )	LA	38
41	PS-S	US 41 Skokie Hwy	IL 176 Rockland ( north of )	LA	39

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42	PS-L	IL 47	IL 72	KA	40
43	PS-S	US 41 Skokie Hwy	IL 132 Grand Ave ( north of )	LA	41
44	PS-L	IL 83 Kingery Hwy	IL 64 North Ave ( south of )	DU	42
46	PS-L	US 41 Skokie Hwy	Clavey Rd	LA	43
47	PS-L	IL 59	North Aurora Ave	DU	44
48	PS-S	IL 56 Butterfield Rd	IL 59 ( west of )	DU	45
50	PS-S	IL 22 Half Day Rd	US 41 Skokie Hwy	LA	46
51	PS-S	127th St	Crawford Ave ( east of )	CO	47
52	PS-L	IL 59	IL 126	WI	48

**SURVEILLANCE SYSTEM - Pay Code S-1 Ramp Controls**

Loc. #	Cab.	Main Route	Cross Street	Co.	Equip Type	Qty.
2005	A2	I 57	IL 1 Halsted St	CO	S-1B	1
3075	E113	I 90 KENN OB	Cumberland Ave Exit	CO	S-1A	2
3080	E115	I 90 KENN OB	Cumberland Ave Ent	CO	S-1A	3
3085	E120	I 90 KENN	Cumberland Ave Exit	CO	S-1A	4
3095	F118	I 90 KENN IB Ent	Canfield Ave	CO	S-1A	5
3105	F109	I 90 KENN	IL 43 Harlem Ave	CO	S-1A	6
3110	F114	I 90 KENN	IL 43 Harlem Ave	CO	S-1A	7
3125	G112	I 90 KENN	IL 43 Harlem Ave	CO	S-1A	8
3135	G110	I 90 KENN	Sayre Ave	CO	S-1A	9
3140	H101	I 90 KENN	Nagle Ave	CO	S-1A	10
3155	H106	I 90 KENN	Bryn Mawr Ave	CO	S-1A	11
3165	H97	I 90 KENN	Foster Ave	CO	S-1A	12
3175	I102	I 90 KENN	Foster Ave	CO	S-1A	13
3185	I100	I 90 KENN	Central Ave Ent	CO	S-1A	14
3210	J91	I 90 KENN	Lawrence Ave	CO	S-1A	15
3215	J94A	I 90 KENN	Lawrence Ave	CO	S-1A	16
3240	J92	I 90 94 KENN	Montrose Ave	CO	S-1A	17
3245	K77	I 90 94 KENN	Keeler Ave	CO	S-1A	18
3270	K84	I 90 94 KENN	Pulaski Rd	CO	S-1A	19
3275	K86	I 90 94 KENN	IL 19 Irving Park Rd	CO	S-1A	20
3310	L76	I 90 94 KENN	Avondale Ave	CO	S-1A	21
3320	L65	I 90 94 KENN	Kimball Ave	CO	S-1A	22
3325	L72	I 90 94 KENN	Kimball Ave	CO	S-1A	23
3340	L70	I 90 94 KENN	Kedzie Ave	CO	S-1A	24
3350	M57	I 90 94 KENN	California Ave	CO	S-1A	25
3365	M66	I 90 94 KENN	Sacramento Blvd	CO	S-1A	26
3385	M62	I 90 94 KENN	Diversey Ave	CO	S-1A	27
3390	N51	I 90 94 KENN	Fullerton Ave	CO	S-1A	28
3405	N58	I 90 94 KENN	Fullerton Ave	CO	S-1A	29
3415	N56	I 90 94 KENN	Webster Ave	CO	S-1A	30
3420	O45	I 90 94 KENN	Armitage Ave	CO	S-1A	31
3435	O52	I 90 94 KENN	Armitage Ave	CO	S-1A	32
3445	P41A	I 90 94 KENN	IL 64 North Ave	CO	S-1A	33
3450	P48	I 90 94 KENN	IL 64 North Ave	CO	S-1A	34
3460	R39	I 90 94 KENN	Division St	CO	S-1A	35
3465	R44	I 90 94 KENN	Division St	CO	S-1A	36
3480	R42	I 90 94 KENN	Augusta Blvd	CO	S-1A	37

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3485	R35	I 90 94 KENN	Ogden Ave	CO	S-1A	38
3525	Y28	I 90 94 KENN	Lake St Ent	CO	S-1A	39
3565	Y23	I 90 94 KENN	Washington Blvd	CO	S-1A	40
3595	Y15	I 90 94 KENN	Monroe St	CO	S-1A	41
4010	2	I 94 EDENS	Wilson Ave	CO	S-1A	42
4015	3	I 94 EDENS	Wilson Ave	CO	S-1A	43
4020	B4	I 94 EDENS	Elston Ave	CO	S-1A	44
4025	B5	I 94 EDENS	Foster Ave	CO	S-1A	45
4040	C8	I 94 EDENS	Peterson Ave	CO	S-1A	46
4045	C9	I 94 EDENS	Peterson Ave	CO	S-1A	47
4050	C10	I 94 EDENS	Peterson Ave	CO	S-1A	48
4065	E12	I 94 EDENS	Touhy Ave	CO	S-1A	49
4070	E15	I 94 EDENS	Touhy Ave	CO	S-1A	50
4075	E16	I 94 EDENS	Touhy Ave	CO	S-1A	51
4080	E17	I 94 EDENS	Touhy Ave	CO	S-1A	52
4100	H21	I 94 EDENS	Dempster St	CO	S-1A	53
4105	H22	I 94 EDENS	Dempster St	CO	S-1A	54
4110	H23	I 94 EDENS	Dempster St	CO	S-1A	55
4115	H24	I 94 EDENS	Dempster St	CO	S-1A	56
5015	68	I 94 RYAN NB	95th St Ent	CO	S-1B	57
5035	65	I 94 RYAN SB	87th St Ent	CO	S-1B	58
5040	64	I 94 RYAN NB	87th St Ent	CO	S-1B	59
5055	62	I 94 RYAN NB	83rd St Ent	CO	S-1B	60
5070	58	I 94 RYAN NB	79th St Ent	CO	S-1B	61
5075	59	I 94 RYAN SB	79th St Ent	CO	S-1B	62
5105	56	I 94 RYAN NB	75th St Ent	CO	S-1B	63
5115	52	I 94 RYAN NB	71st St Ent	CO	S-1C	64
5120	53	I 94 RYAN SB	71st St Ent	CO	S-1B	65
5125	49	I 94 RYAN SB	67th St Ent	CO	S-1B	66
5145	46	I 94 RYAN NB	63rd St Ent	CO	S-1B	67
5160	45	I 90 94 RYAN SB	59th St Ent	CO	S-1B	68
5195	41	I 90 94 RYAN SB	55th St Ent	CO	S-1B	69
5210	42	I 90 94 RYAN	55th St Ent	CO	S-1B	70
5225	37	I 90 94 RYAN SB	47th St Ent	CO	S-1B	71
5235	38	I 90 94 RYAN	47th St Ent	CO	S-1B	72
5250	35A	I 90 94 RYAN	43rd St Ent	CO	S-1B	73
5255	36	I 90 94 RYAN	43rd St Ent	CO	S-1B	74
5290	31	I 90 94 RYAN SB	39th St Ent	CO	S-1B	75
5385	C5	I 90 94 RYAN	Roosevelt Rd	CO	S-1A	76
5390	C6	I 90 94 RYAN	Roosevelt Rd Ent	CO	S-1A	77
5405	D4	I 90 94 RYAN	Taylor	CO	S-1A	78

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6255	M2	I 94 FORD	99th Pl Wabash Ent	CO	S-1B	79
8040	G8	I 290 IKE	Ashland Ave	CO	S-1A	80
8060	H11A	I 290 IKE	Damen Ave & Paulina	CO	S-1A	81
8085	H15	I 290 IKE	Western Ave	CO	S-1A	82
8095	H16	I 290 IKE	California Ave	CO	S-1A	83
8105	I19	I 290 IKE	Sacramento Blvd	CO	S-1A	84
8110	I20	I 290 IKE	Homan Ave	CO	S-1A	85
8120	J22	I 290 IKE	Independence Blvd	CO	S-1A	86
8135	J27	I 290 IKE	Independence Blvd	CO	S-1A	87
8140	J26	I 290 IKE	Kostner Ave	CO	S-1A	88
8160	K33	I 290 IKE	IL 50 Cicero Ave	CO	S-1A	89
8165	K30	I 290 IKE	Laramie Ave	CO	S-1A	90
8175	L32	I 290 IKE	Central Ave	CO	S-1A	91
8195	L39	I 290 IKE	Central Ave	CO	S-1A	92
8210	M43	I 290 IKE	Austin Blvd	CO	S-1A	93
8230	M40	I 290 IKE	IL 43 Harlem Ave	CO	S-1A	94
8240	M49	I 290 IKE	IL 43 Harlem Ave	CO	S-1A	95
8255	N53	I 290 IKE	Des Plaines Ave	CO	S-1A	96
8265	O48	I 290 IKE	IL 171 1st Ave	CO	S-1A	97
8280	O59	I 290 IKE	IL 171 1st Ave	CO	S-1A	98
8285	P52	I 290 IKE	9th Ave	CO	S-1A	99
8295	P54	I 290 IKE	17th Ave	CO	S-1A	100
8310	P65	I 290 IKE	17th Ave	CO	S-1A	101
8315	R58	I 290 IKE	25th Ave	CO	S-1A	102
8320	R60	I 290 IKE	25th Ave	CO	S-1A	103
8340	R69	I 290 IKE	Addison Creek	CO	S-1A	104
8345	S64	I 290 IKE	Mannheim Rd SE	CO	S-1A	105
8350	S66	I 290 IKE	Mannheim Rd SW	CO	S-1A	106
8370	S75	I 290 IKE	Mannheim Rd NW	CO	S-1A	107
8375	T70	I 290 IKE	Hillside Car Max Ent	CO	S-1A	108
9030	W80	I 290	St Charles Rd	DU	S-1	109
9035	W82	I 290	St Charles Rd	DU	S-1	110
9040	W83	I 290	St Charles Rd	DU	S-1	111
9045	W85	I 290	St Charles Rd	DU	S-1	112
9055	X86	I 290	IL 64 North Ave	DU	S-1	113
9075	X90	I 290	IL 64 North Ave	DU	S-1	114
9130	A101	I 290 WB	IL 83 Kingery Hwy	DU	S-1	115
9140	A103	I 290	IL 83 Kingery Hwy	DU	S-1	116

**SURVEILLANCE SYSTEM - Pay Code - S-2  
Cabinets**

Loc. #	Cab.	Main Route	Cross Street	Co.	Equip Type	Qty.
1000	B0	I 55 STEV	Martin Luther King	CO	S-2A	1
1005	B1	I 55 STEV	Martin Luther King	CO	S-2A	2
1010	B3	I 55 STEV	State St	CO	S-2A	3
1015	C2	I 55 STEV	26th St & Wentworth	CO	S-2A	4
1020	C5	I 55 STEV	26th St & Wentworth	CO	S-2A	5
1025	C4	I 55 STEV	Wentworth Ave ( west )	CO	S-2A	6
1030	C7	I 55 STEV	Wentworth Ave ( west )	CO	S-2A	7
1035	Y15	I 55 STEV	I 90 94 RYAN Inter	CO	S-2A	8
1040	Y16	I 55 STEV	I 90 94 RYAN Inter	CO	S-2A	9
1045	Y17	I 55 STEV	I 90 94 RYAN Inter	CO	S-2A	10
1047	MCD	I 55 STEV	I 90 94 RYAN Cross Con	CO	S-2K	11
1050	Y18	I 55 STEV	I 90 94 RYAN I 55 Inter	CO	S-2A	12
1055	6	I 55 STEV	Archer Ave & Mary St	CO	S-2A	13
1060	8	I 55 STEV	Lock St	CO	S-2A	14
1065	10	I 55 STEV	Wood St	CO	S-2A	15
1075	12	I 55 STEV	Hoyne Ave	CO	S-2A	16
1080	14	I 55 STEV	Penn RR	CO	S-2A	17
1100	16	I 55 STEV	Kedzie & California Ave	CO	S-2A	18
1105	18	I 55 STEV	Kedzie & California Ave	CO	S-2A	19
1110	20	I 55 STEV	Kedzie & California Ave	CO	S-2A	20
1115	9	I 55 STEV	Pulaski Rd ATSF RR (east)	CO	S-2A	21
1120	H11	I 55 STEV	Pulaski Rd	CO	S-2A	22
1125	22	I 55 STEV	Pulaski Rd	CO	S-2A	23
1130	13	I 55 STEV	IL 50 Cicero Ave	CO	S-2A	24
1135	TDC1	I 55 STEV	IL 50 Cicero Ave	CO	S-2A	25
1140	15	I 55 STEV	IL 50 Cicero Ave OB Exit	CO	S-2A	26
1150	26	I 55 STEV	IL 50 Cicero Ave IB RS	CO	S-2A	27
1160	24	I 55 STEV	IL 50 Cicero Ave	CO	S-2A	28
1165	17	I 55 STEV	Central Ave	CO	S-2A	29
1170	28	I 55 STEV	Central Ave	CO	S-2A	30
1175	30	I 55 STEV	Central Ave IL 43 Harlem	CO	S-2A	31
1180	32	I 55 STEV	60th IB RS	CO	S-2A	32
1185	19	I 55 STEV	Central Ave IL 43 Harlem	CO	S-2A	33
1190	21	I 55 STEV	Central Ave IL 43 Harlem	CO	S-2A	34
1195	23	I 55 STEV	IL 43 Harlem Ave	CO	S-2A	35
1205	34	I 55 STEV	IL 43 Harlem Ave	CO	S-2A	36
1210	25	I 55 STEV	IL 43 Harlem Ave	CO	S-2A	37
1215	36	I 55 STEV	IL 43 Harlem Ave	CO	S-2A	38

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1220	27	I 55 STEV	75th West	CO	S-2A	39
1225	29	I 55 STEV	Lawndale Ave	CO	S-2A	40
1235	38	I 55 STEV	Lawndale Ave IB	CO	S-2A	41
1240	31	I 55 STEV	Lawndale Ave	CO	S-2A	42
1245	40	I 55 STEV	Lawndale Ave	CO	S-2A	43
1250	42	I 55 STEV	B&O RR 83rd (west)	CO	S-2A	44
1255	44	I 55 STEV	86th ( west )	CO	S-2A	45
1260	46	I 55 STEV	88th (west )	CO	S-2A	46
1265	P50	I 55 STEV	91st ( west )	CO	S-2A	47
1270	R43	I 55 STEV	97th (west )	CO	S-2A	48
1275	R45	I 55 STEV	US 12 20 45 LaGrange Rd	CO	S-2A	49
1280	R47	I 55 STEV	US 12 20 45 LaGrange Rd	CO	S-2A	50
1285	R52	I 55 STEV	US 12 20 45 LaGrange Rd	CO	S-2A	51
1290	R54	I 55 STEV	US 12 20 45 LaGrange Rd SW	CO	S-2A	52
1295	R49	I 55 STEV	Willow Springs Rd (east )	CO	S-2A	53
1300	R49A	I 55 STEV	Willow Springs Rd OB (east)	CO	S-2A	54
1305	S51	I 55 STEV	I 294 Tlwy	CO	S-2A	55
1310	S56	I 55 STEV	109th St	CO	S-2A	56
1315	S53	I 55 STEV	I 294 Tlwy	CO	S-2A	57
1320	S55	I 55 STEV	Joliet Rd	CO	S-2A	58
1325	57	I 55 STEV	County Line Rd (east)	CO	S-2A	59
1330	59	I 55 STEV	County Line (west )	DU	S-2A	60
1335	61	I 55 STEV	County Line (one mile west )	DU	S-2A	61
1340	63	I 55 STEV	Madison St	DU	S-2A	62
1345	58	I 55 STEV	IL 83 (east )	DU	S-2A	63
1350	60	I 55 STEV	IL 83 (west )	DU	S-2A	64
1355	65	I 55 STEV	Clarendon Hills Rd	DU	S-2A	65
1360	62	I 55 STEV	Clarendon Hills Rd ( 1/2 m west )	DU	S-2A	66
1365	64	I 55 STEV	Cass Ave (east )	DU	S-2A	67
1370	66	I 55 STEV	Cass Ave (west )	DU	S-2A	68
1375	68	I 55 STEV	Cass Ave (one mile west )	DU	S-2A	69
1380	67	I 55 STEV	Lemont Rd (half mile east )	DU	S-2A	70
1385	70	I 55 STEV	Lemont Rd (east )	DU	S-2A	71
1390	72	I 55 STEV	Lemont Rd (west )	DU	S-2A	72
1395	74	I 55 STEV	Lemont Rd (half mile west )	DU	S-2A	73
1400	76	I 55 STEV	Woodward Ave	DU	S-2A	74
1401	RVD9	I 55	I 355 Tlwy	WI	S-2F	75
1402	RVD6	I 55	I 355 Tlwy	WI	S-2F	76
1403	RVD5	I 55	I 355 Tlwy	WI	S-2F	77
1404	RVD7	I 55	I 355 Tlwy	WI	S-2F	78

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1405	RVD8	I 55	I 355 Tlwy	WI	S-2F	79
1406	RVD4	I 55	I 355 Tlwy	WI	S-2F	80
1407	RVD2	I 55	I 355 Tlwy	WI	S-2F	81
1408	RVD3	I 55	I 355 Tlwy	WI	S-2F	82
1425	69	I 55	Joliet Rd	WI	S-2A	83
1427	RVD1	I 55	I 355 Tlwy Ent	WI	S-2F	84
1430	71	I 55	Joliet Rd (half mile west )	WI	S-2A	85
1435	82	I 55	Upton Rd (west )	WI	S-2A	86
1440	73	I 55	IL 53 (half mile east )	WI	S-2A	87
1445	84	I 55	IL 53 (east )	WI	S-2A	88
1450	86	I 55	IL 53 (west )	WI	S-2A	89
1455	88	I 55	Schmidt Rd (east )	WI	S-2A	90
1460	75	I 55	Schmidt Rd (west )	WI	S-2A	91
1465	90	I 55	Naperville Rd (half mile east )	WI	S-2A	92
1470	92	I 55	Naperville Rd (west )	WI	S-2A	93
1475	77	I 55	Weber Rd (half mile north )	WI	S-2G	94
1480	79	I 55	Weber Rd Exit	WI	S-2G	95
1485	81	I 55	Weber Rd (north)	WI	S-2G	96
1490	83	I 55	Weber Rd (south)	WI	S-2G	97
1495	85	I 55	Weber Rd (half mile south )	WI	S-2G	98
1500	87	I 55	Weber Rd (one mile north )	WI	S-2G	99
1505	94	I 55	Weber Rd (half mile north )	WI	S-2G	100
1510	89	I 55	IL 126 Exit	WI	S-2G	101
1515	91	I 55	IL 126	WI	S-2G	102
1520	96	I 55	IL 126 (quarter mile south )	WI	S-2G	103
1525	98	I 55	IL 126 (half mile south )	WI	S-2B	104
1530	93	I 55	Lockport Rd (half mile north )	WI	S-2B	105
1535	95	I 55	Lockport Rd (north )	WI	S-2B	106
1540	97	I 55	Lockport Rd (south )	WI	S-2B	107
1545	100	I 55	Renwick Rd (north )	WI	S-2B	108
1550	100A	I 55	US 30 (half mile north )	WI	S-2B	109
1555	101	I 55	US 30 (north)	WI	S-2B	110
1560	103	I 55	US 30 (south)	WI	S-2B	111
1565	105	I 55	US 30 (half mile south )	WI	S-2B	112
1572	107	I 55	Caton Farm Rd (half mile north)	WI	S-2B	113
1575	102	I 55	Caton Farm Rd	WI	S-2B	114
1580	104	I 55	Caton Farm (half mile south)	WI	S-2B	115
1585	109	I 55	US 52 (one mile north)	WI	S-2B	116
1590	106	I 55	US 52 (half mile north)	WI	S-2B	117
1595	108	I 55	Black Rd	WI	S-2B	118



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1600	111	I 55	US 52 (half mile north)	WI	S-2B	119
1608	113	I 55	US 52 (north)	WI	S-2B	120
1610	115	I 55	US 52 (south)	WI	S-2B	121
1615	110	I 55	IL 59 (half mile north)	WI	S-2B	122
1620	117	I 55	IL 59 (north)	WI	S-2B	123
1625	119	I 55	IL 59 (south)	WI	S-2B	124
1630	121	I 55	I 80 (half mile north)	WI	S-2B	125
1635	123	I 55	I 80 (north)	WI	S-2B	126
1640	125	I 55	I 80 (south)	WI	S-2B	127
1645	127	I 55	I 80 (half mile south)	WI	S-2B	128
1650	129	I 55	I 80 (one mile south)	WI	S-2B	129
1655	131	I 55	Canal Rd	WI	S-2B	130
1660	133	I 55	US 6 (north)	WI	S-2B	131
1665	135	I 55	US 6 (south)	WI	S-2B	132
1670	137	I 55	Amoco Rd	WI	S-2B	133
1675	139	I 55	Bluff Rd (one mile north)	WI	S-2B	134
1680	141	I 55	Bluff Rd (half mile north)	WI	S-2B	135
1685	143	I 55	Bluff Rd (north)	WI	S-2B	136
1690	145	I 55	Bluff Rd (north)	WI	S-2B	137
1695	147	I 55	DesPlaines River (north)	WI	S-2B	138
1700	149	I 55	Arsenal Rd	WI	S-2B	139
1705	151	I 55	Arsenal Rd (west of)	WI	S-2B	140
1710	153	I 55	Arsenal Rd Exit	WI	S-2B	141
1715	155	I 55	Arsenal Rd Ent	WI	S-2B	142
1720	112A	I 55	Arsenal Rd (1 mile west)	WI	S-2B	143
1723	112	I 55	Blodgett Rd (quarter mile east)	WI	S-2B	144
1725	159	I 55	Blodgett Rd (half mile west)	WI	S-2G	145
1730	161	I 55	River Rd (one mile east)	WI	S-2G	146
1735	163	I 55	River Rd (half mile east)	WI	S-2G	147
1740	165	I 55	River Rd	WI	S-2B	148
1745	167	I 55	Lorenzo Rd (east)	WI	S-2B	149
1750	169	I 55	Lorenzo Rd (west)	WI	S-2B	150
1755	171	I 55	Lorenzo Rd (half mile west)	WI	S-2B	151
2000	A3	I 57	C & W RR	CO	S-2F	152
2015	B7	I 57	IL 1 Halsted St	CO	S-2F	153
2020	B4	I 57	100th St	CO	S-2F	154
2025	B6	I 57	104th St	CO	S-2F	155
2030	C9	I 57	107th St	CO	S-2F	156
2035	C8	I 57	111th St	CO	S-2A	157
2040	C11	I 57	111th St	CO	S-2A	158

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2050	D13	I 57	111th St	CO	S-2F	159
2055	D12	I 57	119th St	CO	S-2F	160
2060	E14	I 57	119th St	CO	S-2F	161
2065	D12A	I 57	119th St	CO	S-2F	162
2075	F16	I 57	127th St	CO	S-2F	163
2080	F19	I 57	127th St	CO	S-2A	164
2085	G18	I 57	127th St	CO	S-2F	165
2095	G20	I 57	Cal Sag Channel	CO	S-2A	166
2100	H22	I 57 IB	B&O RR	CO	S-2F	167
2105	H24	I 57 IB	IHB RR	CO	S-2F	168
2110	I26	I 57 IB	IHB RR (half mile south )	CO	S-2F	169
2115	I23	I 57 OB	IL 83 Sibley (half mile south)	CO	S-2A	170
2120	J25	I 57 OB	IL 83 147th St Sibley Blvd	CO	S-2A	171
2125	J28	I 57 IB	IL 83 147th St Sibley Blvd	CO	S-2A	172
2135	J32	I 57	I 294 Tlwy	CO	S-2A	173
2140	K27	I 57	Kedzie Ave (north )	CO	S-2A	174
2145	K29	I 57	155th St	CO	S-2A	175
2155	L33	I 57	US 6 159th St	CO	S-2A	176
2160	L34	I 57	US 6 159th St	CO	S-2A	177
2165	L35	I 57	US 6 159th St	CO	S-2F	178
2170	L36	I 57	US 6 159th St	CO	S-2A	179
2175	M37	I 57	163rd St	CO	S-2F	180
2180	N39	I 57	167th St	CO	S-2A	181
2190	N43	I 57	167th St	CO	S-2F	182
2195	O38	I 57	167th St	CO	S-2A	183
2205	O42	I 57	167th St	CO	S-2A	184
2210	T45	I 57	Cicero Ave (west )	CO	S-2F	185
2215	T47	I 57	Cicero Ave (half mile west )	CO	S-2F	186
2220	T44	I 57	I 80 Interchange	CO	S-2A	187
2225	T46	I 57	I 80 Interchange	CO	S-2A	188
2230	T49	I 57	I 80 Interchange	CO	S-2A	189
2235	U48	I 57	I 80 Interchange	CO	S-2A	190
2240	U51	I 57	I 80 Interchange	CO	S-2A	191
2245	U53	I 57	I 80 Interchange	CO	S-2A	192
3000	C131	I 90 KENN	OHare Airport Parking Lot C	CO	S-2A	193
3005	C127	I 90 KENN	US 12 45 Mannheim Rd	CO	S-2A	194
3007	C127A	I 90 KENN	US 12 45 Mannheim Rd	CO	S-2A	195
3010	C129	I 90 KENN	US 12 45 Mannheim Rd	CO	S-2A	196
3015	C134	I 190	US 12 45 Mannheim Rd	CO	S-2H	197
3020	C136	I 190	US 12 45 Mannheim Rd	CO	S-2H	198

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3025	C123	I 90 KENN	I 90 Toll Plaza	CO	S-2A	199
3030	C125	I 90 KENN	I 90 Toll Plaza	CO	S-2A	200
3035	C130	I 90 KENN	I 90 Toll Plaza	CO	S-2A	201
3040	C132	I 90 KENN	I 90 Toll Plaza	CO	S-2A	202
3045	D119	I 90 KENN	Des Plaines River Rd	CO	S-2A	203
3050	D121	I 90 KENN	Des Plaines River Rd	CO	S-2A	204
3055	D126	I 90 KENN	Des Plaines River Rd	CO	S-2A	205
3060	D128	I 90 KENN	Des Plaines River Rd	CO	S-2A	206
3065	D124	I 90 KENN	East River Rd	CO	S-2A	207
3067	MCD6	I 90 KENN	East River Rd	CO	S-2K	208
3070	D122	I 90 KENN	Cumberland Ave	CO	S-2A	209
3090	F111	I 90 KENN	Canfield Ave	CO	S-2A	210
3100	F107	I 90 KENN	IL 43 Harlem Ave	CO	S-2A	211
3115	F116	I 90 KENN	IL 43 Harlem Ave	CO	S-2A	212
3120	G105	I 90 KENN	IL 43 Harlem Ave	CO	S-2A	213
3130	G103	I 90 KENN	Sayre Ave	CO	S-2A	214
3145	H108	I 90 KENN	Nagle Ave	CO	S-2A	215
3150	H99	I 90 KENN	Bryn Mawr Ave	CO	S-2A	216
3160	H104	I 90 KENN	Meade Ave	CO	S-2A	217
3170	I95	I 90 KENN	Foster Ave	CO	S-2A	218
3180	I93	I 90 KENN	Central Ave	CO	S-2A	219
3190	I100A	I 90 KENN	Central Ave	CO	S-2A	220
3195	I98	I 90 KENN	Milwaukee Ave	CO	S-2A	221
3200	J87	I 90 KENN	Lawrence Ave	CO	S-2A	222
3205	J89	I 90 KENN	Lawrence Ave	CO	S-2A	223
3220	J96	I 90 KENN	Lawrence Ave	CO	S-2A	224
3230	94	I 90 KENN	IL 50 Cicero Ave	CO	S-2A	225
3232	MCD1	I 90 KENN	Montrose Ave	CO	S-2K	226
3235	81	I 90 KENN	Montrose Ave	CO	S-2A	227
3238	92A	I 90 KENN	Montrose Ave	CO	S-2A	228
3250	79	I 90 KENN	Kostner Ave	CO	S-2A	229
3253	77A	I 90 KENN	Keeler Ave	CO	S-2A	230
3255	90	I 90 KENN	Keeler Ave	CO	S-2A	231
3260	73	I 90 KENN	Pulaski Rd	CO	S-2A	232
3290	L67	I 90 KENN	Addison Rd	CO	S-2A	233
3295	L69	I 90 KENN	Addison Rd	CO	S-2A	234
3300	78	I 90 KENN	Addison Rd	CO	S-2I	235
3315	L63	I 90 KENN	Kimball Ave	CO	S-2A	236
3330	L74	I 90 94 KENN	Kimball Ave	CO	S-2A	237
3335	L61	I 90 94 KENN	Belmont Ave	CO	S-2A	238
3345	M55	I 90 94 KENN	Sacramento Blvd	CO	S-2A	239

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3375	M64	I 90 94 KENN	California Ave	CO	S-2A	240
3380	M53	I 90 94 KENN	Diversey Ave	CO	S-2A	241
3395	N60	I 90 94 KENN	Fullerton Ave	CO	S-2A	242
3400	N49	I 90 94 KENN	Fullerton Ave	CO	S-2A	243
3410	N47	I 90 94 KENN	Webster Ave	CO	S-2A	244
3425	O45	I 90 94 KENN	Armitage Ave	CO	S-2A	245
3430	O43	I 90 94 KENN	Armitage Ave	CO	S-2A	246
3440	P41	I 90 94 KENN	North Ave	CO	S-2A	247
3455	O50	I 90 94 KENN	North Ave	CO	S-2A	248
3462	R39A	I 90 94 KENN	Division St	CO	S-2A	249
3470	R46	I 90 94 KENN	Division St	CO	S-2A	250
3475	R37	I 90 94 KENN	Augusta Blvd	CO	S-2A	251
3490	R40	I 90 94 KENN	Chicago Ave	CO	S-2A	252
3495	S31	I 90 94 KENN	Ohio St	CO	S-2A	253
3500	S33	I 90 94 KENN	Ohio St	CO	S-2A	254
3505	S38	I 90 94 KENN	Ohio St Feeder	CO	S-2A	255
3510	S32	I 90 94 KENN	Ohio St Feeder	CO	S-2A	256
3515	S34	I 90 94 KENN	Ohio St Feeder	CO	S-2A	257
3520	S36	I 90 94 KENN	Green St	CO	S-2A	258
3530	Y30	I 90 94 KENN	Lake St	CO	S-2A	259
3540	Y26	I 90 94 KENN	Randolph St	CO	S-2A	260
3545	Y27	I 90 94 KENN	Randolph St	CO	S-2A	261
3558	Y22S	I 90 94 KENN	Washington Blvd	CO	S-2A	262
3560	Y22	I 90 94 KENN	Washington Blvd	CO	S-2A	263
3580	Y18	I 90 94 KENN	Madison Ave	CO	S-2A	264
3585	Y19	I 90 94 KENN	Madison Ave	CO	S-2A	265
3610	Z12	I 90 94 KENN	Monroe St	CO	S-2A	266
3615	Z14	I 90 94 KENN	Monroe St	CO	S-2A	267
3620	Z8	I 90 94 KENN	Adams St	CO	S-2A	268
3630	Z11	I 90 94 KENN	Adams St	CO	S-2A	269
3640	Z1	I 90 94 KENN	I 290 Circle Interchange	CO	S-2A	270
3645	Z2	I 90 94 KENN	Circle Int Ryan IB @ Harrison	CO	S-2A	271
3650	Z3	I 90 94 KENN	I 290 Circle Interchange	CO	S-2A	272
3655	Z4	I 90 94 KENN	I 290 Circle Interchange	CO	S-2A	273
3660	Z5	I 90 94 KENN	I 290 Circle Interchange	CO	S-2A	274
3665	Z6	I 90 94 KENN IB Van B I 90 94 KENN OB Van B	I 290 Circle Interchange	CO	S-2A	275
3670	Z7		I 290 Circle Interchange	CO	S-2A	276
3675	MCD5	I 90 94 KENN	I 290 Circle Interchange	CO	S-2K	277
4000	A2A	I 94 EDENS	Wilson Ave	CO	S-2A	278
4005	A1	I 94 EDENS	Wilson Ave	CO	S-2A	279

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4016	MCD1	I 94 EDENS	Wilson Ave	CO	S-2K	280
4018	MCD1	I 94 EDENS	Wilson Ave	CO	S-2K	281
4030	B6	I 94 EDENS	IL 50 Cicero Ave	CO	S-2A	282
4035	C7	I 94 EDENS	Peterson Ave	CO	S-2A	283
4055	D11	I 94 EDENS	Devon Ave	CO	S-2A	284
4060	D13	I 94 EDENS	Pratt Ave	CO	S-2A	285
4085	E19	I 94 EDENS	Niles Center Rd	CO	S-2A	286
4090	G18	I 94 EDENS	Oakton St	CO	S-2A	287
4095	G20	I 94 EDENS	Lincoln Ave	CO	S-2A	288
4120	H26	I 94 EDENS	Church St	CO	S-2A	289
4125	J25	I 94 EDENS	Golf Rd	CO	S-2A	290
4130	K27	I 94 EDENS	Old Orchard	CO	S-2A	291
4135	K28	I 94 EDENS	Old Orchard	CO	S-2A	292
4140	K30	I 94 EDENS	Glenview Ave	CO	S-2A	293
4145	L29	I 94 EDENS	Lake Ave	CO	S-2A	294
4150	L32	I 94 EDENS	Lake Ave	CO	S-2A	295
4155	L34	I 94 EDENS	Lake Ave	CO	S-2A	296
4160	M31	I 94 EDENS	US 41 Skokie Blvd	CO	S-2A	297
4165	M36	I 94 EDENS	US 41 Skokie Blvd	CO	S-2A	298
4170	M33	I 94 EDENS	Winnetka Rd	CO	S-2A	299
4175	N35	I 94 EDENS	Willow Rd	CO	S-2A	300
4180	N37	I 94 EDENS	Willow Rd	CO	S-2A	301
4185	N38	I 94 EDENS	Willow Rd	CO	S-2A	302
4190	N40	I 94 EDENS	Willow Rd	CO	S-2A	303
4195	O42	I 94 EDENS	Tower Rd (half mile south )	CO	S-2A	304
4200	O39	I 94 EDENS	Tower Rd	CO	S-2A	305
4205	O44	I 94 EDENS	Tower Rd	CO	S-2A	306
4210	P46	I 94 EDENS	Tower Rd (half mile north )	CO	S-2A	307
4215	P48	I 94 EDENS	IL 68 Dundee (half mile south )	CO	S-2A	308
4220	R41	I 94 EDENS	IL 68 Dundee Rd	CO	S-2A	309
4225	R50	I 94 EDENS	IL 68 Dundee Rd	CO	S-2A	310
4230	R52	I 94 EDENS	IL 68 Dundee Rd	CO	S-2A	311
4235	R54	I 94 EDENS	I 294 Tlwy	CO	S-2A	312
4240	S56	I 94 EDENS	Lake Cook Rd	CO	S-2A	313
4245	S58	US 41 Skokie Hwy	Lake Cook Rd	LA	S-2A	314
4250	T60	US 41 Skokie Hwy	Lake Cook Rd (half mile north )	LA	S-2A	315
4255	T45	US 41 Skokie Hwy	Bob O Link Golf Club	LA	S-2A	316
4260	T62	US 41 Skokie Hwy	Chantilly Blvd	LA	S-2A	317
4265	T43	US 41 Skokie Hwy	Clavey Rd	LA	S-2A	318
5005	71	I 94 RYAN	97th St	CO	S-2B	319

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5010	69	I 94 RYAN	97th St	CO	S-2B	320
5020	O67	I 94 RYAN SB	95th St Exit	CO	S-2B	321
5030	66	I 94 RYAN	87th St or 90 <sup>th</sup> St Exit	CO	S-2B	322
5045	63	I 94 RYAN	87th St Ent	CO	S-2B	323
5060	61	I 94 RYAN	83rd St Exit	CO	S-2B	324
5065	60	I 94 RYAN	79th St Exit	CO	S-2B	325
5080	58A	I 94 RYAN	79th St Exit	CO	S-2B	326
5085	57	I 94 RYAN	76th St Ent	CO	S-2B	327
5090	57A	I 94 RYAN	76th St CD Ent	CO	S-2B	328
5095	55	I 94 RYAN	75th St Exit	CO	S-2B	329
5100	54	I 94 RYAN	75th St Exit	CO	S-2B	330
5110	51	I 94 RYAN	75th St Exit	CO	S-2B	331
5122	50	I 94 RYAN NB	67th St Exit	CO	S-2B	332
5135	47	I 94 RYAN SB	65th St Skyway Exit	CO	S-2B	333
5140	48	I 94 RYAN NB	65th St Skyway Ent	CO	S-2B	334
5150	45A	I 90 94 RYAN SB	63rd St Exit	CO	S-2B	335
5155	46A	I 90 94 RYAN NB	59th St Exit	CO	S-2B	336
5165	43	I 90 94 RYAN SB	59th St	CO	S-2B	337
5170	44	I 90 94 RYAN NB	59th St	CO	S-2B	338
5220	39	I 90 94 RYAN SB	53rd St	CO	S-2B	339
5230	40	I 90 94 RYAN	47th St Exit	CO	S-2B	340
5240	35	I 90 94 RYAN	47th St Exit	CO	S-2B	341
5245	38A	I 90 94 RYAN	43rd St Exit	CO	S-2B	342
5260	33	I 90 94 RYAN	43rd St Exit	CO	S-2B	343
5265	34	I 90 94 RYAN	39th St Exit	CO	S-2B	344
5295	32	I 90 94 RYAN NB	39th St Exit	CO	S-2B	345
5300	29	I 90 94 RYAN SB	35th St	CO	S-2B	346
5305	30	I 90 94 RYAN NB	35th St	CO	S-2B	347
5310	27	I 90 94 RYAN SB	35th St	CO	S-2B	348
5315	25	I 90 94 RYAN SB	33rd St	CO	S-2B	349
5320	28	I 90 94 RYAN NB	33rd St	CO	S-2B	350
5325	23	I 90 94 RYAN SB	31st St	CO	S-2B	351
5330	26	I 90 94 RYAN NB	31st St	CO	S-2B	352
5335	X20	I 90 94 RYAN	29th St	CO	S-2A	353
5340	X21	I 90 94 RYAN	29th St	CO	S-2A	354
5345	X22	I 90 94 RYAN	29th St	CO	S-2A	355
5350	X24	I 90 94 RYAN	29th St	CO	S-2A	356
5355	X19	I 90 94 RYAN	26th St & Princeton Ave	CO	S-2A	357
5360	Z12	I 90 94 RYAN	Ford Ave	CO	S-2A	358
5365	Z14	I 90 94 RYAN	Ford Ave	CO	S-2A	359
5370	Z10	I 90 94 RYAN	22nd St & Emerald Ave	CO	S-2A	360

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5375	Z13	I 90 94 RYAN	22nd St & Emerald Ave	CO	S-2A	361
5380	A11	I 90 94 RYAN	16th St & Union Ave	CO	S-2A	362
5393	C6A	I 90 94 RYAN	Taylor St	CO	S-2A	363
5395	C8	I 90 94 RYAN	Roosevelt Rd	CO	S-2A	364
5400	C3	I 90 94 RYAN	Taylor St	CO	S-2A	365
5410	D1	I 90 94 RYAN	Polk St	CO	S-2A	366
6000	7	I 94 FORD EB	I 94 I 80 Interchange (east )	CO	S-2A	367
6005	6	I 94 FORD WB	I 94 I 80 Interchange (east )	CO	S-2A	368
6010	8	I 94 FORD EB	Torrence Slip to I 80 WB	CO	S-2A	369
6015	12	I 94 FORD WB	I 94 I 80 Interchange (east )	CO	S-2A	370
6035	C40	I 94 FORD	171st St	CO	S-2B	371
6040	E38	I 94 FORD WB	163rd St	CO	S-2B	372
6045	F32	I 94 FORD	US 6 159th St	CO	S-2A	373
6050	F34	I 94 FORD	US 6 159th St	CO	S-2A	374
6055	F36	I 94 FORD	US 6 159th St	CO	S-2A	375
6060	F47	I 94 FORD	US 6 159th St	CO	S-2A	376
6065	F49	I 94 FORD	US 6 159th St	CO	S-2A	377
6070	F45	I 94 FORD	Penn Central RR	CO	S-2A	378
6075	F43	I 94 FORD	Pulaski Rd	CO	S-2A	379
6080	G28	I 94 FORD	IL 83 147th St Sibley Blvd	CO	S-2A	380
6085	G30	I 94 FORD	IL 83 147th St Sibley Blvd	CO	S-2A	381
6090	G37	I 94 FORD	IL 83 147th St Sibley Blvd	CO	S-2A	382
6095	G39	I 94 FORD	IL 83 147th St Sibley Blvd	CO	S-2A	383
6100	G41	I 94 FORD	IL 83 147th St Sibley Blvd	CO	S-2A	384
6105	H24	I 94 FORD	Dolton St	CO	S-2A	385
6110	H26	I 94 FORD	Dolton St	CO	S-2A	386
6120	H35	I 94 FORD	Dolton St	CO	S-2A	387
6125	H31	I 94 FORD	B & O RR (north )	CO	S-2A	388
6130	X22	I 94 FORD	138th St	CO	S-2A	389
6135	X29	I 94 FORD	138th St	CO	S-2A	390
6140	X20	I 94 FORD	133rd St	CO	S-2A	391
6145	I16	I 94 FORD	130th St	CO	S-2A	392
6150	I18	I 94 FORD	130th St	CO	S-2A	393
6155	I25	I 94 FORD	130th St	CO	S-2A	394
6160	I27	I 94 FORD	130th St	CO	S-2A	395
6165	J23	I 94 FORD	128th St	CO	S-2A	396
6170	J21	I 94 FORD	124th St	CO	S-2A	397
6175	J19	I 94 FORD	125th St	CO	S-2A	398
6180	H12	I 94 FORD	115th St	CO	S-2A	399
6185	H14	I 94 FORD	115th St	CO	S-2A	400
6190	H15	I 94 FORD	115th St	CO	S-2A	401

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6195	J17	I 94 FORD	115th St	CO	S-2A	402
6200	K8	I 94 FORD	111th St	CO	S-2A	403
6205	K10	I 94 FORD	111th St	CO	S-2A	404
6210	K11	I 94 FORD	111th St	CO	S-2A	405
6215	K13	I 94 FORD	111th St	CO	S-2A	406
6220	L7	I 94 FORD	107th St	CO	S-2A	407
6225	L9	I 94 FORD	107th St	CO	S-2A	408
6230	L6	I 94 FORD	103rd St	CO	S-2A	409
6235	BFT1	I 94 FORD	109th (in median)	CO	S-2A	410
6240	L5	I 94 FORD	Ellis Ave	CO	S-2A	411
6245	M3	I 94 FORD	Rhodes St	CO	S-2A	412
6250	M1	I 94 FORD	Michigan Ave	CO	S-2B	413
7000	2	I 80 WB	Indiana State Line	CO	S-2B	414
7005	1	I 80 EB	Wentworth (west )	CO	S-2B	415
7010	3	I 80 EB	Burnham (west )	CO	S-2B	416
7015	5	I 80 EB	Railroad Ave (west )	CO	S-2B	417
7020	4	I 80 WB	Torrence Ave	CO	S-2B	418
7025	9	I 80 EB	I 80 I 94 IL 394	CO	S-2B	419
7030	10	I 80 WB	I 80 I 94 IL 394	CO	S-2B	420
8000	B2	I 290 IKE	Franklin St	CO	S-2A	421
8010	G1	I 290 IKE	Morgan	CO	S-2A	422
8015	G3	I 290 IKE	Racine Ave	CO	S-2A	423
8020	G4	I 290 IKE	Racine Ave	CO	S-2A	424
8025	G5	I 290 IKE	Racine Ave	CO	S-2A	425
8030	G6	I 290 IKE	Racine Ave	CO	S-2A	426
8035	G7	I 290 IKE	Ashland Ave	CO	S-2A	427
8045	G9	I 290 IKE	Damen Ave & Paulina	CO	S-2A	428
8050	G10	I 290 IKE	Damen Ave & Paulina	CO	S-2A	429
8055	H11	I 290 IKE	Damen Ave & Paulina	CO	S-2A	430
8065	H12	I 290 IKE	Damen Ave & Paulina	CO	S-2A	431
8070	H12A	I 290 IKE	Damen Ave & Paulina	CO	S-2A	432
8075	H13	I 290 IKE	Oakley Ave	CO	S-2A	433
8080	H14	I 290 IKE	Oakley Ave	CO	S-2A	434
8090	H17	I 290 IKE	Western Ave	CO	S-2A	435
8100	I18	I 290 IKE	Sacramento Blvd	CO	S-2A	436
8115	I23	I 290 IKE	Homan Ave	CO	S-2A	437
8125	J24	I 290 IKE	Independence Blvd	CO	S-2A	438
8130	J25	I 290 IKE	Independence Blvd	CO	S-2A	439
8145	J29	I 290 IKE	Kostner Ave	CO	S-2A	440
8150	K28	I 290 IKE	IL 50 Cicero Ave	CO	S-2A	441
8155	K31	I 290 IKE	IL 50 Cicero Ave	CO	S-2A	442



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8170	K35	I 290 IKE	Laramie Ave	CO	S-2A	443
8180	L34	I 290 IKE	Central Ave	CO	S-2A	444
8185	L34S	I 290 IKE	Central Ave	CO	S-2A	445
8190	L37	I 290 IKE	Central Ave	CO	S-2A	446
8200	L36	I 290 IKE	Austin Blvd	CO	S-2A	447
8205	M41	I 290 IKE	Austin Blvd	CO	S-2A	448
8215	M38	I 290 IKE	East Ave	CO	S-2A	449
8220	M45	I 290 IKE	East Ave	CO	S-2A	450
8225	MCD1	I 290 IKE	East Ave	CO	S-2K	451
8235	M47	I 290 IKE	IL 43 Harlem Ave	CO	S-2A	452
8245	N42	I 290 IKE	Des Plaines Ave	CO	S-2A	453
8250	N51	I 290 IKE	Des Plaines Ave	CO	S-2A	454
8260	O44	I 290 IKE	Des Plaines River	CO	S-2A	455
8270	O55	I 290 IKE	IL 171 1st Ave	CO	S-2A	456
8275	O57	I 290 IKE	IL 171 1st Ave	CO	S-2A	457
8290	P61	I 290 IKE	9th Ave	CO	S-2A	458
8300	P56	I 290 IKE	17th Ave	CO	S-2A	459
8305	P63	I 290 IKE	17th Ave	CO	S-2A	460
8325	R67	I 290 IKE	25th Ave	CO	S-2A	461
8335	R62	I 290 IKE	Addison Creek	CO	S-2A	462
8360	S71	I 290 IKE	Mannheim Rd	CO	S-2A	463
8380	T77	I 290 IKE	Hillside Ave Wolf Rd Exit	CO	S-2A	464
9000	V72	I 290 IKE	Wolf Rd	CO	S-2A	465
9005	MCD3	I 290 IKE	Wolf Rd	CO	S-2K	466
9010	V74	I 290	Butterfield Rd	CO	S-2A	467
9015	V76	I 290	I 294 Tlwy	CO	S-2A	468
9020	V81	I 290	I 294 Tlwy	CO	S-2A	469
9025	W78	I 290	Maple Ave	CO	S-2A	470
9050	X84	I 290	Cn RR C & NW RR	DU	S-2A	471
9060	X87	I 290	IL 64 North Ave	DU	S-2A	472
9065	X88	I 290	IL 64 North Ave	DU	S-2A	473
9070	X89	I 290	IL 64 North Ave	DU	S-2A	474
9080	X91	I 290	IL 64 North Ave	DU	S-2A	475
9085	X92	I 290	Emroy Ave	DU	S-2A	476
9090	Y93	I 290	York Rd & Lake St	DU	S-2A	477
9095	Y94	I 290	York Rd & Lake St	DU	S-2A	478
9100	Y95	I 290 WB	York Rd & Lake St	DU	S-2A	479
9105	Y96	I 290 IKE EB	York Rd & Lake St	DU	S-2A	480
9110	Y97	I 290 WB	York Rd & Lake St	DU	S-2A	481
9115	Y99	I 290 WB	Church Rd	DU	S-2A	482
9120	Y98	I 290 EB	Grand Ave	DU	S-2A	483

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9125	A100	I 290 EB	IL 83 Kingery Hwy	DU	S-2A	484
9135	A102	I 290	IL 83 Kingery Hwy	DU	S-2A	485
9145	B105	I 290	Wooddale Rd	DU	S-2A	486
9150	E107	I 290	Wooddale Rd (west )	DU	S-2A	487
9155	E109	I 290	Addison Rd	DU	S-2A	488
9160	E104	I 290	Addison Rd (west )	DU	S-2A	489
9165	F111	I 290	Mill Rd	DU	S-2A	490
9170	G106	I 290 IL 53	Itasca Rd	DU	S-2A	491
9175	G110	I 290 IL 53	Nordic Rd	DU	S-2A	492
9180	J112	I 290 IL 53	Nordic Rd	DU	S-2A	493
9190	J114	I 290 IL 53	IL 19 Irving Park Rd (north )	DU	S-2A	494
9195	J113	I 290	Thorndale (1/2 mile south)	DU	S-2A	495
9200	J116	I 290	Thorndale (south )	DU	S-2A	496
9205	J117	I 290	Thorndale (south )	DU	S-2A	497
9210	J119	I 290	Thorndale (NE Quad)	DU	S-2A	498
9215	K118	I 290	Thorndale (NW Quad)	DU	S-2A	499
9225	L121	I 290 IL 53 OB	Devon Ave	DU	S-2A	500
9230	L123	I 290 IL 53 OB	Devon Ave (north )	CO	S-2A	501
9235	L122	I 290 IL 53 IB	Biesterfield Rd	CO	S-2A	502
9240	L123A	I 290 IL 53 OB Ent	Biesterfield Rd	CO	S-2A	503
9245	M124	I 290 IL 53 IB	Biesterfield Rd (north )	CO	S-2A	504
9250	M126	I 290 IL 53 IB	WGN Radio Station Tower	CO	S-2A	505
9255	M128	I 290 IL 53 IB	IL 72 Higgins Rd ( 1 1/2 mile south )	CO	S-2A	506
9260	N130	I 290 IL 53 IB	IL 72 Higgins Rd (one mile south )	CO	S-2A	507
9270	O127	I 290 IL 53 OB	IL 72 Higgins Rd	CO	S-2A	508
9275	O132	I 290 IL 53 IB	IL 72 Higgins Rd	CO	S-2A	509
9285	P129	I 290 IL 53 OB	Woodfield Dr	CO	S-2A	510
9295	P131	I 290 IL 53	I 90 Tlwy	CO	S-2A	511
9300	P138	I 290 IL 53	I 90 Tlwy	CO	S-2A	512
10000	133	IL 53	I 90 Tlwy IB	CO	S-2A	513
10003	140	IL 53	I 90 Tlwy OB	CO	S-2A	514
10005	135	IL 53	IL 62 Algonquin Rd	CO	S-2A	515
10010	142	IL 53	IL 62 Algonquin Rd	CO	S-2A	516
10015	144	IL 53	Algonquin Rd (half mile north )	CO	S-2A	517
10020	146	IL 53	Kirchoff Rd	CO	S-2A	518
10025	137	IL 53	Kirchoff Rd	CO	S-2A	519
10030	143	IL 53	Industrial Ave	CO	S-2A	520
10035	139	IL 53	Euclid St	CO	S-2A	521
10040	148	IL 53	Euclid St	CO	S-2A	522
10045	150	IL 53	Euclid St	CO	S-2A	523

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10047	141	IL 53	Euclid St	CO	S-2A	524
10050	145	IL 53	US 14 Northwest Hwy	CO	S-2A	525
10055	152	IL 53	US 14 Northwest Hwy	CO	S-2A	526
10060	147	IL 53	Palatine Rd	CO	S-2A	527
10065	149	IL 53	Palatine Rd	CO	S-2A	528
10070	154	IL 53	Palatine Rd	CO	S-2A	529
10075	156	IL 53	Palatine Rd	CO	S-2A	530
10080	151	IL 53	Anderson Dr	CO	S-2A	531
10085	153	IL 53	US 12 Rand Rd	CO	S-2A	532
10090	158	IL 53	US 12 Rand Rd	CO	S-2A	533
10095	155	IL 53	IL 68 Dundee Rd	CO	S-2A	534
10100	157	IL 53	IL 68 Dundee Rd	CO	S-2A	535
10105	160	IL 53	IL 68 Dundee Rd	CO	S-2A	536
10110	162	IL 53	IL 68 Dundee Rd	CO	S-2A	537
10115	159	IL 53	Lake Cook Rd (half mile south)	CO	S-2A	538
11000	G108	I 355 Tlwy	Schick Rd	DU	S-2A	539
11005	11	I 355 Tlwy	US 20 Lake St	DU	S-2A	540
11010	12	I 355 Tlwy	US 20 Lake St	DU	S-2A	541
11015	14	I 355 Tlwy	US 20 Lake St	DU	S-2A	542
11020	16	I 355 Tlwy	Kings Point Dr	DU	S-2A	543
12000	1	Lake Shore Dr	Marquette Rd (south )	CO	S-2A	544
12005	2	Lake Shore Dr	Marquette Rd (south )	CO	S-2A	545
12010	3	Lake Shore Dr	Hayes Dr	CO	S-2A	546
12015	4	Lake Shore Dr	59th St (south )	CO	S-2A	547
12020	5	Lake Shore Dr	59th St (south )	CO	S-2A	548
12025	6	Lake Shore Dr	53rd St (south )	CO	S-2A	549
12030	7	Lake Shore Dr	48th St (south )	CO	S-2A	550
12035	8	Lake Shore Dr	47th St (south )	CO	S-2A	551
12040	9	Lake Shore Dr	47th St (south )	CO	S-2A	552
12045	10	Lake Shore Dr	43rd St (south )	CO	S-2A	553
12050	11	Lake Shore Dr	Oakwood Blvd (south )	CO	S-2A	554
12055	12	Lake Shore Dr	Oakwood Blvd (south )	CO	S-2A	555
12060	13	Lake Shore Dr	Oakwood Blvd (north )	CO	S-2A	556
12065	14	Lake Shore Dr	35th St (south )	CO	S-2A	557
12070	15	Lake Shore Dr	31st St (south )	CO	S-2A	558
12075	16	Lake Shore Dr	31st St (north )	CO	S-2A	559
12080	17	Lake Shore Dr	31st St (south )	CO	S-2A	560
12085	18	Lake Shore Dr	31st St (north )	CO	S-2A	561
12090	19	Lake Shore Dr	25th St	CO	S-2A	562
12095	20	Lake Shore Dr	23rd St	CO	S-2A	563

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12100	21	Lake Shore Dr	23rd St (north )	CO	S-2A	564
12105	MCD7	Lake Shore Dr	23rd St (north )	CO	S-2K	565
12106	22	Lake Shore Dr	18th St	CO	S-2A	566
12107	21A	Lake Shore Dr OB	18th St	CO	S-2A	567
12110	23	Lake Shore Dr	McFetridge Dr (south )	CO	S-2A	568
12115	24	Lake Shore Dr	Balbo Ave (south )	CO	S-2A	569
12120	25	Lake Shore Dr	Jackson Blvd	CO	S-2A	570
13025	26	Lake Shore Dr	Randolph St	CO	S-2A	571
13030	27	Lake Shore Dr	Randolph St	CO	S-2A	572
13035	28	Lake Shore Dr	Randolph St	CO	S-2A	573
13040	29	Lake Shore Dr	Randolph St	CO	S-2A	574
13045	30	Lake Shore Dr	Wacker Dr	CO	S-2A	575
13050	31	Lake Shore Dr	Illinois	CO	S-2A	576
13055	32	Lake Shore Dr	Grand Ave	CO	S-2A	577
13060	33	Lake Shore Dr	Wacker Dr	CO	S-2A	578
13065	34	Lake Shore Dr	Erie St	CO	S-2A	579
13070	35	Lake Shore Dr	Chicago Ave (south )	CO	S-2A	580
13075	36	Lake Shore Dr	Chicago Ave	CO	S-2A	581
13080	37	Lake Shore Dr	Chicago Ave	CO	S-2A	582
13085	38	Lake Shore Dr	Chestnut St	CO	S-2A	583
13090	39	Lake Shore Dr	Chestnut St	CO	S-2A	584
13095	40	Lake Shore Dr	Michigan Ave	CO	S-2A	585
13100	41	Lake Shore Dr	Michigan Ave	CO	S-2A	586
13105	42	Lake Shore Dr	Michigan Ave	CO	S-2A	587
13110	43	Lake Shore Dr	Division St	CO	S-2A	588
13115	44	Lake Shore Dr	Division St	CO	S-2A	589
13120	45	Lake Shore Dr	Division St	CO	S-2A	590
13125	46	Lake Shore Dr	North Ave	CO	S-2A	591
13130	47	Lake Shore Dr	North Ave	CO	S-2A	592
13135	48	Lake Shore Dr	North Ave	CO	S-2A	593
13140	49	Lake Shore Dr	North Ave	CO	S-2A	594
13145	50	Lake Shore Dr	North Ave	CO	S-2A	595
13150	51	Lake Shore Dr	Armitage Ave	CO	S-2A	596
13155	52	Lake Shore Dr	Fullerton Parkway	CO	S-2A	597
13160	53	Lake Shore Dr	Fullerton Parkway	CO	S-2A	598
13165	54	Lake Shore Dr	Fullerton Parkway	CO	S-2A	599
13170	55	Lake Shore Dr	Diversey Ave	CO	S-2A	600
13175	56	Lake Shore Dr	Diversey Ave	CO	S-2A	601
13180	57	Lake Shore Dr	Belmont Ave	CO	S-2A	602
13185	58	Lake Shore Dr	Belmont Ave	CO	S-2A	603
13190	59	Lake Shore Dr	Belmont Ave	CO	S-2A	604

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13195	60	Lake Shore Dr	Belmont Ave	CO	S-2A	605
13200	61	Lake Shore Dr	Belmont Ave	CO	S-2A	606
13205	62	Lake Shore Dr	Addison St	CO	S-2A	607
13210	63	Lake Shore Dr	Addison St	CO	S-2A	608
13215	64	Lake Shore Dr	IL 19 Irving Park Rd	CO	S-2A	609
13220	65	Lake Shore Dr	IL 19 Irving Park Rd	CO	S-2A	610
13225	66	Lake Shore Dr	IL 19 Irving Park Rd	CO	S-2A	611
13230	67	Lake Shore Dr	IL 19 Irving Park Rd	CO	S-2A	612
13235	68	Lake Shore Dr	Montrose Ave	CO	S-2A	613
13240	69	Lake Shore Dr	Montrose Ave	CO	S-2A	614
13245	70	Lake Shore Dr	Wilson Ave	CO	S-2A	615
13250	71	Lake Shore Dr	Wilson Ave	CO	S-2A	616
13255	72	Lake Shore Dr	Wilson Ave	CO	S-2A	617
13260	73	Lake Shore Dr	Lawrence Ave	CO	S-2A	618
13265	74	Lake Shore Dr	Lawrence Ave	CO	S-2A	619
13270	75	Lake Shore Dr	Lawrence Ave	CO	S-2A	620
13275	76	Lake Shore Dr	Foster Ave	CO	S-2A	621
13280	77	Lake Shore Dr	Foster Ave	CO	S-2A	622
13285	78	Lake Shore Dr	Foster Ave	CO	S-2A	623
13290	79	Lake Shore Dr	Bryn Mawr Ave	CO	S-2A	624
13295	80	Lake Shore Dr	Bryn Mawr Ave	CO	S-2A	625
13297	81	Lake Shore Dr	Bryn Mawr Ave	CO	S-2A	626
15000	2	I 80	I 294 Tlwy	CO	S-2A	627
15005	4E	I 80	Kedzie Ave	CO	S-2A	628
15010	1	I 80	Kedzie Ave (half mile west )	CO	S-2A	629
15015	6E	I 80	Crawford Ave	CO	S-2A	630
15020	8E	I 80	IL 50 Cicero Ave (1/2 mile east )	CO	S-2A	631
15025	10	I 80	IL 50 Cicero Ave	CO	S-2A	632
15030	3	I 80	I 57 (east)	CO	S-2A	633
15035	5	I 80	I 57 (west )	CO	S-2A	634
15040	7	I 80	Central Ave	CO	S-2A	635
15045	12	I 80	183rd St	CO	S-2A	636
15050	14	I 80	Ridgeland Ave	CO	S-2A	637
15055	9	I 80	Oak Park Ave	CO	S-2A	638
15060	16	I 80	IL 43 Harlem Ave (east )	CO	S-2A	639
15065	18	I 80	IL 43 Harlem Ave (west)	WI	S-2A	640
15067	MCD1	I 80	Harlem Ave	CO	S-2K	641
15070	11	I 80	76th St	WI	S-2A	642
15075	20	I 80	80th Ave	WI	S-2A	643
15080	13	I 80	187th St	WI	S-2A	644

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15085	15	I 80	Metra RR Bridge (east)	WI	S-2A	645
15090	17	I 80	Metra RR Bridge (west)	WI	S-2A	646
15095	22	I 80	US 45 LaGrange Rd (east)	WI	S-2A	647
15100	24	I 80	US 45 LaGrange Rd (west)	WI	S-2A	648
15105	25	I 80	LaGrange Rd (half mile west)	WI	S-2C	649
15110	27	I 80	LaGrange Rd (one mile west)	WI	S-2C	650
15115	29	I 80	Wolf Rd (half mile east)	WI	S-2C	651
15120	31	I 80	Wolf Rd (west)	WI	S-2C	652
15125	33	I 80	Wolf Rd (half mile west)	WI	S-2C	653
15130	35	I 80	Maple (half mile east)	WI	S-2C	654
15135	37	I 80	Maple Rd	WI	S-2C	655
15140	39	I 80	Norfolk Southern RR	WI	S-2C	656
15145	41	I 80	Parker Rd (east)	WI	S-2C	657
15150	43	I 80	Parker Rd (half mile west)	WI	S-2C	658
15155	45	I 80	I 355 Tlwy East	WI	S-2C	659
15160	47	I 80	I 355 Tlwy	WI	S-2C	660
15165	49	I 80	I 355 West ( Cedar Rd )	WI	S-2C	661
15170	51	I 80	I 355 ( half mile west )	WI	S-2C	662
15175	53	I 80	Francis Rd ( half mile east )	WI	S-2C	663
15180	55	I 80	Francis Rd	WI	S-2C	664
15185	57	I 80	US 30 (quarter mile east)	WI	S-2D	665
15205	61	I 80	Briggs (one mile east)	WI	S-2D	666
15215	63	I 80	Briggs (east)	WI	S-2D	667
15235	67	I 80	Richards St (west)	WI	S-2D	668
15245	69	I 80	Meadow Center St Exit WB	WI	S-2D	669
15255	71	I 80	Larkin (half mile east)	WI	S-2E	670
15265	73	I 80	Larkin (half mile west)	WI	S-2D	671
15275	75	I 80	Houbolt (half mile east)	WI	S-2E	672
15285	77	I 80	Houbolt Exit EB	WI	S-2D	673
15295	79	I 80	I 55 (east)	WI	S-2D	674
15305	81	I 80	River Rd	WI	S-2E	675
15315	83	I 80	I 55 (one mile west)	WI	S-2D	676
15325	85	I 80	Shepley Rd (quarter mile east)	WI	S-2D	677
16000	11	IL 394 SB	I 80 94 SW Quad IL 39	CO	S-2B	678
16005	14	IL 394 NB	I 80 94 SE Quad IL 39	CO	S-2B	679
16010	16	IL 394 NB	Thorton Lansing Rd (south )	CO	S-2B	680
16020	18	IL 394 NB	186th St	CO	S-2F	681
20000	1040	US 12 IL 59	IL 134 Long Lake Big Hollow Rd	LA	S-2I	682
20005	1050	IL 59 Sutton Rd	US 20 Lake St	CO	S-2I	683
20010	1121	I 90 94 KENN	51st St	CO	S-2I	684

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20015	1123	I 90 94 KENN	51st St	CO	S-2I	685
20020	1170	US 6 159th St	Pulaski Rd Crawford Ave	CO	S-2I	686
20025	1310	I 355 Tlwy	75th	DU	S-2I	687
20030	1320	IL 64 North Ave	IL 59 Sutton Rd	DU	S-2I	688
20035	1420	IL 31 Lincoln Way	IL 56 State St	KA	S-2I	689
20040	1500	US 45	IL 176	LA	S-2I	690
20045	1520	IL 22 Half Day Rd	IL 83	LA	S-2I	691
20050	1610	IL 31	US 14 Northwest Hwy	MC	S-2I	692
20055	1730	US 45 LaGrange Rd	US 30 Lincoln Hwy	WI	S-2I	693
20060	1330	IL 38 Roosevelt Rd	Finley Rd (west )	DU	S-2I	694
20065	1530	IL 131 Green Bay Rd	20th St (south )	LA	S-2I	695
20070	1280	IL 43 Harlem Ave	Techny Rd	CO	S-2I	696
20075	1290	IL 68 Dundee Rd	Portwine Rd	CO	S-2I	697
20080	1430	Peplow Rd	Ramm Rd (north )	KA	S-2I	698
20085	1260	IL 58 Golf Rd	Birch Ave	CO	S-2I	699
20090	1200	IL 50 Cicero Ave	99th St (south )	CO	S-2I	700
20095	1340	IL 83 Kingery Hwy	55th St (north )	DU	S-2I	701
20100	1540	IL 59	Hillcrest Dr (south )	LA	S-2I	702
20105	1740	Independence Blvd	Taylor St (north)	WI	S-2I	703
20110	1190	IL 7 SW Highway	131st St	CO	S-2I	704
20115	1270	US 14 Northwest Hwy	Chatham Pl (west )	CO	S-2I	705
20120	1230	Devon Ave	Arlington Heights Rd (east )	CO	S-2I	706
20125	1350	Wooddale Ave	Mark St (south )	DU	S-2I	707
20130	1440	Galligan Rd	Freeman Rd (south )	KA	S-2I	708
20135	1550	Wilson Ave	Marshall Blvd (north )	LA	S-2I	709
20140	1560	IL 176 Park Ave	Blue Spruce Ln (east )	LA	S-2I	710
20145	1750	IL 126 Plainfield Rd	143rd St (north)	WI	S-2I	711
20150	1620	US 14	Deep Cut Rd (SE )	MC	S-2I	712
20155	1450	Campton Hills Rd	Lynn Dr (east )	KA	S-2I	713
20160	1250	Kedzie Ave	Touhy Ave (south )	CO	S-2I	714
20165	1240	IL 72 Higgins	I 294 Tlwy (east )	CO	S-2I	715
20170	1570	Lake St	West St (west )	LA	S-2I	716
20175	1760	7th St	Peppermill Rd (west)	WI	S-2I	717
20180	1770	Manhattan Rd	Elwood (one mile north)	WI	S-2I	718
20185	1780	I 57	Kennedy Rd (east)	WI	S-2I	719
20190	1790	Peotone Beecher Rd	Kedzie Ave (west)	WI	S-2I	720
20195	1850	I 80	Shepley Rd Holt Rd (north)	WI	S-2I	721
20196	1840	I 80	Cherry Hill Rd	WI	S-2I	722
20200	1860	I 55 STEV	IL 113 (south)	WI	S-2I	723
20205	1180	IL 83 147th St Sibley Blvd	Minerva Ave (west )	CO	S-2I	724

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20210	1210	Cossitt Ave	Sunset Ave (east )	CO	S-2I	725
20215	1220	US 12 45 Mannheim Rd	Roadway Shipping Terminal Ent	CO	S-2I	726
20220	1995	IL 59	75th St (south )	DU	S-2I	727
22015	1140	I 290	IL 83 Kingery Hwy	DU	S-2I	728
22450	S2K	I 190	Mannheim Rd SB	CO	S-2K	729
23100	TBD	I 55 STEV	IL 129	WI	S-2J	730
23200	TBD	I 57	US 30 (north)	WI	S-2J	731
23300	TBD	I 57	Peotone Wilmington Exit	WI	S-2J	732



**SURVEILLANCE  
SYSTEM - Pay Code  
S-3 - Dynamic  
Message Signs**

Loc. #	Cab.	Main Route	Cross Street	Co.	Equip Type	Qty.
1007	DMS7	I 55 STEV OB	Martin Luther King Dr	CO	S-3F	1
1112	DMS5	I 55 STEV Median	Kedzie Ave (west )	CO	S-3F	2
1262	DMS23	I 55 STEV IB	1st Ave (west )	CO	S-3A	3
1282	DMS104	US 12 20 45 LaGrange NB	87th St	CO	S-3J	4
1283	DMS105	US 12 20 45 LaGrange SB	I 55 (north )	CO	S-3J	5
1332	DMS24	I 55 STEV IB	County Line Rd (west )	DU	S-3A	6
1570	DMS34	I 55 STEV NE	Caton Farm	WI	S-3C	7
1605	DMS33	I 55 STEV NE	US 6	WI	S-3C	8
2052	DMS29	I 57 IB	119th St	CO	S-3E	9
2177	DMS44	I 57	163rd	CO	S-3K	10
2265	DMS28	I 57 IB	I 80 183rd St (south )	CO	S-3E	11
3096	DMS19	I 90 KENN IB	Canfield Ave	CO	S-3A	12
3176	DMS18	I 90 KENN IB	Foster Ave	CO	S-3F	13
3281	DMS17	I 90 94 KENN IB	Pulaski Rd	CO	S-3F	14
3331	DMS16	I 90 94 KENN Reversible IB	Kimball Ave	CO	S-3A	15
3416	DMS14	I 90 94 KENN Reversible IB	Webster Ave	CO	S-3A	16
3417	DMS15	I 90 94 KENN OB	Damen Ave	CO	S-3F	17
3482	DMS13	I 90 94 KENN IB	Augusta Blvd	CO	S-3F	18
4072	DMS106	Touhy Ave WB OB	I 94 EDENS (east )	CO	S-3H	19
4073	DMS107	Touhy Ave EB IB	I 94 EDENS (west )	CO	S-3H	20
4086	DMS21	I 94 EDENS IB	Niles Center Rd	CO	S-3A	21
4206	DMS22	I 94 EDENS IB	Tower Rd	CO	S-3A	22
5052	DMS30	I 94 RYAN SB	83rd St	CO	S-3B	23
5053	DMS02	I 94 RYAN NB	83rd St	CO	S-3B	24
5186	DMS3L	I 90 94 RYAN NB	57th St Locals	CO	S-3B	25
5188	DMS3E	I 90 94 RYAN NB	57th St	CO	S-3B	26
5196	DMA31L	I 90 94 RYAN SB	55th St Locals	CO	S-3B	27
5197	DMS31E	I 90 94 RYAN SB	55th St	CO	S-3B	28
5292	DMS32L	I 90 94 RYAN SB	39th St Locals	CO	S-3B	29
5293	DMS32E	I 90 94 RYAN SB	39th St	CO	S-3B	30
5296	DMS4L	I 90 94 RYAN NB	37th St Locals	CO	S-3B	31
5298	DMS4E	I 90 94 RYAN NB	37th St	CO	S-3B	32

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5377	DMS8	I 90 94 RYAN	Chicago River South Branch	CO	S-3B	33
5406	DMS9	I 90 94 RYAN	Taylor St	CO	S-3F	34
5407	DMS10	I 90 94 RYAN Median	Taylor St	CO	S-3F	35
6103	DMS26	I 94 FORD IB	145th St	CO	S-3B	36
6104	DMS25	I 94 FORD OB	145th St	CO	S-3D	37
6177	DMS20	I 94 FORD SB	119th St	CO	S-3B	38
6178	DMS06	I 94 FORD NB	124th St	CO	S-3B	39
7001	DMS1	I 80 WB	State Line	CO	S-3C	40
8002	DMS12	I 290 IKE IB	Old Post Office (east )	CO	S-3F	41
8072	DMS11	I 290 IKE IB	Damen Ave	CO	S-3F	42
9132	DMS102	IL 83 Kingery NB	I 290	DU	S-3J	43
9133	DMS103	IL 83 Kingery SB	I 290	DU	S-3J	44
9167	DMS43	I 290	Mill Rd	DU	S-3L	45
9252	DMS35	I 290 IB	Biesterfield Rd (north )	DU	S-3E	46
10029	DMS36	IL 53 I 290 Exit	Industrial Ave	CO	S-3E	47
11017	DMS42	I 290 IB	Army Trail Rd	DU	S-3L	48
15107	DMS39	I 80 EB	US 45 LaGrange Rd (west)	WI	S-3F	49
15121	DMS40	I 80 WB	Wolf Rd (west)	WI	S-3F	50
15210	DMS41	I 80 EB	Cherry Hill Rd (west)	WI	S-3F	51
16015	DMS27	IL 394 NB	186th St	CO	S-3D	52
22050	DMS101	Grand Ave EB IB	77th Ave	CO	S-3H	53
22100	DMS111	US 41 Skokie Hwy OB	West Park Ave (south )	LA	S-3J	54
22150	DMS108	Stoney Island Ave SB OB	98th Pl	CO	S-3J	55
22200	DMS109	US 6 159th St EB IB	Crawford Ave (west )	CO	S-3J	56
22250	DMS110	US 6 159th St WB OB	Dixie Hwy (west )	CO	S-3H	57
22300	DMS112	US 41 Skokie Hwy OB	IL 22 Half Day Rd (south )	LA	S-3I	58
22350	DMS113	US 45 Mannheim Rd NB	I 290 (south )	CO	S-3H	59
22400	DMS114	US 45 Mannheim Rd SB	I 290 (north )	CO	S-3H	60

**SURVEILLANCE SYSTEM - Pay Code S-4 - REVLAC Locations**

**REVLAC - Swing Gates**

<b>Loc. #</b>	<b>Length</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
IE1	5 FT	I 94 KENN	Lawrence Ave (south of)	CO	1
IE2	9 FT	I 94 KENN	Lawrence Ave (south of)	CO	2
IE3	12 FT	I 94 KENN	Lawrence Ave (south of)	CO	3
IE4	16 FT	I 94 KENN	Lawrence Ave (south of)	CO	4
IE5	17 FT	I 94 KENN	Lawrence Ave (south of)	CO	5
IE6	17 FT	I 94 KENN	Lawrence Ave (south of)	CO	6
IE7	17 FT	I 94 KENN	Lawrence Ave (south of)	CO	7
IE8	17 FT	I 94 KENN	Wilson Ave (north of)	CO	8
IE9	17 FT	I 94 KENN	Wilson Ave (north of)	CO	9
IE10	10 FT	I 94 KENN	Wilson Ave (north of)	CO	10
IE11	9 FT	I 94 KENN	Wilson Ave (north of)	CO	11
IE12	22 FT	I 94 KENN	Wilson Ave (south of)	CO	12
IE13	16 FT	I 94 KENN	Wilson Ave (south of)	CO	13
IE14	8 FT	I 94 KENN	Wilson Ave (south of)	CO	14
IE15	5 FT	I 94 KENN	Wilson Ave (south of)	CO	15
IS1	12 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	16
IS2	15 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	17
IS3	18 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	18
IS4	21 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	19
IS5	23 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	20
IS6	23 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	21
IS7	23 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	22
IS8	23 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	23
IS9	23 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	24
IS10	14 FT	I 90 94 KENN	Sacramento Ave (north of)	CO	25
IS11	14 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	26
IS12	23 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	27
IS13	23 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	28
IS14	23 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	29
IS15	23 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	30
IS16	23 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	31
IS17	23 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	32
IS18	22 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	33
IS19	21 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	34
IS20	18 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	35
IS21	16 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	36
IS22	14 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	37

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IS23	12 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	38
IS24	10 FT	I 90 94 KENN	Kedzie Ave (south of)	CO	39
IW1	5 FT	I 90 KENN	Montrose Ave (north of)	CO	40
IW2	9 FT	I 90 KENN	Montrose Ave (north of)	CO	41
IW3	11 FT	I 90 KENN	Montrose Ave (north of)	CO	42
IW4	14 FT	I 90 KENN	Montrose Ave (north of)	CO	43
IW5	17 FT	I 90 KENN	Montrose Ave (north of)	CO	44
IW6	17 FT	I 90 KENN	Montrose Ave (north of)	CO	45
IW7	17 FT	I 90 KENN	Montrose Ave (north of)	CO	46
IW8	17 FT	I 90 KENN	Montrose Ave (north of)	CO	47
IW9	17 FT	I 90 KENN	Montrose Ave (north of)	CO	48
IW10	8 FT	I 90 KENN	Montrose Ave (north of)	CO	49
IW11	9 FT	I 90 KENN	Montrose Ave (north of)	CO	50
IW12	20 FT	I 90 KENN	Montrose Ave (north of)	CO	51
IW13	19 FT	I 90 KENN	Montrose Ave	CO	52
IW14	14 FT	I 90 KENN	Montrose Ave	CO	53
IW15	10 FT	I 90 KENN	Montrose Ave (south of)	CO	54
IW16	6 FT	I 90 KENN	Montrose Ave (south of)	CO	55
IW17	5 FT	I 90 KENN	Montrose Ave (south of)	CO	56
IW18	5 FT	I 90 KENN	Montrose Ave (south of)	CO	57
IW19	5 FT	I 90 KENN	Montrose Ave (south of)	CO	58
IW20	5 FT	I 90 KENN	Montrose Ave (south of)	CO	59
OM1	12 FT	I 90 94 KENN	Grand Ave (south of)	CO	60
OM2	12 FT	I 90 94 KENN	Grand Ave (south of)	CO	61
OM3	12 FT	I 90 94 KENN	Grand Ave (south of)	CO	62
OM4	15 FT	I 90 94 KENN	Grand Ave (south of)	CO	63
OM5	14 FT	I 90 94 KENN	Grand Ave (south of)	CO	64
OM6	14 FT	I 90 94 KENN	Grand Ave (south of)	CO	65
OM7	20 FT	I 90 94 KENN	Grand Ave (south of)	CO	66
OM8	20 FT	I 90 94 KENN	Grand Ave (south of)	CO	67
OM9	18 FT	I 90 94 KENN	Grand Ave (south of)	CO	68
OM10	6 FT	I 90 94 KENN	Grand Ave (south of)	CO	69
OM11	2 FT	I 90 94 KENN	Grand Ave (south of)	CO	70
OM12	16 FT	I 90 94 KENN	Grand Ave (south of)	CO	71
OM13	17 FT	I 90 94 KENN	Grand Ave (south of)	CO	72
OM14	17 FT	I 90 94 KENN	Grand Ave (south of)	CO	73
OM15	15 FT	I 90 94 KENN	Grand Ave (south of)	CO	74
OM16	13 FT	I 90 94 KENN	Grand Ave (south of)	CO	75
OM17	11 FT	I 90 94 KENN	Grand Ave (south of)	CO	76
OM18	7 FT	I 90 94 KENN	Grand Ave (south of)	CO	77
OM19	7 FT	I 90 94 KENN	Grand Ave (south of)	CO	78
OM20	9 FT	I 90 94 KENN	Grand Ave (south of)	CO	79

Various Routes  
Section 2017-033-I  
Various Counties  
Contract No. 62F52

OM21	9 FT	I 90 94 KENN	Grand Ave (south of)	CO	80
OO1	12 FT	I 90 94 KENN	Milwaukee Ave (east of)	CO	81
OO2	12 FT	I 90 94 KENN	Milwaukee Ave	CO	82
OO3	13 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	83
OO4	13 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	84
OO5	13 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	85
OO6	20 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	86
OO7	20 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	87
OO8	8 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	88
OO9	8 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	89
OO10	20 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	90
OO11	20 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	91
OO12	16 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	92
OO13	12 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	93
OO14	6 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	94
OO15	4 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	95
OO16	4 FT	I 90 94 KENN	Milwaukee Ave (west of)	CO	96
OS1	6 FT	I 90 94 KENN	Logan Blvd (north of)	CO	97
OS2	10 FT	I 90 94 KENN	Logan Blvd (north of)	CO	98
OS3	14 FT	I 90 94 KENN	Logan Blvd (north of)	CO	99
OS4	16 FT	I 90 94 KENN	Logan Blvd (north of)	CO	100
OS5	20 FT	I 90 94 KENN	Logan Blvd (north of)	CO	101
OS6	21 FT	I 90 94 KENN	Logan Blvd (north of)	CO	102
OS7	21 FT	I 90 94 KENN	Logan Blvd (north of)	CO	103
OS8	21 FT	I 90 94 KENN	Logan Blvd (north of)	CO	104
OS9	21 FT	I 90 94 KENN	Logan Blvd (north of)	CO	105
OS10	21 FT	I 90 94 KENN	Logan Blvd (north of)	CO	106
OS11	13 FT	I 90 94 KENN	Logan Blvd (north of)	CO	107
OS12	14 FT	I 90 94 KENN	Logan Blvd (north of)	CO	108
OS13	23 FT	I 90 94 KENN	Logan Blvd (north of)	CO	109
OS14	23 FT	I 90 94 KENN	Logan Blvd (north of)	CO	110
OS15	23 FT	I 90 94 KENN	Logan Blvd (north of)	CO	111
OS16	23 FT	I 90 94 KENN	Logan Blvd (north of)	CO	112
OS17	23 FT	I 90 94 KENN	Logan Blvd (north of)	CO	113
OS18	21 FT	I 90 94 KENN	Logan Blvd (north of)	CO	114
OS19	20 FT	I 90 94 KENN	Logan Blvd (north of)	CO	115
OS20	18 FT	I 90 94 KENN	Logan Blvd (north of)	CO	116
OS21	16 FT	I 90 94 KENN	Logan Blvd (north of)	CO	117

**REVLAC - Aux Signs**

<b>Loc. #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
IEAS1	I 94	Lawrence Ave (north of)	CO	1
IEAS2	I 94	Lawrence Ave (south of)	CO	2
ISAS1	I 90 94	Kedzie Ave (south of)	CO	3
ISAS2	I 90 94	Kedzie Ave (south of)	CO	4
IWAS1	I 90	Cicero Ave (west of)	CO	5
IWAS2	I 90	Cicero Ave	CO	6
OMAS1	I 90 94	Grand Ave (south of)	CO	7
OMAS2	I 90 94	Grand Ave (south of)	CO	8
OMAS3	I 90 94	Grand Ave (south of)	CO	9
OOAS1	I 90 94	Milwaukee Ave (east of)	CO	10
OOAS2	I 90 94	Milwaukee Ave (east of)	CO	11
OOAS3	I 90 94	Milwaukee Ave (east of)	CO	12
OSAS1	I 90 94	Logan Blvd (north of)	CO	13
OSAS2	I 90 94	Logan Blvd (north of)	CO	14

**REVLAC - Roadside Panel Controls**

<b>Loc. #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
IER1	I 94	Foster Ave	CO	1
IER2	I 94	Wilson Ave (north of)	CO	2
IER3	I 94	Lawrence Ave (south of)	CO	3
ISR1	I 90 94	Kedzie Ave (south of)	CO	4
ISR2	I 90 94	Kedzie Ave (south of)	CO	5
ISR3	I 90 94	Kedzie Ave (south of)	CO	6
IWR1	I 90	Lawrence Ave (south of)	CO	7
IWR2	I 90	Montrose Ave (north of)	CO	8
IWR3	I 90	Montrose Ave (north of)	CO	9
OMR1	I 90	Grand Ave (north of)	CO	10
OOR1	I 90 94	Milwaukee Ave (east of)	CO	11
OOR2	I 90 94	Milwaukee Ave (east of)	CO	12
OOR3	I 90 94	Milwaukee Ave (east of)	CO	13
OOR4	I 90 94	Milwaukee Ave (east of)	CO	14
OSR1	I 90 94	Diversey Ave (south of)	CO	15
OSR2	I 90 94	Diversey Ave (south of)	CO	16

**REVLAC -  
Gore Signs**

Loc. #	Main Route	Cross Street	Co.	Qty.
IEG1	I 94	Wilson Ave (north of)	CO	1
ISG1	I 90 94	Kedzie Ave (south of)	CO	2
IWG1	I 90	Montrose Ave (north of)	CO	3
OMG1	I 90 94	Ogden Ave (south of)	CO	4
OOG1	I 90 94	Milwaukee Ave (west of)	CO	5
OSG1	I 90 94	Logan Blvd (north of)	CO	6

**REVLAC - Barriers**

Loc. #	Length	Main Route	Cross Street	Co.	Qty.
IEB1	28 Ft	I 94	Wilson Ave (north of)	CO	1
ISB1	36.21 Ft	I 90 94	Sacramento Ave (north of)	CO	2
IWB1	28.94 Ft	I 90	Montrose Ave (north of)	CO	3
OMB1	22.27 Ft	I 90	Grand Ave (north of)	CO	4
OOB1	28 Ft	I 90 94	Milwaukee Ave (west of)	CO	5
OSB1	38.25 Ft	I 90 94	Diversey Ave (south of)	CO	6

**REVLAC - X Signs**

Loc. #	Main Route	Cross Street	Co.	Qty.
IEX1	I 94	Wilson Ave (south of)	CO	1
ISX1	I 90 94	Kedzie Ave (south of)	CO	2
IWX1	I 90	Montrose Ave (north of)	CO	3
OMX1	I 90 94	Grand Ave (north of)	CO	4
OOX1	I 90 94	Milwaukee Ave (west of)	CO	5
OSX1	I 90 94	Diversey Ave (south of)	CO	6

**REVLAC - Chevrons**

<b>Loc. #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
IEV1	I 94	Lawrence Ave (south of)	CO	1
IEV2	I 94	Lawrence Ave (south of)	CO	2
IEB3	I 94	Lawrence Ave (south of)	CO	3
ISV1	I 90 94	Kedzie Ave (south of)	CO	4
ISB2	I 90 94	Kedzie Ave (south of)	CO	5
ISB3	I 90 94	Kedzie Ave (south of)	CO	6
IWV1	I 90	Montrose Ave (north of)	CO	7
IWV2	I 90	Montrose Ave (north of)	CO	8
IWV3	I 90	Montrose Ave (north of)	CO	9
IWV4	I 90	Montrose Ave (north of)	CO	10
IWV5	I 90	Montrose Ave (south of)	CO	11
OMV1	I 90 94	Grand Ave (south of)	CO	12
OMV2	I 90 94	Grand Ave (south of)	CO	13
OMV3	I 90 94	Grand Ave (south of)	CO	14
OMV4	I 90 94	Grand Ave (south of)	CO	15
OOV1	I 90 94	Milwaukee Ave	CO	16
OOV2	I 90 94	Milwaukee Ave	CO	17
OOV3	I 90 94	Milwaukee Ave (west of)	CO	18
OSV1	I 90 94	Logan Blvd (north of)	CO	19
OSV2	I 90 94	Logan Blvd (north of)	CO	20
OSV3	I 90 94	Logan Blvd (north of)	CO	21

**REVLAC - Changeable Message Signs**

<b>Loc. #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
OMCM1	I 90 94	Fulton St (NW of)	CO	1
OMCM2	I 90 94	Green St (SE of)	CO	2
OMCM6	I 90 94	Grand Ave (SE of)	CO	3
OMCM7	I 90 94	Ohio St (NE of)	CO	4
OOCM3	Ontario St	Kennedy Split	CO	5
OOCM4	Ontario St	Kennedy Split (east of)	CO	6
OOCM5	Ontario St	Chicago River	CO	7
OSCM8	I 90 94	Fullerton Ave	CO	8
OSCM9	I 90 94	Diversey Ave (south of)	CO	9
IECM12	I 94	Lawrence Ave (south of)	CO	10
IECM13	I 94	Foster Ave	CO	11
ISCM10	I 90 94	Sacramento Ave	CO	12
ISCM11	I 90 94	Kimball Ave	CO	13
IWCM14	I 90	Lawrence Ave (south of)	CO	14
IWCM15	I 90	Montrose Ave (north of)	CO	15



**REVLAC - Operations Cameras**

Loc. #	Main Route	Cross Street	Co.	Qty.
IECC1	I 94	Lawrence Ave (south of)	CO	1
IECC2	I 94	Lawrence Ave (south of)	CO	2
IECC3	I 94	Lawrence Ave (south of)	CO	3
IECC4	I 94	Lawrence Ave (south of)	CO	4
IECC5	I 94	Wilson Ave (south of)	CO	5
IECC6	I 94	Wilson Ave (south of)	CO	6
ISCC1	I 90 94	Sacramento Ave (north of)	CO	7
ISCC2	I 90 94	Sacramento Ave (north of)	CO	8
ISCC3	I 90 94	Sacramento Ave (north of)	CO	9
ISCC4	I 90 94	Sacramento Ave (north of)	CO	10
ISCC5	I 90 94	Sacramento Ave (north of)	CO	11
ISCC6	I 90 94	Sacramento Ave (north of)	CO	12
ISCC7	I 90 94	Sacramento Ave (north of)	CO	13
ISCC8	I 90 94	Sacramento Ave (north of)	CO	14
IWCC1	I 90 94	Cicero Ave	CO	15
IWCC2	I 90	Cicero Ave (south of)	CO	16
IWCC3	I 90	Montrose Ave (north of)	CO	17
IWCC5	I 90	Montrose Ave (north of)	CO	18
IWCC6	I 90	Montrose Ave (south of)	CO	19
IWCC7	I 90	Montrose Ave (south of)	CO	20
OMCC1	I 90 94	Grand Ave (north of)	CO	21
OMCC2	I 90 94	Grand Ave (north of)	CO	22
OMCC3	I 90 94	Ogden Ave (south of)	CO	23
OMCC4	I 90 94	Grand Ave (north of)	CO	24
OMCC5	I 90 94	Ogden Ave (south of)	CO	25
OMCC6	I 90 94	Ogden Ave (south of)	CO	26
OMCC7	I 90 94	Ogden Ave (south of)	CO	27
O OCC1	I 90 94	Milwaukee Ave (west of)	CO	28
O OCC2	I 90 94	Milwaukee Ave (west of)	CO	29
O OCC3	I 90 94	Milwaukee Ave (east of)	CO	30
O OCC4	I 90 94	Milwaukee Ave (east of)	CO	31
O OCC5	I 90 94	Milwaukee Ave (east of)	CO	32
O OCC6	I 90 94	Milwaukee Ave (east of)	CO	33
O SCC1	I 90 94	Diversey Ave (south of)	CO	34
O SCC2	I 90 94	Diversey Ave (south of)	CO	35
O SCC3	I 90 94	Diversey Ave (south of)	CO	36
O SCC4	I 90 94	Diversey Ave (south of)	CO	37
O SCC5	I 90 94	Diversey Ave (south of)	CO	38
O SCC6	I 90 94	Diversey Ave (south of)	CO	39

**SURVEILLANCE SYSTEM - Pay Code S-4 – RACS Locations**

**RACS - Gates**

<b>Loc. #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
G1	IL 38	I 88 (east of)	DU	1
G2	IL 38	I 88 (east of)	DU	2
G3	IL 38	I 88 (east of)	DU	3
G4	IL 38	I 88 (east of)	DU	4
G5	IL 38	I 88 (east of)	DU	5
G6	IL 38	I 88 (east of)	DU	6
G7	IL 38	I 88 (east of)	DU	7
G8	IL 38	I 88 (east of)	DU	8
G9	IL 38	I 88 (east of)	DU	9
G10	IL 38	I 88 (east of)	DU	10

**RACS - Dynamic Message**

**Signs**

<b>Loc. #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
R1	IL 38	York Rd (west of)	DU	1
R3	IL 38	I 88 (west of)	DU	2
R4	IL 38	I 88 (east of)	DU	3

**RACS - Chevrons**

<b>Loc. #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
V1	IL 38	I 88 (east of)	DU	1
V2	IL 38	I 88 (east of)	DU	2
V3	IL 38	I 88 (east of)	DU	3
V4	IL 38	I 88 (east of)	DU	4
V5	IL 38	I 88 (east of)	DU	5
V6	IL 38	I 88 (east of)	DU	6

**RACS - Aux Signs**

<b>Loc. #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
AS1	IL 38	I 88 (west of)	DU	1
AS2	IL 38	I 88 (west of)	DU	2

**RACS - Operational**  
**Cameras**

Loc. #	Main Route	Cross Street	Co.	Qty.
C1	IL 38	York Rd (west of)	DU	1
C2	IL 38	York Rd (east of)	DU	2
C3	IL 38	York Rd (east of)	DU	3
C4	IL 38	I 88 (east of)	DU	4
C5	IL 38	I 88 (east of)	DU	5
C6	IL 38	I 88 (east of)	DU	6
C7	IL 38 Ramp	I 294 (south of)	DU	7
C8	IL 38	Hillside Tower (3 Cam)	DU	8

**SURVEILLANCE SYSTEM**

**TRAFFIC MONITORING CAMERAS POWERED SEPARATELY - Pay Code S-5**

**Cameras Powered Separately - Pay Code S-5**

**Cameras Powered and Paid through Lighting System RM - Pay Code S5-L**

**Cameras Powered and Paid through Pump Station System RM - Pay Code S5-P**

**Cameras Powered and Paid through Surveillance System RM - Pay Code S5-S**

**Cameras Powered and Paid through Traffic Signals System RM - Pay Code S5-T**

**Cameras Powered and Paid through IDOT Buildings/Huts RM - Pay Code S6-IN**

**Bishop Ford Expressway**

Loc. #	Pay Code	Main Route	Cross Street	Co.	Qty.
BF01A	S5-L	I 94 Ford IB	Ellis Ave	CO	1
BF02	S5-L	I 94 Ford	Stoney Island SB to I 94	CO	2
BF02A	S5-L	I 94 Ford	103rd St	CO	3
BF02B	S5-L	I 94 Ford	Stoney Island NB Exit	CO	4
BF02C	S5-L	I 94 Ford	Stoney Island SB Exit	CO	5
BF02D	S5-L	I 94 Ford	Stoney Island SB 98th St	CO	6
BF0B	S5-L	I 94 Ford	Michigan Ave	CO	7
BF0D	S5-L	I 94 Ford	M L King Dr	CO	8
BF11	S5-L	I 94 Ford	170 <sup>th</sup> ST	CO	9
BF11A	S5-L	I 94 Ford	WB I 80 to NB I 94	CO	10
BF11B	S5-L	I 94 Ford	I 94 W of IL 394	CO	11
BF11C	S5-L	I 94 Ford	I 80 ( south of )	CO	12

**Dan Ryan Expressway**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
DR01	S-5	I 90 94 Ryan	Archer Ave	CO	1
DR01A	S-5	I 90 94 Ryan	Archer Ave	CO	2
DR02	S-5	I 90 94 Ryan	I 55	CO	3
DR02B	S-5	I 90 94 Ryan	28th Place	CO	4
DR03C	S5-L	I 90 94 Ryan	35 <sup>th</sup> St	CO	5
DR04C	S5-L	I 90 94 Ryan	45 <sup>th</sup> St	CO	6
DR05B	S5-L	I 90 94 Ryan	50 <sup>th</sup> St	CO	7
DR06B	S5-L	I 90 94 Ryan	58 <sup>th</sup> St	CO	8
DR07A	S5-L	I 94 Ryan	63 <sup>rd</sup> St	CO	9
DR07C	S5-L	I 94 Ryan	67 <sup>th</sup> St	CO	10
DR08A	S5-L	I 94 Ryan	72 <sup>nd</sup> St	CO	11
DR09A	S5-L	I 94 Ryan	81 <sup>st</sup> St	CO	12
DR09C	S5-L	I 94 Ryan	86 <sup>th</sup> St	CO	13
DR0A	S5-L	I 90 94 Ryan	Polk St	CO	14
DR10A	S5-L	I 94 Ryan	90 <sup>th</sup> St	CO	15
DR11	S5-L	I 94 Ryan	96 <sup>th</sup> St	CO	16

**I 94 Edens Expressway**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
ED00	S6-IN	I 94 EDENS	4755 Wilson Bldg E	CO	1
ED01	S6-IN	I 94 EDENS	Foster Tower Bldg AIS	CO	2

**US 41**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
FR01	S5-L	US 41	West Park	LA	1

**I 57 Expressway**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
FS00	S-5	I 57	Wentworth Ave (south of)	CO	1
FS0A	S5-L	I 57	Wentworth Ave	CO	2
FS01	S5-S	I 57	Halsted	CO	3
FS01A	S5-S	I 57	100th St	CO	4
FS02	S5-S	I 57	104th St	CO	5
FS02A	S5-S	I 57	107th Troop	CO	6
FS03	S5-S	I 57	110th St	CO	7
FS03A	S5-S	I 57	114th St	CO	8
FS03B	S5-S	I 57	116th St	CO	9
FS04	S5-S	I 57	121st	CO	10
FS05	S5-S	I 57	125th St	CO	11
FS05A	S5-S	I 57	128th St Oak St	CO	12
FS05B	S5-S	I 57	Broadway	CO	13
FS06	S5-S	I 57	Charles Dr	CO	14
FS06A	S5-S	I 57	Thorton Rd	CO	15
FS07	S5-S	I 57	141st St	CO	16
FS07A	S5-S	I 57	Norris Oakley	CO	17
FS08	S5-S	I 57	Sibley onto I 57	CO	18
FS08A	S5-S	I 57	Sibley	CO	19
FS08B	S5-S	I 57	I 294 TLWY	CO	20
FS09	S5-S	I 57	Kedzie	CO	21
FS09A	S5-S	I 57	155th St	CO	22
FS10	S5-S	I 57	159th US 6	CO	23
FS10A	S5-S	I 57	159th US 6	CO	24
FS10B	S5-S	I 57 NB	163rd St	CO	25
FS11	S5-S	I 57	Crawford Pulaski	CO	26
FS11A	S5-S	I 57 NB	167th St	CO	27
FS12	S5-S	I 57	167th St	CO	28
FS12A	S5-S	I 57	Cicero Ave	CO	29
FS12B	S5-S	I 57	173rd St	CO	30
FS13	S6-IN	I 57	175th St ( south of ) I 57 Hut	CO	31
FS13A	S5-S	I 57	I 80	CO	32

**I 90 & Roselle Rd & Central Rd**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
HQ01	S6-IN	Roselle Rd	Central Rd	CO	1
HQ02	S6-IN	Roselle Rd	Central Rd	CO	2
HQ03	S6-IN	Roselle Rd	Central Rd	CO	3

**I 80 Expressway**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
IE14A	S5-S	I 80	Harlem Ave	CO	1
IE15A	S5-S	I 80	80th Ave	CO	2
IE17	S-5	I 80	US 45 (west of)	CO	3
IE18	S-5	I 80	104 <sup>th</sup> St	WI	4
IE19	S-5	I 80	Wolf Rd	WI	5
IE20	S-5	I 80	116 <sup>th</sup> St	WI	6
IE21	S-5	I 80	187 <sup>th</sup> St	WI	7
IE22	S-5	I 80	Parker Rd	WI	8
IE23	S-5	I 80	I 355 Tollway (east of)	WI	9
IE23A	S-5	I 80	Francis Rd	WI	10
IE24	S-5	I 80	Michael Ln (west of I 355)	WI	11
IE25	S5-L	I 80 WB	E of US 30	WI	12
IE25A	S5-L	I 80 EB	US 30	WI	13
IE25B	S5-L	I 80 WB	US 30	WI	14

**I 290 Eisenhower Expressway**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
IK01	S5-S	I 290 IKE	Paulina St Upper	CO	1
IK01A	S5-S	I 290 IKE	Paulina St Lower	CO	2
IK03	S5-S	I 290 IKE	Sacramento	CO	3
IK04	S5-S	I 290 IKE	Independence Upper	CO	4
IK04A	S5-S	I 290 IKE	Independence Lower	CO	5
IK06	S5-S	I 290 IKE	Central Ave	CO	6
IK08	S6-IN	I 290 IKE	TSC Bldg - 445 Harrison Oak Park	CO	7
IK09A	S5-S	I 290 IKE	Desplaines	CO	8
IK0A	S-5	Chicago River	I 290 Bridge House IB E Cam	CO	9
IK0B	S-5	Chicago River	I 290 Bridge House IB W Cam	CO	10
IK0C	S-5	Chicago River	I 290 Bridge House OB Lower	CO	11
IK0D	S-5	Chicago River	I 290 Bridge House OB Upper	CO	12
IK0G	S5-P	I 290 IKE OB PS 05	701 W Van Buren N Cam	CO	13
IK0H	S5-P	I 290 IKE OB PS 05	701 W Van Buren S Cam	CO	14
IK0I	S6-IN	I 90 94 KENN	Halsted Hut West Cam	CO	15
IK0J	S6-IN	I 90 94 KENN	Halsted Hut East Cam	CO	16
IK0K	S-5	I 290 UIC Roof	601 S Morgan St	CO	17
IK0L	S-5	I 290 UIC Roof	601 S Morgan St	CO	18
IK0M	S-5	I 290 UIC Roof	601 S Morgan St	CO	19
IK10	S5-S	I 290 IKE	1st Ave	CO	20

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IK11	S5-S	I 290 IKE	25th Ave	CO	21
IK14	S5-S	I 290	I 88 EB TLWY Merge	CO	22
IK14A	S6-IN	I 290 IKE I 294 I 88	Hillside Tower & Hut	CO	23
IK14B	S6-IN	I 290 IKE I 294 I 88	Hillside Tower & Hut	CO	24
IK14C	S6-IN	I 290 IKE I 294 I 88	Hillside Tower & Hut	CO	25
IK14D	S5-L	I 290	Wolf Rd	CO	26
IK14E	S5-L	I 290	IL 56 Butterfield Rd	CO	27
IK15	S5-L	I 290	St Charles Rd	CO	28
IK17	S5-L	I 290	IL 64 North Ave	CO	29
IK18	S5-L	I 290	York Rd	DU	30
IK19	S5-L	I 290	Grand Ave	CO	31
IK21	S5-S	I 290	Addison Rd Median	CO	32
IK22	S5-S	I 290	Mill Rd	DU	33
IK23	S6-IN	I 290	Nordic Tower & Hut	DU	34
IK23A	S6-IN	I 290	Nordic Tower & Hut	DU	35
IK23B	S6-IN	I 290	Nordic Tower & Hut	DU	36
IK25B	S5-S	I 290	Devon	CO	37
IK26	S5-S	I 290	Biesterfield Rd Exit	CO	38
IK26A	S5-S	I 290	Biesterfield Rd	CO	39
IK27	S5-S	I 290	Biesterfield Rd	CO	40
IK27A	S5-S	I 290	Biesterfield Rd	CO	41
IK28A	S5-L	I 290	Schaumburg Rd	CO	42
IK28B	S5-S	I 290	IL 72 Higgins Ent Ramp	CO	43
IK29	S5-L	I 290	SB IL 72 Higgins Rd Ext Ramp	CO	44
IK29A	S5-S	I 290	IL 72 Higgins Ent Ramp	CO	45
IK29B	S5-L	I 290	Woodfield Dr	CO	46
IK29C	S5-S	I 290	Woodfield Dr Ent Ramp	CO	47
IK29D	S5-L	I 290	IL 58 Golf Rd	CO	48
IK30	S5-L	I 290	SW Quad of I 90	CO	49
IK30A	S5-L	I 290	NW Quad of I 90	CO	50
IK30B	S5-L	I 290	IL 62 Algonquin Rd	CO	51

**IL 59**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
IL59A	S5-L	IL 59	I 88 TLWY	DU	1
IL59B	S5-L	IL 59	I 88 TLWY	DU	2
IL59D	S5-T	IL 59	North Aurora Rd	DU	3

**I 90 94 Kennedy Expressway**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
KE01	S-5	I 90 94 KENN	Grand Ave	CO	1
KE01A	S6-IN	I 90 94 KENN	950 W Ontario Bldg A	CO	2
KE03	S-5	I 90 94 KENN	Webster Ave	CO	3
KE03A	S-5	I 90 94 KENN	Webster Ave Damon Ave	CO	4
KE03B	S-5	I 90 94 KENN	Damon Ave	CO	5
KE04	S-5	I 90 94 KENN	Fullerton Ave N AIS	CO	6
KE04A	S-5	I 90 94 KENN	Fullerton Ave	CO	7
KE04B	S-5	I 90 94 KENN	Fullerton Ave S AIS	CO	8
KE04C	S-5	I 90 94 KENN	Western Ave	CO	9
KE04D	S-5	I 90 94 KENN	Logan Blvd Western Ave	CO	10
KE04E	S-5	I 90 94 KENN	Logan Blvd	CO	11
KE05	S-5	I 90 94 KENN	Diversey Ave	CO	12
KE05A	S-5	I 90 94 KENN	California Diversey Ave	CO	13
KE05B	S-5	I 90 94 KENN	California Ave	CO	14
KE05C	S6-IN	I 90 94 KENN	Sacramento BLDG D	CO	15
KE05D	S-5	I 90 94 KENN	Sacramento Ave	CO	16
KE06	S-5	I 90 94 KENN	Kimball Ave	CO	17
KE06A	S-5	I 90 94 KENN	Kimball Ave (NW of)	CO	18
KE07	S-5	I 90 94 KENN	Irving Park Rd	CO	19
KE07A	S-5	I 90 94 KENN	Keeler Ave Irving Park Rd	CO	20
KE07B	S-5	I 90 94 KENN	Keeler Ave	CO	21
KE07C	S-5	I 90 94 KENN	Kostner Ave	CO	22
KE07D	S-5	I 90 94 KENN	Kostner Ave (NW of)	CO	23
KE09	S5-S	I 90 94 KENN	Bryn Mawr	CO	24
KE0B	S-5	I 90 94 KENN	Hubbard St Cave	CO	25
KE0C	S-5	I 90 94 KENN	Hubbard St Cave	CO	26
KE0D	S-5	I 90 94 KENN	Hubbard St Cave	CO	27
KE0E	S-5	I 90 94 KENN	Hubbard St Cave	CO	28
KE0F	S-5	I 90 94 KENN	Hubbard St Cave	CO	29
KE13	S5-L	I 90 KENN	IL 171 Cumberland Ave	CO	30
KE13A	S5-L	I 90 KENN	IL 171 Cumberland Ave	CO	31
KE14	S5-L	I 90 KENN	East River Rd	CO	32
KE15	S5-L	I 90 KENN	US 12 45 Mannheim Rd (east of)	CO	33
KEFOS	S5-S	I 90 KENN	Foster Ave	CO	34
PS23	S5-P	I 90 94 KENN	Roscoe Addison PS23	CO	35



**Kingery Expressway**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
KI0A	S6-IN	I 80 94 Kingery	Ind State Line - Ltg Tower AGH9	CO	1
KI0B	S5-L	I 80 94 Kingery	William St	CO	2
KI01	S5-L	I 80 94 Kingery	Wildwood Dr	CO	3
KI01A	S5-L	I 80 94 Kingery	Torrence Ave	CO	4
KI02	S5-L	I 80 94 Kingery	Paxton Ave	CO	5

**I 355 Tollway**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
NS01	S5-S	I 355 Tlwy SB	Lake St	DU	1
NS01A	S5-S	I 355 Tlwy SB	Army Trail Rd (North of)	DU	2
NS02	S5-L	I 355 Tlwy SB	Army Trail Rd	DU	3

**Pump Station Standalone**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
PS44	S5-P	IL 83 Kingery PS 44	North Ave	DU	1

**I 55 Stevenson Expressway**

<b>Loc. #</b>	<b>Pay Code</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
ST00	S5-S	LAKE SHORE DR	25TH ST	CO	1
ST00A	S5-L	I STEV	MLK ML King Dr	CO	2
ST01	S-5	I 55 STEV	Canal (West of)	CO	3
ST01A	S-5	I 55 STEV	I 90 94 Kennedy	CO	4
ST01B	S-5	I 55 STEV	I 90 94 Dan Ryan	CO	5
ST01C	S-5	I 55 STEV	Halsted St (east of)	CO	6
ST04	S5-S	I 55 STEV	California	CO	7
ST06	S5-S	I 55 STEV	Cicero Ave	CO	8
ST06A	S5-S	I 55 STEV	Cicero Ave Exit Ramp	CO	9
ST07	S5-S	I 55 STEV	Central Ave	CO	10
ST08	S5-S	I 55 STEV	Central Ave	CO	11
ST09	S5-S	I 55 STEV	Harlem Ave	CO	12
ST10	S5-S	I 55 STEV	Harlem Ave	CO	13
ST10A	S5-S	I 55 STEV	1st Ave	CO	14
ST11	S5-S	I 55 STEV	1st Ave	CO	15
ST11A	S5-S	I 55 STEV	1st Ave	CO	16
ST12	S5-S	I 55 STEV	1st Ave	CO	17
ST12A	S5-S	I 55 STEV	1 St Ave	CO	18
ST13	S5-S	I 55 STEV	East Ave	CO	19
ST14	S5-S	I 55 STEV	Lagrange Rd	CO	20
ST14A	S5-S	I 55 STEV	Lagrange Rd NW Quad	CO	21
ST14B	S5-S	I 55 STEV	Lagrange Rd SW Quad	CO	22

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ST15	S5-S	I 55 STEV	Willow Springs Rd	CO	23
ST16	S-5	I 55 STEV	Wolf Rd	CO	24
ST16A	S-5	I 55 STEV	I 294 Tollway	CO	25
ST17	S-5	I 55 STEV	County Line Rd (east of)	CO	26
ST18	S-5	I 55 STEV	County Line Rd (west of)	DU	27
ST18A	S-5	I 55 STEV	Madison St	DU	28
ST19	S-5	I 55 STEV	IL 83	DU	29
ST20	S-5	I 55 STEV	Portsmouth Dr	DU	30
ST20A	S-5	I 55 STEV	Cass Ave	DU	31
ST22	S-5	I 55 STEV	Lemont Rd (east of)	DU	32
ST23	S-5	I 55 STEV	Lemont Rd	DU	33
ST23A	S-5	I 55 STEV	I 355 to Lemont Rd	DU	34
ST24	S-5	I 55 STEV	I 355	DU	35
ST24A	S-5	I 55 STEV	Joliet Rd	WI	36
ST25	S-5	I 55 STEV	IL 53 to Joliet Rd	WI	37
ST26	S-5	I 55 STEV	IL 53	WI	38
ST27	S-5	I 55 STEV	Schmidt Rd (east of)	WI	39
ST28	S-5	I 55 STEV	IB Weigh Station	WI	40
ST29	S-5	I 55 STEV	Windham Pkwy	WI	41
ST30	S-5	I 55 STEV	Weber Rd	WI	42
ST30A	S-5	I 55 STEV	Weber Rd NW	WI	43
ST31	S-5	I 55 STEV	113 <sup>th</sup> St to Weber Rd	WI	44
ST32	S-5	I 55 STEV	IL 126 (north of)	WI	45
ST32A	S-5	I 55 STEV	IL 126 (south of)	WI	46
ST34	S-5	I 55 STEV	Lockport St	WI	47
ST35	S-5	I 55 STEV	159th St (south of)	WI	48
ST35A	S-5	I 55 STEV	Dan Ireland	WI	49
ST36	S-5	I 55 STEV	US 30 (north of)	WI	50
ST36A	S-5	I 55 STEV	US 30 (south of)	WI	51
ST37	S-5	I 55 STEV	US 30 to Caton Farm	WI	52
ST37A	S-5	I 55 STEV	Caton Farm Rd	WI	53
ST38	S-5	I 55 STEV	Caton Farm Rd (south of)	WI	54
ST39	S-5	I 55 STEV	Black Rd (south of)	WI	55
ST40	S-5	I 55 STEV	Jefferson St (north of)	WI	56
ST40A	S-5	I 55 STEV	Jefferson St (south of)	WI	57
ST42	S-5	I 55 STEV	Seil Rd	WI	58
ST43	S-5	I 55 STEV	I 80 NE Quad	WI	59
ST43A	S-5	I 55 STEV	I 80 SE Quad	WI	60
ST44	S-5	I 55 STEV	I 55 Maint Yd	WI	61
ST45	S-5	I 55 STEV	US 6	WI	62

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ST46	S-5	I 55 STEV	Bluff Rd SB Exit	WI	63
ST47	S-5	I 55 STEV	Des Plaines River (north of)	WI	64
ST47A	S5-L	I 55	Desplaines River Bridge (under)	WI	65
ST47B	S-5	I 55 STEV	Des Plaines River Bridge (under)	WI	66
ST48	S5-L	I 55	Desplaines River Bridge	WI	67
ST48A	S5-L	I 55	Arsenal Rd OB Ent	WI	68
ST50	S5-L	I 55	Arsenal Rd IB Ent	WI	69
ST51	S-5	I 55 STEV	Des Plaines River (south of)	WI	70
ST52	S-5	I 55 STEV	Lorenzo Rd	WI	71

**SURVEILLANCE SYSTEM - VARIOUS**

**Buildings/Huts/Towers/Equipment - Pay Code S-6**

**Fiber Runs - Pay Code S-7**

**Fiber Cabinets - Pay Code S7-IN -Inclusive to S-7**

**Routine Maintenance On-Call Locations - Pay Codes S-8 and S-9**

**Joliet Moveable Bridges S-10**

**Matteson Flood Warning System S-11**

Loc. #	Pay Code	Main Route	Cross Street	Co.	Qty.
A	S-6	Building Equipment & Monopole	I 90 94 KENN @ 950 W Ontario BLDG A	CO	1
B	S-6	Building Equipment	I 90 94 KENN @ Grand	CO	2
C	S-6	Building Equipment	I 90 94 KENN @ 2735 George St	CO	3
D	S-6	Building Equipment & Monopole	I 90 KENN @ 3002 Francisco	CO	4
E	S-6	Building Equipment & Monopole	I 90 94 @ 4755 Wilson BLDG E	CO	5
H290A	S-6	Hut & Equipment	I 290 IKE @ Halsted St	CO	6
H55A	S-6	Building Equipment & Monopole	I 55 STEV @ 26 St Wallace	CO	7
H55B	S-6	Hut & Equipment	I 55 STEV @ Normal Ave	CO	8
H55WS	S-6	Hut & Equipment	I 55 STEV @ IL 53 (1/4 mile West)	CO	9
H57A	S-6	Hut & Equipment	I 57 @ Parnell Ave	CO	10
H57B	S-6	Hut & Equipment	I 57 @ I 80	CO	11
H80	S-6	Hut & Equipment	I 80 @ IL 394	CO	12
H94	S-6	Hut & Equipment	I 90 94 RYAN @ State St 66TH St	CO	13
HQ	S-6	Building Equipment & Monopole	I 90 Tlwy @ Roselle Rd	CO	14
HRB	S-6	Hut & Equipment	IL 38 @ RACS Ramp	CO	15
TFOS	S-6	Tower & Equipment	I 94 EDENS @ Foster Ave	CO	16
THIL	S-6	Tower / Hut & Equipment	I 294 I 88 Tlwy @ 5250 W Harrison	CO	17
TNOR	S-6	Tower / Huts & Equipment	I 290 @ I 355 Tlwy	DU	18
TPLA	S-6	Tower & Equipment	IL 47 @ McDonald Rd	KA	19
TSC	S-6	Building Equipment/ Monopole / 9 Cameras	I 290 @ 445 Harrison/Oak Park	CO	20
TSCH	S-6	Tower & Hut Equipment	I 90 Tlwy @ IDOT Mat Lab BLDG	CO	21
TSTA	S-6	Tower & Hut Equipment	I 80 Kingery @ Ind State line	CO	22

**Cabinet Inclusive to Hut**

Loc. #	Pay Code	Main Route	Cross Street	Co.	Qty.
Z1A	S6-IN	I 90 94 Kennedy	Halsted Loc. # SH290A	CO	1

**Fiber**

Loc. #	Pay Code	Main Route	Description	Co.	Qty.
I190	S-7	IL 190	Fiber Run	VA	1
I290	S-7	I 290 IKE	Fiber Run	VA	2
I355	S-7	I 355	Fiber Run	VA	3
IL394	S-7	IL 394	Fiber Run	VA	4
IL53	S-7	IL 53 I 355	Fiber Run	VA	5
I55	S-7	I 55 STEV	Fiber Run	VA	6
I57	S-7	I 57	Fiber Run	VA	7
I80	S-7	I 80	Fiber Run	VA	8
I90	S-7	I 90 JFK	Fiber Run	VA	9
I94	S-7	I 94 EDENS	Fiber Run	VA	10

**Fiber Cabinets Inclusive to Fiber Runs**

Loc. #	Pay Code	Main Route	Cross Street	Co.	Qty.
CIE1	S7-IN	I 80	I 355 TLWY	CO	1
CIE2	S7-IN	I 80	I 294 TLWY NB EXT	CO	2
CIE3	S7-IN	I 80	US 30	WI	3
CIE4	S7-IN	I 80	North Ave	CO	4
CIK1	S7-IN	I 90 JFK	IL 53 NW Quad	CO	5
CDR94	S7-IN	I 94 RYAN	31 St	CO	6
CST1	S7-IN	I 55 STEV	I 80	WI	7
CST2	S7-IN	I 55 STEV	Lorenzo Rd	WI	8

**On-Call Only Facilities**

Loc. #	Pay Code	Main Route	Cross Street	Co.	Qty.
COM	S-8 RM	IDOT ComCenter	201Center Ct Schaumburg	CO	1
EMC	S-8 RM	EMC Dispatch Center	TBD	CO	2
ISP	S-8 RM	State Police Dist Chicago	Communications Area Desplaines	CO	3
JRTC	S-8 RM	IL Thompson Center	100 W Randolph St (LL201)	CO	4
ROD	S-8 RM	Rodenburg Yard	Backup ComCenter	CO	5
TWOD	S-8 RM	Woodstock Tower	11916 Catalpa Ln	MC	6

**On-Call Only Solar Speed Signs**

Loc. #	Pay Code	Main Route	Cross Street	Co.	Qty.
1317	S-9 RM	I 55 NE	I 294 Tlwy NB Ext	CO	1
1717	S-9 RM	I 55 NE	Arsenal Rd Exit	WI	2
9073	S-9 RM	I 290 EB	North Ave	CO	3
10120	S-9 RM	I 290 IL 53 NB	Lake Cook Rd EB Ext	CO	4
10125	S-9 RM	Backup ComCenter	Lake Cook Rd WB Ext	CO	5

**SURVEILLANCE  
 SYSTEM**

**Pay Code S-10**

**Moveable Bridges**

Loc. #	Pay Code	Main Route	Cross Street	Co.	Qty.
BRAN	S-10	Moveable Bridge	Brandon St	WI	1
CASS	S-10	Moveable Bridge	Cass St	WI	2
JACK	S-10	Moveable Bridge	Jackson St	WI	3
JBO	S-10	Bridge Office	Joliet	WI	4
JEFF	S-10	Moveable Bridge	Jefferson St	WI	5
MCDN	S-10	Moveable Bridge	McDonough St	WI	6
RUBY	S-10	Moveable Bridge	Ruby St	WI	7

**SURVEILLANCE  
 SYSTEM**

**Pay Code S-11**

**Matteson Flood Warning System**

Loc. #	Pay Code Route	Main	Cross Street	Co.	Qty.
214V	S-11	Matteson Viaduct 214	Gov Hwy 214th	WI	1
219V	S-11	Matteson Viaduct 214	Gov Hwy 219th	WI	2

**TRAFFIC SIGNAL SYSTEM – T-1A - Permanent Signals**

<b>Loc. #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	<b>Qty.</b>
5	I 55 N Ramp WB Off Ramp	IL 43 Harlem Ave	CO	1
10	I 55	Central Ave	CO	2
15	I 55 S Ramp EB Off Ramp	IL 43 Harlem Ave	CO	3
20	I 57	119th Ashland Ave	CO	4
22	131st St	Kedzie Ave	CO	5
25	I 57 E Ramp	Marshfield Ave 127th St	CO	6
30	I 57 West Ramp	IL 83 Sibley Blvd 147th	CO	7
31	I 57 East Ramp	IL 83 Sibley Blvd 147th	CO	8
35	I 57 W Ramp	Paulina St 127th St	CO	9
45	Dixie Hwy	I 80	CO	10
48	171 St	Dixie Hwy	CO	11
50	I 80	Kedzie Ave	CO	12
60	I 94 Edens Spur N Ramp Brookside Plaza	IL 43 Waukegan Rd	CO	13
61	I 94 Edens Spur S Ramp	IL 43 Waukegan Rd	CO	14
65	I 290 Eisenhower	IL 50 Cicero Ave	CO	15
75	I 290 Eisenhower S Frontage Rd	US 12 20 45 Mannheim Rd	CO	16
77	I 290 Eisenhower Ramp F	US 12 20 45 Mannheim Rd	CO	17
80	I 290 Eisenhower Ramp B & G	US 12 20 45 Mannheim Rd	CO	18
85	I 290 Eisenhower	IL 43 Harlem Ave	CO	19
90	I 290 Eisenhower IL 53 E Frontage Rd	IL 58 Golf Rd	CO	20
91	I 290 Eisenhower IL 53 W Frontage Rd	IL 58 Golf Rd	CO	21
95	I 290 Eisenhower IL 53 W Frontage Rd	IL 72 Higgins Rd	CO	22
96	I 290 Eisenhower IL 53 E Frontage Rd	IL 72 Higgins Rd	CO	23
100	IL 171 1st	I 290 Bataan Harris	CO	24
105	I 290 Eisenhower	17th Ave	CO	25
110	I 290 Eisenhower	Austin Blvd	CO	26
115	I 290 Eisenhower	DesPlaines Ave Harrison Ave	CO	27
125	IL 50 IL 83 Cicero Ave	IL 83 128th Pl	CO	28
130	I 294 Tri-State Tlwy W Ramp	Cermak Rd 22nd St	CO	29
135	I 294 Tri-State Tlwy W Ramp	Cermak Rd 22nd St	CO	30
140	I 294 Tri-State Tlwy W Ramp	Willow Rd	CO	31
145	I 294 Tri-State Tlwy W Ramp	Willow Rd	CO	32
150	US 6 159th St	US 45 96th Ave LaGrange Rd	CO	33
155	US 6 159th St	IL 1 Halsted St	CO	34
156	179th St	Wolf Rd	CO	35
158	IL 7 Wolf Rd	151st St	CO	36

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159		IL 7 Wolf Rd	153rd St	CO	37
160		US 6 159th St	IL 7 Wolf Rd North Jct	CO	38
161		US 6 Wolf Rd	US 6 173rd St South Jct	CO	39
162		US 6 Wolf Rd	Brookhill Dr	CO	40
163		IL 7 159th St	Will Cook Rd	CO	41
165		US 6 159th St	IL 43 Harlem Ave	CO	42
170		US 6 159th St	IL 50 Cicero Ave	CO	43
175		US 6 159th St	IL 83 Torrence Ave	CO	44
180		US 6 159th St	76th Ave	CO	45
185		US 6 159th St	80th Ave	CO	46
190		US 6 159th St	94th St	CO	47
195		US 6 IL 83 Torrence Ave	170th St	CO	48
200		US 6 159th St	Carse Ave	CO	49
205		US 6 159th St	Central Ave	CO	50
210		US 6 159th St	Cottage Grove Ave	CO	51
215		US 6 159th St	Crawford Ave Pukaski Rd	CO	52
220		US 6 159th St	Dixie Hwy	CO	53
225		US 6 159th St	Ellis Ave	CO	54
230		US 6 159th St	Greenwood Rd	CO	55
235		US 6 159th St	71st Ct	CO	56
240		US 6 159th St	84th Ave	CO	57
245		US 6 159th St	Kedzie Ave	CO	58
255		US 6 159th St	Oak Park Ave	CO	59
265		US 6 159th St	Parkway The Park	CO	60
270		US 6 159th St	Paxton Ave	CO	61
275		US 6 159th St	Ridgeland Ave	CO	62
280		US 6 159th St	Ring Rd	CO	63
285		US 6 159th St	School St	CO	64
290		US 6 159th St	South Park Ave Chicago Rd	CO	65
293		US 6 159th St	Wausau Ave	CO	66
295		US 6 159th St	State St Indiana Ave	CO	67
300		US 6 159th St	Thornton Blue Island Rd	CO	68
305		US 6 159th St	Van Dam Rd	CO	69
310		US 6 159th St	Vincennes Ave Van Bruen St	CO	70
315		US 6 159th St	Wood St	CO	71
320		US 6 159th St	Woodlawn East Ave	CO	72
325		US 6 159th St	Laramie Ave	CO	73
326		US 14 Dempster St	IL 21 Milwaukee Ave	CO	74
330		US 6 159th St	88th Ave	CO	75
345		US 6 IL 83 Torrence Ave	River Oaks South Ent 6	CO	76
350		US 6 IL 83 Torrence Ave	River Oaks Center Ent 5	CO	77
355		US 6 IL 83 Torrence Ave	River Oaks North Ent 4	CO	78
365		US 12 Rand Rd	US 12 45 DesPlaines River Rd	CO	79
370		US 12 Rand Rd	US 12 Elk Blvd	CO	80



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375		US 12 Rand Rd	IL 58 Golf Rd	CO	81
380		US 12 Rand Rd	IL 83 Elmhurst Rd Foundry Rd	CO	82
385		US 12 Rand Rd	Baldwin Rd Williams Dr	CO	83
390		US 12 Rand Rd	Camp McDonald Rd	CO	84
392		US 12 Rand Rd	Schoenbeck Rd	CO	85
395		US 12 Rand Rd	Euclid Ave	CO	86
400		US 12 Rand Rd	Hintz Rd	CO	87
405		US 12 Rand Rd	Kennicott Dr	CO	88
410		US 12 Rand Rd	Lake Cook Rd	CO	89
415		US 12 Rand Rd	Clarence Ave Dryden Ave	CO	90
419		US 12 Rand Rd	Olive Ave	CO	91
420		US 12 Rand Rd	Thomas Ave Willow Rd	CO	92
421		US 12 Rand Rd	Beverly Rd	CO	93
425		US 12 Rand Rd	Wolf Rd	CO	94
427		I-294 Ramp B	US 12 20 95th St	CO	95
430		US 12 20 95th St	US 12 20 45 LaGrange Rd	CO	96
435		US 12 20 95th St	IL 50 Cicero Ave	CO	97
440		US 12 20 95th St	52nd Ave	CO	98
445		US 12 20 95th St	54th Ave	CO	99
450		US 12 20 95th St	78 th Ave	CO	100
460		US 12 20 95th St	Campbell Ave	CO	101
465		US 12 20 95th St	Central Ave	CO	102
470		US 12 20 95th St	Chicago Ridge Mall Drive Ent B	CO	103
475		US 12 20 95th St	Cook Ave	CO	104
480		US 12 20 95th St	Crawford Ave Pukaski Rd	CO	105
481		US 12 20 95th St	Keeler Ave	CO	106
485		US 12 20 95th St	Kedzie Ave	CO	107
490		US 12 20 95th St	Kostner Ave	CO	108
492		US 12 20 95th St	Kilbourn Ave	CO	109
495		US 12 20 95th St	K Mart Ent	CO	110
500		US 12 20 95th St	Millard Ave	CO	111
502		US 20 Lake St	Naperville Rd	CO	112
503		US 20 Lake St	Lambert Rose Ln	CO	113
505		US 12 20 95th St	Chicago Ridge Mall Dr Ent A Nashville	CO	114
510		US 12 20 95th St	Oak Park Ave	CO	115
515		US 12 20 95th St	Melvina Ave	CO	116
520		US 12 20 95th St	Ridgeland Ave	CO	117
525		US 12 20 95th St	Roberts Rd	CO	118
530		US 12 20 95th St	IL 7 Southwest Hwy	CO	119
535		US 12 20 95th St	Western Ave	CO	120
537		Western Ave	92nd Pl	CO	121
540		US 12 20 95th St	Homan Ave	CO	122
741		IL 19 Irving Park Rd	Shales Pkwy	CO	123

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742		IL 19 Irving Park Rd	Poplar Creek Dr	CO	124
743		IL 19 Irving Park Rd	Rohrsen Rd	CO	125
744		IL 19 Irving Park Rd	Schaumburg Rd	CO	126
747		IL 58 Summit St	Shales Pkwy Countryfield Rd	CO	127
1007		123rd St McCarthy Rd	Will Cook Rd	CO	128
1008		124th St McCarthy Rd	Walker Rd	CO	129
1009		123rd St McCarthy Rd	Bell Rd	CO	130
1010		US 12 20 45 Mannheim Rd	US 20 Lake St	CO	131
1011		123rd St McCarthy Rd	Wolf Rd	CO	132
1015		US 12 20 45 Mannheim Rd	IL 38 Roosevelt Rd	CO	133
1020		US 12 20 45 Mannheim Rd	Washington Blvd	CO	134
1022		IL 59 Sutton Rd	US 20 Lake N Ramps	CO	135
1023		IL 59 Sutton Rd	US 20 Lake S Ramps	CO	136
1025		US 12 20 45 LaGrange Rd	31st St	CO	137
1030		US 12 20 45 LaGrange Rd	47th St	CO	138
1035		US 12 20 45 LaGrange Rd	55th St	CO	139
1040		US 12 20 45 LaGrange Rd	67th St	CO	140
1043		US 12 20 45 LaGrange Rd	63rd St	CO	141
1045		US 12 20 45 LaGrange Rd	87th St	CO	142
1050		US 12 20 45 LaGrange Rd	Cermak Rd	CO	143
1055		US 12 20 45 LaGrange Rd	Countryside Plaza	CO	144
1060		US 12 20 45 LaGrange Rd	Joliet Rd	CO	145
1065		US 12 20 45 LaGrange Rd	Plainfield Rd	CO	146
1070		US 12 20 45 Mannheim Rd	Randolph St	CO	147
1075		US 12 20 45 Mannheim Rd	St Charles Rd	CO	148
1080		US 12 20 45 Mannheim Rd	Madison St	CO	149
1085		US 12 45 Lee St	US 45 DesPlaines River Rd	CO	150
1090		US 12 45 Elk Blvd	US 45 DesPlaines River Rd	CO	151
1095		US 12 45 Mannheim Rd	IL 19 Irving Park Rd	CO	152
1100		US 12 20 45 Mannheim Rd	IL 72 Higgins Rd	CO	153
1102		IL 72 Higgins Rd	Willow Creek Health Club	CO	154
1104		IL 72 Lee St Higgins Rd	I 90 Ramp C North Ramp	CO	155
1105		US 12 45 Mannheim Rd	Armitage Ave	CO	156
1106		IL 72 Lee St Higgins Rd	I 90 Ramp C South Ramp	CO	157
1110		US 12 45 Mannheim Rd	Fullerton Ave	CO	158
1114		US 12 45 Mannheim Rd	Wrightwood Ave	CO	159
1115		US 12 45 Mannheim Rd	Melrose Crossing N Ent	CO	160
1120		US 12 45 Mannheim Rd	Melrose Crossing S Ent	CO	161
1125		US 12 45 Mannheim Rd	Lawrence Ave	CO	162
1130		US 12 45 Lee St	Oakton St	CO	163
1135		US 12 45 Mannheim Rd	Touhy Ave	CO	164
1137		US 12 45 Mannheim Rd	Lunt Ave	CO	165
1140		US 12 45 Mannheim Rd	United Pkwy	CO	166
1145		US 12 45 Mannheim Rd	Montrose OHare Access Rd	CO	167

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1150		US 12 IL 53 Rand Rd	IL 53 Hicks Rd	CO	168
1155		US 12 IL 53 Rand Rd	IL 53 IL 68 Dundee Rd	CO	169
1157		IL 68 Dundee Rd	Lynda Dr Access Dr	CO	170
1160		US 12 IL 53 Rand Rd	Old Hicks Rd Coach Rd	CO	171
1165		US 14 IL 58 Dempster St	US 14 IL 43 Waukegan Rd	CO	172
1170		US 14 Northwest Hwy	US 14 Baldwin	CO	173
1172		US 14 Northwest Hwy	Sterling Ave	CO	174
1175		US 14 Caldwell Ave	US 14 IL 43 Waukegan Rd	CO	175
1180		US 14 Northwest Hwy	IL 53 East Ramp	CO	176
1185		US 14 Northwest Hwy	IL 53 West Ramp	CO	177
1190		US 14 Northwest Hwy	Benton St	CO	178
1200		US 14 Dempster St	Cumberland Ave	CO	179
1205		US 14 Dempster St	Dee Rd	CO	180
1210		US 14 Dempster St	Greenwood Ave	CO	181
1213		US 14 Dempster St	Western Ave	CO	182
1215		US 14 Caldwell Ave	Gross Point Rd	CO	183
1220		US 14 Dempster St	Harlem Ave	CO	184
1225		US 14 Northwest Hwy	Hicks Rd S Jct	CO	185
1230		US 14 Caldwell Ave	Howard St	CO	186
1235		US 14 Northwest Hwy	Lincoln St Hicks Pl	CO	187
1240		US 14 Dempster St	Luther Ln	CO	188
1245		US 14 Northwest Hwy	Lake Cook Rd	CO	189
1250		US 14 Northwest Hwy	US Post Office	CO	190
1255		US 14 Northwest Hwy	Mt Prospect Rd	CO	191
1260		US 14 Caldwell Ave	Oakton St	CO	192
1265		US 14 Dempster St	Ozark Concrete	CO	193
1270		US 14 Northwest Hwy	Palatine Rd	CO	194
1275		US 14 Dempster St	Potter Rd	CO	195
1280		US 14 Baldwin Rd	Quentin Rd	CO	196
1285		US 14 Dempster St	Rand Rd	CO	197
1290		US 14 Northwest Hwy	Rohlwing Rd	CO	198
1295		US 14 Dempster St	Shermer Rd	CO	199
1300		US 14 Northwest Hwy	Smith Rd	CO	200
1305		US 14 Caldwell Ave	Touhy Ave	CO	201
1310		US 14 Northwest Hwy	Wilke Rd	CO	202
1315		US 14 Northwest Hwy	Plum Grove Rd	CO	203
1320		US 20 Lake St	Bluff City Rd Lovell Rd	CO	204
1325		US 20 Lake St	Oak St	CO	205
1330		US 20 Lake St	Park St	CO	206
1335		US 20 Lake St	44th St	CO	207
1338		US 20 Lake St	I 294 Tlwy Ramp	CO	208
1340		US 30 Lincoln Hwy	US 30 IL 83 Glenwood Dyer Rd	CO	209
1345		US 30 Lincoln Hwy	IL 1 Chicago Ave	CO	210
1350		US 30 Lincoln Hwy	IL 43 Harlem Ave	CO	211

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1355		US 30 Lincoln Hwy	IL 50 Cicero Ave	CO	212
1357		IL 50 Cicero Ave	207th St Birchwood Dr	CO	213
1358		IL 50 Cicero Ave	Morning Glory Village Commons	CO	214
1360		US 30 Lincoln Hwy	Cottage Grove	CO	215
1365		US 30 Lincoln Hwy	Division St	CO	216
1370		US 30 Lincoln Hwy	Ford Motor Plant	CO	217
1375		US 30 Lincoln Hwy	Governors Hwy Crawford Ave	CO	218
1376		Governors Hwy	212th Pl	CO	219
1380		US 30 Lincoln Hwy	Halsted St	CO	220
1385		US 30 Lincoln Hwy	Main St	CO	221
1390		US 30 Lincoln Hwy	Olympian Way	CO	222
1395		US 30 Lincoln Hwy	Orchard Rd	CO	223
1400		US 30 Lincoln Hwy	Ridgeland Ave	CO	224
1405		US 30 IL 83 Lincoln Hwy	Sauk Trail	CO	225
1410		US 30 Lincoln Hwy	State St	CO	226
1414		US 30 Lincoln Hwy	Center Ave	CO	227
1415		US 30 Lincoln Hwy	Torrence Ave	CO	228
1420		US 30 Lincoln Hwy	Western Ave	CO	229
1425		US 30 Lincoln Hwy	Woodlawn	CO	230
1430		US 30 Lincoln Hwy	Lindenwood Lincoln Mall	CO	231
1435		US 30 Lincoln Hwy	Ashland Ave	CO	232
1437		US 30 Lincoln Hwy	Access Rd Transportation Dr	CO	233
1440		US 30 Lincoln Hwy	Brookwood Dr	CO	234
1445		US 30 Lincoln Hwy	Hilltop Ave	CO	235
1450		US 30 Lincoln Hwy	Kostner Ave	CO	236
1455		US 34 Ogden Ave	IL 43 Harlem Ave	CO	237
1460		US 34 Ogden Ave	39th St Miller Rd	CO	238
1465		US 34 Ogden Ave	Gilbert Ave Willow Springs Rd	CO	239
1470		US 34 Ogden Ave	Joliet Rd	CO	240
1480		US 34 Ogden Ave	Wolf Rd	CO	241
1485		US 41 IL 50 Cicero Ave	US 41 Lincoln Ave	CO	242
1490		US 41 Skokie Blvd	IL 58 Dempster St	CO	243
1495		US 41 Skokie	Church St	CO	244
1500		US 41 Lincoln Ave	Crawford Ave	CO	245
1503		Touhy Ave	St Louis Ave	CO	246
1505		US 41 Lincoln Ave	Devon Ave	CO	247
1510		US 41 Skokie Blvd	East Lake Ave	CO	248
1515		US 41 Skokie Blvd	Edens Plaza	CO	249
1520		US 41 Skokie Blvd	Emerson Ave	CO	250
1525		US 41 Skokie Hwy	Golf Rd	CO	251
1530		US 41 Skokie Blvd	Gross Point Rd	CO	252
1535		US 41 Skokie Blvd	Hibbard Rd	CO	253
1540		US 41 Skokie Blvd	Howard St	CO	254
1545		US 41 Lincoln Ave	Kostner ave	CO	255

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1555		US 41 Skokie Hwy	Foster Ave	CO	256
1560		US 41 Skokie Blvd	Main St	CO	257
1565		US 41 Skokie Blvd	New Glenview Rd	CO	258
1570		US 41 Skokie Blvd	Niles Center Rd	CO	259
1574		Niles Center Rd	Fargo Ave	CO	260
1575		US 41 Skokie Hwy	Oakton St	CO	261
1577		US 41 Skokie Hwy	Searle Pkwy	CO	262
1580		US 41 Skokie Blvd	Old Glenview Rd	CO	263
1590		US 41 Skokie Hwy	Old Orchard Rd	CO	264
1595		US 41 Skokie Hwy	Old Orchard Shop Ctr North	CO	265
1600		US 41 Skokie Hwy	Old Orchard Shop Ctr Central	CO	266
1605		US 41 Skokie Hwy	Old Orchard Shop Ctr South	CO	267
1610		US 41 Lincoln Ave	Pratt Ave	CO	268
1613		Crawford Ave	Pratt Ave	CO	269
1615		US 41 Lincoln Ave	Touhy Ave	CO	270
1617		IL 72 Touhy Ave	Kilbourn Ave	CO	271
1620		US 41 Skokie Blvd	Wilmette Ave	CO	272
1625		US 45 DesPlaines River Rd	IL 58 Golf Rd	CO	273
1626		US 45 DesPlaines River Rd	Nazareth Way Holy Family	CO	274
1630		US 45 LaGrange Rd	107th St	CO	275
1631		111th St	84th Ave	CO	276
1632		111th St	Kean Ave	CO	277
1633		107th	104th	CO	278
1634		104th Ave	95th St	CO	279
1635		US 45 LaGrange Rd	111th St	CO	280
1640		US 45 LaGrange Rd	131st St	CO	281
1641		US 45 LaGrange Rd	Creek Rd	CO	282
1645		US 45 LaGrange Rd	135th St	CO	283
1650		US 45 LaGrange Rd	143rd St	CO	284
1651		US 45 LaGrange Rd	142nd St	CO	285
1655		US 45 LaGrange Rd	147th St	CO	286
1660		US 45 LaGrange Rd	149th St	CO	287
1664		US 45 LaGrange Rd	154th St Darwin Ent	CO	288
1665		US 45 LaGrange Rd	151st St	CO	289
1668		US 45 LaGrange Rd	156th St	CO	290
1670		US 45 LaGrange Rd	153rd St	CO	291
1675		US 45 DesPlaines River Rd	Central Rd	CO	292
1676		Central Rd	East River Rd	CO	293
1677		Central Rd	Oakton Community College	CO	294
1680		US 45 DesPlaines River Rd	Euclid St	CO	295
1685		US 45 DesPlaines River Rd	Kensington Rd Foundry St	CO	296
1690		US 45 LaGrange Rd	McCarthy Rd 123rd St	CO	297
1695		US 45 LaGrange Rd	Old Willow Rd Seminol Ln	CO	298
1700		US 45 LaGrange Rd	167th St	CO	299

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1701		US 45 LaGrange Rd	163rd St	CO	300
1705		US 45 LaGrange Rd	Lakeview Plaza Dr 158th St	CO	301
1710		US 45 LaGrange Rd	Carl Sandburg HS	CO	302
1712		US 45 DesPlaines River Rd	Camp Mc Donald Rd	CO	303
1715		US 45 IL 21 Milwaukee Ave	IL 68 Dundee Rd	CO	304
1720		US 45 IL 21 Milwaukee Ave	Hintz Rd	CO	305
1724		US 45 IL 21 Milwaukee Ave	Lake Cook Rd South Ramp B&C	CO	306
1726		US 45 IL 21 Milwaukee Ave	Lake Cook Rd North Ramp A&D	CO	307
1730		US 45 IL 21 Milwaukee Ave	Wolf Rd	CO	308
1735		US 45 IL 21 Milwaukee Ave	Apple Dr	CO	309
1740		US 45 IL 21 Milwaukee Ave	Palatine Rd North Ramp	CO	310
1745		US 45 IL 21 Milwaukee Ave	Palatine Rd South Ramp	CO	311
1750		US 45 LaGrange Rd	144th Pl	CO	312
1755		IL 1 Halsted St	IL 1 Cutoff Parkside	CO	313
1760		IL 1 Halsted St	IL 1 Vincennes	CO	314
1765		IL 83 Sibley 147th St	IL 1 Halsted St	CO	315
1770		IL 1 Chicago Rd	15th St	CO	316
1775		IL 1 Chicago Rd	16th St	CO	317
1780		IL 1 Chicago Rd	26th St	CO	318
1785		IL 1 Halsted St	123rd St	CO	319
1790		IL 1 Halsted St	127th St	CO	320
1795		IL 1 Halsted St	138th St	CO	321
1800		IL 1 Halsted St	149th St	CO	322
1805		IL 1 Halsted St	152nd St	CO	323
1810		IL 1 Halsted St	157th St	CO	324
1815		IL 1 Halsted St	163rd St	CO	325
1820		IL 1 Halsted St	167th St	CO	326
1825		IL 1 Halsted St	171st St	CO	327
1830		IL 1 Halsted St	183rd St	CO	328
1835		IL 1 Halsted St	Holbrook Rd	CO	329
1840		IL 1 Halsted St	187th St	CO	330
1845		IL 1 Cut Off	Riegel Rd Chicago Rd	CO	331
1850		IL 1 Halsted St	Joe Orr Rd	CO	332
1855		IL 1 Halsted St	Ridge Rd	CO	333
1860		IL 1 Chicago Vincennes Rd	Sauk Trail	CO	334
1865		IL 1 Chicago Ave	Steger Rd	CO	335
1870		IL 1 Halsted St	Vollmer Rd	CO	336
1875		IL 1 Halsted St	Maple Gate 3	CO	337
1880		IL 1 Halsted St	175th St	CO	338
1885		IL 1 Chicago Vincennes Rd	Dixie Hwy	CO	339
1890		IL 7 Southwest Hwy	IL 43 Harlem Ave	CO	340
1895		IL 7 Southwest Hwy	IL 83 Cal Sag 80th Ave	CO	341
1899		80th Ave	123rd St McCarthy Rd	CO	342
1900		IL 7 Southwest Hwy	111th St	CO	343

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1903		IL 7 Southwest Hwy	117th St	CO	344
1904		IL 7 Southwest Hwy	Metra Train Station 114th Pl	CO	345
1905		IL 7 Southwest Hwy	131st St	CO	346
1910		IL 7 Southwest Hwy	135th St	CO	347
1911		131st St	76th Ave	CO	348
1913		131st St	86th Ave	CO	349
1915		IL 7 Southwest Hwy	143rd St	CO	350
1920		IL 7 143rd St	West Ave 100th Ave	CO	351
1925		IL 19 Irving Park Rd	IL 43 Harlem Ave	CO	352
1930		IL 19 Irving Park Rd	IL 59 New Sutton Rd	CO	353
1932		IL 19 Irving Park Rd	Madison St	CO	354
1935		IL 19 Irving Park Rd	Bartlett Rd	CO	355
1937		IL 59	Gulf Keys	CO	356
1940		IL 171 Cumberland	IL 19 Irving Park Rd	CO	357
1945		IL 19 Irving Park Rd	Des Plaines River Rd	CO	358
1948		US 45 DesPlaines River Rd	Ivanhoe Rd	CO	359
1950		IL 19 Irving Park Rd	Forest Preserve Dr	CO	360
1953		IL 19 Irving Park Rd	Judd Ave	CO	361
1955		IL 19 Irving Park Rd	Oriole Ave	CO	362
1957		IL 19 Irving Park Rd	Seymour Ave	CO	363
1960		IL 19 Irving Park Rd	Ruby 25th	CO	364
1965		IL 19 Irving Park Rd	Springinsguth Rd	CO	365
1970		IL 19 Irving Park Rd	Wesley Terr	CO	366
1975		IL 19 Irving Park Rd	Wise Rd	CO	367
1976		IL 19 Irving Park Rd	Mercury Dr	CO	368
1980		IL 19 Irving Park Rd	Sunnydale Blvd	CO	369
1985		IL 19 Irving Park Rd	East Ave	CO	370
1987		IL 19 Irving Park Rd	Taft Ave OHare Cargo Access	CO	371
1990		IL 21 Milwaukee Ave	IL 43 Harlem	CO	372
1995		IL 21 Milwaukee Ave	IL 58 Golf Rd	CO	373
2000		IL 21 Milwaukee Ave	Ballard Rd	CO	374
2005		IL 21 Milwaukee Ave	Central Rd	CO	375
2010		IL 21 Milwaukee Ave	Dearlove Rd Glenview Rd	CO	376
2015		IL 21 Milwaukee Ave	Greenwood Ave	CO	377
2020		IL 21 Milwaukee Ave	Howard St	CO	378
2025		IL 21 Milwaukee Ave	Main St	CO	379
2030		IL 21 Milwaukee Ave	Maryland St	CO	380
2035		IL 21 Milwaukee Ave	Oak Mill Mall	CO	381
2040		IL 21 Milwaukee Ave	Oakton St	CO	382
2045		IL 21 Milwaukee Ave	Sanders Rd	CO	383
2050		IL 21 Milwaukee Ave	Euclid St West Lake Ave	CO	384
2055		IL 21 Milwaukee Ave	Castillian Ct Aon Dr	CO	385
2060		IL 21 Milwaukee Ave	Golf Mill Center Drive	CO	386
2065		IL 21 Milwaukee Ave	Golf Mill North Drive	CO	387

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2070		IL 38 Roosevelt Rd	Hamilton Ave Harrison	CO	388
2075		IL 38 Roosevelt Rd	Wolf Rd	CO	389
2077		IL 38 Roosevelt Rd	Fencl Ln	CO	390
2080		IL 43 Harlem Ave	IL 43 Oakton St	CO	391
2085		IL 43 Waukegan Rd	IL 43 Oakton St	CO	392
2087		Oakton St	Niles Civic Center Plaza	CO	393
2090		IL 43 IL 58 Waukegan Rd	IL 58 Golf	CO	394
2095		IL 43 Harlem Ave	IL 64 North Ave	CO	395
2100		IL 43 Waukegan Rd	IL 68 Dundee Rd	CO	396
2105		IL 43 Harlem Ave	IL 83 119th St College Dr	CO	397
2110		IL 43 Harlem Ave	16th St	CO	398
2115		IL 43 Harlem Ave	23rd St	CO	399
2120		IL 43 Harlem Ave	25th St	CO	400
2125		IL 43 Harlem Ave	26th St	CO	401
2130		IL 43 Harlem Ave	39th St Pershing Rd	CO	402
2135		IL 43 Harlem Ave	47th St	CO	403
2140		IL 43 Harlem Ave	57th St	CO	404
2145		IL 43 Harlem Ave	60th St	CO	405
2150		IL 43 Harlem Ave	63rd St	CO	406
2155		IL 43 Harlem Ave	63rd St Cut Off	CO	407
2160		IL 43 Harlem Ave	65th St	CO	408
2165		IL 43 Harlem Ave	71st St	CO	409
2170		IL 43 Harlem Ave	75th Pl	CO	410
2175		IL 43 Harlem Ave	79th Pl	CO	411
2180		IL 43 Harlem Ave	83rd St	CO	412
2185		IL 43 Harlem Ave	87th St	CO	413
2190		IL 43 Harlem Ave	88th St Southfield SC Dr	CO	414
2195		IL 43 Harlem Ave	90th St Cambridge St	CO	415
2200		IL 43 Harlem Ave	99th St	CO	416
2205		IL 43 Harlem Ave	103rd St	CO	417
2210		IL 43 Harlem Ave	111th St	CO	418
2215		IL 43 Harlem Ave	115th St	CO	419
2220		IL 43 Harlem Ave	123rd St	CO	420
2225		IL 43 Harlem Ave	127th St	CO	421
2226		IL 171 Archer Ave	127th St	CO	422
2227		IL 43 Harlem Ave	Ishnala Dr	CO	423
2230		IL 43 Harlem Ave	131st St	CO	424
2235		IL 43 Harlem Ave	135th St	CO	425
2240		IL 43 Harlem Ave	151st St	CO	426
2245		IL 43 Harlem Ave	175th St	CO	427
2250		IL 43 Harlem Ave	157th St	CO	428
2255		IL 43 Harlem Ave	183rd St	CO	429
2256		183rd St	Oak Park Ave	CO	430
2260		IL 43 Harlem Ave	Archer Ave 55th St	CO	431



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2265		IL 43 Harlem Ave	Armitage Ave	CO	432
2270		IL 43 Harlem Ave	Augusta Blvd	CO	433
2275		IL 43 Harlem Ave	Bloomington Rd	CO	434
2280		IL 43 Harlem Ave	Cermak Ave	CO	435
2285		IL 43 Waukegan Rd	Chestnut St	CO	436
2290		IL 43 Harlem Ave	Chicago Ave	CO	437
2295		IL 43 Harlem Ave	Division St	CO	438
2300		IL 43 Waukegan Rd	East Lake Ave	CO	439
2305		IL 43 Harlem Ave	Forest Preserve Dr	CO	440
2310		IL 43 Harlem Ave	Foster Ave	CO	441
2315		IL 43 Harlem Ave	Garfield Ave Harrison St	CO	442
2325		IL 43 Harlem Ave	Gunnison Lawrence	CO	443
2330		IL 43 Harlem Ave	Howard St	CO	444
2335		IL 43 Harlem Ave	92nd Pl Stanford Dr	CO	445
2340		IL 43 Harlem Ave	84th St	CO	446
2345		IL 43 Harlem Ave	77th St	CO	447
2350		IL 43 Harlem Ave	Jackson Blvd	CO	448
2355		IL 43 Harlem Ave	41st St Joliet Rd	CO	449
2360		IL 43 Harlem Ave	Lake St	CO	450
2362		Lake St	Bonnie Brae Ave	CO	451
2370		IL 43 Harlem Ave	Madison St	CO	452
2375		IL 43 Harlem Ave	Montrose Ave Agatite Ave	CO	453
2377		IL 43 Harlem Ave	Montrose Ave West	CO	454
2380		IL 43 Harlem Ave	North Blvd Central	CO	455
2385		IL 43 Harlem Ave	Ontario St	CO	456
2390		IL 43 Harlem Ave	Randolph St	CO	457
2395		IL 43 Harlem Ave	Riverside Dr Longcommon Rd	CO	458
2400		IL 38 Roosevelt Rd	Harlem Ave	CO	459
2401		IL 38 Roosevelt Rd	Lathrop Ave	CO	460
2406		IL 43 Waukegan Rd	Founders Rd	CO	461
2410		IL 43 Harlem Ave	Touhy Ave	CO	462
2411		IL 43 Harlem Ave	Pioneer Park Joswiak Pkwy	CO	463
2415		IL 43 Harlem Ave	Washington Blvd	CO	464
2420		IL 43 Harlem Ave	Wheeler Ave	CO	465
2425		IL 43 Waukegan Rd	Willow Rd	CO	466
2430		IL 43 Harlem Ave	Wilson Ave	CO	467
2435		IL 43 Waukegan Rd	Winnetka Rd	CO	468
2443		IL 50 Cicero Ave	34th St Access Dr	CO	469
2445		IL 50 Cicero Ave	31st St	CO	470
2450		IL 50 Cicero Ave	39th St Pershing Rd	CO	471
2451		IL 50 Cicero Ave	Burbank Station	CO	472
2455		IL 50 Cicero Ave	65th St	CO	473
2456		IL 50 Cicero Ave	66th St West Leg	CO	474
2460		IL 50 Cicero Ave	67th St Marquette St	CO	475

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2465		IL 50 Cicero Ave	73rd St State Rd	CO	476
2470		IL 50 Cicero Ave	79th St	CO	477
2475		IL 50 Cicero Ave	83rd St	CO	478
2480		IL 50 Cicero Ave	87th St	CO	479
2485		IL 50 Cicero Ave	94th St	CO	480
2490		IL 50 Cicero Ave	99th St	CO	481
2495		IL 50 Cicero Ave	103rd St	CO	482
2500		IL 50 Cicero Ave	107th St	CO	483
2505		IL 50 Cicero Ave	110th St	CO	484
2510		IL 50 Cicero Ave	111th St	CO	485
2512		111th St	Jodan Dr Laramie Ave	CO	486
2515		IL 50 Cicero Ave	113th State Bank of Alsip	CO	487
2520		IL 50 Cicero Ave	115th St	CO	488
2525		IL 50 Cicero Ave	80th St	CO	489
2530		IL 50 Cicero Ave	91st St	CO	490
2535		IL 50 Cicero Ave	76th Pl Ford City South	CO	491
2540		IL 50 Cicero Ave	88th Ave	CO	492
2545		IL 50 Cicero Ave	75th Pl Ford City North	CO	493
2550		IL 50 Cicero Ave	72nd St	CO	494
2555		IL 50 Cicero Ave	122nd St	CO	495
2560		IL 50 Cicero Ave	123rd St	CO	496
2565		IL 50 IL 83 Cicero Ave	IL 83 127th St	CO	497
2566		I 294 Tri-State E Ramp	127th St	CO	498
2567		I 294 Tri-State W Ramp	127th St	CO	499
2570		IL 50 Cicero Ave	151st St	CO	500
2575		IL 50 Cicero Ave	155th St	CO	501
2580		IL 50 Cicero Ave	167th St	CO	502
2585		IL 50 Cicero Ave	183rd St	CO	503
2590		IL 50 Cicero Ave	Devon Ave	CO	504
2595		IL 50 Cicero Ave	Fieldcrest Dr 166th St	CO	505
2600		IL 50 Cicero Ave	Flossmoor Rd	CO	506
2605		IL 50 Cicero Ave	Pratt Ave	CO	507
2610		IL 50 Cicero Ave	Roosevelt Rd	CO	508
2620		IL 50 Cicero Ave	Southwest Hwy	CO	509
2625		IL 50 Cicero Ave	Touhy Ave	CO	510
2630		IL 50 Cicero Ave	Matteson Town Center Mall	CO	511
2635		IL 50 Cicero Ave	Vollmer Rd	CO	512
2640		IL 50 Cicero Ave IL 83	IL 83 147th St SibleyBlvd	CO	513
2645		IL 50 IL 83 Cicero Ave	IL 83 Cal Sag Rd	CO	514
2649		IL 50 IL 83 Cicero Ave	Rivercrest East Ent	CO	515
2650		IL 50 IL 83 Cicero Ave	135th St	CO	516
2655		IL 50 IL 83 Cicero Ave	Midlothian Turnpike	CO	517
2660		IL 53 IL 68 Dundee Rd	West Frontage Rd	CO	518
2665		IL 53 E Ramp	IL 62 Algonquin Rd	CO	519

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2670		IL 53 W Ramp	IL 62 Algonquin Rd	CO	520
2677		IL 53 Hicks Rd	Lake Cook Rd	CO	521
2685		IL 53 IL 68 Dundee Rd	Baldwin Ct	CO	522
2693		IL 56 Butterfield Rd	Darmstadt Rd	CO	523
2700		IL 59 Sutton Rd	IL 58 Golf Rd	CO	524
2705		IL 58 Golf Rd	IL 62 Algonquin Rd	CO	525
2707		IL 62 Algonquin Rd	Lowes Ent	CO	526
2708		IL 62 Algonquin Rd	Market Place	CO	527
2710		IL 58 Golf Rd	IL 72 Higgins Rd	CO	528
2715		IL 58 Golf Rd	IL 83 Elmhurst Rd	CO	529
2720		IL 58 Golf Rd	Arlington Heights Rd	CO	530
2725		IL 58 Golf Rd	Barrington Rd	CO	531
2730		IL 58 Golf Rd	Bartlett Rd	CO	532
2735		IL 58 Dempster St	Bronx Ave	CO	533
2740		IL 58 Golf Rd	Busse Rd	CO	534
2745		IL 58 Dempster St	CTA Skokie Swift Rd	CO	535
2750		IL 58 Golf Rd	Dee Rd	CO	536
2755		IL 58 Golf Rd	East River Rd	CO	537
2760		IL 58 Golf Rd	Gannon Dr	CO	538
2765		IL 58 Golf Rd	Goebbert Rd	CO	539
2767		IL 58 Golf Rd	International Plaza	CO	540
2770		IL 58 Golf Rd	Gould Dr	CO	541
2775		IL 58 Golf Rd	Greenwood Ave	CO	542
2780		IL 58 Golf Rd	Harlem Ave	CO	543
2785		IL 58 Golf Rd	6th Ave	CO	544
2790		IL 58 Golf Rd	Highland Blvd	CO	545
2795		IL 58 Golf Rd	Jones Rd Salem Dr	CO	546
2800		IL 58 Golf Rd	Kraft Food	CO	547
2805		IL 58 Dempster St	Lockwood Ave	CO	548
2810		IL 58 Golf Rd	Meacham Rd	CO	549
2815		IL 58 Golf Rd	Wilke Rd	CO	550
2817		IL 58 Golf Rd	Continental Towers Walmart	CO	551
2820		IL 58 Dempster St	Niles Center Rd	CO	552
2825		IL 58 Golf Rd	Oakton Community College	CO	553
2830		IL 58 Golf Rd	Plum Grove Rd	CO	554
2835		IL 58 Golf Rd	Potter Rd	CO	555
2840		IL 58 Golf Rd	Roselle Rd	CO	556
2845		IL 58 Golf Rd	Shermer Rd	CO	557
2850		IL 58 Golf Rd	Washington St	CO	558
2855		IL 58 Golf Rd	Western Ave	CO	559
2860		IL 58 Golf Rd	3 Com Ent Apollo Dr	CO	560
2865		IL 58 Golf Rd	Wolf Rd Segers Rd	CO	561
2870		IL 58 Golf Rd	Moon Lake Rd Walnut Ln	CO	562
2875		IL 58 Golf Rd	Meier Rd	CO	563

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2880		IL 58 Golf Rd	Valley Lake Rd	CO	564
2885		IL 58 Golf Rd	Four Flags Shopping Center	CO	565
2890		Hawthorne Sutton Rd	IL 68 Dundee	CO	566
2892		IL 59 New Sutton Rd	Bartlett Rd	CO	567
2895		IL 59	IL 72 Higgins Rd	CO	568
2897		IL 59 New Sutton Rd	Penny Rd	CO	569
2899		IL 59	Arboretum Blvd	CO	570
2900		IL 59 Hough Rd	Barrington Rd	CO	571
2905		IL 59 Hough Rd	Hillside Ave	CO	572
2910		IL 59 Sutton Rd	Schaumburg Rd	CO	573
2915		IL 59 IL 68 Sutton Rd	IL 62 Algonquin Rd IL 68 Dundee Rd	CO	574
2920		IL 62 Algonquin Rd	IL 68 Dundee Brinker Rd	CO	575
2922		IL 62 Algonquin Rd	Palatine Rd	CO	576
2925		IL 62 Algonquin Rd	IL 83 Elmhurst Rd	CO	577
2930		IL 62 Algonquin Rd	Arbor Dr	CO	578
2935		IL 62 Algonquin Rd	Arlington Heights Rd	CO	579
2936		IL 62 Algonquin Rd	95 West Raddison Ent Marriot Ent	CO	580
2938		I 90 Tollway N Ramp A	Arlington Heights Rd	CO	581
2939		I 90 Tollway S Ramp G	Arlington Heights Rd	CO	582
2940		IL 62 Algonquin Rd	Barrington Rd	CO	583
2945		IL 62 Algonquin Rd	Busse Rd	CO	584
2950		IL 62 Algonquin Rd	Dempster St	CO	585
2955		IL 62 Algonquin Rd	Ela Rd	CO	586
2957		IL 62 Algonquin Rd	Winston Dr	CO	587
2960		IL 62 Algonquin Rd	Freeman Rd Huntington Blvd	CO	588
2965		IL 62 Algonquin Rd	Goebbert Rd	CO	589
2966		IL 62 Algonquin Rd	Tonne Rd	CO	590
2967		IL 62 Algonquin Rd	Meijer Ent Pappa Deux Ent	CO	591
2970		IL 62 Algonquin Rd	Harper College Ent	CO	592
2975		IL 62 Algonquin Rd	Linneman Rd	CO	593
2980		IL 62 Algonquin Rd	Magnolia Dr Commerce Rd	CO	594
2985		IL 62 Algonquin Rd	New Wilke Rd	CO	595
2990		IL 62 Algonquin Rd	Roselle Rd	CO	596
2995		IL 64 North Ave	IL 171 1st Ave	CO	597
3000		IL 64 North Ave	5th Ave	CO	598
3005		IL 64 North Ave	7th Ave	CO	599
3010		IL 64 North Ave	9th Ave	CO	600
3015		IL 64 North Ave	19th Ave Broadway	CO	601
3020		IL 64 North Ave	25th Ave	CO	602
3025		IL 64 North Ave	76th Ave Lathrop	CO	603
3030		IL 64 North Ave	Austin Blvd	CO	604
3035		IL 64 North Ave	35th St Cornell Ave	CO	605
3040		IL 64 North Ave	George St	CO	606
3045		IL 64 North Ave	Hawthorne Ave	CO	607

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3050		IL 64 North Ave	Indian Boundary Rd Ruby	CO	608
3055		IL 64 North Ave	Narragansett Ave Edner Ave	CO	609
3060		IL 64 North Ave	Natoma Ave Columbian Ave	CO	610
3065		IL 64 North Ave	Northwest Ave	CO	611
3067		US 20 Lake St	Railroad Ave	CO	612
3070		IL 64 North Ave	Oak Park Ave	CO	613
3075		IL 64 North Ave	Railroad Ave	CO	614
3080		IL 64 North Ave	Ridgeland Ave Mobile Ent	CO	615
3083		IL 64 North Ave	Roy St	CO	616
3085		IL 64 North Ave	Thatcher Ave	CO	617
3090		IL 64 North Ave	Wolf Rd	CO	618
3095		IL 68 Dundee Rd	IL 83 Elmhurst Rd	CO	619
3100		IL 68 Dundee Rd	Arlington Heights Rd	CO	620
3105		IL 68 Dundee Rd	Barrington Rd	CO	621
3110		IL 68 Dundee Rd	Buffalo Grove Rd	CO	622
3112		IL 68 Dundee Rd	Buffalo Grove High School	CO	623
3115		IL 68 Dundee Rd	Charlemagne Dr Torre Pines	CO	624
3120		IL 68 Dundee Rd	Hicks Rd	CO	625
3122		IL 68 Dundee Rd	Denise Dr Deergrove	CO	626
3125		IL 68 Dundee Rd	Huehl Rd	CO	627
3130		IL 68 Dundee Rd	Kennicott Ave	CO	628
3135		IL 68 Dundee Rd	Landwehr Rd	CO	629
3137		IL 68 Dundee Rd	Anthony Trail	CO	630
3140		IL 68 Dundee Rd	Midway	CO	631
3145		IL 68 Dundee Rd	Old McHenry Rd Wheeling Rd	CO	632
3150		IL 68 Dundee Rd	Ridge Ave	CO	633
3155		IL 68 Dundee Rd	Golfview Terrace	CO	634
3160		IL 68 Dundee Rd	Pfingsten Rd	CO	635
3165		IL 68 Dundee Rd	Quentin Rd	CO	636
3168		IL 68 Dundee Rd	Sterling Ave	CO	637
3170		IL 68 Dundee Rd	Sanders Rd	CO	638
3175		IL 68 Dundee Rd	Schoenbeck Rd	CO	639
3180		IL 68 Dundee Rd	Shermer Rd	CO	640
3185		IL 68 Dundee Rd	Skokie Blvd	CO	641
3190		IL 68 Dundee Rd	Smith Rd	CO	642
3195		IL 68 Dundee Rd	Western Ave	CO	643
3200		IL 68 Dundee Rd	Wolf Rd	CO	644
3204		IL 68 Dundee Rd	Portwine Rd	CO	645
3205		IL 68 Dundee Rd	IL 53 East Frontage Rd WI	CO	646
3210		IL 68 Dundee Rd	Weidner Rd Crofton Ln	CO	647
3213		IL 68 Dundee Rd	Buffalo Grove Fire House	CO	648
3215		IL 72 Higgins Rd	Landmeier Rd	CO	649
3220		IL 72 Higgins Rd	Mall Dr	CO	650
3225		IL 72 Higgins Rd	Martingale Rd	CO	651

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3230		IL 72 Higgins Rd	Meacham Rd	CO	652
3235		IL 72 Higgins Rd	Mt Prospect Rd	CO	653
3240		IL 72 Higgins Rd	Oakton St West	CO	654
3245		IL 72 Higgins Rd	Plum Grove Rd	CO	655
3250		IL 72 Higgins Rd	Roselle Rd	CO	656
3251		IL 72 Higgins Rd	Ash Rd	CO	657
3255		IL 72 Higgins Rd	Salem Dr	CO	658
3260		IL 72 Touhy Ave	Wolf Rd	CO	659
3262		IL 72 Higgins Rd	I 90 Tlwy WB Exit	CO	660
3265		IL 72 Higgins Rd	O'Hare Plaza Entrance 2	CO	661
3270		IL 72 Touhy Ave	IL 72 Lee St	CO	662
3275		IL 72 Higgins Rd	IL 72 IL 83 Oakton East	CO	663
3280		Busse Hwy	Oakton St	CO	664
3285		IL 72 Higgins Rd	Arlington Heights Rd	CO	665
3290		IL 72 Higgins Rd	Barrington Rd	CO	666
3295		IL 72 Higgins Rd	Bartlett Rd	CO	667
3297		IL 72 Higgins Rd	Arboretum Blvd	CO	668
3300		IL 72 Higgins Rd	Canfield Rd	CO	669
3305		IL 72 Higgins Rd	IL 171 Cumberland	CO	670
3310		IL 72 Higgins Rd	Dee Rd East River Rd	CO	671
3315		IL 72 Higgins Rd	TouhyAve @ Elmhurst Rd	CO	672
3318		IL 83 Elmhurst Rd	Landmeier Rd	CO	673
3325		IL 72 Higgins Rd	Gannon Dr	CO	674
3330		IL 72 Higgins Rd	Governors Dr Moon Lake Blvd	CO	675
3335		IL 72 Higgins Rd	King Rd Stanley St	CO	676
3340		IL 72 Higgins Rd	Beverly Rd	CO	677
3345		IL 83 Torrence Ave	IL 83 Glenwood Dyer	CO	678
3350		IL 83 Elmhurst Rd	IL 83 Oakton St	CO	679
3355		IL 83 Elmhurst Rd	IL 83 Old McHenry Rd	CO	680
3360		IL 83 Cal Sag Rd	104th Ave	CO	681
3365		IL 83 IL 171 N Cal Sag North	107th St	CO	682
3370		IL 83 IL 171 S Cal Sag South	111th St	CO	683
3375		IL 83 Cal Sag Rd	127th St	CO	684
3380		IL 83 Torrence Ave	186th St	CO	685
3385		IL 83 Sibley Blvd 147th St	Broadway St	CO	686
3390		IL 83 Elmhurst Rd	Camp McDonald Rd	CO	687
3395		IL 83 Sibley Blvd 147th St	Chicago Rd	CO	688
3400		IL 83 Sibley Blvd 147th St	Crawford Ave	CO	689
3405		IL 83 Elmhurst Rd	Dempster St Thacker Ave	CO	690
3410		IL 83 Busse Rd	Devon Ave	CO	691
3415		IL 83 Sibley 147th	Dixie Hwy	CO	692
3420		IL 83 Elmhurst Rd	Euclid Ave	CO	693
3425		IL 83 Busse Rd	Greenleaf Ave	CO	694
3430		IL 83 Elmhurst Rd	Hintz Rd	CO	695

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3435		IL 83 Sibley Blvd 147th St	Homan Ave	CO	696
3440		IL 83 Sibley Blvd 147th St	Indiana Ave	CO	697
3445		IL 83 Sibley Blvd 147th St	Keeler Ave	CO	698
3450		IL 83 Sibley Blvd 147th St	Kedzie Ave	CO	699
3455		IL 83 Sibley Blvd 147th St	Kilbourn Ave	CO	700
3460		IL 83 Busse Rd	Landmeier Rd	CO	701
3465		IL 83 Sibley Blvd 147th St	LaSalle St Markham Dr	CO	702
3470		IL 83 Sibley Blvd 147th St	Loomis St	CO	703
3475		IL 83 Sibley Blvd 147th St	Michigan City Rd Lincoln Ave	CO	704
3480		IL 83 Torrence Ave	Michigan City Rd	CO	705
3485		IL 83 Elmhurst Rd	Palatine Rd	CO	706
3490		IL 83 Busse Rd	Pratt Rd	CO	707
3495		IL 83 Torrence Ave	Ridge Rd	CO	708
3500		IL 83 Elmhurst Rd	Randhurst Shopping Ctr	CO	709
3502		Kensington Rd	Randhurst Mall Perimeter	CO	710
3505		IL 83 Cal Sag Rd	Ridgeland Ave	CO	711
3510		IL 83 Sibley Blvd 147th St	Robey St	CO	712
3515		IL 83 Torrence Ave	Thornton Lansing Rd	CO	713
3519		Thornton Lansing Rd	Stony Island Vollbrecht Rd	CO	714
3520		IL 83 Sibley Blvd 147th St	Wood St	CO	715
3525		IL 83 Sibley Blvd 147th St	Wallace St	CO	716
3530		IL 83 Cal Sag Rd	119th St	CO	717
3532		IL 83 Cal Sag Rd	76th Ave	CO	718
3535		IL 83 Elmhurst Rd	Huntington Commons	CO	719
3540		IL 83	Willow Rd	CO	720
3545		IL 171 Archer Ave	63rd St	CO	721
3550		IL 171 1st Ave E Ramp	Joliet Rd	CO	722
3555		IL 171 Archer Ave	55th St	CO	723
3557		IL 171 Archer Ave	59th St	CO	724
3560		IL 171 Archer Ave	Roberts Rd	CO	725
3565		IL 171 Archer Ave	State St	CO	726
3567		IL 171 Archer Ave	Access Dr Target Ent	CO	727
3570		IL 171 Archer Ave	Willow Springs Rd	CO	728
3572		IL 171 Archer Ave	Nolton Ave	CO	729
3573		Willow Springs Rd	German Church Rd	CO	730
3575		IL 171 1st Ave Frontage	47th St East Ramp	CO	731
3580		IL 394 FORD	Steger Rd	CO	732
3585		IL 171 1st Ave	26th St	CO	733
3590		IL 171 1st Ave	31st St	CO	734
3595		IL 171 1st Ave	31st St Cutoff Golfview	CO	735
3600		IL 171 1st Ave	Cermak Rd	CO	736
3605		IL 171 1st Ave	Cermak Cut off	CO	737
3610		IL 171 1st Ave	Chicago Ave	CO	738
3615		IL 171 1st Ave	Des Plaines River Rd	CO	739

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3620		IL 171 1st Ave	Forest Ave Ridgewood Ave	CO	740
3625		IL 171 1st Ave	Fullerton Ave	CO	741
3630		IL 171 1st Ave	Lake St	CO	742
3635		IL 171 1st Ave	13th St Madden Medical Ctr	CO	743
3640		IL 171 1st Ave	Madison St	CO	744
3645		IL 171 1st Ave	Maybrook Square	CO	745
3650		IL 171 1st Ave	Roosevelt Rd	CO	746
3656		IL 171 1st Ave	Warren	CO	747
3660		IL 171 1st Ave	Thatcher Rd Cut Off	CO	748
3665		IL 171 1st Ave	Van Buren St ComEd	CO	749
3670		IL 171 1st Ave	Washington Blvd	CO	750
3675		IL 171 1st Ave	17th St	CO	751
3680		5th Ave	DesPlaines River Rd	CO	752
3685		5th Ave	Triton College North Ent	CO	753
3690		5th Ave	Triton College South Ent	CO	754
3691		31st St	Prairie Ave	CO	755
3693		30th St	Maple Ave	CO	756
3695		17th Ave Maple Ave	31st St Logan Blvd	CO	757
3700		22nd St Cermak Rd	17th Ave	CO	758
3701		22nd St Cermak Rd	12th Ave	CO	759
3705		Roosevelt Rd	17th Ave	CO	760
3715		25th St	Lake St	CO	761
3720		25th Ave	Lexington Dr	CO	762
3725		Roosevelt Rd	25th Ave	CO	763
3735		26th St	Des Plaines Ave	CO	764
3740		26th St	East End Ave	CO	765
3745		26th St	Highland Blvd	CO	766
3750		26th St	North Riverside Plaza Vet	CO	767
3755		26th St	Ridgeland Ave	CO	768
3760		31st St	Des Plaines Ave	CO	769
3765		31st St	Golfview Ln Cutoff to 1st Ave	CO	770
3770		31st St	Kemman Ave Grand Ave	CO	771
3775		31st St	Wolf Rd	CO	772
3780		39th St Pershing Rd	Central Ave	CO	773
3785		39th St Pershing Rd	Laramie Ave	CO	774
3790		39th St Pershing Rd	Oak Park Ave	CO	775
3795		39th St Pershing Rd	Ridgeland Ave	CO	776
3800		39th St Pershing Rd	Austin Blvd	CO	777
3805		Central Ave	47th St	CO	778
3810		47th St	Joliet Rd	CO	779
3815		47th St	Lawndale Ave	CO	780
3820		47th St	Plainfield Rd	CO	781
3825		47th St	Wolf Rd	CO	782
3830		55th St	Brainard Ave	CO	783



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3835		IL 171 Archer Ave	Center Ave Lawndale Ave	CO	784
3840		55th St	County Line Rd	CO	785
3845		55th St	East Ave	CO	786
3850		55th St	Joliet Rd	CO	787
3855		55th St	Plainfield Rd	CO	788
3860		55th St	Willow Springs Rd	CO	789
3865		55th St	Wolf Rd	CO	790
3870		55th St	Laurel Ave	CO	791
3875		79th St	Austin Blvd	CO	792
3880		79th St	Central Ave	CO	793
3885		79th St	Narragansett Ave	CO	794
3890		79th St	Roberts Rd	CO	795
3893		79th St	Willow Springs Rd	CO	796
3895		79th St	Sayre Ave	CO	797
3900		79th St	State Rd	CO	798
3910		87th St	Kedzie Ave	CO	799
3915		87th St	Kostner Ave	CO	800
3920		Crawford Ave Pulaski Rd	Southwest Hwy Columbus Dr	CO	801
3925		103rd St	Crawford Ave Pulaski Rd	CO	802
3930		103rd St	Kedzie Ave	CO	803
3935		103rd St	Southwest Hwy	CO	804
3936		Crawford Ave Pulaski Rd	123rd St	CO	805
3940		111th St	86th Ave	CO	806
3942		111th St	Possum Dr College Pkwy	CO	807
3945		111th St	Central Ave	CO	808
3950		111th St	Ridgeland Ave	CO	809
3955		111th St	Roberts Rd	CO	810
3960		115th St	Crawford Ave Pulaski Rd	CO	811
3965		115th St	Kedzie Ave	CO	812
3970		119th St	Vincennes Ave	CO	813
3975		127th St	76th Ave	CO	814
3980		127th St	Ashland Ave	CO	815
3985		127th St	Central Ave	CO	816
3990		127th St	Crawford Ave Pulaski Rd	CO	817
3995		127th St	Kedzie Ave	CO	818
4000		127th St	Ridgeland Ave	CO	819
4005		127th St	Throop St	CO	820
4010		127th St	Wood St	CO	821
4015		127th St	Bishop St	CO	822
4030		135th St	Long	CO	823
4035		135th St	Ridgeland Ave	CO	824
4045		138th St	Ashland Ave Wood St	CO	825
4050		142nd St Main St	Chicago Ave	CO	826
4055		142nd St Main St	Indiana Ave	CO	827

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4060		142nd St Main St	Lincoln Ave	CO	828
4075		147th St	Central Ave	CO	829
4076		147th St	Ridgeland Ave	CO	830
4080		154th St	Chicago Ave South Park Ave	CO	831
4085		167th St	Wood St	CO	832
4090		Governors Hwy 175th St	Dixie Hwy	CO	833
4092		Governors Hwy 174th St Wood St	Metra Train Station	CO	834
4095		183rd St	Crawford Ave Pulaski Rd	CO	835
4108		183rd St	Ridgeland Ave	CO	836
4110		183rd St	Riegel Rd	CO	837
4115		IL 171 Cumberland Ave	Addison Ave	CO	838
4120		IL 68 Algonquin Rd	Mt Prospect Rd	CO	839
4125		IL 68 Algonquin Rd	Oakton St	CO	840
4130		IL 68 Algonquin Rd	Wolf Rd	CO	841
4135		Ashland Ave	Broadway and North Water St	CO	842
4140		Ashland Ave	Vermont St	CO	843
4145		Ballard Rd	Dee Rd	CO	844
4146		Ballard Rd	Nesset Dr	CO	845
4150		Ballard Rd	Greenwood Ave	CO	846
4155		Ballard Rd	Potter Rd	CO	847
4160		Ballard Rd	Rand Rd	CO	848
4165		Barrington Rd	Bourbon Parkway	CO	849
4170		Barrington Rd	Bode Rd	CO	850
4175		Barrington Rd	Hassel Rd	CO	851
4176		Barrington Rd	Central Rd Studio Dr	CO	852
4180		Barrington Rd	Schaumburg Rd	CO	853
4182		Barrington Rd	Holmes Way	CO	854
4185		Barrington Rd	Mundhank Rd	CO	855
4188		Barrington Rd	Tennis Club Ln Lakewood	CO	856
4190		Belmont Ave	80th Ave Pacific Ave	CO	857
4200		IL 171 Cumberland Ave	Belmont Ave	CO	858
4203		IL 171 Cumberland Ave	Thatcher Woods Shopping Cntr	CO	859
4204		Belmont Ave	Plainfield Rd	CO	860
4205		Belmont Ave	Des Plaines River Rd	CO	861
4210		Belmont Ave	Forest Preserve Dr	CO	862
4215		Belmont Ave	77th Ave Overhill Ave	CO	863
4220		Brainard Ave	Burnham Ave	CO	864
4225		Broadway	Joe Orr Rd and Riegel Rd	CO	865
4230		Burnham Ave	170th St	CO	866
4235		Burnham Ave	Ridge Rd	CO	867
4240		Burnham Ave	River Oaks Dr	CO	868
4245		Busse Rd	Potter Rd	CO	869
4250		Busse Rd	Dempster St	CO	870
4255		Canfield	Devon Ave	CO	871

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4260		Canfield	Talcott Ave	CO	872
4270		111th St	Crawford Ave Pulaski Rd	CO	873
4280		IL 43 Harlem Ave	143rd St	CO	874
4285		IL 43 Harlem Ave	Foster Shopping Center	CO	875
4375		Joe Orr Rd	Ashland Ave	CO	876
4410		Burnham Ave	152nd St Memorial Dr	CO	877
4415		Burnham Ave	156th St	CO	878
4425		Burnham Ave	Michigan City Rd	CO	879
4430		Burnham Ave	154th St	CO	880
4435		IL 83 Sibley Blvd	Burnham Ave	CO	881
4660		IL 59 Sutton Rd	West Bartlett Rd	CO	882
4695		US 14 Northwest Hwy	Eastern Hillside Ave	CO	883
4715		IL 43 Harlem Ave	48th St Amoco Oil	CO	884
4725		IL 50 Cicero Ave	37th St Citco Oil	CO	885
4735		Central Ave	51st St	CO	886
4740		Central Rd	Dee Rd	CO	887
4742		Central Rd	Dearlove Rd Glenview Rd	CO	888
4745		Central Rd	Greenwood Ave	CO	889
4755		Central Rd Carpenter	Pratt Ave	CO	890
4760		Central Rd	Roosevelt Rd	CO	891
4765		Central Rd	Wolf Rd	CO	892
4775		22nd St Cermak Rd	57th Ave	CO	893
4780		22nd St Cermak Rd	58th Ave	CO	894
4785		22nd St Cermak Rd	Austin Blvd	CO	895
4790		22nd St Cermak Rd	Central Ave	CO	896
4795		22nd St Cermak Rd	Cermak Plaza North Entrance	CO	897
4800		22nd St Cermak Rd	Des Plaines River Rd	CO	898
4805		22nd St Cermak Rd	East Rd	CO	899
4810		22nd St Cermak Rd	Home Ave	CO	900
4815		22nd St Cermak Rd	Lombard Ave	CO	901
4820		22nd St Cermak Rd	North Riverside Plaza West	CO	902
4825		22nd St Cermak Rd	North Riverside Plaza East	CO	903
4830		22nd St Cermak Rd	Oak Park Ave	CO	904
4835		22nd St Cermak Rd	Ridgeland Ave	CO	905
4840		22nd St Cermak Rd	Riverside Dr Wesley St	CO	906
4845		22nd St Cermak Rd	Wolf Rd	CO	907
4850		22nd St Cermak Rd	Westbrook Dr	CO	908
4851		22nd St Cermak Rd	Enterprise Drive	CO	909
4855		Chicago Rd	Indianwood Dr	CO	910
4861		Chicago Heights Glenwood Rd	Holbrook Rd	CO	911
4870		Church St	Niles Center Rd	CO	912
4875		Church St	McCormick Blvd	CO	913
4885		Crawford Ave Pulaski Rd	99th St	CO	914
4890		Crawford Ave Pulaski Rd	119th St	CO	915

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4892		Crawford Ave Pulaski Rd	Jewel Aldi 120th St	CO	916
4900		Crawford Ave	167th St	CO	917
4905		Crawford Ave	175th St	CO	918
4907		Crawford Ave Pulaski Rd	178th St Cambridge Cir	CO	919
4910		Crawford Ave	Devon Ave	CO	920
4915		Crawford Ave	Golf Rd	CO	921
4920		Crawford Ave	Harrison St Old Orchard Rd	CO	922
4930		Crawford Ave	Vollmer Rd	CO	923
4935		Crawford Ave	Flossmoor Rd	CO	924
4940		87th St	California Ave	CO	925
4945		Crawford Ave Pulaski Rd	Governors Hwy	CO	926
4950		Crawford Ave Pulaski Rd	Wilmette Ave	CO	927
4955		Cumberland Ave	Devon Ave	CO	928
4960		IL 171 Cumberland Ave	Forest Preserve Dr	CO	929
4965		IL 171 Cumberland Ave	Lawrence Ave	CO	930
4970		IL 171 Cumberland Ave	Montrose Ave	CO	931
4985		DesPlaines River Rd	Grand Ave	CO	932
4990		DesPlaines River Rd	Lawrence Ave	CO	933
4995		Oakton St	DesPlaines River Rd	CO	934
5000		Roosevelt Rd	DesPlaines Ave	CO	935
5005		DesPlaines River Rd	Touhy Ave	CO	936
5010		DesPlaines River Rd	Fullerton Ave	CO	937
5015		Dempster St	Crawford Ave	CO	938
5017		Dempster St	Hamlin Ave	CO	939
5020		Dempster St	East Prairie Ave	CO	940
5025		Dempster St	St Louis Ave Lincoln Ave	CO	941
5030		Dempster St	Keeler Ave Brownstone Ave	CO	942
5035		Dempster St	McCormick Blvd	CO	943
5040		Devon Ave	Dee Rd	CO	944
5045		Devon Ave	McCormick Blvd	CO	945
5047		US 41 Lincoln Ave	Fire Station	CO	946
5050		Dixie Hwy	167th St 170th St	CO	947
5055		Dixie Hwy	Holbrook Rd	CO	948
5060		Dixie Hwy	Joe Orr Rd	CO	949
5065		Joliet Rd	East Ave	CO	950
5066		Joliet Rd	Quarry Mall Entrance	CO	951
5067		Joliet Rd	Walmart Ent Quarry Mall	CO	952
5070		Plainfield Rd	East Ave	CO	953
5075		East End Ave	Sauk Trail	CO	954
5080		Elmhurst Rd	Devon Ave	CO	955
5090		Euclid Ave	Wolf Rd	CO	956
5095		Forest Preserve Dr	Montrose	CO	957
5100		Forest Preserve Dr	Oak Park	CO	958
5105		Flossmoor Rd	Western Ave	CO	959

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5110		Franklin Ave	Wolf Rd	CO	960
5115		Fullerton Ave	Thatcher Ave	CO	961
5120		Foundry Kensington	Wolf Rd	CO	962
5125		Glenwood Dyer Rd	Cottage Grove	CO	963
5130		Glenwood Dyer Rd	Main St Glenwood Lansing Rd	CO	964
5135		Glenview Rd	Greenwood Ave	CO	965
5140		Golf Rd	Central Park Ave	CO	966
5145		Golf Rd	East Prairie Ave	CO	967
5150		Golf Rd	Gross Point Rd	CO	968
5152		Gross Point Rd	Kenton Ave	CO	969
5155		Golf Rd	Harms Rd	CO	970
5157		Golf Rd	Woods Dr	CO	971
5160		Golf Rd	Lavergne Ave	CO	972
5165		Golf Rd	Lawler Ave	CO	973
5170		Golf Rd	McCormick Blvd	CO	974
5175		Golf Rd	Glenview Country Club	CO	975
5180		Governors Hwy	Flossmoor Rd	CO	976
5185		Governors Hwy	Kedzie Ave	CO	977
5195		Governors Hwy	Poplar Ave	CO	978
5200		Governors Hwy	Vollmer Rd	CO	979
5205		Grand Ave	Oak St Struckman Ave	CO	980
5210		Grand Ave	Mt Prospect Rd	CO	981
5211		Grand Ave	Northwest Ave	CO	982
5215		IL 171 1st Ave	Grand Ave	CO	983
5220		Grand Ave	Wolf Rd	CO	984
5235		Greenwood Ave	Lake Ave	CO	985
5240		Gross Point Rd	Church St	CO	986
5245		Gross Point Rd	Harrison St Old Orchard Rd	CO	987
5250		Gross Point Rd	Laramie Ave Carol St	CO	988
5255		Gross Point Rd	Oakton St Central Ave	CO	989
5260		Touhy Ave	Gross Point Rd	CO	990
5270		Gunnison St	Nagle Ave	CO	991
5275		Gunnison St	Oak Park Ave	CO	992
5285		Harts Rd Gross Pt Rd	Milwaukee Ave	CO	993
5295		Hicks Rd	Cunningham Dr	CO	994
5300		Hicks Rd	Euclid St	CO	995
5305		Hicks Rd	Illinois St Industrial Dr	CO	996
5315		Hicks Rd	Carpenter	CO	997
5320		Hibbard St	Lake Ave	CO	998
5325		Howard St	US 41 Lincoln Ave	CO	999
5330		Howard St	Gross Point Rd Menard Ent	CO	1000
5335		Howard St	Lehigh Ave	CO	1001
5340		Howard St	McCormick Blvd	CO	1002
5345		Indiana Ave	137th St	CO	1003

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5350		Indiana Ave	138th St	CO	1004
5355		Joliet Rd	Brainard Ave	CO	1005
5360		Joliet Rd	Lawndale Ave	CO	1006
5365		Joliet Rd	Willow Springs Rd	CO	1007
5370		Joliet Rd	Wolf Rd	CO	1008
5375		Joliet Rd	Universal Oil Products	CO	1009
5380		Kedzie Ave	119th St Oakhill Cemetery	CO	1010
5385		Kedzie Ave	123rd St	CO	1011
5390		Kensington	Wheeling Rd	CO	1012
5395		Kirchoff Rd	Wilke Rd	CO	1013
5425		Lake Cook Rd	Quentin Rd	CO	1014
5430		Lake Cook Rd	Sheridan Rd	CO	1015
5435		Lawrence Ave	Dee Rd East River Rd	CO	1016
5440		Lawrence Ave	Foster Rd	CO	1017
5445		Lee St	Touhy Ave	CO	1018
5448		Oakton St	River Rd	CO	1019
5450		Lehigh Ave	Oakton St	CO	1020
5455		Lehigh Ave	Touhy Ave	CO	1021
5460		Madison St	Jackson Blvd	CO	1022
5465		McCormick Blvd	Main St	CO	1023
5475		McCormick Blvd	Pratt Ave	CO	1024
5477		McCormick Blvd	Northeast Pkwy	CO	1025
5480		McCormick Blvd	Touhy Ave	CO	1026
5483		Touhy Ave	Kedzie Ave	CO	1027
5485		McCormick Blvd	Oakton St	CO	1028
5490		Milwaukee Ave	Touhy Ave	CO	1029
5495		IL 21 Milwaukee Ave	IL 43 Waukegan Rd	CO	1030
5500		Montrolse Ave	Narragansett Ave	CO	1031
5505		Northwest Hwy	Oakton St	CO	1032
5510		Northwest Hwy	Potter Rd	CO	1033
5515		Oak Park Ave	31st St	CO	1034
5520		US 34 Ogden Ave	Oak Park Ave	CO	1035
5525		Roosevelt Rd	Oak Park Ave	CO	1036
5535		Oakton St	Florence Dr	CO	1037
5540		Oakton St	Greenwood Ave	CO	1038
5545		Oakton St	Mt Prospect Rd	CO	1039
5550		Oakton St	Wolf Rd	CO	1040
5555		US 34 Ogden Ave	31st St	CO	1041
5556		US 34 Ogden Ave	25th Pl 26th St	CO	1042
5557		IL 50 Cicero Ave	Connector	CO	1043
5558		US 34 Ogden Ave	Connector	CO	1044
5565		US 34 Ogden Ave	Austin Blvd	CO	1045
5570		US 34 Ogden Ave	Clarence Ave	CO	1046
5575		US 34 Ogden Ave	Clinton Ave	CO	1047

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5580		US 34 Ogden Ave	East Ave	CO	1048
5590		US 34 Ogden Ave	Home Ave	CO	1049
5595		US 34 Ogden Ave	Ridgeland Ave 34th St	CO	1050
5600		Old Plum Grove Rd	Meacham Rd	CO	1051
5605		Palatine Rd	Kennicott Dr	CO	1052
5610		Palatine Rd	Quentin Rd	CO	1053
5620		Palatine Rd	Schoenbeck Rd	CO	1054
5625		Palatine Rd	Wheeling Rd	CO	1055
5630		Palatine Rd	Windsor Drive	CO	1056
5640		Palatine Rd	Wolf Rd	CO	1057
5645		Palatine Rd	Ela Rd	CO	1058
5650		171st St	Park Ave	CO	1059
5652		Palatine Rd	Huntington Rd	CO	1060
5655		Willow Rd	Pfingsten Rd	CO	1061
5670		Colfax Ave	Quentin Rd	CO	1062
5675		Ridgeland Ave	96th St	CO	1063
5680		Ridgeland Ave	98th St	CO	1064
5690		Ridgeland Ave	Ridgeland Ave Commons Shop Ctr	CO	1065
5695		Ridge Rd	Ashland Ave Riegel Rd	CO	1066
5710		Riegel Rd	Holbrook Rd	CO	1067
5715		IL 53 Rohlwing Rd	Devon Ave	CO	1068
5720		Roosevelt Rd	5th Ave	CO	1069
5725		Roosevelt Rd	9th Ave	CO	1070
5730		Roosevelt Rd	Austin Blvd	CO	1071
5735		Roosevelt Rd	East Ave	CO	1072
5740		Roosevelt Rd	Laramie Ave	CO	1073
5745		Roosevelt Rd	Mayfield Ave	CO	1074
5750		Roosevelt Rd	Ridgeland Ave	CO	1075
5755		Sauk Trail	State Rd	CO	1076
5760		Sauk Trail	Torrence	CO	1077
5770		Shermer Rd	Willow Rd	CO	1078
5780		State Rd	Central Ave 80th St	CO	1079
5785		State St	Illinois St	CO	1080
5790		State Rd	Steger Rd	CO	1081
5795		St Charles Rd	Taft Ave	CO	1082
5800		St Charles Rd	Wolf Rd	CO	1083
5810		Talcott Rd	Dee Rd	CO	1084
5815		Talcott Rd	Touhy Ave	CO	1085
5820		Torrence Ave	Dolton State Rd	CO	1086
5825		Touhy Ave	Crawford Ave	CO	1087
5830		Touhy Ave	Dee Rd	CO	1088
5835		Touhy Ave	Kostner Ave	CO	1089
5840		Touhy Ave	Mobile Ave	CO	1090
5841		Touhy Ave	Meade Ave	CO	1091

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5843		Touhy Ave	Melvina Ave	CO	1092
5845		Touhy Ave	Riverside Ave	CO	1093
5850		Washington Blvd Randolph St	Lathrop Ave	CO	1094
5855		91st St	Western Ave	CO	1095
5860		Western Ave	98th St	CO	1096
5865		Western Ave	99th St	CO	1097
5870		Western Ave	119th St	CO	1098
5875		123rd St	Western Ave	CO	1099
5880		139th St	Western Ave	CO	1100
5885		Western Ave	Monee Rd	CO	1101
5890		Western Ave	Steger Rd	CO	1102
5895		Western Ave	Vollmer Rd	CO	1103
5900		Western Ave	Illinois 16th	CO	1104
5915		Willow Rd	Greenwood Ave	CO	1105
5920		Willow Rd	Landwehr Rd	CO	1106
5925		Willow Rd	Sanders Rd	CO	1107
5927		Willow Rd	Culligan Accenture Pkwy	CO	1108
5930		Willow Rd	Old Willow Rd	CO	1109
5931		Willow Rd	Ravina Way	CO	1110
5932		Willow Rd	Patriot Blvd	CO	1111
5933		Willow Rd	Westleigh Dr Founders Dr	CO	1112
5935		Willow Springs Rd	Plainfield Rd	CO	1113
5940		Wireton Rd	Francisco Ave	CO	1114
5944		Wolf Rd	Edward Rd	CO	1115
5945		Wolf Rd	Camp McDonald Rd	CO	1116
5950		Wolf Rd	Willow Rd Old Willow Rd	CO	1117
5955		Wolf Rd	Howard St	CO	1118
5965		Wood St	171st St	CO	1119
6077		US 20 Lake St	North Ave East Bartlett Rd	CO	1120
6612		US 45 Mannheim	IL 83 E Ramps B&D	CO	1121
6613		US 45 Mannheim	IL 83 W Ramps A&C	CO	1122
7185		Lake Cook Rd	Hart Rd	CO	1123
7417		US 45	183rd St	CO	1124
7635		IL 19 Irving Park Rd	Rodenburg Rd	CO	1125
7637		IL 19 Irving Park Rd	Wright Blvd	CO	1126
7645		IL 43 Harlem Ave	Grand Ave Fullerton Ave	CO	1127
7655		IL 62 Algonquin Rd	Lexington Dr	CO	1128
7860		Barrington Rd	Tower Dr	CO	1129
7885		IL 62 Algonquin Rd	Quentin Rd	CO	1130
7947		IL 43 Harlem Ave	34th St Windsor Dr	CO	1131
7950		IL 43 Harlem Ave	32nd St	CO	1132
8780		IL 58 Golf Rd	Woodfield Mall Center Ent	CO	1133
8785		IL 58 Golf Rd	Woodfield Mall W Ent	CO	1134
8790		IL 58 Golf Rd	Woodfield Mall E Ent Hyatt Ent	CO	1135



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8800		IL 64 North Ave	Winston Plaza Ent	CO	1136
8905		IL 58 Golf Rd	Lamon Ave	CO	1137
8910		IL 43 Harlem Ave	167th St	CO	1138
8920		IL 43 Harlem Ave	171st ST	CO	1139
8935		IL 43 Harlem Ave	163rd St Brementowne Dr	CO	1140
8940		IL 19 Irving Park Rd	Park Blvd	CO	1141
9085		IL 72 Higgins Rd	Devon Ave	CO	1142
9090		IL 72 Higgins Rd	Scott St	CO	1143
9150		IL 83 147th St	I 294 Tlwy East Ramp	CO	1144
9152		IL 83 147th St	I 294 Tlwy West Ramp	CO	1145
9155		IL 83 147th St	Cleveland	CO	1146
9160		IL 83 147th St	Harrison St	CO	1147
9185		Cumberland Ave	Talcott Ave	CO	1148
9190		IL 171 Cumberland Ave	Touhy Ave	CO	1149
9205		Greenwood Ave	Talcott Ave	CO	1150
9215		US 14 Northwest Hwy	Meacham Ave	CO	1151
9220		US 14 Northwest Hwy	Washington St	CO	1152
9222		Touhy Ave	Summit Ave	CO	1153
9235		Busse Hwy	Greenwood Ave	CO	1154
9240		Busse Hwy	Meacham AveTouhy Ave Park Ridge Blvd	CO	1155
9245		Courtland St	Devon Ave	CO	1156
9247		US 14 Northwest Hwy	Summit Ave	CO	1157
9250		US 14 Northwest Hwy	Prospect Ave Park Ridge Blvd	CO	1158
9255		Touhy Ave	Washington St	CO	1159
9295		Western Ave	26th St	CO	1160
9297		Western Ave	Norwood Square Shop Ctr	CO	1161
9300		Western Ave	Beacon Blvd	CO	1162
9335		Crawford Ave	107th St	CO	1163
9360		22nd St Cermak Rd	Mid City Bank N Riverside	CO	1164
9625		IL 83 Elmhurst Rd	Lonnquist Blvd	CO	1165
9630		US 14 Northwest Hwy	IL 83 Elmhurst Rd	CO	1166
9640		US 14 Northwest Hwy	Emerson St	CO	1167
9645		US 12 Rand Rd	Business Center	CO	1168
9653		Busse Rd	Central Rd	CO	1169
9654		Central Rd	3 Com Ent	CO	1170
9660		IL 83 Main St ( in Mt Prospect )	Central Rd	CO	1171
9665		IL 83 Elmhurst Rd	Council Trail	CO	1172
9670		IL 83 Elmhurst Rd	Lincoln St	CO	1173
9690		US 14 Northwest Hwy	Central Rd	CO	1174
9726		147th St	Oak Park Ave Justamere Rd	CO	1175
9727		143rd St	Justamere Rd	CO	1176
9950		US 6 159th St	Oak Forest Hospital	CO	1177
10125		IL 43 Harlem Ave	Harlem Irving Plaza	CO	1178

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10595		IL 43 Waukegan Rd	Kraft Food Three Lakes	CO	1179
10597		IL 43 Waukegan Rd	Golf Gate Shopping Access	CO	1180
10635		US 6 159th St	Central Park Ave	CO	1181
10640		US 6 159th St	Richmond Ave	CO	1182
10880		IL 43 Waukegan Rd	Dewes St	CO	1183
10900		IL 43 Waukegan Rd	Carillon Square	CO	1184
10905		IL 43 Waukegan Rd	Glenview Rd	CO	1185
10915		IL 64 North Ave	Jewel Foods Plant Ent	CO	1186
10920		IL 43 Waukegan Rd	Grove St	CO	1187
10970		US 12 45 Mannheim Rd	Belmont Ave	CO	1188
10975		Belmont Pacific Ave	Rose St 25th Ave	CO	1189
11015		US 12 45 Mannheim Rd	Grand Ave	CO	1190
11030		US 12 45 Mannheim Rd	Seymour Ave	CO	1191
11035		US 12 45 Mannheim Rd	Waveland Ave	CO	1192
11040		DesPlaines River Rd	King Ave	CO	1193
11074		Belmont Ave	Oriole Ave 76th St	CO	1194
11080		55th St	Electro Motive Dr	CO	1195
11086		55th St	Sergo Dr	CO	1196
11130		IL 59	Shoe Factory Rd	CO	1197
11133		IL 72 Higgins Rd	Shoe Factory Rd	CO	1198
11161		Touhy Ave	Northpoint Plaza Circuit City	CO	1199
11170		IL 58 Golf Rd	Michael Manor	CO	1200
11175		US 12 45 Mannheim Rd	Zemke Blvd	CO	1201
11185		Devon Ave	Kenton Ave Lemont Rd	CO	1202
11190		US 30 Lincoln Hwy	Matteson Shopping Ctr	CO	1203
11210		IL 58 Golf Rd	Milwaukee Plaza Toys R US Ent	CO	1204
11245		US 12 45 Lee St	US 12 45 Mannheim Rd	CO	1205
11250		Touhy Ave	Central Ave	CO	1206
11270		US 20 Lake St	Bartlett Rd	CO	1207
11280		IL 59 Hough Rd	Main St Lake Cook Rd	CO	1208
11282		Lake Cook Rd	Applebee's Ent	CO	1209
11285		Barrington Rd	Palatine Rd	CO	1210
11290		US 12 Rand Rd	IL 53 W Ramp	CO	1211
11295		US 12 Rand Rd	IL 53 E Ramp	CO	1212
11303		West Lake Ave	Greenwood Rd	CO	1213
11305		Pfingsten Rd	West Lake Ave	CO	1214
11310		IL 72 Higgins Rd	IL 83 Busse Rd	CO	1215
11320		Arlington Heights Rd	Northwest Point South Dr	CO	1216
11325		IL 43 Harlem Ave	161st St	CO	1217
11330		US 6 159th St	Park Center Dr	CO	1218
11345		US 30 Lincoln Hwy	Mid Continent Drive	CO	1219
11350		US 6 IL 83 Torrence Ave	Landings Shopping Ctr	CO	1220
11355		Margaret	Williams	CO	1221
11356		Margaret	Schwab St	CO	1222

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11360		Williams	Eleanor	CO	1223
11460		IL 83 Sibley Blvd 147th St	Woodlawn Ave	CO	1224
11465		IL 83 Sibley Blvd 147th St	Greenwood Rd	CO	1225
11470		IL 83 Sibley Blvd 147th St	Engle Ct	CO	1226
11475		IL 83 Sibley Blvd 147th St	Cottage Grove Ave Dolton Ave	CO	1227
11635		IL 171 Archer Ave	65th St	CO	1228
11640		US 12 20 95th St	Kean Ave	CO	1229
11645		IL 50 Cicero Ave	23rd St	CO	1230
11690		IL 68 Dundee Rd	Northgate Pkwy	CO	1231
11692		IL 68 Dundee Rd	Community Blvd	CO	1232
11695		US 14 Northwest Hwy	Elm St	CO	1233
11710		US 6 159th St	Arroyo Dr	CO	1234
11715		Western Ave	Sauk Trail	CO	1235
11716		Western Ave	Maint St ( in Park Forest )	CO	1236
11720		IL 50 Cicero Ave	175th St	CO	1237
11725		Dixie Hwy	Flossmoor Rd Cambridge Dr	CO	1238
11730		Hicks Rd	Northrup Rd	CO	1239
11735		Hicks Rd	Hellen Rd	CO	1240
11745		IL 394 FORD	Sauk Trail	CO	1241
11750		US 6 159th St	Park Ave	CO	1242
11755		Ashland Ave Wood St	Thornton Blue Island Rd	CO	1243
11760		US 12 20 95th St	76th Ave	CO	1244
11765		US 12 20 95th St	88th Ave	CO	1245
11770		Ridgeland Ave	IL 7 Southwest Hwy	CO	1246
11785		US 12 20 95th St	California Ave	CO	1247
11790		US 12 20 95th St	Utica Ave	CO	1248
11795		US 12 20 95th St	Mariano Ent	CO	1249
11800		22nd St Cermak Rd	1st Ave Cut off	CO	1250
11805		IL 171 1st Ave Frontage Rd	47th St W Ramp	CO	1251
11810		IL 171 1st Ave Frontage Rd	Ramps B & B1	CO	1252
11815		IL 171 Archer Ave	123td St McCarthy Rd	CO	1253
11853		Kedzie Ave	94th Ave	CO	1254
11860		IL 68 Dundee Rd	Ela Rd	CO	1255
11861		US 14 Northwest Hwy	IL 68 Dundee Rd East Ramp	CO	1256
11862		US 14 Northwest Hwy	IL 68 Dundee Rd West Ramp	CO	1257
11865		Main St North Vincennes	Glenwood Dyer Main St Glenwood	CO	1258
11870		IL 72 Higgins Rd	Lee Ramp Trammel Crow	CO	1259
11965		IL 64 North Ave	Polk Plaza Shop Ctr	CO	1260
11985		US 14 Northwest Hwy	Hicks Rd North Jct	CO	1261
12000		US 6 IL 83 Torrence Ave	Bernice Rd 173rd St	CO	1262
12005		Hicks Rd	Old Hicks Rd	CO	1263
12010		IL 58 Dempster St	Gross Point Rd	CO	1264
12015		IL 56 Butterfield Rd	Taft Ave	CO	1265
12025		Lawrence Ave	25th Ave Ruby St	CO	1266

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12035		Crawford Ave Pulaski Rd	93rd St	CO	1267
12075		IL 72 Higgins Rd	Huntington Blvd	CO	1268
12090		Touhy Ave	Barclay Pl Hyatt Dr	CO	1269
12100		State St	Taft Ave	CO	1270
12101		State St	168th St	CO	1271
12102		State St	Armory Dr	CO	1272
12105		142nd St	Cottage Grove Ave	CO	1273
12115		IL 1 Halsted St	Park Place Plaza	CO	1274
12125		IL 83 Busse Rd	Howard St	CO	1275
12135		111th St	Kostner Ave	CO	1276
12155		IL 53 IL 68 Dundee Rd	IL 53 West Ramp	CO	1277
12160		IL 53 IL 68 Dundee Rd	IL 53 East Ramp	CO	1278
12165		27th St	Lake St	CO	1279
12175		US 12 Rand Rd	Winslowe Dr Park Pl	CO	1280
12220		IL 171 Archer Ave	66th Pl	CO	1281
12400		IL 50 Cicero Ave	Southwick Dr	CO	1282
12403		IL 50 Cicero Ave	Wal Mart Ent	CO	1283
12404		IL 50 Cicero Ave	North Gateway Dr	CO	1284
12530		IL 43 Harlem Ave	100th Pl	CO	1285
12535		Arlington Heights Rd	White Oak St	CO	1286
12540		Arlington Heights Rd	Central Rd	CO	1287
12550		Arlington Heights Rd	Sigwalt St	CO	1288
12555		US 14 Northwest Hwy	Arlington Heights Rd	CO	1289
12560		Arlington Heights Rd	Miner Rd	CO	1290
12565		Arlington Heights Rd	Euclid Ave	CO	1291
12585		Arlington Heights Rd	Lillian Ave	CO	1292
12590		Arlington Heights Rd	Palatine Rd	CO	1293
12595		Arlington Hts Rd	US 12 Rand Rd	CO	1294
12600		Arlington Heights Rd	North Point SC	CO	1295
12615		Central Rd	Kirchoff Rd	CO	1296
12620		Central Rd	Arthur St	CO	1297
12625		US 12 Rand Rd	Cub Foods Ent	CO	1298
12630		US 12 Rand Rd	Palatine Rd	CO	1299
12635		US 12 Rand Rd	Northpoint Center	CO	1300
12640		US 12 Rand Rd	Arlington Plaza	CO	1301
12660		US 14 Northwest Hwy	Euclid Ave	CO	1302
12665		US 14 Northwest Hwy	McKinley Ave Arthur Ave	CO	1303
12670		US 14 Northwest Hwy	Kensington Rd Douglas	CO	1304
12675		US 14 Northwest Hwy	Evergreen Ave	CO	1305
12680		US 14 Northwest Hwy	Dunton Ave	CO	1306
12685		US 14 Northwest Hwy	Vail Ave	CO	1307
12690		US 14 Northwest Hwy	Walnut Ave Ridge Ave	CO	1308
12700		US 12 Rand Rd	Annex SC	CO	1309
12770		IL 50 Cicero Ave	22nd St Cermak Rd	CO	1310

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12775		22nd St Cermak Rd	49th Ave	CO	1311
12780		22nd St Cermak Rd	50th Ave	CO	1312
12785		22nd St Cermak Rd	Laramie Ave	CO	1313
12790		22nd St Cermak Rd	54th Ave	CO	1314
12795		IL 50 Cicero Ave	16th St	CO	1315
12825		IL 50 Cicero Ave	19th St	CO	1316
12830		IL 50 Cicero Ave	29th St	CO	1317
12966		IL 43 Waukegan Rd	Chestnut St By Deerbrook Mall	CO	1318
12985		Touhy Ave	Maple Ave	CO	1319
12995		Oakton St	Webster Ln	CO	1320
13000		US 12 45 Lee St	Algonquin Rd	CO	1321
13005		Algonquin Rd	Seymour Ave	CO	1322
13020		IL 58 Golf Rd	Mt Prospect Rd	CO	1323
13022		IL 58 Golf Rd	Marianos Ent Access Dr	CO	1324
13025		US 12 45 Lee St Mannheim Rd	Prairie Ave	CO	1325
13026		US 12 45 Lee St Mannheim Rd	Thacker St	CO	1326
13027		US 12 45 Graceland Ave	Thacker St	CO	1327
13035		US 12 45 Lee St	US 14 Miner St Ellenwood	CO	1328
13040		US 14 Miner St	Pearson St	CO	1329
13050		US 12 45 Graceland Ave	Prairie Ave	CO	1330
13055		US 12 45 Graceland Ave	US 14 Miner St	CO	1331
13065		US 12 45 Mannheim Rd	Prospect Ave	CO	1332
13070		DesPlaines River Rd	Perry St	CO	1333
13071		US 12 45 Lee St	Perry St	CO	1334
13072		DesPlaines River Rd	Pearson St	CO	1335
13075		US 14 Miner St	Des Plaines River Rd	CO	1336
13080		US 14 Northwest Hwy	State St	CO	1337
13085		US 12 Rand Rd	3rd Ave	CO	1338
13140		IL 72 Higgins Rd	Lively Blvd	CO	1339
13145		IL 53 Rohlwing Rd	Nerge Rd	CO	1340
13150		IL 53 Rohlwing Rd	Biesterfield Rd	CO	1341
13285		IL 58 Summit St	Hiawatha Dr	CO	1342
13286		IL 58 Summit St	Waverly Dr	CO	1343
13440		IL 19 Irving Park Rd	Chicago St and Willard Ave	CO	1344
13470		Wolf Rd	Dempster St Thacker Ave	CO	1345
13685		DesPlaines Ave	Jackson St	CO	1346
13687		DesPlaines Ave	CTA Station	CO	1347
13700		Roosevelt Rd	Circle Ave	CO	1348
13745		IL 19 Irving Park Rd	Barrington Rd	CO	1349
13750		IL 19 Irving Park Rd	Menards Ent Tradewinds Ent	CO	1350
13755		IL 19 Irving Park Rd	Kingsbury Dr	CO	1351
13756		IL 19 Irving Park Rd	Westview Center	CO	1352
13760		US 20 Lake St	Metra Commuter Lot Church St	CO	1353
13762		US 20 Lake St	Center Ave	CO	1354

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13765		US 20 Lake St	Barrington Rd	CO	1355
13775		Barrington Rd	Walnut	CO	1356
13785		150th St	Dixie Hwy	CO	1357
13790		154th St	Dixie Hwy	CO	1358
13795		150th St	Wood St	CO	1359
13800		154th St	Wood St	CO	1360
13805		155th St	Wood St	CO	1361
13810		156th St	Wood St	CO	1362
13815		158th St	Wood St	CO	1363
13820		154th St	Park Ave	CO	1364
13825		155th St	Park Ave	CO	1365
13830		157th St	Park Ave	CO	1366
13835		150th St	Morgan St	CO	1367
13845		Green Bay Rd	Kenilworth Ave Park Dr	CO	1368
13855		US 34 Ogden Ave	Brainard Ave	CO	1369
13860		US 34 Ogden Ave	Waiola Ave	CO	1370
13865		US 34 Ogden Ave	Kensington Ave	CO	1371
13870		US 34 Ogden Ave	Eberle Ave East Ave	CO	1372
13871		US 34 Ogden Ave	DuBois Blvd	CO	1373
13872		US 34 Ogden Ave	US 34 Ogden Ave @ Maple Ave	CO	1374
13873		US 34 Ogden Ave	Prairie Ave	CO	1375
13880		US 12 20 45 LaGrange Rd	Harris Ave	CO	1376
13885		US 12 20 45 LaGrange Rd	Cossit Ave	CO	1377
13890		47th St	Willow Springs Rd	CO	1378
13895		47th St	Edgewood Ave	CO	1379
13900		47th St	Brainard Ave	CO	1380
13905		US 12 20 45 LaGrange Rd	Burlington Ave Hillgrove Ave	CO	1381
13910		US 12 20 45 LaGrange Rd	US 34 Ogden Ave	CO	1382
13912		US 34 Ogden Ave	Locust Ave	CO	1383
13915		US 12 20 45 LaGrange Rd	Harding Ave	CO	1384
13920		US 12 20 45 LaGrange Rd	Homestead Rd	CO	1385
13923		31st St	Brainard Ave	CO	1386
13925		31st St	Forest Ave	CO	1387
13930		31st St	Raymond Ave Harrison St	CO	1388
13940		IL 83 Torrence Ave	178th St	CO	1389
13942		I 80 I 94	Torrence	CO	1390
14155		US 34 Ogden Ave	IL 171 1st Ave	CO	1391
14157		US 34 Ogden Ave	Lawndale Ave	CO	1392
14160		IL 171 1st Ave	Plainfield Rd	CO	1393
14165		IL 171 1st Ave	44th St	CO	1394
14170		US 34 Ogden Ave	Plainfield Rd	CO	1395
14175		US 34 Ogden Ave	Custer Ave	CO	1396
14183		5th Ave	Main St Charles ( in Maywood )	CO	1397
14190		5th Ave	Washington St	CO	1398

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14195		5th Ave	Madison	CO	1399
14200		5th Ave	Lake St	CO	1400
14205		5th Ave	Chicago Ave	CO	1401
14215		17th Ave	Madison Ave	CO	1402
14220		9th Ave	Lake St	CO	1403
14245		9th Ave	Chicago Ave	CO	1404
14265		IL 64 North Ave	15th Ave	CO	1405
14270		Golf Rd	Narragansett Ave	CO	1406
14275		IL 43 IL 58 Waukegan Rd	Emerson St	CO	1407
14280		IL 43 IL 58 Waukegan Rd	Beckwith Rd	CO	1408
14285		IL 58 Dempster St	Prairie View Dr Park Dr	CO	1409
14290		IL 58 Dempster St	Lehigh Ave	CO	1410
14295		IL 58 Dempster St	Ferris Ave	CO	1411
14300		IL 58 Dempster St	Fernald Ave	CO	1412
14305		IL 58 Dempster St	Austin Ave	CO	1413
14310		IL 58 Dempster St	Menard Ave	CO	1414
14315		IL 58 Dempster St	Central Ave	CO	1415
14325		Oakton St	Austin Ave	CO	1416
14330		Oakton St	Menard Ave	CO	1417
14375		IL 171 Cumberland Ave	Foster Ave	CO	1418
14395		IL 43 Harlem Ave	Cullom Ave	CO	1419
14400		IL 43 Waukegan Rd	Walters Ave	CO	1420
14402		IL 43 Waukegan Rd	Voltz Rd	CO	1421
14430		IL 43 Waukegan Rd	Shermer Rd	CO	1422
14460		Willow Rd	Central South Happ	CO	1423
14465		Willow Rd	Northfield North Happ Rd	CO	1424
14466		Willow Rd	Clarkson Park Churchill	CO	1425
14470		Willow Rd	Wagner Rd	CO	1426
14475		Willow Rd	Sunset Ridge Rd	CO	1427
14480		IL 43 Waukegan Rd	Westleigh Christian Heritage	CO	1428
14485		Winnetka Rd	Hibbard Rd	CO	1429
14715		Palatine Rd	Smith Rd	CO	1430
14720		Palatine Rd	Brockway St	CO	1431
14725		Palatine Rd	Plum Grove Rd	CO	1432
14730		Hicks Rd	First Bank Dr Palatine Mall	CO	1433
14741		IL 62 Algonquin Rd	Carriage Way Essex Way	CO	1434
14744		IL 62 Algonquin Rd	Weber Rd Old Wilke Rd	CO	1435
14750		IL 62 Algonquin Rd	Hammond Dr	CO	1436
14755		IL 62 Algonquin Rd	Motorola E Dr Village Tree	CO	1437
14760		IL 62 Algonquin Rd	Motorola W Dr Plum Grove Rd	CO	1438
14765		IL 62 Algonquin Rd	Thoreau Dr Thorntree Ln	CO	1439
14770		Woodfield Rd	East Frontage I 290	CO	1440
14775		Woodfield Rd	West Frontage Rd I 290	CO	1441
14780		IL 62 Algonquin Rd	Meacham Rd	CO	1442

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14820		Niles Center Rd	Howard St	CO	1443
14835		Touhy Ave	Niles Center Rd Carpenter Rd	CO	1444
14840		Touhy Ave	Laramie Ave	CO	1445
14845		Touhy Ave	Leclaire Ave	CO	1446
14855		US 12 45 Mannheim Rd	Hirsch Ave Soffel Ave	CO	1447
14861		IL 171 Archer Ave	Derby Rd	CO	1448
14863		123rd St McCarthy Rd	Derby Rd	CO	1449
15105		US 12 45 Mannheim Rd	Dorchester Ave Balmoral Ave	CO	1450
15110		IL 38 Roosevelt Rd	Westchester Blvd	CO	1451
15115		Cermak Rd	Mayfair Ave	CO	1452
15120		US 12 20 45 LaGrange Rd	Canterbury St	CO	1453
15320		Gren Bay Rd	Winnetka Ave	CO	1454
20341		Touhy Ave	Lawndale Ave	CO	1455
20345		Touhy Ave	Lincolnwood Town Ctr Ent	CO	1456
20355		Niles Center Rd Carpenter Rd	Village Crossing Ent D	CO	1457
20365		US 6 159th St	91st Ave Park Hill Dr	CO	1458
20366		IL 50 IL 83 Cicero Ave	137th St	CO	1459
20380		US 14 Northwest Hwy	Ela Rd	CO	1460
20385		Barrington Rd	Bender Rd East River Rd	CO	1461
20395		McCormick Blvd	Lincolnwood Town Center	CO	1462
20400		Barrington Rd	St Alexius Ent Hoffman Medical Ent	CO	1463
20402		IL 58 Golf Rd	Hoffman Estates SC	CO	1464
20405		US 45 DesPlaines River Rd	US 45 IL 21 Milwaukee Ave	CO	1465
20435		IL 50 Cicero Ave	24th St	CO	1466
20480		Palatine Rd	Roselle Rd	CO	1467
20490		US 6 159th St	108th St	CO	1468
20491		US 6 159th St	Ravinia Ave	CO	1469
20495		IL 50 Cicero Ave	120th St	CO	1470
20525		IL 171 Archer Ave	Bulldog Dr 57th St	CO	1471
20555		Waukegan Rd	Niles Civic Center Plaza	CO	1472
20560		US 6 Wolf Rd	167th St	CO	1473
20575		US 20 Lake St	Walnut Ave	CO	1474
20590		US 14 Northwest Hwy	First Bank Ent	CO	1475
20605		I 290 Eisenhower Expy West Ramp Entrance	Biesterfield Rd	CO	1476
20610		I 290 Eisenhower Expy East Ramp Exit	Biesterfield Rd	CO	1477
20615		Brainard Ave	Hegewisch Metra Parking Lot	CO	1478
20935		Touhy Ave	Village Crossing SC Ent C	CO	1479
20945		US 45 LaGrange 96th Ave	179th St	CO	1480
20955		US 6 IL 83 Torrence Ave	166th St Fieldcrest Dr	CO	1481
20965		127th St	Kostner Ave	CO	1482
20986		Torrence Ave	Joe Orr Rd	CO	1483
21015		IL 50 Cicero Ave	105th St	CO	1484
21090		Glenwood Dyer Rd	Stony Island Dr	CO	1485



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21100		IL 83 Old McHenry Rd	Lexington Dr	CO	1486
21125		IL 58 Golf Rd	Golf Glen Shopping Center	CO	1487
21130		Barrington Rd	Old Church Rd	CO	1488
21145		Elmhurst Rd	Greenleaf Ave	CO	1489
21150		Elmhurst Rd	Pratt Ave	CO	1490
21175		31st St	Mayfair Ave	CO	1491
21185		IL 83 Torrence Ave	Glenwood Lansing Rd	CO	1492
21200		IL 68 Dundee Rd	Huntington Lane Lake Blvd	CO	1493
21210		Lake Cook Rd	Ela Rd	CO	1494
21220		111th St	Austin Ave	CO	1495
21235		IL 58 Golf Rd	Basswood Rd	CO	1496
21237		IL 58 Golf Rd	Wilkening Rd	CO	1497
21275		Willow Rd	Kraft Food Three Lakes Dr	CO	1498
21280		Barrington Rd	Buttitta Dr Laurie Ln	CO	1499
21285		Barrington Rd	Ramblewood	CO	1500
21290		IL 58 Golf Rd	National Pkwy	CO	1501
21320		IL 72 Higgins Rd	Spring Mill Road	CO	1502
21322		IL 72 Higgins Rd	Grand Canyon Pkwy	CO	1503
21325		IL 43 Harlem Ave	Oak Park Ave	CO	1504
21340		IL 83 Torrence Ave	176th Ave	CO	1505
21355		IL 62 Algonquin Rd	Briarwood Dr	CO	1506
21370		IL 58 Golf Rd	Knollwood Dr	CO	1507
21375		IL 58 Golf Rd	Harmon Blvd	CO	1508
21450		IL 19 Irving Park Rd	Old Salem Rd	CO	1509
21473		IL 171 Archer Ave	131st St	CO	1510
21475		IL 171 Archer Ave	Bell Rd	CO	1511
21510		I 90 NW Tlwy South Ramp	IL 59	CO	1512
21515		IL 43 Harlem Ave	Vollmer Rd	CO	1513
21520		IL 7 143rd St	IL 7 Wolf Rd	CO	1514
21522		IL 7 143rd St	108th St	CO	1515
21523		143rd St	Will Cook Rd	CO	1516
21535		I 90 NW Tlwy	IL 59 North Ramp Poplar Creek Ent	CO	1517
21537		IL 59	Poplar Creek Entrance	CO	1518
21550		IL 68 Dundee Rd	Barrington Middle School	CO	1519
21553		IL 72 Higgins Rd	Prairie Stone Pkwy	CO	1520
21555		IL 72 Higgins Rd	Sears E Ent Trillium Blvd	CO	1521
21557		IL 72 Higgins Rd	Sears W Ent	CO	1522
21560		IL 72 Higgins Rd	Old Sutton Rd Theater Ent	CO	1523
21595		IL 62 Algonquin Rd	Newport Dr	CO	1524
21600		Pfingsten Rd	Glenlake Dr Glenbrook Hospital	CO	1525
21605		US 30 Lincoln Hwy	Ellis St	CO	1526
21650		IL 50 Cicero Ave	71st St Walmart Ent	CO	1527
21709		IL 19 Irving Park Rd	I 390 East Frontage Rd	CO	1528
21710		IL 19 Irving Park Rd	I 390 West Frontage Rd	CO	1529

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21775		Montrose Ave	Neenah Ave	CO	1530
21795		Western Ave	Joe Orr Rd Country Club Dr	CO	1531
21805		Palatine Rd	Chambers Dr Jewel Osco Ent	CO	1532
21845		Main St in Barrington Lakes	Dundee Ave	CO	1533
21850		IL 64 North Ave	Walmart Ent Hillside	CO	1534
21855		IL 43 Waukegan Rd	Overlook Dr Kraft Food Ent	CO	1535
21890		Biesterfield Rd	Beisner Rd	CO	1536
21920		US 6 159th St	Jewel Orland Town Center	CO	1537
21955		IL 72 Higgins Rd	National Pkwy	CO	1538
22035		75th St	Willow Springs Rd	CO	1539
22060		US 45 Lagrange Rd	171st St	CO	1540
22065		22nd St Cermak Rd	14th St	CO	1541
22095		104th Ave	123rd St McCarthy Rd	CO	1542
22120		17th Ave	19th St	CO	1543
22121		17th Ave	23rd St	CO	1544
22150		Devon Ave	Greenwood Ave	CO	1545
22165		25th Ave	Armitage Ave	CO	1546
22195		127th St	State St	CO	1547
22215		US 12 20 45 LaGrange Rd	58th St	CO	1548
22225		IL 58 Golf Rd	Rohrsen Rd	CO	1549
22230		IL 62 Algonquin Rd	Willow Creek Church Dr Willowmere	CO	1550
22235		Arlington Heights Rd	Bennett Rd	CO	1551
22240		IL 62 Algonquin Rd	Penny Rd	CO	1552
22263		IL 43 Harlem Ave	191st St	CO	1553

545		IL 83	3rd Ave	DU	1
550		IL 83	22nd St	DU	2
565		IL 83	63rd St	DU	3
570		IL 83	75th St	DU	4
580		IL 83	Bluff Rd	DU	5
585		IL 83	Central Ave	DU	6
587		IL 83	91st St	DU	7
590		IL 83	Foster Ave	DU	8
595		IL 83	Grove Ave Sherwood Dr	DU	9
600		IL 83	Hillside Dr	DU	10
605		IL 83	Elmhurst SC Kmart	DU	11
610		IL 83	Mark St	DU	12
615		IL 83	Midway Dr	DU	13
620		IL 83	Hodges Rd Oakbrook Ct	DU	14
625		IL 83	16th St	DU	15
630		IL 83	Chicago Elmhurst Stone	DU	16
635		IL 83	Plainfield Rd	DU	17
637		IL 83	72nd Ct	DU	18
640		IL 83	Riverside Dr	DU	19

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645		IL 83	St. Charles Rd	DU	20
650		IL 83	Thorndale Ave	DU	21
888		IL 53 Rohlwing Rd	I 390 Tlwy WB Frontage N Ramp	DU	22
889		IL 53 Rohlwing Rd	I 390 Tlwy EB Frontage S Ramp	DU	23
982		Highland	East Gate	DU	24
990		IL 53 Rohlwing Rd	Nordic Rd	DU	25
992		IL 53 Rohlwing Rd	Spring Lake Dr	DU	26
995		IL 53 Rohlwing Rd	Ardmore Ave	DU	27
1989		IL 19 Irving Park Rd	South Access Rd	DU	28
4595		US 20 Lake St	Fairfield Ct	DU	29
4600		US 20 Lake St	Bloomington Rd	DU	30
4605		US 20 Lake St	Circle Ave	DU	31
4610		US 20 Lake St	Springbrook Center	DU	32
4670		IL 59	Stearns Rd	DU	33
5975		I 55 Stev North Frontage Rd	Cass Ave	DU	34
5985		I 290 Ramps K & O	US 20 Lake St	DU	35
5990		I 290 Eisenhower Expy	York Rd N Rmp Winthrop	DU	36
5995		I 290 Eisenhower Expy	US 20 York Rd S Ramp Lake St	DU	37
6000		I 290 E Ramp	Thorndale Ave	DU	38
6005		I 290 W Ramp	Thorndale Ave	DU	39
6015		US 20 Lake St	IL 83 W Ramps K & M	DU	40
6020		US 20 Lake St	Addison Rd	DU	41
6025		US 20 Lake St	Church St	DU	42
6030		US 20 Lake St	Gary Ave	DU	43
6035		US 20 Lake St	Glen Ellyn Rd	DU	44
6037		US 20 Lake St	Euclid Ave Lake View Dr	DU	45
6040		US 20 Lake St	IL 83 Grand E Ramps J & L	DU	46
6043		US 20 Lake St	Greenbriar Dr	DU	47
6045		US 20 Lake St	Medinah Rd	DU	48
6046		US 34 Ogden Ave	Commons Dr	DU	49
6047		US 34 Ogden Ave	75th St	DU	50
6048		US 34 Ogden Ave	Long Grove Rd	DU	51
6049		US 34 Ogden Ave	Eola Rd	DU	52
6050		US 34 Ogden Ave	Montgomery Rd	DU	53
6051		US 34 Ogden Ave	Frontenac Rd	DU	54
6060		US 20 Lake St	IL 53 Rohlwing Rd	DU	55
6061		IL 53 Rohlwing Rd	Mall Ent	DU	56
6062		IL 53 Rohlwing Rd	Woodland Ave	DU	57
6065		US 20 Lake St	Springfield Dr	DU	58
6070		US 20 Lake St	Villa Ave Wood Dale Rd	DU	59
6075		US 20 Lake St	Walnut St	DU	60
6080		US 20 Lake St	West Ave	DU	61
6085		US 20 Lake St	Rosedale Ave	DU	62
6089		IL 59	McCoy Fox River Commons	DU	63

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6090		IL 59	US 34 Ogden Ave	DU	64
6092		IL 59	87th St White Eagle Dr	DU	65
6095		US 34 Ogden Ave	Cass Ave	DU	66
6100		US 34 Ogden Ave	Pasquinelli Dr Middaugh Dr	DU	67
6110		US 34 Ogden Ave	IL 83 West Ramps A & B	DU	68
6115		US 34 Ogden Ave	IL 83 East Ramps C & D	DU	69
6116		US 34 Ogden Ave	Salt Creek Ln Oak St	DU	70
6118		US 34 Ogden Ave	York Rd	DU	71
6120		US 34 Ogden Ave	Cross St	DU	72
6125		US 34 Ogden Ave	Belmont Rd Finley Rd	DU	73
6130		US 34 Ogden Ave	Madison St	DU	74
6135		US 34 Ogden Ave	Oakwood Rd	DU	75
6140		IL 19 Irving Park Rd	Marshall Rd	DU	76
6145		IL 19 Irving Park Rd	Medinah Rd	DU	77
6155		IL 19 Irving Park Rd	IL 53 Rohlwing Rd	DU	78
6156		IL 53 Rohlwing Rd	Bryn Mawer Ave	DU	79
6157		IL 53 Rohlwing Rd	West Thorndale Ave	DU	80
6158		IL 53 Rohlwing Rd	Norwood Ave	DU	81
6160		IL 19 Irving Park Rd	Spruce Ave	DU	82
6163		IL 19 Irving Park Rd	Catalpa Ave	DU	83
6164		IL 19 Irving Park Rd	Bloomington Rd	DU	84
6165		IL 19 Irving Park Rd	Walnut St	DU	85
6170		IL 19 Irving Park Rd	Prospect Ave	DU	86
6175		IL 38 Roosevelt Rd	Fabyan Pkwy Washington St	DU	87
6180		IL 38 Roosevelt Rd	Joliet Rd	DU	88
6185		IL 38 Roosevelt Rd	Kress Rd	DU	89
6190		IL 38 Roosevelt Rd	Meyers Rd	DU	90
6195		IL 38 Roosevelt Rd	Summit Ave	DU	91
6200		IL 38 Roosevelt Rd	Winfield Rd	DU	92
6205		IL 38 Roosevelt Rd	IL 59 N Ramp Dayton Ave	DU	93
6206		IL 38 Roosevelt Rd	IL 59 S Ramp	DU	94
6210		IL 38 Roosevelt Rd	Courtyard Shpping Center	DU	95
6215		IL 53	IL 64 North Ave	DU	96
6220		IL 53	75th St	DU	97
6225		IL 53	Hobson Rd	DU	98
6230		IL 53	Park Ave	DU	99
6237		IL 53 Columbine Ave	Madison St	DU	100
6240		IL 53	Summerhill Dr Bell Tech Ent	DU	101
6245		IL 53	83rd St	DU	102
6250		IL 53	59th St Four Lakes Ent	DU	103
6255		IL 53	Woodridge Dr Seven Bridges Ent	DU	104
6256		IL 53	High Trail Seven Bridges Ent	DU	105
6260		IL 56 Butterfield Rd	IL 59	DU	106
6265		IL 56 Butterfield Rd	22nd St	DU	107

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6270		IL 56 Butterfield Rd	Batavia Rd	DU	108
6275		IL 56 Butterfield Rd	Finley Rd	DU	109
6290		IL 56 Butterfield Rd	Lambert Ave	DU	110
6293		IL 56 Butterfield Rd	Fountain Squarte Rd	DU	111
6295		IL 56 Butterfield Rd	Meyers Rd	DU	112
6300		IL 56 Butterfield Rd	Midwest Rd Summit Ave	DU	113
6305		IL 56 Butterfield Rd	Park Blvd	DU	114
6310		IL 56 Butterfield Rd	Fairfield Ave	DU	115
6315		IL 56 Butterfield Rd	Naperville Rd	DU	116
6320		IL 56 Butterfield Rd	Winfield Rd	DU	117
6325		IL 56 Butterfield Rd	Eola Rd	DU	118
6330		IL 56 Butterfield Rd	Herrick Rd Weisbrook Rd	DU	119
6335		IL 56 Butterfield Rd	Orchard Rd	DU	120
6340		IL 56 Butterfield Rd	Glenbard South High School	DU	121
6345		IL 56 Butterfield Rd	Trans Am Plaza	DU	122
6350		IL 56 Butterfield Rd	Woodcreek Dr Lloyd Ave	DU	123
6352		IL 56 Butterfield Rd	Home Depot Ent Esplanade Ent	DU	124
6355		IL 64 North Ave	IL 59	DU	125
6360		IL 59	75th St	DU	126
6362		IL 59	Beebe Dr Costco Ent	DU	127
6365		IL 59	Army Trail Rd	DU	128
6370		IL 59	Batavia Rd	DU	129
6377		IL 59	Struckman Blvd	DU	130
6378		IL 59	Apple Valley Dr Home Depot Ent	DU	131
6379		IL 59	Woodland Hills Pkwy	DU	132
6380		IL 59	North Aurora Rd	DU	133
6390		IL 59	Forest Blvd	DU	134
6395		IL 59	Continental Dr Meadow Dr	DU	135
6400		IL 64 North Ave	IL 83	DU	136
6405		IL 64 North Ave	Addison Rd	DU	137
6410		IL 64 North Ave	Ardmore Ave	DU	138
6415		IL 64 North Ave	Berteau Ave	DU	139
6420		IL 64 North Ave	Bloomington Rd	DU	140
6425		IL 64 North Ave	County Farm Rd	DU	141
6430		IL 64 North Ave	Emroy Ave Melrose Ave	DU	142
6435		IL 64 North Ave	Gary Ave	DU	143
6440		IL 64 North Ave	Grace St	DU	144
6445		IL 64 North Ave	Kuhn Rd	DU	145
6446		IL 64 North Ave	Bennett Dr	DU	146
6450		IL 64 North Ave	Glen Ellyn Rd Main St	DU	147
6455		IL 64 North Ave	Main St ( in Lombard )	DU	148
6456		IL 64 North Ave	Lombard Rd	DU	149
6460		IL 64 North Ave	Myrtle Ave	DU	150
6465		IL 64 North Ave	Schmale Rd	DU	151

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6470		IL 64 North Ave	Michigan Ave North Park Mall Ent	DU	152
6475		IL 64 North Ave	Swift Rd	DU	153
6480		IL 64 North Ave	Villa Ave	DU	154
6490		IL 64 North Ave	West St	DU	155
6495		IL 64 North Ave	Westwood Ave	DU	156
6500		IL 64 North Ave	York Rd	DU	157
6505		IL 64 North Ave	Elmhurst Plaza	DU	158
7695		US 20 Lake St	Bear Flag Dr	DU	159
7800		IL 56 Butterfield Rd	Macarthur Dr	DU	160
7830		IL 53	Maple Ave	DU	161
7835		IL 53	IL 56 Butterfield Rd	DU	162
7850		IL 53 Rohlwing Rd	Army Trail Rd	DU	163
7851		IL 53 Rohlwing Rd	Mitchel Ct	DU	164
7855		US 34 Ogden Ave	Main St in Lisle	DU	165
7870		US 20 Lake St	Bartels Rd Arlington Rd	DU	166
7875		US 20 Lake St	Bryn Mawr Ave	DU	167
8225		IL 38 Roosevelt Rd	County Farm Rd	DU	168
8325		15th St	Highland Blvd	DU	169
8370		US 34 Ogden Ave	Fairview Ave	DU	170
8375		22nd St	Midwest Rd Summit Ave	DU	171
8377		22nd St	Shops of Oak Brook	DU	172
8830		US 34 Ogden Ave	Washington St	DU	173
8850		IL 59	James St	DU	174
8853		IL 59	Hawthorn Ln	DU	175
8855		IL 59	Washington St	DU	176
8860		IL 59	Main St ( in West Chicago )	DU	177
8970		IL 53	22nd St	DU	178
9022		IL 38 Roosevelt Rd	Kautz Rd	DU	179
9035		IL 19 Irving Park Rd	Roselle Rd	DU	180
9037		IL 19 Irving Park Rd	Lawerence Ave	DU	181
9040		IL 19 Irving Park Rd	Park St	DU	182
9100		IL 19 Irving Park Rd	Maple Ave	DU	183
9450		IL 59	Diehl Rd	DU	184
9455		IL 59	Bruce Ln Brookdale Rd	DU	185
9472		IL 59 North & South Ramps	I 88 Tlwy	DU	186
10910		US 34 Ogden Ave	Warwick Shopping Center Ent	DU	187
11083		IL 59	Duke Pkwy	DU	188
11085		IL 59	Ferry Rd	DU	189
11105		US 20 Lake St	Swift Rd	DU	190
11125		Madison St	Joliet Rd I 55 Frontage Rd	DU	191
11180		IL 38 Roosevelt Rd	Fairfield Ave	DU	192
11390		IL 64 North Ave	Menards Glendale Square	DU	193
11410		IL 56 Butterfield Rd	Downers Dr	DU	194
11415		IL 38 Roosevelt Rd	Lombard Shop Ctr	DU	195

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11420		US 34 Ogden Ave	Saratoga Ave	DU	196
11425		US 34 Ogden Ave	Main St ( in Downers Grove )	DU	197
11655		IL 53	Main St ( in Lisle )	DU	198
11660		IL 53	Short St	DU	199
11662		IL 53	I 88 North Ramp	DU	200
11665		IL 53	Warrenville Rd	DU	201
11670		IL 53	Burlington Ave	DU	202
11675		US 34 Ogden Ave	Blackhawk Dr	DU	203
11680		US 34 Ogden Ave	IL 53 North Ramp	DU	204
11685		US 34 Ogden Ave	IL 53 South Ramp	DU	205
11825		US 34 Ogden Ave	Swartz Ave	DU	206
11830		US 34 Ogden Ave	Yackley Rd	DU	207
11835		US 34 Ogden Ave	Indiana Ave Western Ave	DU	208
11840		US 34 Ogden Ave	Old Tavern Rd	DU	209
11970		IL 59	83rd St Montgomery Rd	DU	210
12020		IL 59	Joliet Rd	DU	211
12021		IL 59	Mack Rd	DU	212
12045		IL 19 Irving Park Rd	York Rd	DU	213
12065		IL 19 Irving Park Rd	Church Rd	DU	214
12140		IL 59	Liberty St Jefferson	DU	215
12215		IL 83	67th St	DU	216
12250		IL 64 North Ave	I 355 NS Tlwy E Rmp	DU	217
12255		IL 64 North Ave	I 355 NS Tlwy W Rmp	DU	218
12310		IL 59	Aurora Marketplace Audrey	DU	219
12320		IL 38 Roosevelt Rd	Finley Rd	DU	220
12325		IL 38 Roosevelt Rd	Main St ( in Lombard )	DU	221
12335		US 20 Lake St	I 355 N S Tlwy E Ramp	DU	222
12340		US 20 Lake St	I 355 N S Tlwy W Ramp	DU	223
12360		US 34 Ogden Ave	Trade St Aurora Marketplace	DU	224
12373		IL 64 North Ave	Atlantic Dr	DU	225
12375		IL 64 North Ave	Prince Crossing Rd	DU	226
12376		IL 64 North Ave	Fair Oaks Rd	DU	227
12420		US 34 Ogden Ave	I 355 N S Tlwy E Ramp	DU	228
12421		US 34 Ogden Ave	I 355 N S Tlwy W Ramp	DU	229
12424		IL 38 Roosevelt Rd	Baker Hill Dr	DU	230
12425		IL 38 Roosevelt Rd	I 355 N S Tlwy E Ramp	DU	231
12426		IL 38 Roosevelt Rd	I 355 N S Tlwy W Ramp	DU	232
12500		US 20 Lake St	Itasca Rd	DU	233
12505		US 20 Lake St	Lombard Ave	DU	234
12510		US 20 Lake St	Mill Rd	DU	235
12513		US 20 Lake St	Marcus Dr	DU	236
12515		US 20 Lake St	Kennedy Dr	DU	237
12520		IL 53 Rohlwing Rd	Fullerton Ave	DU	238
13770		US 20 Lake St	Greenbrook Blvd	DU	239

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14062		IL 38 Roosevelt Rd	Mariano Ent	DU	240
14065		IL 38 Roosevelt Rd	Highland Ave	DU	241
14491		22nd St Cermak Rd	Oak Brook Center East	DU	242
14492		22nd St Cermak Rd	Oak Brook Center West	DU	243
14493		22nd St Cermak Rd	Spring Rd	DU	244
14494		22nd St Cermak Rd	McDonald Drive	DU	245
14495		22nd St Cermak Rd	York Rd	DU	246
14496		22nd St Cermak Rd	Jorie Blvd	DU	247
14497		22nd St Cermak Rd	Windsor Dr	DU	248
15090		IL 19 Irving Park Rd	Addison Rd	DU	249
15100		IL 19 Irving Park Rd	Wooddale Rd	DU	250
15175		IL 56 Butterfield Rd	Bradford Dr	DU	251
15178		IL 56 Butterfield Rd	Leask Lane	DU	252
15230		IL 38 Roosevelt Rd	Lorraine Rd	DU	253
15235		IL 38 Roosevelt Rd	President St	DU	254
15240		IL 38 Roosevelt Rd	Naperville Rd	DU	255
15245		IL 38 Roosevelt Rd	Main in Wheaton	DU	256
15250		IL 38 Roosevelt Rd	West St Warrenville Rd	DU	257
15255		IL 38 Roosevelt Rd	Carleton Ave	DU	258
15260		IL 38 Roosevelt Rd	Adare Dr Saddle Rd	DU	259
15261		IL 38 Roosevelt Rd	Marian Joy Ent	DU	260
15305		IL 38 Roosevelt Rd	Villa Oaks Dr	DU	261
15310		IL 38 Roosevelt Rd	Ardmore Ave	DU	262
15315		IL 64 North Ave	Westmore Rd	DU	263
20330		IL 53	DuPage Blvd Baker Hill Dr	DU	264
20335		IL 53	Pershing Ave	DU	265
20360		IL 59	Meridian Pkwy Glacier Prky	DU	266
20370		IL 56 Butterfield Rd	Cromwell Dr	DU	267
20620		IL 59	New York Aurora Ave	DU	268
20625		IL 56 Butterfield Rd	I 355 N S Tlwy E Ramp	DU	269
20630		IL 56 Butterfield Rd	I 355 N S Tlwy W Ramp	DU	270
20631		IL 38 Roosevelt Rd	Nicoll Way	DU	271
20632		IL 38 Roosevelt Rd	Park Blvd	DU	272
20634		IL 38 Roosevelt Rd	Lambert Rd	DU	273
20635		IL 59	Fox Valley CSC N Ent	DU	274
20660		IL 56 Butterfield Rd	East Loop Dr	DU	275
20910		US 34 Ogden Ave	Fox River Commons SC Ent	DU	276
21030		22nd St	McArthur Dr Costco Ent	DU	277
21035		22nd St	Parkview Dr	DU	278
21139		IL 59	Westridge Ct Meijer Ent	DU	279
21250		IL 38 Roosevelt Rd	Blanchard St	DU	280
21255		IL 38 Roosevelt Rd	Main Glen Ellyn	DU	281
21395		IL 64 North Ave	President St Fireside Dr	DU	282
21505		IL 53	Sheehan Ave	DU	283



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21700		US 34 Ogden Ave	Chelsea Ave US Post Office	DU	284
21830		US 34 Ogden Ave	Downers Plaza KMart	DU	285
21870		IL 56 Butterfield Rd	Maxant Dr WasteManagement Tech	DU	286
21910		US 20 Lake St	Elgin O'Hare	DU	287
21930		Aurora Rd	Westridge Ct Naper W Plaza	DU	288
22025		US 20 Lake St	Rodenburg Rd	DU	289
22110		IL 59	Ingaltton Ave	DU	290
22115		IL 59	Diversey Prkwy	DU	291
22125		IL 59	Schick Rd	DU	292
22135		IL 53 Rohlwing Rd	Sidney Ave	DU	293

196		IL 38	IL 47	KA	1
197		IL 47	IL 64	KA	2
198		IL 38	Meredith PL	KA	3
665		IL 25 Dundee	I 90 Tlwy	KA	4
670		IL 25	Villa Ave	KA	5
675		US 20	IL 31 US 20 Bypass	KA	6
677		US 20	Nesler Rd	KA	7
682		US 20	McLean Blvd	KA	8
693		US 20	Plank Rd Coombs Rd	KA	9
700		US 30 Baseline Rd	US 30 IL 47	KA	10
703		IL 47	Keslinger Rd	KA	11
710		US 30	IL 31 South Ramp	KA	12
725		US 30	Jericho Rd	KA	13
727		US 30	Griffin Dr	KA	14
728		US 30	Gordon Rd	KA	15
730		US 30	Orchard Rd	KA	16
735		IL 31	I 88 IL 56 EW Tlwy	KA	17
737		IL 31	Oak St	KA	18
740		IL 19	IL 25	KA	19
745		IL 25 River Rd	IL 58 Summit St	KA	20
750		IL 25 River Rd	IL 25 Wilson Ave	KA	21
755		IL 38	IL 25	KA	22
760		IL 25	IL 62 Algonquin Rd	KA	23
765		IL 25	IL 68 Dundee Rd	KA	24
770		IL 25	IL 72 Higgins Rd	KA	25
775		IL 25	Brandt Dr	KA	26
776		US 20 IL 72 South Intersection	IL 47	KA	27
777		US 20 IL 72 North Intersection	IL 47	KA	28
785		IL 25 Washington St	Wilson Ave	KA	29
793		IL 25 Broadway	Sullivan	KA	30
795		IL 31	Third St	KA	31
805		IL 38	IL 31	KA	32
810		IL 31 State	Tollgate Rd Airport Rd	KA	33

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814		IL 25 Broadway	Illinois St	KA	34
815		IL 31	Big Timber Rd	KA	35
820		IL 31 State	West River Davis	KA	36
830		IL 31	Middle St	KA	37
833		IL 31	Watkins US 30 North Ramp	KA	38
835		IL 31	Webster St Aucutt Rd	KA	39
845		IL 38	Eastside Ave	KA	40
854		IL 31 La Fox Rd	Bowes Rd	KA	41
856		IL 38	Bricher Rd 14th St	KA	42
857		IL 38	Peck Rd	KA	43
858		IL 38	Williamsburg Ave	KA	44
859		IL 38	La Fox Rd	KA	45
860		US 30	Cross St	KA	46
861		US 30	Municipal Drive	KA	47
862		US 30	Dugan Rd	KA	48
865		IL 47	Galena Blvd	KA	49
868		IL 47	Bliss Rd Wheeler Rd	KA	50
869		IL 47	Waubonsee Dr	KA	51
870		IL 64 Main St ( in St Charles )	Kirk Rd	KA	52
871		IL 47	Waubonsee Dr Old Oaks North Entrance	KA	53
872		IL 56	Galena Blvd East Ramp	KA	54
873		IL 56	Galena Blvd West Ramp	KA	55
877		IL 64 Main St ( in St Charles )	Peck Rd	KA	56
878		IL 64 North Ave	Burlington Rd	KA	57
880		IL 68 Penny Rd	IL 72 Higgins Rd	KA	58
883		IL 68 Dundee Rd	Golfview Ln	KA	59
885		IL 72 Main St ( in East Dundee )	River St	KA	60
890		IL 72 Main St ( in West Dundee )	Van Buren St	KA	61
895		IL 72 Main St ( in West Dundee )	1st St	KA	62
900		IL 72 Main St ( in West Dundee )	2nd St	KA	63
902		IL 72 Higgins Rd	Reinking Rd	KA	64
905		IL 72 Main St ( in East Dundee )	Rock Rd	KA	65
1000		IL 31	IL 72	KA	66
4305		IL 25	Golfview Ln	KA	67
4310		IL 25	King Rd	KA	68
4315		IL 25	Besinger Dr	KA	69
4320		IL 25	Helm Rd	KA	70
4325		IL 25	Robin Rd	KA	71
4330		IL 31	Chicago Rawhide Driveway	KA	72
4390		IL 25	Lake Marion Rd	KA	73
4457		IL 25	West Bartlett Rd	KA	74
4458		IL 25	Kenyon Rd	KA	75
4640		IL 31	Main St in Batavia	KA	76

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4642		IL 31	Mooseheart Rd	KA	77
4645		IL 31	Wilson Ave	KA	78
6052		US 34 Ogden Ave	Copley Hospital Entrance	KA	79
6053		US 34 Ogden Ave	Ridge Rd Waterford Dr	KA	80
7324		IL 47	Huntley Crossing	KA	81
7328		IL 47	Regency Prkwy	KA	82
7331		IL 47	Freeman Rd	KA	83
7332		IL 47	Del Webb Ent	KA	84
7333		IL 47	Plank Rd	KA	85
7336		IL 47 North Ramp	I 90	KA	86
7337		IL 47 South Ramp	I 90	KA	87
7339		IL 47	Big Timber Rd	KA	88
8975		IL 31	Illinois St	KA	89
8980		IL 64 Main St ( in St Charles )	Dunham Rd	KA	90
8990		IL 25	IL 64 North Ave	KA	91
8992		IL 64 Main St ( in St Charles )	Oak St	KA	92
8995		IL 25	Illinois St	KA	93
9000		IL 64 Main St ( in St Charles )	Tyler Rd	KA	94
9010		IL 64 Main St ( in St Charles )	IL 31 West 2nd Ave	KA	95
9015		IL 64 Main St ( in St Charles )	West 3rd St	KA	96
9016		IL 64 Main St ( in St Charles )	7th St	KA	97
9017		IL 64 Main St ( in St Charles )	15th St	KA	98
9020		IL 64 Main St ( in St Charles )	7th Ave	KA	99
9023		IL 64 North Ave	Kautz Rd Smith Rd	KA	100
9024		IL 64 Main St ( in St Charles )	Pheasant Run Ent	KA	101
9047		IL 38	Meijer Ent	KA	102
9065		IL 64 Main St ( in St Charles )	1st Ave	KA	103
9070		IL 64 Main St ( in St Charles )	1st Street	KA	104
9700		IL 31	Knell Rd	KA	105
10945		IL 38	Glen Gary Dr	KA	106
10950		IL 38	3rd St	KA	107
10952		IL 38	7th St	KA	108
10955		IL 38	Anderson Blvd	KA	109
11481		IL 31	Lovedale Ln	KA	110
11482		IL 31	Airport Rd	KA	111
11483		IL 31	IL 56 State St	KA	112
11484		IL 56	Hart Rd Mitchell Rd	KA	113
11485		IL 56	Kirk Rd	KA	114
11486		IL 56 Butterfield Rd	Church St	KA	115
11488		IL 56 Butterfield Rd	Raddant Rd	KA	116
11975		IL 25	IL 56	KA	117
11978		IL 25 Broadway	Indian Trail	KA	118
12091		IL 25 Dunham	IL 25 Stearns	KA	119
12092		IL 25 Stearns	Gilbert St	KA	120

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12093		IL 25 Stearns	Stearns Rd	KA	121
12094		IL 31	McLean Blvd	KA	122
13404		IL 72	Tyrrell Rd	KA	123
13412		IL 72 Higgins Rd	Big Timber Rd	KA	124
13414		IL 72 Gilberts Rd Higgins Rd	Galvin Dr	KA	125
14865		IL 72	Locust Dr	KA	126
14867		IL 72	Tartans Dr	KA	127
14875		IL 72 Main St	5th St	KA	128
14880		IL 31	Hillside St	KA	129
14885		IL 31	Spruce Dr Aldi Ent	KA	130
14890		IL 31	Huntley Rd	KA	131
14895		Huntley Rd	Elm St	KA	132
14900		IL 31	Willow Rd Strom Dr	KA	133
20323		IL 31	Silver Glen Rd	KA	134
20373		IL 31	Red Gate Rd	KA	135
20390		IL 38	St Charles Mall	KA	136
20396		IL 31	Kane St	KA	137
21630		IL 31	Boncosky Rd	KA	138
21745		IL 64 Main St	38th St Charlestown Mall East Ent	KA	139
21746		IL 64 North Ave	Charlestown Center W Dr	KA	140
21747		IL 64 Main St	Foxfield Commons Lakeside Dr	KA	141
21768		IL 72	Sleepy Hollow Rd Carrington Dr	KA	142
21935		IL 31	Prairie St	KA	143
21972		I 90 NW Tlwy	US 20	KA	144
21996		IL 25	Country Club Rd	KA	145
21997		IL 25	Red Gate Rd	KA	146
22305		IL 72	Village Quarter Rd	KA	147

695		US 20	US 34 Ogden Ave	KE	1
696		US 34 Ogden Ave	Hill Ave	KE	2
698		US 34 Ogden Ave	Hafenrichter Rd Farnsworth Rd	KE	3
715		US 30	Briarcliff Rd	KE	4
720		US 30	Douglas Rd	KE	5
722		US 30	5th St	KE	6
731		US 30	Goodwin Dr	KE	7
732		Hill Ave	Goodwin Dr	KE	8
733		US 30 US 34	Commercial Drive Menards	KE	9
837		IL 31	Caterpillar Entrance	KE	10
21390		US 30	Wolf Crossing Rd	KE	11

557		IL 134	Wilson Rd	LA	1
558		US 12 IL 59	Hartigan Home Depot	LA	2
559		US 12 IL 59	IL 134	LA	3
717		IL 59	Monaville Rd W	LA	4

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925		IL 176	I 94 Tri State Tlwy W Ramp	LA	5
930		IL 176	I 94 Tri State Tlwy E Ramp Lamb	LA	6
935		IL 137 Buckley Rd	I 94 West Ramp	LA	7
936		IL 137 Buckley Rd	I 94 East Ramp	LA	8
940		US 12	IL 22	LA	9
941		IL 22	Village Square	LA	10
945		US 12	Grand Ave	LA	11
950		US 12	Old Rand Rd North	LA	12
955		US 12	Quentin Rd	LA	13
957		US 12	Quentin Rd Collection	LA	14
960		US 12	Ronney Lake Shore Dr	LA	15
965		US 12	Long Grove Rd	LA	16
966		IL 53	Long Grove Rd	LA	17
967		US 12	Old Rand Rd South	LA	18
969		US 12	Deer Park Rd	LA	19
975		US 12	Cuba Rd	LA	20
2367		IL 43 Waukegan Rd	Oakmont Ave	LA	21
4685		US 14 Northwest Hwy	Berry Rd	LA	22
4690		US 14 Northwest Hwy	Western Ave Chicago Aerial Industries	LA	23
4700		US 14 Northwest Hwy	Hart Rd	LA	24
4705		IL 83 Main St ( in Antioch )	Lake St	LA	25
4710		IL 83 Main St ( in Antioch )	North Ave	LA	26
4712		IL 83 Main St ( in Antioch )	Orchard St	LA	27
6510		US 12 IL 59	IL 120	LA	28
6511		US 12 IL 59	Old Belvedere Rd Volo Village	LA	29
6512		US 12 IL 59	Sullivan Lake Rd Molidor	LA	30
6515		US 12 IL 59 East Ramp	IL 176	LA	31
6516		US 12 IL 59 West Ramp	IL 176	LA	32
6517		IL 176	Wauconda Crossing	LA	33
6520		US 12 IL 59	Bonner Rd	LA	34
6525		US 14 Northwest Hwy	IL 59 Hough Rd	LA	35
6530		US 14 Northwest Hwy	Kelsey Rd	LA	36
6531		IL 22	Kelsey Rd	LA	37
6532		US 14 Northwest Hwy	Pepper Rd	LA	38
6535		US 41	IL 21 Milwaukee Ave	LA	39
6540		US 41	IL 22 Half Day Rd	LA	40
6543		IL 22	US 41 North Ramp	LA	41
6545		US 41 Skokie Hwy	IL 60 Kennedy Rd	LA	42
6550		US 41	IL 132 Grand Ave	LA	43
6551		IL 132 Grand Ave	1st St	LA	44
6555		US 41	IL 137	LA	45
6560		US 41	IL 173	LA	46
6565		US 41	22nd St	LA	47

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6567		US 41	Amhurst Pkwy	LA	48
6568		IL 173	I 94 Off Ramp	LA	49
6569		IL 173	I 94 On Ramp	LA	50
6570		US 41 Skokie Hwy	Delaney Rd	LA	51
6575		US 41	Old Elm Rd	LA	52
6580		US 41	Wadsworth Rd	LA	53
6585		US 41	Westleigh Rd	LA	54
6590		US 41	West Park Ave	LA	55
6594		US 45 IL 21 Milwaukee Ave	Old Half Day Rd	LA	56
6595		US 45 IL 21 Milwaukee Ave	US 45 Old Half Day Rd	LA	57
6598		US 45	Port Clinton Rd	LA	58
6600		US 45 IL 21 Milwaukee Ave	IL 22	LA	59
6605		US 45	IL 60	LA	60
6610		US 45	IL 83	LA	61
6615		US 45	IL 132 Grand Ave	LA	62
6617		US 45	Sand Lake Rd	LA	63
6618		US 45	Dada Dr Grant Ave	LA	64
6620		US 45	IL 173	LA	65
6622		IL 173 Rosecreans Rd	Gregory Dr	LA	66
6625		US 45	IL 176	LA	67
6630		US 45 IL 21 Milwaukee Ave	Aptakistic Rd	LA	68
6635		US 45	Brae Loch Rd	LA	69
6640		US 45	Butterfield Rd	LA	70
6641		US 45	Oakwood Rd	LA	71
6645		US 45	Center Rd	LA	72
6650		US 45 IL 21 Milwaukee Ave	Deerfield Rd	LA	73
6655		US 45	Deerpath Rd	LA	74
6657		US 45	Commuter Lot Ranney Ave	LA	75
6658		US 45	Buffalo Grove Rd Fairway Dr	LA	76
6660		US 45 IL 21 Milwaukee Ave	Inverrary Rd	LA	77
6665		US 45 IL 21 Milwaukee Ave	Knightsbridge Pkwy	LA	78
6675		US 45	Peterson Rd	LA	79
6680		US 45 IL 21 Milwaukee Ave	Busch Parkway	LA	80
6685		US 45	Washington St	LA	81
6695		US 45 IL 21 Milwaukee Ave	Marriott Lincolnshire Ent	LA	82
6698		US 45 IL 21 Milwaukee Ave	Audobon Way	LA	83
6700		IL 21 Milwaukee Ave	IL 60	LA	84
6705		IL 21 Milwaukee Ave	IL 132 Grand Ave	LA	85
6708		IL 21 Milwaukee Ave	Casey Rd	LA	86
6710		IL 21 Milwaukee Ave	IL 137	LA	87
6715		IL 21 Milwaukee Ave	IL 176	LA	88
6718		IL 21 Milwaukee Ave	North Hollister Dr	LA	89
6720		IL 21 Milwaukee Ave	Hawthorn Center Drive 6	LA	90
6725		IL 21 Milwaukee Ave	Hawthorn Center Drive 7	LA	91

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6730		IL 21 Milwaukee Ave	Washington St	LA	92
6732		IL 21 Milwaukee Ave	Six Flags Riverside Dr Great America	LA	93
6735		IL 22	IL 43	LA	94
6740		IL 22	IL 59	LA	95
6742		IL 22	Old Barrington Rd	LA	96
6745		IL 22	IL 83	LA	97
6750		Main St	Midlothian Church In Lake Zurich	LA	98
6751		IL 22	Buesching Rd	LA	99
6753		Midlothian Rd	Oakwood Rd	LA	100
6757		IL 22	Old Rand Rd	LA	101
6758		IL 22	East Main St	LA	102
6759		IL 22	West Main St	LA	103
6760		IL 22	Port Clinton Rd Old Half Day Rd	LA	104
6765		IL 22	Quentin Rd	LA	105
6767		IL 22	Kemper Insurance Ent	LA	106
6770		IL 22	Riverwoods Rd Bradley Rd	LA	107
6775		IL 22	Ela Rd	LA	108
6780		IL 22	Barclay Blvd	LA	109
6785		IL 22	Old Mill Grove Rd Oakwood Rd	LA	110
6790		IL 22	Westminster Way Hewitt Dr	LA	111
6795		IL 43 Waukegan Rd	IL 60	LA	112
6800		IL 43 Waukegan Rd	IL 137 Buckley Rd	LA	113
6805		IL 43 Waukegan Rd	IL 176	LA	114
6806		IL 43 Waukegan Rd	Westmoreland Dr Middle Fork	LA	115
6810		IL 43 Waukegan Rd	22nd St Martin L King Dr	LA	116
6815		IL 43 Waukegan Rd	Abbott Labs Gate 1	LA	117
6820		IL 43 Waukegan Rd	Abbott Labs Gate 2	LA	118
6830		IL 43 Waukegan Rd	Foster Ave	LA	119
6835		IL 53	IL 83	LA	120
6837		IL 83	Robert Parker Coffin Rd	LA	121
6838		IL 53	Menards Ent	LA	122
6839		IL 53	Old McHenry Rd	LA	123
6840		IL 59	IL 132	LA	124
6843		IL 173	Tiffany Rd	LA	125
6845		IL 59	IL 173	LA	126
6847		IL 173	Walmart Ent	LA	127
6850		IL 59	Grand Ave Washington St	LA	128
6855		IL 59	Grass Lake Rd	LA	129
6857		IL 59	Beach Grove Rd	LA	130
6860		IL 59	Miller Rd	LA	131
6865		IL 60	Butterfield Rd	LA	132
6870		IL 60	Deerpath Rd	LA	133
6875		IL 60	Lakeview Pkwy Hawthorn Ct	LA	134

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6880		IL 60	Hawthorn Center Drive 3	LA	135
6885		IL 60	Hawthorn Center Drive 4	LA	136
6890		IL 60	Hawthorn Center Drive 5	LA	137
6895		IL 60	St Mary's Rd	LA	138
6900		IL 60	Aspen Dr	LA	139
6905		IL 60	Oak Creek Plaza	LA	140
6906		IL 120 Belvedere Rd	Cedar Lake Rd	LA	141
6908		IL 60	Cedar Lake Rd	LA	142
6909		IL 60	Peterson Rd	LA	143
6910		IL 60 IL 83	Schanck Ave North Junction	LA	144
6911		IL 60	Connector	LA	145
6912		IL 60	Fairfield Rd	LA	146
6915		IL 60 IL 83	IL 176	LA	147
6917		IL 176	Hawley St West	LA	148
6920		IL 60 IL 83	Diamond Lake Rd	LA	149
6930		IL 60 IL 83	Hawley St	LA	150
6935		IL 60 IL 83	Willow Springs Rd South Junction	LA	151
6940		IL 83	IL 120	LA	152
6945		IL 83	IL 132 Grand Ave	LA	153
6948		IL 83	Monaville Rd	LA	154
6949		IL 83	Engle Dr Walmart Ent	LA	155
6950		IL 83	IL 173	LA	156
6955		IL 83	Aptakisic Rd Long Grove Rd	LA	157
6957		IL 83	Hilltop Rd	LA	158
6960		IL 83	Arlington Heights Rd	LA	159
6965		IL 83	Deerfield Pkwy Checker Dr	LA	160
6970		IL 83	Grass Lake Rd	LA	161
6975		IL 83	Buffalo Grove Rd	LA	162
6982		IL 83	Peterson Rd	LA	163
6985		IL 83	Buffalo Grove SC Highpoint Rd	LA	164
6990		IL 83	Gilmer Rd Oakwood Dr	LA	165
6992		IL 83	Westmoreland Dr	LA	166
6995		IL 120 Belvedere Rd	IL 134	LA	167
7000		IL 120 Belvedere Rd	Hainsville Rd	LA	168
7005		IL 120 Belvedere Rd	Knight Ave	LA	169
7010		IL 120 Belvedere Rd	Oplaine Rd	LA	170
7015		IL 131 Green Bay Rd	IL 137 Buckley	LA	171
7018		IL 131 Green Bay Rd	Cavin Rd	LA	172
7020		IL 131 Green Bay Rd	IL 176 Rockland Rd Scranton Ave	LA	173
7030		IL 131 Green Bay Rd	Wadsworth Rd	LA	174
7035		IL 131 Green Bay Rd	Washington St	LA	175
7040		IL 131 Green Bay Rd	Yorkhouse Rd	LA	176
7045		IL 131 Green Bay Rd	10th St	LA	177
7048		IL 173	Hunt Club Rd	LA	178



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7049		IL 131 Green Bay Rd	21st St	LA	179
7050		IL 131 Green Bay Rd	IL 173	LA	180
7054		IL 131 Green Bay Rd	Russel Rd	LA	181
7055		IL 132 Grand Ave	Great America Ent Lawson Blvd	LA	182
7060		IL 132 Grand Ave	Hunt Club Rd	LA	183
7062		IL 132 Grand Ave	Brookside Dr	LA	184
7065		IL 132 Grand Ave	Oplaine Rd	LA	185
7070		IL 132 Grand Ave	Sand Lake Rd	LA	186
7075		IL 132 Grand Ave	Granada Blvd Lindenhurst Dr	LA	187
7078		IL 132 Grand Ave	Fairfield Rd	LA	188
7080		IL 132 Grand Ave	Deep Lake Rd	LA	189
7081		IL 132 Grand Ave	Munn Rd	LA	190
7085		IL 132 Grand Ave	Dilleys Rd	LA	191
7090		IL 134	Fairfield Rd	LA	192
7094		IL 137	Butterfield Square	LA	193
7095		IL 137	Butterfield Rd	LA	194
7100		IL 137 Buckley Rd	Meridian Dr Georgia Rd	LA	195
7105		IL 137 Buckley Rd	O'Plaine Rd	LA	196
7110		IL 137 Buckley Rd	St Mary's Rd	LA	197
7115		IL 137 Buckley Rd	Great Lakes Dr	LA	198
7120		IL 137 Buckley Rd	Mississippi St	LA	199
7125		IL 137 Buckley Rd	Abbott No Entrance Gate 3	LA	200
7129		IL 173	Savage Rd Deercrest Dr	LA	201
7130		IL 173	Deep Lake Rd	LA	202
7132		IL 173	Delany Rd	LA	203
7135		IL 176	Darrell Rd	LA	204
7137		IL 176	Westridge Dr	LA	205
7139		IL 176	Beech St Eastway Dr	LA	206
7140		IL 176	Fairfield Rd	LA	207
7142		IL 176	Gilmer Rd	LA	208
7145		IL 176	Midlothian Rd	LA	209
7150		IL 176	Old Rand Rd Main St ( in Wauconda )	LA	210
7152		IL 176	Larkdale Dr	LA	211
7155		IL 176	Brown St	LA	212
7160		IL 137 Buckley Rd	Lewis Ave	LA	213
7170		IL 137 Buckley Rd	Illinois St	LA	214
7175		IL 137 Buckley Rd	Ray St	LA	215
7190		IL 137 Sheridan Rd	Beach Rd	LA	216
7195		IL 137 Sheridan Rd	Wadsworth Rd	LA	217
7200		IL 137 Sheridan Rd	Yorkhouse Rd	LA	218
7820		IL 131 Green Bay Rd	IL 120 Belvidere Rd	LA	219
7825		IL 83	Rollins Rd	LA	220
8795		IL 137 Sheridan Rd	9th St	LA	221

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9375		IL 131 Green Bay Rd	14th St	LA	222
9380		IL 131 Green Bay Rd	22nd St	LA	223
9390		IL 131 Green Bay Rd	Saratoga St	LA	224
9407		IL 137 Sheridan Rd	10th St	LA	225
9415		IL 137 Sheridan Rd	14th St	LA	226
9420		IL 137 Sheridan Rd	16th St	LA	227
9425		IL 137 Sheridan Rd	18th St	LA	228
9885		IL 83 McHenry Rd	Pauline Ave Town Place Pk	LA	229
10661		Sheridan Rd	Old Elm Rd	LA	230
10665		IL 43 Waukegan Rd	Deerpath Rd	LA	231
10670		IL 43 Waukegan Rd	Everett Rd	LA	232
10675		IL 43 Waukegan Rd	Westleigh Rd	LA	233
10676		IL 43 Waukegan Rd	Gloucester Crossing	LA	234
10822		Lake Cook Rd	Green Bay Rd	LA	235
11115		IL 43 Waukegan Rd	Bannockburn Office Plaza	LA	236
11595		Sheridan Rd	Buckley Rd	LA	237
11596		Sheridan Rd	24th St	LA	238
11597		Sheridan Rd	Farragut Ave	LA	239
11598		Sheridan Rd	D St	LA	240
11605		IL 22	Elm Rd Oxford Dr	LA	241
11615		IL 21 Milwaukee Ave	Hawthorn Hills SC Hawthorn Pkwy	LA	242
11700		IL 60	Bradley Dr Riverwoods Dr	LA	243
11701		IL 60	W W Grainger Ent	LA	244
11705		IL 60	I 94 Tri State E Ramp NB E	LA	245
11706		IL 60	I 94 Tri State W Ramp SB W	LA	246
11707		IL 60	Conway Farms	LA	247
11708		IL 60	Lake Forest Academy	LA	248
11875		US 41	Clavey Rd Old Skokie Rd	LA	249
11876		Skokie Valley Rd	Clavey Rd	LA	250
11877		US 41	Skokie Valley Rd	LA	251
11930		IL 120 Belvedere Rd	Hunt Club Rd	LA	252
11935		IL 22	Telegraph Rd	LA	253
11937		IL 22 Half Day Rd	Deerfield Bannockburn	LA	254
11940		IL 59	Wilson Rd Ridge Rd	LA	255
11945		US 12	State Park Rd East St	LA	256
12120		IL 21 Milwaukee Ave	Rockland Rd	LA	257
12145		IL 137 Sheridan Rd	7th Main St	LA	258
12275		US 41	IL 176 East	LA	259
12277		IL 43 Waukegan Rd	Knollwood Rd North Shore Dr	LA	260
12280		US 41 West Ramp	IL 176 Shagbark Frontage Rd	LA	261
12285		US 12	Northlake Commons K Mart	LA	262
12286		US 12	Honey Lake Rd	LA	263
12290		US 12	Eagle Point Rd Sayton Rd	LA	264
12295		US 12	Ela Rd	LA	265

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12297		US 12	June Terrace	LA	266
12305		US 45	IL 120 Belvedere Rd	LA	267
12315		IL 83	Washington St	LA	268
12317		IL 83	Brighton Ln	LA	269
12330		US 45	Winchester Rd	LA	270
12380		IL 22	I 94 Tri State Tlwy E Ramp	LA	271
12385		IL 22	I 94 Tri State Tlwy W Ramp	LA	272
12390		IL 22	Ridge Rd East	LA	273
12391		IL 22	Tennyson Ln Ridge Rd West	LA	274
12915		IL 43 Waukegan Rd	McDonalds Ent Cadwells Cr	LA	275
12920		IL 43 Waukegan Rd	Kates Rd	LA	276
12925		IL 43 Waukegan Rd	Longfellow Ave Osterman Ave	LA	277
12930		IL 43 Waukegan Rd	Deerfield Blvd	LA	278
12935		IL 43 Waukegan Rd	Deerfield Rd	LA	279
12937		IL 43 Waukegan Rd	Deerfield Fire Station	LA	280
12940		IL 43 Waukegan Rd	Hazel Ave Elder Ln	LA	281
12945		IL 43 Waukegan Rd	Greenwood Ave	LA	282
12950		IL 43 Waukegan Rd	Deerfield High School	LA	283
12952		IL 43 Waukegan Rd	North Ave	LA	284
13739		IL 83	Library Ln	LA	285
13740		IL 83	Center Ave	LA	286
13741		IL 83	Frederick St	LA	287
13742		IL 120	Lake St	LA	288
13746		IL 120 Belvedere Rd	Allegheny Rd	LA	289
13985		IL 21 Milwaukee Ave	Winchester Rd	LA	290
13990		IL 21 Milwaukee Ave	Cook St	LA	291
13995		IL 21 Milwaukee Ave	Church St	LA	292
14005		IL 21 Milwaukee Ave	Valley Park Dr	LA	293
14007		IL 21 Milwaukee Ave	Condell Dr	LA	294
14013		IL 21 Milwaukee Ave	South Artaius Pkwy	LA	295
14015		IL 21 Milwaukee Ave	Red Top Dr Greentree Blvd	LA	296
14016		IL 21 Milwaukee Ave	Adler Dr	LA	297
14017		IL 21 Milwaukee Ave	Golf Rd	LA	298
14018		IL 21 Milwaukee Ave	Greggs Pkwy North Artaius Pkwy	LA	299
14020		IL 176	Butterfield Rd	LA	300
14025		IL 176	Garfield Ave Brainard Ave	LA	301
14030		IL 176	Dawes St	LA	302
14035		IL 176	4th Ave	LA	303
14340		US 45	Diamond Lake Rd	LA	304
14345		US 45	Division St	LA	305
14350		US 45	Hawley St	LA	306
14370		US 45	Allanson Rd	LA	307
14372		US 45	Courtland St	LA	308
14904		IL 43 Waukegan Rd	Pulaski Dr	LA	309

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14905		IL 43 Waukegan Rd	Lakehurst Rd	LA	310
14910		IL 43 Waukegan Rd	Fountain Square Pl	LA	311
14915		IL 43 Waukegan Rd	Northpoint Blvd	LA	312
14916		IL 43 Waukegan Rd	Bur Wood Dr Burwood Dr	LA	313
14917		IL 43 Waukegan Rd	Lakeside Dr Baxter Ent	LA	314
14925		IL 120 Belvedere Rd	Greenleaf St North Ramp	LA	315
14930		IL 120 Belvedere Rd	Greenleaf St South Ramp	LA	316
14940		IL 120 Belvedere Rd	Lewis Ave	LA	317
14945		IL 120 Belvedere Rd	Glen Rock Ave	LA	318
14950		IL 120 Belvedere Rd	Jackson Ave	LA	319
14955		IL 120 Belvedere Rd	McAlister Ave	LA	320
14960		IL 120 Belvedere Rd	County St	LA	321
14965		IL 120 Belvedere Rd	Genesee St	LA	322
14970		IL 120 Belvedere Rd	Keller Ave	LA	323
14972		IL 120 Belvedere Rd	Pioneer Ct Lake Plaza	LA	324
14974		IL 120 Belvedere Rd	Belvedere Mall East Ent	LA	325
14980		Grand Ave	Baldwin Ave	LA	326
14985		Grand Ave	McAree Ave	LA	327
14990		Grand Ave	Genesee St	LA	328
14995		Grand Ave	County St	LA	329
15000		Grand Ave	West St	LA	330
15005		Grand Ave	Jackson Ave	LA	331
15010		Grand Ave	Butrick St	LA	332
15015		Grand Ave	Lewis Ave	LA	333
15020		IL 131 Green Bay Rd	IL 132 Grand Ave	LA	334
15022		IL 131 Green Bay Rd	Brookside Ave	LA	335
15025		IL 131 Green Bay Rd	Sunset Ave	LA	336
15030		IL 137 Sheridan Rd	South St	LA	337
15035		Sheridan Rd	Belvidere Rd	LA	338
15050		Sheridan Rd	Grand Ave	LA	339
15060		IL 137 Sheridan Rd	Greenwood Ave	LA	340
15065		IL 137 Sheridan Rd	Miraflores Ave	LA	341
15131		IL 137 Sheridan Rd	Genesee St	LA	342
20350		IL 22	Lakeside Dr	LA	343
20375		IL 176	Bradley Dr	LA	344
20425		IL 22	Buffalo Grove Rd	LA	345
20426		IL 22	Buffalo Grove Fire House	LA	346
20485		IL 131 Green Bay Rd	Crescent Ave	LA	347
20530		IL 60	Saunders Rd Field Dr	LA	348
20535		US 12	Pheasant Ridge Dr	LA	349
20595		US 12	Old McHenry Rd	LA	350
20901		IL 137 Sheridan Rd	IL 173 21st St	LA	351
20902		23rd St	IL 137 Sheridan Rd	LA	352
20903		27th St	IL 137 Sheridan Rd	LA	353

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20904		29th St	IL 137 Sheridan Rd	LA	354
20905		25th St Shiloh Blve	IL 137 Sheridan Rd	LA	355
20906		31st St	IL 137 Sheridan Rd	LA	356
20907		33rd St	IL 137 Sheridan Rd	LA	357
20908		34th St	Sheridan Rd IL 137	LA	358
20995		US 45 IL 21 Milwaukee Ave	Riverwalk Dr Columbus Pkwy	LA	359
21000		IL 132 Grand Ave	Gurnee Mills Circle West Menards Ent	LA	360
21010		IL 137 Amstutz Expy	IL 137 Buckley Rd	LA	361
21070		US 45	Evergreen Dr	LA	362
21085		IL 137 Sheridan Rd	22nd St	LA	363
21110		IL 132 Grand Ave	Gurnee Mills Circle East Tri State Pkwy	LA	364
21115		IL 132 Grand Ave	Grand Hunt SC Sam's Club	LA	365
21117		IL 132 Grand Ave	Almond Rd Hutchins Rd	LA	366
21118		IL 132 Grand Ave	Rollins Rd Oakwood Dr	LA	367
21119		IL 132 Grand Ave	Stonebrook Dr	LA	368
21120		US 41	Stearns School Rd	LA	369
21181		IL 22	Main St Prarie Rd W Junction	LA	370
21190		IL 59	Kelsey Rd	LA	371
21195		IL 132 Grand Ave	Belle Plaine St	LA	372
21215		IL 22	Arboretum Way	LA	373
21260		US 45	Motorola Pkwy	LA	374
21295		US 12	Miller Rd	LA	375
21350		IL 59	Cuba Rd	LA	376
21405		US 45 IL 21 Milwaukee Ave	Tower Pkwy	LA	377
21409		IL 21 Milwaukee Ave	American Hotel Dr	LA	378
21410		IL 21 Milwaukee Ave	Corporate Woods Pkwy	LA	379
21411		IL 21 Milwaukee Ave	Woodland Dr	LA	380
21412		IL 21 Milwaukee Ave	Jamestown Rd Port Clinton Rd	LA	381
21420		US 45	Dunbar Rd	LA	382
21490		IL 21 Milwaukee Ave	Lake St	LA	383
21525		IL 22	Old McHenry Rd	LA	384
21543		IL 21 Milwaukee Ave	IL 120 North Ramp	LA	385
21544		IL 21 Milwaukee Ave	IL 120 South Ramp	LA	386
21545		IL 21 Milwaukee Ave	Gages Lake Rd	LA	387
21547		IL 21 Milwaukee Ave	I 94 Exit Ramp	LA	388
21625		IL 134	Hart Rd	LA	389
21635		IL 59	Petite Lake Rd	LA	390
21637		IL 83	Petite Lake Rd	LA	391
21655		US 45	Gages Lake Rd	LA	392
21660		US 45	IL 137	LA	393
21662		IL 137	Casey Rd Midlothian Rd	LA	394
21663		US 45	Casey Rd	LA	395
21695		IL 43 Waukegan Rd	Baxter Ent Norman Rd	LA	396

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21715		IL 43 Waukegan Rd	Abbott Labs Gate 4	LA	397
21717		IL 43 Waukegan Rd	Atkinson Ave	LA	398
21755		US 45	Grass Lake Rd	LA	399
21756		US 45	Millburn Rd	LA	400
21785		US 12	Plum Grove Rd	LA	401
21885		US 45	Arbor Vista Ln	LA	402
21940		IL 120 Belvedere Rd	Gilmer Rd	LA	403
21942		IL 120 Belvedere Rd	Fish Lake Rd	LA	404
21965		IL 22	Stevenson HS Ent Palazzo Dr	LA	405
21969		IL 120 Belvedere Rd	Mill Rd	LA	406
21975		US 45	Townline Square SC	LA	407
21990		IL 83	Lake St	LA	408
21991		IL 83	Home Depot Ent Millstone	LA	409
21992		IL 83	Hook Dr Old Rollins Rd	LA	410
21993		IL 83	Shorewood Dr	LA	411
22010		IL 120 Belvedere Rd	IL 60	LA	412
22015		IL 60	Fish Lake Rd	LA	413
22040		IL 59	Roberts Rd	LA	414
22041		IL 59	Indian Trail	LA	415
22050		IL 21 Milwaukee Ave	Market Pl	LA	416
22102		IL 120 Belvedere Rd	Darrell Rd	LA	417
22130		IL 59	Devlin Rd	LA	418
22205		Gilmer Rd	Midlothian Rd	LA	419
22250		IL 120 Belvedere Rd	Fairfield Rd	LA	420
22255		IL 120 Belvedere Rd	Wilson Rd	LA	421

1236		US 14	Algonquin Rd	MC	1
1237		US 14	Lincoln Ave	MC	2
1238		US 14	Foxmoor Rd	MC	3
5812		US 14	Wal Mart Ent	MC	4
7210		US 12	IL 31	MC	5
7215		US 12	IL 173	MC	6
7220		US 12	Fox Lake Rd	MC	7
7223		US 12	Wilmot Rd	MC	8
7225		US 12	Winn Rd Spring Grove Rd	MC	9
7230		US 14	IL 22	MC	10
7233		US 14	Ridgefield	MC	11
7235		US 14	IL 47	MC	12
7236		US 14	Lake Ave	MC	13
7237		US 14	West Lake Shore Dr	MC	14
7238		US 14	Dean St	MC	15
7239		US 14	Doty	MC	16
7240		US 14	IL 173 W S Jct Brink St	MC	17
7241		US 14	Lake Shore Dr	MC	18

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7245		US 14	Cary Rd West Main St	MC	19
7246		US 14	Cary East Main St	MC	20
7248		US 14	Cary Square Shop Ctr	MC	21
7260		US 14	Three Oaks Rd	MC	22
7270		US 14	IL 173 E N Jct Diggins St Ayer St	MC	23
7275		US 14	First St	MC	24
7280		IL 31	IL 62	MC	25
7281		IL 62 Algonquin Rd	IL 31 NB Ramps A & B	MC	26
7282		IL 62 Algonquin Rd	IL 31 SB Ramps C & D	MC	27
7285		IL 31 Front St	IL 120 West Jct	MC	28
7288		IL 31	Prime Prky Albany St	MC	29
7289		IL 31	Shamrock Ln	MC	30
7290		IL 120 Elm E Jct	IL 31 North Richmond	MC	31
7295		IL 31	IL 176 Terra Cotta Ave	MC	32
7296		IL 176	Valley View Dr	MC	33
7298		IL 176	Smith Rd	MC	34
7300		IL 31	Bull Valley Rd	MC	35
7305		IL 31	Crystal Lake Rd	MC	36
7310		IL 31	Johnsburg Rd	MC	37
7311		IL 31	Running Brook Farm	MC	38
7315		IL 31	Three Oaks Rd	MC	39
7320		IL 47	Algonquin Rd Huntley Rd	MC	40
7322		IL 47	Reed Rd	MC	41
7323		IL 47	McConnell Rd	MC	42
7325		IL 47	Lake Ave Woodstock Dr	MC	43
7329		IL 47	Kreutzer Rd	MC	44
7330		IL 47	Main St in Huntley	MC	45
7335		IL 120	Chapel Hill Rd	MC	46
7340		IL 120	River Rd	MC	47
7342		IL 120	Thompson Rd	MC	48
7345		IL 120	Wonder Lake Rd	MC	49
7740		IL 176	River Rd	MC	50
7741		IL 176	Newport Ct	MC	51
7795		IL 62 Algonquin Rd	Eastgate Dr	MC	52
7797		IL 31	Huntington Dr	MC	53
7996		IL 31	Edgewood Dr	MC	54
7998		IL 31 Algonquin Bypass	Main St Quarry Access	MC	55
11580		IL 62 Algonquin Rd	Harrison St	MC	56
11880		IL 176	Roberts Rd	MC	57
11885		IL 31 Richmond	Pearl St	MC	58
11890		IL 31	Lillian St	MC	59
11895		IL 31	McCullom Lake Rd	MC	60
11896		IL 31	Diamond Dr	MC	61
11897		IL 31	Blake Rd	MC	62

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11900		IL 120	Ringwood Rd Currant Rd	MC	63
11905		IL 120	Meadow Rd	MC	64
11910		IL 120	Industrial Dr Oak Ave	MC	65
11915		IL 120	Crystal Lake Ave	MC	66
11920		IL 120	Green St	MC	67
11925		IL 120	Riverside Dr	MC	68
12170		IL 62 Algonquin Rd	Algonquin Town Center	MC	69
15080		IL 47	Russel Ct	MC	70
15086		IL 120	Fleming Rd	MC	71
15087		IL 47	Irving Ave	MC	72
15088		IL 47	IL 120	MC	73
15089		IL 120	Raffel Rd	MC	74
21240		IL 47	IL 176 South	MC	75
21241		IL 47	IL 176 North	MC	76
21460		US 14 Division St	Airport Rd McGuire Rd	MC	77
21463		US 14	IL 23	MC	78
21470		US 14	Kishwaukee Valley Rd	MC	79
21640		IL 62 Algonquin Rd	Sandbloom Rd Countryside Dr	MC	80
21815		US 14	Jandus Rd Lake Julian Ln	MC	81
21968		US 20	Prospect St	MC	82
21970		US 20	IL 23	MC	83
21971		IL 23	IL 176	MC	84
22100		IL 120	Lily Lake Rd	MC	85
22155		IL 31	James Rakow Rd	MC	86
22156		IL 31	Virginia	MC	87
22157		IL 31	Klasen Rd	MC	88
22220		US 14	Cary Algonquin Rd	MC	89
22242		County Line Rd	Haegers Bend Rd	MC	90
22245		IL 62 Chicago St	County Line Rd	MC	91

157		183rd St	Wolf Rd	WI	1
452		US 30 Lincoln Hwy	Gougar Rd	WI	2
924		IL 1	Crete Monee Rd	WI	3
1084		IL 113 Main St	IL 129 Washington St and IL 53 Front St	WI	4
4290		US 30 Plainfield Rd	Larkin Ave	WI	5
4295		IL 7 Larkin Ave	Theodore Ave	WI	6
4730		Larkin Ave	Hillcrest SC	WI	7
6385		IL 59	Caton Farm Rd	WI	8
7350		Weber Rd	Normantown Rd	WI	9
7352		I 55	Weber Rd South Ramp	WI	10
7354		I 55	Weber Rd North Ramp	WI	11
7385		I 80	Richards St North Ramp	WI	12
7386		US 52	Manhattan Rd Foxford Dr	WI	13



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7387		US 52	Laraway Rd	WI	14
7390		I 80	Richards St South Ramp	WI	15
7394		I 80 North Ramps	Briggs St	WI	16
7395		I 80	US 30 East Ramp	WI	17
7400		I 80	US 30 Lincoln Hwy	WI	18
7405		US 6 Channahon Rd	IL 7 Larkin Ave	WI	19
7410		US 6 Maple St	Walnut Ct Draper Ave	WI	20
7411		US 45 LaGrange Rd 96th Ave	Lincoln Way Ln Alsip Nursery	WI	21
7412		US 45 LaGrange Rd	Laraway Rd	WI	22
7413		US 45 LaGrange Rd 96th Ave	Nebraska Ave	WI	23
7414		US 45 LaGrange Rd 96th Ave	Old Frankfort Way	WI	24
7415		US 30 North St Lincoln Hwy	US 45 96th Ave	WI	25
7416		US 30	Elsner Rd	WI	26
7418		US 30	Pfieffer Dr	WI	27
7420		US 30	IL 7 Theodore Rd	WI	28
7425		US 30	IL 59 Commercial Dr	WI	29
7426		IL 59	Fort Beggs St	WI	30
7430		US 30 Plainfield Rd	Canton Farm Rd Gaylord Rd	WI	31
7431		US 6 Southwest Hwy	I 355 West Ramps	WI	32
7432		US 6 Southwest Hwy	I 355 East Ramps	WI	33
7433		US 6 Southwest Hwy	Cedar Rd	WI	34
7434		US 6	Silver Cross Blvd Hospital Ent	WI	35
7435		US 30 Lincoln Hwy Maple St	Cedar Rd	WI	36
7436		US 6 Southwest Hwy	Parker Rd	WI	37
7437		US 30 Lincoln Hwy	Prairie Dr	WI	38
7439		US 30	Williams St	WI	39
7440		US 30 Lincoln Hwy	Nelson Rd	WI	40
7442		US 30	Marley Rd	WI	41
7445		US 30 Lincoln Hwy Cass St	Walnut Rd	WI	42
7450		US 30 Lincoln Hwy Cass St	Washington St	WI	43
7455		US 30 Lincoln Hwy Maple St	Vine St East South Junction	WI	44
7460		US 30 Lincoln Hwy Cass St	Briggs St	WI	45
7465		US 30 Lincoln Hwy Maple St	Vine St West North Junction	WI	46
7470		US 30 Plainfield Rd	Renwick Rd Brown St	WI	47
7471		IL 59	St Marys Rd	WI	48
7472		US 30	Lily Cache Rd	WI	49
7473		IL 59	Fraser Rd	WI	50
7474		IL 59 Division St @ Renwick Rd	Renwick Rd	WI	51
7475		US 30 Lincoln Hwy	Wolf Rd	WI	52
7476		US 30 Lincoln Hwy	Locust St	WI	53
7478		US 30 Lincoln Hwy	Ridgemore Rd	WI	54
7479		US 30 Lincoln Hwy	Joliet Hwy	WI	55
7480		US 45 Mannheim Rd	191st St	WI	56
7482		I 80 South Ramp	US 45 96th Ave	WI	57

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7483		I 80 Ramp B	US 45 96th Ave	WI	58
7485		US 45 Mannheim Rd	195th St Willow Ln	WI	59
7490		US 52 Doris Ave	IL 53 Chicago St	WI	60
7492		IL 59	School St	WI	61
7493		IL 59	Seil Rd	WI	62
7495		US 52 Jefferson St	IL 59 Brook Forest Cottage	WI	63
7496		US 52	Brookshore Dr	WI	64
7497		US 52 Jeferson St	River Rd	WI	65
7500		IL 1 Main St	Exchange St	WI	66
7503		IL 1 Dixie Hwy	Church Rd	WI	67
7504		IL 1 Dixie Hwy	Chestnut Ln	WI	68
7505		IL 1 Dixie Hwy	Indiana Ave 303rd St	WI	69
7510		IL 7 IL 53 Broadway St	IL 7 Renwick Rd	WI	70
7511		IL 7 159th St	Gougar Rd	WI	71
7515		IL 7 IL 53 Broadway St	IL 7 Theodore St	WI	72
7516		IL 171 State	Division St	WI	73
7517		IL 171 State St	IL 7 9th St	WI	74
7518		IL 171 State	2nd St	WI	75
7519		IL 171 State St	10th St	WI	76
7520		IL 7 159th St	Bell Rd North	WI	77
7525		IL 7 159th St	Cedar Rd	WI	78
7529		IL 7 159th St	Adelman Rd	WI	79
7530		IL 7 Larkin Ave	Moen Ave	WI	80
7532		IL 7 Larkin Ave	Meadow Ave	WI	81
7535		IL 7 Theodore St	Arbor Ln	WI	82
7540		IL 7 Larkin Ave	North Ridge Plaza Drive	WI	83
7543		IL 7 ( 9th St )	Thornton St	WI	84
7544		I 57 East Ramp ( A & E )	University Pkwy Stuenkel	WI	85
7545		IL 7 IL 53 Broadway St	Division St 16th St Stateville Rd	WI	86
7546		I 57 West Ramp ( C )	University Rd Stuenkel Rd	WI	87
7548		IL 50 Cicero Ave	University Pkwy Stuenkel Rd	WI	88
7549		IL 171 State St	13th St Metra Station	WI	89
7550		IL 50 Cicero Ave	Governors Hwy	WI	90
7552		IL 50 Walnut St	Court St	WI	91
7553		I 57	Manhattan Monee Rd East Ramp	WI	92
7554		I 57	Manhattan Monee Rd West Ramp	WI	93
7555		IL 53 Baltimore St	IL 102 Water St	WI	94
7560		IL 53	Airport Rd	WI	95
7563		IL 53	Material Rd	WI	96
7565		IL 53	Joliet Rd	WI	97
7567		Joliet Rd	Bluff Rd	WI	98
7568		Joliet Rd	St James Gate	WI	99
7570		IL 53 Chicago St	Laraway Rd	WI	100
7575		IL 53	Normantown Rd Devonwood Dr	WI	101

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7577		IL 59	Vermette Cir	WI	102
7578		IL 59	Walmart Ent	WI	103
7580		IL 53	Kankakee River Wilmington Peotone Rd	WI	104
7581		IL 53	North River Rd	WI	105
7582		IL 53	South Arsenal Rd	WI	106
7585		US 30 IL 59 Division St	IL 126 Main St	WI	107
7586		US 30 IL 59 Division St	Naperville Rd	WI	108
7587		IL 59	Meijer Entrance	WI	109
7588		US 30 IL 59 Division St	US 30 143rd St	WI	110
7590		IL 59	Black Rd	WI	111
7592		IL 59	Industrial Dr	WI	112
7593		IL 59	Vertin Blvd Target Ent	WI	113
7595		IL 59	Theodore St	WI	114
7600		IL 102 Water St	East Kahler Rd West Kahler Rd	WI	115
7603		IL 171 Archer Ave	151st St	WI	116
7605		IL 171 Archer Ave	143rd St	WI	117
7607		IL 171 Archer Ave	Smith Rd	WI	118
7608		IL 171 Archer Ave	I 355 SB Ramp A	WI	119
7609		IL 171 Archer Ave	I 355 NB Ramp D	WI	120
7610		IL 171 Collins St	Woodruff St	WI	121
7615		IL 394	Exchange St	WI	122
7616		IL 394 IL 1	Goodenow Rd	WI	123
7619		IL 394	IL 1 Village Woods Dr	WI	124
7859		IL 53	Honeytree Dr	WI	125
7866		IL 53 Independence Blvd	Enterprise Dr	WI	126
9105		IL 53 Independence Blvd	135th St Romeo Rd	WI	127
9115		IL 53 Independence Blvd	Belmont Ave	WI	128
9120		IL 53 Independence Blvd	Murphy Dr	WI	129
9125		135th St Romeo Rd	New Ave Lemont Rd	WI	130
9130		IL 53 Independence Blvd	Taylor Rd	WI	131
9714		Arsenal Rd	Baseline Elwood Interna P	WI	132
9717		Arsenal Rd	I 55 West Frontage Connector	WI	133
11045		US 45 LaGrange Rd 96th Ave	Colorado Ave	WI	134
11047		US 45 LaGrange Rd 96th Ave	Market St	WI	135
11135		IL 53	1st St	WI	136
11141		IL 53	Strip Mine Rd	WI	137
11142		IL 53	Coal City Rd	WI	138
11625		IL 53	University Pkwy	WI	139
11630		US 45 LaGrange Rd 96th Ave	St Frances Rd	WI	140
11633		US 30	80th Ave	WI	141
11634		US 30	Frankfort Square Ent	WI	142
11950		US 52 IL 53 Chicago St	Patterson Rd	WI	143
11955		US 30 IL 59 Division St	Lockport St	WI	144

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12260		I 55 STEV	US 6 East Ramp	WI	145
12261		US 6 Eames St	W Frontage Rd ( to I 55 )	WI	146
12265		I 55	US 6 West Ramp	WI	147
12266		US 6 Eames Rd	Tryon St	WI	148
12267		US 6 Eames Rd	Bluff Rd	WI	149
12268		US 6 Eames Rd	Roberts Rd Steve Rittof Dr	WI	150
12269		US 6 Eames Rd	Bell Rd	WI	151
12271		US 6	McKinley Woods Dr	WI	152
20561		IL 7 IL 53	Caton Farm Rd	WI	153
20600		US 6	Brandon Rd	WI	154
20967		IL 126	Meadow Ln	WI	155
20968		US 30	New Van Dyke Rd	WI	156
20969		IL 126	Drauden Rd Steiner Rd	WI	157
20970		IL 126	Wallin Dr	WI	158
20971		IL 126	New Van Dyke Rd	WI	159
20972		US 30	135th St	WI	160
20979		US 30	127th St	WI	161
21020		US 6 Maple St	Briggs St Fernwood Ave	WI	162
21134		US 30 Lincoln Hwy	Retail Dr Vancina	WI	163
21135		US 30 Lincoln Hwy	School House Rd Schmuhl Rd	WI	164
21393		US 30	111th St	WI	165
21435		IL 53	Manhattan Rd	WI	166
21437		IL 53	East Access Rd Strawn Dr	WI	167
21439		IL 53	Hoff Rd	WI	168
21465		IL 59	103rd St	WI	169
21516		IL 43 Harlem Ave	Benton Rd	WI	170
21565		US 45 LaGrange Rd 96th Ave	La Porte Rd	WI	171
21570		IL 53 Chicago St	Mills Rd	WI	172
21590		Joliet Rd	International Pkwy	WI	173
21820		I 80 North Ramp	IL 53 Chicago Ave	WI	174
21825		US 6 US 52 McDonald St	IL 53 Chicago St	WI	175
21860		IL 59	111th St	WI	176
21861		IL 59	Royal Worthington Dr	WI	177
21862		IL 59	127th St	WI	178
21863		IL 59	119th St	WI	179
21864		IL 59	135th St	WI	180
21880		US 6 Channahon Rd	Caterpillar W Dr Johns Manville Ent	WI	181
21881		US 6 Channahon Rd	Caterpillar E Dr	WI	182
21882		US 6	Hollywood Blvd	WI	183
21883		US 6	McClintock Rd	WI	184
21893		IL 59	Cantore Dr	WI	185
21895		IL 59	95th St	WI	186
21897		IL 59	Lacrosse Ln	WI	187
21900		US 6 Channahon Rd	Busch Pkwy	WI	188

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21925		I 80 North Ramp	Houbolt Ave	WI	189
21926		I 80 South Ramp	Houbolt Ave	WI	190
22055		IL 43 Harlem Ave	St Frances Rd	WI	191
22180		I 55	US 52 Jefferson St East	WI	192
22185		I 55	US 52 Jefferson St West	WI	193
22191		I 55 East Frontage Rd	US 52 Jefferson St	WI	194
75111		IL 7	I 355 West Ramp	WI	195
75112		IL 7	I 355 East Ramp	WI	196

**TRAFFIC SIGNAL  
SYSTEM - Pay  
Code T-1B - Span  
Wire (Perm-  
Temps)**

Loc. #	Main Route	Cross Street	Co.	Qty.
78	US 12 20 45 Mannheim Rd	Gladys	CO	1
2690	IL 56 Butterfield Rd	Washington Blvd	CO	2
3320	IL 72 Higgins Rd	Gabrieski Dr Patton Dr	CO	3
3972	119th St	Page St	CO	4
4040	135th St	Central Ave	CO	5
5127	I 394 East Ramp	Glenwood Dyer Rd	CO	6
5128	I 394 West Ramp	Glenwood Dyer Rd	CO	7
8770	111th St	Oketo Ave	CO	8
11723	183rd	Central Ave	CO	9
21500	IL 83 Glenwood Dyer Rd	Burnham Ave	CO	10
6366	IL 59	Smith Rd	DU	1
12070	IL 64 North Ave	Powis Rd	DU	2
20333	IL 53	Spring Ave	DU	3
221	IL 72	State Getzelman	KA	1
11980	IL 25	Grant St	KA	2
21962	US 20	Big Timber Rd	KA	3
6690	US 45	Rollins Rd	LA	1
6925	IL 60 IL 83	Midlothian	LA	2
6943	IL 120	Atkinson Rd	LA	3
6980	IL 83	IL 137	LA	4
7053	IL 173	Kenosha	LA	5
7133	IL 173	Kilbourne	LA	6
22052	IL 21 Milwaukee	CDW DR Market PI Continental	LA	7
7313	IL 31	Ringwood Rd	MC	1
15085	Country Club Rd	IL 47	MC	2
21973	IL 23	Coral Pleasant Grove	MC	3

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7388		New Lenox	Briggs	WI	1
7393		I 80 Ramps South	Briggs St	WI	2
7514		IL 7 159th St	Bell Rd South	WI	3
7583		IL 126	Essington Rd	WI	4
7618		IL 394	Richton Rd	WI	5
7626		IL 7 159th St	Southwest @ Parker	WI	6
9711		Arsenal Rd	Exxon Mobile Main Gate	WI	7
9712		Arsenal Rd	Mobil Oil Gate 2	WI	8
9715		Arsenal Rd	Exxon Mobile Gate # 5	WI	9
11140		I 55 SB Exit Ramp	IL 113	WI	10
20974		US 30 Lincoln Hwy	US 30 143rd St	WI	11

**TRAFFIC SIGNAL SYSTEM - T-2A OVERHEAD  
FLASHERS**

**COOK COUNTY**

**FL Loc**

#	Main Route	Cross Street	Co	Ct
FL28	US 12 Lee St	Park Pl Jefferson	CO	1
FL490	107th St	Kean	CO	2
FL566	123rd St McCarthy	86th Ave	CO	3

**DUPAGE COUNTY**

**FL Loc**

#	Main Route	Cross Street	Co	Ct
FL1301	US 20 Lake St East of	IL 390 Tlwy WB	DU	1
FL1302	IL 53 (west of)	IL 390 Tlwy EB	DU	2
FL1303	IL 390 WB	US 20 WB	DU	T2AI
FL1304	IL 390 EB	IL 53 Middle Truss	DU	3
FL1305	IL 390 EB	IL 53 West Sign Truss	DU	4

**KANE COUNTY**

**FL Loc**

#	Main Route	Cross Street	Co	Ct
FL170	IL 31	Moosehart Rd	KA	1
FL210	IL 47	Main St ( in Kaneville )	KA	T2AB
FL228	IL 47	Plato Rd WB Red	KA	T2AB

**LAKE COUNTY**

**FL Loc**

#	Main Route	Cross Street	Co	Ct
FL1210	US 41	Deerfield West Park (between)	LA	T2AI
FL1306	IL 137 Buckley Rd	IL 137 Amstutz Expy	LA	T2AI

**MCHENRY COUNTY**

**FL Loc**

#	Main Route	Cross Street	Co	Ct
FL825	IL 23	Kishwaukee Valley	MC	1
FL830	IL 47	IL 173	MC	2
FL835	IL 47	Charles	MC	3
FL840	IL 120	Charles	MC	4
FL851	IL 173	Alden	MC	T2AB
FL855	IL 173	Wilmot Rd	MC	5



**WILL COUNTY**

**FL Loc**

<b>#</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co</b>	<b>Ct</b>
FL1085	IL 129	Coal City Rd	WI	1
FL1086	IL 129	Strip Mine Rd	WI	T2AB
FL11950	US52 IL53 Chicago	Patterson	WI	T2AI
FL149	US 45	Steger Rd	WI	T2AB
FL18	US 6 Southwest Hwy	Gougar Rd	WI	2
FL2515	US 45	US 52	WI	3
FL890	US 45	Manhattan Monee Rd	WI	4
FL895	US 45 US 52 Main (in Peotone)	US 52 Wilmington Peotone	WI	5
FL913	IL 50 Cicero Ave	Peotone Rd	WI	6
FL925	Governors Hwy	Stunkel	WI	7
FL930	Manhattan Monee Rd	Cedar Rd	WI	8

**T-2A**  
**TOTAL: 21**

**TRAFFIC SIGNAL SYSTEM - T2AI FLASHERS -  
 OVERHEAD FLASHERS INCLUDED WITH  
 OTHER T2BI LOW MOUNT FLASHERS AT  
 SIGNALIZED INTERSECTIONS,  
 PAID THROUGH T-1A TRAFFIC  
 SIGNALS**

**FL Loc**

<b>#</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co</b>
FL11950	US 52 IL 53 Chicago	Patterson NB	WI
FL1210	US 41	Deerfield West Park	LA
FL1303	IL 390 WB	US 20 WB	DU
FL1306	IL 137 Buckley Rd	IL 137 Amstutz Expy	LA

**TRAFFIC SIGNAL SYSTEM - T2AB FLASHERS -  
OVERHEAD FLASHERS INCLUDED WITH  
OTHER T2BI LOW MOUNT FLASHERS AT NON  
SIGNALIZED INTERSECTIONS,  
PAID THROUGH T-2B  
FLASHERS**

FL #	Loc Main Route	Cross Street	Co
FL1086	IL 129	Strip Mine Rd	WI
FL149	US 45	Steger Rd	WI
FL210	IL 47	Main St ( in Kaneville )	KA
FL228	IL 47	Plato Rd WB Red	KA
FL851	IL 173	Alden	MC

**TRAFFIC SIGNAL SYSTEM - LISTING OF T-2B FLASHERS AT UNSIGNALIZED  
INTERSECTIONS**

**COOK COUNTY**

FL #	Loc Main Route	Cross Street	Co	Value %	Ct
FL1123	IL 83 Cal Sag Rd	Ridgeland NB	CO	T2B-100	1
FL1141	Grand Ave EB Near Right	Elmwood Park RR Crossing	CO	T2B-25	2
FL1142	Grand Ave EB Far Right	Elmwood Park RR Crossing	CO	T2B-25	
FL1143	Grand Ave WB Near Right	Elmwood Park RR Crossing	CO	T2B-25	
FL1144	Grand Ave WB Far Right	Elmwood Park RR Crossing	CO	T2B-25	
FL1151	IL 59 SB Near Side	Lake Cook Rd	CO	T2B-25	3
FL1152	IL 59 SB Far Side	Lake Cook Rd	CO	T2B-25	
FL1153	IL 59	WB Near Side	CO	T2B-25	
FL1154	IL 59	WB Far Side	CO	T2B-25	
FL11795	US 12 95th EB	Marianos ( west of RR )	CO	T2B-25	4
FL11796	US 12 95th EB	Marianos ( east of RR )	CO	T2B-25	
FL11797	US 12 95th WB	Marianos ( east of RR )	CO	T2B-25	
FL11798	US 12 95th WB	Marianos ( west of RR )	CO	T2B-25	
FL1222	LaGrange Rd NB	Weeping Willow Rd	CO	T2B-50	5
FL1223	LaGrange Rd SB	Weeping Willow Rd	CO	T2B-50	
FL1290	203rd	Crawford NB	CO	T2B-50	6
FL1291	203rd	Crawford SB	CO	T2B-50	
FL1295	US 14 WB	Broadway	CO	T2B-50	7
FL1296	US 14 WB Left	Broadway	CO	T2B-50	

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FL1300	US 14 Northwest Hwy EB	Cumberland Metra	CO	T2B-100	8
FL1471	US 34 Ogden Ave WB	Joliet Rd ( west of )	CO	T2B-100	9
FL1472	US 34 Ogden Ave EB	Leland	CO	T2B-100	10
FL195	I 80 I 94 EB Right	Torrence Ave	CO	T2B-25	11
FL196	I 80 I 94 EB Left	Torrence Ave	CO	T2B-25	
FL197	I 80 I 94 WB Right	Torrence Ave	CO	T2B-25	
FL198	I 80 I 94 EB Left	Torrence Ave	CO	T2B-25	
FL21	US 12 Lee St SB	Park Pl Jefferson	CO	T2B-100	12
FL22	132nd St	Kedzie Ave	CO	T2B-100	13
FL2690	IL 56 Butterfield Rd	Washington Blvd	CO	T2B-100	14
FL2760	IL 58 Golf Rd WB	Gannon Dr	CO	T2B-50	15
FL2761	IL 58 Golf Rd EB	Gannon Dr	CO	T2B-50	
FL3150	IL 62 Algonquin Rd WB	Bateman	CO	T2B-25	16
FL3151	IL 62 Algonquin Rd EB	Bateman	CO	T2B-25	
FL3152	IL 62 Algonquin Rd	Bateman SB	CO	T2B-25	
FL3153	IL 62 Algonquin Rd	Bateman NB	CO	T2B-25	
FL3154	IL 62 Algonquin Rd	Old Sutton Rd NB	CO	T2B-25	17
FL3155	IL 62 Algonquin Rd	Old Sutton Rd SB	CO	T2B-25	
FL3156	IL 62 Algonquin Rd	Old Sutton Rd EB	CO	T2B-25	
FL3157	IL 62 Algonquin Rd	Old Sutton Rd WB	CO	T2B-25	
FL3160	IL 68 Dundee Rd WB	Old Sutton Rd	CO	T2B-25	18
FL3161	IL 68 Dundee Rd EB	Old Sutton Rd	CO	T2B-25	
FL3162	IL 68 Dundee Rd	Old Sutton Rd SB	CO	T2B-25	
FL3163	IL 68 Dundee Rd	Old Sutton Rd NB	CO	T2B-25	
FL3200	IL 58 Summit Dr	Shady Oaks Dr EB	CO	T2B-50	19
FL3202	IL 58 Summit Dr	Shady Oaks Dr WB	CO	T2B-50	
FL3300	IL 72 Higgins	Canfield ( east of )	CO	T2B-100	20
FL332	US 14 Northwest Hwy	Chicago Northwestern RR	CO	T2B-100	21
FL3325	IL 72 Higgins Rd WB	Gannon Dr	CO	T2B-50	22
FL3326	IL 72 Higgins Rd EB	Gannon Dr	CO	T2B-50	
FL3540	IL 171 Archer Ave	95th NW	CO	T2B-25	23
FL3542	IL 171 Archer Ave	95th NE	CO	T2B-25	
FL3544	IL 171 Archer Ave NE	95th St	CO	T2B-25	
FL3546	IL 171 Archer Ave SW	95th St	CO	T2B-25	
FL3972	119th EB (before RR)	Page St	CO	T2B-50	24
FL3973	119th EB ( past RR)	Page St	CO	T2B-50	

FL4034	135th EB	Ridgeland ( west of )	CO	T2B-50	25
FL4036	135th WB	Ridgeland ( west of )	CO	T2B-50	
FL480	87th St	Southwest Hwy Columbus	CO	T2B-100	26
FL5240	Francisco Ave	Broadway St	CO	T2B-100	27
FL530	140th RR UP NB & SB	Ashland Wood	CO	T2B-100	28
FL531	140th St	Ashland Ave SB	CO	T2B-100	29
FL590	Palatine Rd EB Frontage	Wheeling Rd ( east of )	CO	T2B-100	30
FL591	Palatine Rd WB Frontage	Wolf Rd ( east of )	CO	T2B-100	31
FL595	Sheridan Rd	Burnham	CO	T2B-100	32
FL600	Sheridan Rd	Main St ( in Evanston )	CO	T2B-50	33
FL601	Sheridan Rd	Main St NB ( in Evanston )	CO	T2B-50	

**DUPAGE COUNTY**

FL Loc #	Main Route	Cross Street	Co	Value %	Ct
FL1115	IL 59 S Neltor Blvd NB	Garys Mill Rd	DU	T2B-50	1
FL1116	IL 59 S Neltor Blvd SB	Garys Mill Rd	DU	T2B-50	
FL1117	IL 38 Roosevelt Rd	Garys Mill Rd NB	DU	T2B-50	2
FL1118	IL 38 Roosevelt Rd	Garys Mill Rd SB	DU	T2B-50	
FL1308	US 20 Lake St EB	Garden	DU	T2B-50	3
FL1309	US 20 Lake St WB	Garden	DU	T2B-50	

**KANE COUNTY**

FL Loc						
#	Main Route	Cross Street	Co	Value %	Ct	
FL140	US 20	Damisch Pingree Grove	KA	T2B-50	1	
FL160	US 20 ( 1/2 Mile West of )	Pingree Grove	KA	T2B-50		
FL150	US 20	Marshall West of	KA	T2B-50	2	
FL151	US 20 WB	Marshall	KA	T2B-50		
FL210	IL 47	Main St ( in Kaneville )	KA	T2AB-33	3	
FL211	IL 47	Main St ( in Kaneville )	KA	T2B-33		
FL212	IL 47	Main St ( in Kaneville )	KA	T2B-33		
FL222	IL 47	Plato Rd NB Right	KA	T2B-20	4	
FL223	IL 47	Plato Rd NB Left	KA	T2B-20		
FL224	IL 47	Plato Rd SB Left	KA	T2B-20		
FL225	IL 47	Plato Rd SB Right	KA	T2B-20		
FL228	IL 47	Plato Rd WB Red	KA	T2AB-20		
FL226	IL 72	Brier Hill Rd EB	KA	T2B-50	5	
FL227	IL 72	Brier Hill Rd EB	KA	T2B-50		
FL754	IL 25 NB	Cherokee Bolz	KA	T2B-100	6	
FL857	IL 38	St Charles Boys School	KA	T2B-100	7	

**LAKE COUNTY**

FL Loc						
#	Main Route	Cross Street	Co	Value %	Ct	
FL1155	IL 59 NB	James St CN	LA	T2B-25	1	
FL1156	IL 59 SB Near	James St CN	LA	T2B-25		
FL1157	IL 59 SB Far	James St CN	LA	T2B-25		
FL1158	IL 59 NB Near	James CN	LA	T2B-25		
FL1193	US 12	IL 59 Off Ramp	LA	T2B-100	2	
FL2113	IL 60	Wilson SB	LA	T2B-100	3	
FL2121	IL 173	Linden Lane	LA	T2B-100	4	
FL2122	IL 173 EB	Grimm Rd	LA	T2B-50	5	
FL2123	IL 173 WB	Grimm Rd	LA	T2B-50		
FL6625	IL 176 WB	US 45	LA	T2B-100	6	
FL6921	IL 60 IL 83 NB	Diamond Lake Rd ( south of RR )	LA	T2B-25	7	
FL6922	IL 60 IL 83 NB	Diamond Lake Rd ( north of RR )	LA	T2B-25		
FL6923	IL 60 IL 83 SB	Diamond Lake Rd ( north of RR )	LA	T2B-25		
FL6924	IL 60 IL 83 SB	Diamond Lake Rd ( south of RR )	LA	T2B-25		

FL701	IL 53	Robert Parker Coffin Rd EB	LA	T2B-100	8
FL740	IL 120 EB	Almond Lake	LA	T2B-50	9
FL741	IL 120 WB	Almond Lake	LA	T2B-50	
FL748	IL 120 WB South	Bacon Rd	LA	T2B-50	10
FL749	IL 120 WB	Bacon Rd	LA	T2B-50	
FL766	US 14 SEB	Cuba Rd	LA	T2B-25	11
FL767	US 14 NWB	Cuba Rd	LA	T2B-25	
FL768	US 14	Cuba Rd EB	LA	T2B-25	
FL769	US 14	Cuba Rd WB	LA	T2B-25	

**MCHENRY COUNTY**

FL #	Loc	Main Route	Cross Street	Co	Value %	Ct
FL100		IL 31 NB	Half Mile Trail	MC	T2B-50	1
FL101		IL 31 SB	Half Mile Trail	MC	T2B-50	
FL105		IL 31 NB	Edgewood Rd	MC	T2B-50	2
FL106		IL 31 SB	Edgewood Rd	MC	T2B-50	
FL110		IL 31 NB	Ames	MC	T2B-50	3
FL111		IL 31 SB	Ames	MC	T2B-50	
FL11890		IL 176 EB	Haligus St	MC	T2B-50	4
FL11892		IL 176 WB	Haligus St	MC	T2B-50	
FL11894		IL 176 EB	Dean St	MC	T2B-50	5
FL11896		IL 176 WB	Dean St	MC	T2B-50	
FL11948		US 12	Solon NB	MC	T2B-50	6
FL11949		US 12	Solon SB	MC	T2B-50	
FL21967		US 20	South Union SB Red	MC	T2B-50	7
FL21970		US 20 NB	Union	MC	T2B-50	
FL21968		US 20 NB	US 20 NB @ Marengo Rd	MC	T2B-50	8
FL21969		US 20 SB	US 20 SB @ Marengo Rd	MC	T2B-50	
FL21971		US 20	Marengo Rd Beck Rd WB	MC	T2B-50	9
FL21972		US 20	Marengo Rd Beck Rd EB	MC	T2B-50	
FL21973		US 20 NB	Coral	MC	T2B-50	10
FL21974		US 20 SB	Coral	MC	T2B-50	
FL21978		US 20	Coral EB Coral Red	MC	T2B-50	11
FL21979		US 20	Coral WB Coral Red	MC	T2B-50	
FL21980		US 20	Harmony Rd EB Red	MC	T2B-16	12
FL21981		US 20	Harmony Rd WB Red	MC	T2B-16	
FL21982		US 20 NB Right	Harmony Rd Yellow	MC	T2B-16	
FL21983		US 20 SB Right	Harmony Rd Yellow	MC	T2B-16	
FL21988		US 20 NB Left	Harmony Rd	MC	T2B-16	
FL21989		US 20 SB Left	Harmony Rd	MC	T2B-16	

Various Routes  
Section 2017-033-I  
Various Counties  
Contract No. 62F52

FL7249	US 14 EB	Hartland Rd Hughes Rd	MC	T2B-25	13
FL7250	US 14 WB	Hartland Rd Hughes Rd	MC	T2B-25	
FL7252	US 14	Hartland Rd Hughes Rd NB	MC	T2B-25	
FL7254	US 14	Hartland Rd Hughes Rd SB	MC	T2B-25	
FL7292	IL 176 WB	Bayview Beach Rd	MC	T2B-50	14
FL7293	IL 176 EB	Bayview Beach Rd	MC	T2B-50	
FL752	IL 23 State Rd NB	River Rd	MC	T2B-25	15
FL753	IL 23 State Rd SB	River Rd	MC	T2B-25	
FL760	IL 23 State Rd	River Rd EB	MC	T2B-25	
FL761	IL 23 State Rd	River Rd WB	MC	T2B-25	
FL755	IL 176 WB	Millstream Rd Dunham Rd	MC	T2B-25	16
FL756	IL 176 EB	Millstream Rd Dunham Rd	MC	T2B-25	
FL757	IL 176	Millstream Dunham Rd NB	MC	T2B-25	
FL758	IL 176	Millstream Dunham Rd SB	MC	T2B-25	
FL764	US 12 NB	Sunset	MC	T2B-100	17
FL836	IL 47 SB	O'Brien	MC	T2B-50	18
FL837	IL 47 NB	O'Brien	MC	T2B-50	
FL851	IL 173	Alden	MC	T2AB-33	19
FL852	IL 173	Alden EB	MC	T2B-33	
FL853	IL 173	Alden WB	MC	T2B-33	
FL856	IL 173	Converse Rd (West of)	MC	T2B-100	20

**WILL COUNTY**

FL Loc #	Main Route	Cross Street	Co	Value %	Ct
FL1027	IL 59	Champion Rd NB	WI	T2B-50	1
FL1028	IL 59	Champion Rd SB	WI	T2B-50	
FL1029	IL 126 WB Right Side East of RR	IL 59 (East of)	WI	T2B-50	2
FL1030	IL 126 WB Right Side West of RR	IL 59 (East of)	WI	T2B-50	
FL1086	IL 129	Strip Mine Rd	WI	T2AB-33	3
FL1088	IL 129	Strip Mine Rd NB	WI	T2B-33	
FL1089	IL 129	Strip Mine Rd SB	WI	T2B-33	
FL1096	IL 394	Burrville Rd NB Left Side	WI	T2B-25	4
FL1097	IL 394	Burrville Rd NB Right Side	WI	T2B-25	
FL1098	IL 394	Burrville Rd SB Left Side	WI	T2B-25	
FL1099	IL 394	Burrville Rd SB Left Side	WI	T2B-25	
FL1125	I 80	IL 53 Water St	WI	T2B-25	5
FL1126	I 80	Water St EB Left	WI	T2B-25	
FL1127	I 80	Water St WB	WI	T2B-25	
FL1128	I 80	Water St WB Left	WI	T2B-25	
FL11955	IL 53 NB	Schweitzer Rd	WI	T2B-25	6
FL11956	IL 53 SB	Schweitzer Rd	WI	T2B-25	
FL11957	IL 53	Schweitzer Rd EB	WI	T2B-25	
FL11958	IL 53	Schweitzer Rd WB	WI	T2B-25	
FL145	US 45 NB	Steger Rd	WI	T2B-33	7
FL146	US 45 SB	Steger Rd	WI	T2B-33	
FL149	US 45	Steger Rd	WI	T2AB-33	8
FL865	I 80	Wheeler	WI	T2B-50	
FL866	I 80	Wheeler	WI	T2B-50	
FL900	US 52 State St	North St	WI	T2B-33	9
FL901	US 52 State St SB	North St	WI	T2B-33	
FL902	US 52 State St NB	North St	WI	T2B-33	
FL927	IL 53 Bolingbrook Dr	Royce Rd SB	WI	T2B-100	10

**T-2B TOTAL: 84**



**TRAFFIC SIGNAL SYSTEM - T2BI - OVERHEAD FLASHERS PAID THROUGH T-1A**  
**TRAFFIC SIGNALS**  
**COOK COUNTY**

TS Loc #	FL Loc #	Main Route	Cross Street	Co	Ct
11245	FL11245	US 12 45 Lee St	US 12 45 Manheim Rd WB	CO	1
	FL11246	US 12 45 Lee St	US 12 45 Manheim Rd NB	CO	
15120	FL1140	US 12 20 45 Mannheim Rd	Canterbury Waterford	CO	2
11715	FL11715	Western	Sauk Trail WB	CO	3
11720	FL11720	IL 50 Cicero Ave	175th St	CO	4
11725	FL11725	Dixie Hwy	Flossmoor Cambridge Rd	CO	5
21681	FL11744	IL 394	Sauk Trail SB RT	CO	6
	FL11745	IL 394	Sauk Trail NB RT	CO	
11750	FL11751	US 6 WB 159th St	Park Ave Right	CO	7
11760	FL11760	US 12 20 95th St	I 294 Off Ramp WB 76th Left	CO	8
	FL11761	US 12 20 95th St	I 294 Off Ramp WB 76th Right	CO	
11765	FL11765	US 12 20 95th St	88th Ave EB	CO	9
11770	FL11770	Southwest Hwy NE	Ridgeland	CO	10
11870	FL11870	IL 72 Higgins Rd	Lee Trammel Crow SB	CO	11
12015	FL12015	IL 56 Butterfield	Taft Ave EB	CO	12
12025	FL12025	Lawrence	25th Ave Ruby EB	CO	13
14402	FL1251	IL 43 Waukegan Rd	Voltz Rd	CO	14
3390	FL1297	Wolf Rd NB	Camp McDonald Rd	CO	15
3280	FL1298	Oakton St EB	Busse Hwy	CO	16
1320	FL1320	US 20 Lake St	Bluff City Lovel WB	CO	17
13765	FL1321	US 20 Lake St	Barrington Rd	CO	18
158	FL158	Wolf Rd	151st St	CO	19
1825	FL1825	IL 1 Halsted	171st NB	CO	20
1945	FL1945	IL 19 Irving Park Rd	Des Plaines River Rd SB	CO	21
21475	FL21475	IL 171 Archer	Bell Rd WB	CO	22
21473	FL21476	IL 171 Archer Ave	131st NB Left	CO	23
	FL21477	IL 171 Archer Ave	131st NB Right	CO	
	FL21478	IL 171 Archer Ave	131st SB Left	CO	
	FL21479	IL 171 Archer Ave	131st SB Right	CO	
3168	FL3168	IL 68 Dundee Rd	Sterling Ave	CO	24

11841	FL330	US 14 Northwest Hwy	IL 68 Dundee Rd	CO	25
14165	FL3575	IL 171 Archer Ave NB Right	44th St	CO	26
	FL3576	IL 171 Archer Ave NB Left	44th St	CO	
3936	FL3936	Crawford Pulaski	123rd St NB	CO	27
4660	FL4660	IL 59 NB	West Bartlett Rd	CO	28
	FL4662	IL 59 SB	West Bartlett Rd	CO	
5930	FL5930	Willow Rd	Old Willow Rd (west of)	CO	29
9670	FL9670	IL 83 NB Elmhurst Rd	Lincoln	CO	30
	FL9671	IL 83 SB Elmhurst Rd	Lincoln	CO	

**DUPAGE COUNTY**

<b>TS Loc #</b>	<b>FL Loc #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co</b>	<b>Ct</b>
545	FL1165	IL 83 SB Left	Red Oak Ln	DU	1
	FL1166	IL 83 NB Right	Red Oak Ln	DU	
21910	FL1303	IL 390 Tlwy WB	US 20 WB	DU	<b>T2AI</b>
6164	FL1310	IL 19 Irving Park Rd WB	Bloomington Rd	DU	2
115100	FL15100	IL 19 Irving Park Rd WB	Wood Dale Rd	DU	3
	FL15101	IL 19 Irving Park Rd EB	Wood Dale Rd	DU	
587	FL587	IL 83	91st St EB	DU	4
6051	FL6051	US 34 Ogden Ave EB	Frontenac	DU	5
12020	FL635	IL 59	Joliet Rd	DU	6
22110	FL640	IL 59	Ingaltton	DU	7
8853	FL8853	IL 59	Hawthorn Ln SB	DU	8

**KANE COUNTY**

TS Loc #	FL Loc #	Main Route	Cross Street	Co	Ct
13412	FL10698	IL 72	Big Timber EB	KA	1
	FL10699	IL 72	Big Timber WB	KA	
197	FL191	IL 47	IL 64 EB	KA	2
812	FL762	IL 72 EB	Randall Rd	KA	3
	FL763	IL 72 WB	Randall Rd	KA	

**LAKE COUNTY**

TS Loc #	FL Loc #	Main Route	Cross Street	Co	Ct
4685	FL1150	US 14	Berry Rd	LA	1
11945	FL11945	US 12	State Park Rd EB	LA	2
6590	FL1210	US 41	Deerfield West Park	LA	<b>T2AI</b>
	FL1211	US 41	Deerfield West Park	LA	3
	FL1212	US 41	West Park NB	LA	
21010	FL1306	IL 137 Buckley Rd	IL 137 Amstutz Expy	LA	<b>T2AI</b>
12315	FL12315	IL 83	Washington St SB	LA	4
6843	FL2116	IL 173 EB	Tiffani	LA	5
	FL2117	IL 173 WB	Tiffani	LA	
559	FL660	US 12 IL 59 SB Right	IL 134	LA	6
	FL661	US 12 IL 59	IL 134	LA	
6917	FL6916	IL 176 EB	Hawley west	LA	7
	FL6917	IL 176 WB	Hawley west	LA	
717	FL715	IL 59	Monaville	LA	8
	FL716	IL 59	Monaville SB	LA	
11708	FL727	IL 60 WB	Lake Forest Academy	LA	9
967	FL967	US 12 IL 59	Old Rand Rd South	LA	10
21755	FL21755	US 45	Grass Lake Rd SB	LA	11

**MCHENRY COUNTY**

TS Loc #	FL Loc #	Main Route	Cross Street	Co	Ct
11880	FL11880	IL 176	Roberts Rd	MC	1
21973	FL21976	IL 23 NB	Coral Pleasant Grove	MC	2
	FL21977	IL 23 SB	Coral Pleasant Grove	MC	

**WILL COUNTY**

<b>TS Loc #</b>	<b>FL Loc #</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>	
7583	FL1034	IL 126	Essington Rd	WI	1
7618	FL1091	IL 394 SB Left Side	Richton Rd	WI	2
	FL1092	IL 394 SB Right Side	Richton Rd	WI	
	FL1093	IL 394 NB Left Side	Richton Rd	WI	
	FL1094	IL 394 NB Right Side	Richton Rd	WI	
21435	FL1131	IL 53 NB	Manhattan Rd	WI	3
	FL1132	IL 53 NB	Manhattan Rd	WI	
	FL1133	IL 53 SB	Manhattan Rd	WI	
	FL1134	IL 53 SB	Manhattan Rd	WI	
7581	FL1136	IL 53 NB	North River Rd	WI	4
	FL1137	IL 53 SB	North River Rd	WI	
11950	FL11950	US 52 IL 53 Chicago	Patterson NB	WI	<b>T2AI</b>
	FL11952	US 52 IL 53 Chicago	Patterson NB	WI	5
	FL11953	US 52 IL 53 Chicago	Patterson SB	WI	
157	FL156	183rd St	Wolf Rd NB	WI	6
	FL157	183rd St	Wolf Rd SB	WI	
20600	FL20600	US 6	Brandon Rd WB	WI	7

Four of the above listed flashers are T2AI Flashers, also paid through the T-1A Traffic Signals

**TOTAL T2BI: 61**

**PLANNED MAINTENANCE LOCATIONS - AT THE TIME OF CONTRACT DEVELOPMENT**

**Lighting Locations - Arterials**

Loc. #	Cab.	Main Route	Cross Street	Co	Qty
1667	XE	Barrington Rd	Central Rd	CO	1
1694	RO	US 12 45	Devon Ave	CO	2
1697	RO	IL 72 Touhy	Mt Prospect Rd	CO	3
1742	BE	US 12 45	Lawrence Ave	CO	4
1786	SV	IL 171	55th St	CO	5
1788	SZ	IL 83 147th St	47th St	CO	6
1923	UX	IL 53 Columbine Ave	Madison St	DU	7
1961	DF	IL 64 North Ave	IL 53 Columbine Ave	DU	8
2320		US 20 Grant Hwy	Marengo Rd Beck Rd Union Rd	MC	9

**Lighting Locations - Expressways**

Loc. #	Cab.	Main Route	Cross Street	Co	Qty
0318	J	I 55	Weber Rd ( south of )	WI	10
0723	M	I 80	Parker Rd	WI	11
0725	L	I 80	Cedar Rd	WI	12

**Pump Stations**

Loc. #	Main Route	Cross Street	Co	Qty.
PS24	I 190	Mannheim Rd ( east of )	CO	1

**Dynamic Message Signs**

Loc. #	Cab.	Main Route	Cross Street	Co	Qty.
22455	DMS-115	US 12 20 45 Mannheim Rd	Lawrence Ave	CO	1
TBD	DMS-43	I 290 EB	Mill Rd	DU	2
TBD	DMS	I 55 SB	Caton Farm Rd Harris Dr	WI	3
TBD	DMS	I 80 EB	Shepley Rd	WI	4
TBD	DMS	I 80 WB	Cherry Hill	WI	5
TBD	DMS	I 80 EB	Larkin ( West of )	WI	6
TBD	DMS	I 80 WB	Larkin ( East of )	WI	7
TBD	DMS	I 55 STEV SB	US 6 Summit Rd	WI	8

**Operations Cameras**

<b>Loc. #</b>	<b>Type</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co</b>	<b>Qty.</b>
IECC7	OPS Cam	I 94 EDENS	Lawrence Ave ( South of )	CO	1
IECC9	OPS Cam	I 94 EDENS	Foster Ave	CO	2
ISCC9	OPS Cam	I 90 94 KENN	Kedzie St	CO	3
ISCC10	OPS Cam	I 90 94 KENN	Avondale Ave	CO	4
IWCC8	OPS Cam	I 90 94 KENN	Lawrence Ave	CO	5
IWCC10	OPS Cam	I 90 94 KENN	Cicero	CO	6
OMCC8	OPS Cam	I 90 94 KENN	Wayman St	CO	7
OMCC9	OPS Cam	I 90 94 KENN	Green St	CO	8
OMCC10	OPS Cam	I 90 94 KENN	Grand Ave	CO	9
OMCC11	OPS Cam	I 90 94 KENN	Ohio St	CO	10
OCC7	OPS Cam	I 90 94 KENN	Halsted St	CO	11
OCC8	OPS Cam	I 90 94 KENN	Union Ave	CO	12
OCC10	OPS Cam	I 90 94 KENN	Chicago River	CO	13
OSCC8	OPS Cam	I 90 94 KENN	Logan Blvd	CO	14
OSCC9	OPS Cam	I 90 94 KENN	Fullerton Ave	CO	15

**Fiber Optic Cable**

<b>Loc. #</b>	<b>Type</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co</b>	<b>Qty</b>
IL 53	Fiber	Roselle Rd	IL 72   290 IL 53	CO	1
I 55	Fiber	Weber Rd	I 55	WI	2

**Bluetooth Detectors - ON-Call Routine Maintenance**

<b>Loc. #</b>	<b>Type</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co</b>	<b>Qty</b>
TBD	DET	I 80 WB	Mile Marker 105	GR	1
TBD	DET	I 80 EB	Mile Marker 106	GR	2
TBD	DET	I 80 WB	Mile Marker 107	GR	3
TBD	DET	I 80 EB	Mile Marker 108	GR	4
TBD	DET	I 80 WB	Mile Marker 109	GR	5
TBD	DET	I 80 EB	Mile Marker 110	GR	6
TBD	DET	I 80 WB	Mile Marker 111	GR	7
TBD	DET	I 80 EB	Mile Marker 112	GR	8
TBD	DET	I 80 WB	Mile Marker 113	GR	9
TBD	DET	I 80 EB	Mile Marker 114	GR	10
TBD	DET	I 80 WB	Mile Marker 115	GR	11
TBD	DET	I 80 EB	Mile Marker 116	GR	12
TBD	DET	I 80 EB	Mile Marker 117	GR	13
TBD	DET	I 80 WB	Mile Marker 118	GR	14
TBD	DET	I 80 EB	Mile Marker 119	GR	15
TBD	DET	I 80 EB	Mile Marker 120	GR	16
TBD	DET	I 80 WB	Mile Marker 121	GR	17
TBD	DET	I 80 EB	Mile Marker 122	GR	18
TBD	DET	I 80 EB	Mile Marker 100	LS	19
TBD	DET	I 80 EB	Mile Marker 101	LS	20
TBD	DET	I 80 WB	Mile Marker 102	LS	21
TBD	DET	I 80 EB	Mile Marker 103	LS	22
TBD	DET	I 80 WB	Mile Marker 104	LS	23
TBD	DET	I 80 WB	Mile Marker 123	WI	24
TBD	DET	I 55 NB	Mile Marker 234	WI	25
TBD	DET	I 55 SB	Mile Marker 234	WI	26
TBD	DET	I 55 NB	Mile Marker 235	WI	27
TBD	DET	I 55 SB	Mile Marker 236	WI	28
TBD	DET	I 55 NB	Mile Marker 237	WI	29
TBD	DET	I 55 SB	Mile Marker 238	WI	30
TBD	DET	I 55 NB	Mile Marker 239	WI	31

**COMBO LIGHTING LOCATIONS  
PAID THROUGH ROUTINE MAINTENANCE FOR THE TRAFFIC SIGNAL SYSTEM**

**LOCATIONS CURRENTLY ON EMC MAINTENANCE**

<b>Loc. #</b>	<b>Ltg. Loc. #</b>	<b>Ltg. Cab.#</b>	<b>Main Route</b>	<b>Cross Street</b>	<b>Co.</b>
TS15320	L1613	RQ	Green Bay Rd	Winnetka Ave	CO
TS5240	L1614	XW	Gross Point Rd	Church St	CO
TS5015	L1618	XS	Dempster St	Crawford Ave	CO
TS5020	L1619	XP	Dempster St	East Prairie Ave	CO
TS5025	L1620	XO	Dempster St	St. Louis Ave Lincolnwood Dr	CO
TS1525	L1621	XA	US 41 Skokie Blvd	Golf Rd Simpson St	CO
TS1555	L1622	XB	US 41 Skokie Blvd	Foster St	CO
TS1590	L1623	XQ	US 41 Skokie Blvd	Old Orchard Rd	CO
TS1530	L1624	XU	US 41 Skokie Blvd	Gross Point Rd	CO
TS1715	L1643	XG	US 45 IL 21 Milwaukee Ave	IL 68 Dundee Rd	CO
TS2625	L1666	XJ	IL 50 Cicero Ave	Touhy Ave	CO
TS21553	L1669	XT	IL 72 Higgins Rd	Prairie Stone Parkway	CO
TS14780	L1671	RL	IL 62 Algonquin Rd	Meacham Rd	CO
TS1010	L1711	YC	US 12 45 Mannheim Rd	US 20 Lake St	CO
TS2295	L1718	YF	IL 43 Harlem Ave	Division St	CO
TS2270	L1719	YG	IL 43 Harlem Ave	Augusta Blvd	CO
TS2290	L1720	YH	IL 43 Harlem Ave	Chicago Ave	CO
TS2385	L1721	YI	IL 43 Harlem Ave	Ontario St	CO
TS2360	L1722	YJ	IL 43 Harlem Ave	Lake St	CO
TS2380	L1723	YK	IL 43 Harlem Ave	South Blvd	CO
TS2390	L1725	YM	IL 43 Harlem Ave	Randolph St	CO
TS2415	L1726	YN	IL 43 Harlem Ave	Washington St	CO
TS2370	L1727	YO	IL 43 Harlem Ave	Madison St	CO
TS2400	L1728	YP	IL 43 Harlem Ave	IL 38 Roosevelt Rd	CO
TS2110	L1729	YR	IL 43 Harlem Ave	16 <sup>th</sup> St	CO
TS5730	L1775	BP	IL 38 Roosevelt Rd	Austin Blvd	CO
TS4285	L1792	YS	IL 43 Harlem Ave	Foster Place	CO
TS2325	L1794	YT	IL 43 Harlem Ave	Lawrence Ave	CO
TS2325	L1796	YU	IL 43 Harlem Ave	Cullom Ave	CO
TS1651	L1807	CI	US 45 LaGrange Rd	142 <sup>nd</sup> St	CO
TS1650	L1808	CO	US 45 LaGrange Rd	143 <sup>rd</sup> St	CO
TS11770	L1875	CQ	IL 7 SW Hwy	Ridgeland Ave	CO



Various Routes  
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TS2620	L1876	ZB	IL 50 Cicero Ave	SW Hwy 93 <sup>rd</sup> St	CO
TS4600	L1902	PT	US 20 Lake St	Bloomington Rd	DU
TS12513	L1906	UA	US 20 Lake St	Marcus Dr	DU
TS12505	L1907	UB	US 20 Lake St	Lombard Ave Foxdale Rd	DU
TS12500	L1908	UC	US 20 Lake St	Itasca Rd	DU
TS12510	L1909	UD	US 20 Lake St	Mill Rd	DU
TS12515	L1911	UE	US 20 Lake St	JFK Dr	DU
TS15230	L1915	DG	IL 38 Roosevelt Rd	Lorraine St	DU
TS15240	L1917	DX	IL 38 Roosevelt Rd	Naperville Rd	DU
TS15245	L1918	DY	IL 38 Roosevelt Rd	Main St Wheaton	DU
TS15250	L1919	DZ	IL 38 Roosevelt Rd	West St Warrenville Rd	DU
TS8225	L1921	PQ	IL 38 Roosevelt Rd	County Farm Rd	DU
TS14497	L1944	UW	22 <sup>nd</sup> St Cermak Rd	Windsor Dr	DU
TS14495	L1945	PA	22 <sup>nd</sup> St Cermak Rd	York Rd	DU
TS6415	L1955	PU	IL 64 North Ave	Berteau Ave	DU
TS6430	L1956	PV	IL 64 North Ave	Emroy Ave	DU
TS6500	L1957	PW	IL 64 North Ave	York Rd	DU
TS6460	L1958	PX	IL 64 North Ave	Myrtle Ave	DU
TS856	L2047	KN	IL 38 Roosevelt Rd	14 <sup>th</sup> St	KA
TS878	L2067	KW	IL 64 North Ave	Burlington Rd	KA
TS750	L2080	KQ	IL 25 River St	IL 25 Wilson St	KA
TS785	L2081	KU	IL 25 Washington Ave	IL 25 Wilson St	KA
TS4645	L2085	KD	IL 31 Batavia Ave	Wilson St	KA
TS730	L2110	EC	US 30 Baseline Rd	Orchard Rd	KE
TS21950	L2209	LT	IL 43 Waukegan Rd	High School Dr	LA
TS20970	L2403	HN	IL 126 Lockport Rd	Wallin Dr	WI
TS7480	L2422	WX	US 45 96 <sup>th</sup> Ave	191 <sup>st</sup> St	WI
TS5480	L1612	RU	Touhy Ave	McCormick Blvd	CO
TS2025	L1616	RP	IL 21 Milwaukee Ave	Main St Niles	CO
TS1300	L1631	XX	US 14 NW Hwy	Smith Rd	CO
TS1315	L1632	XY	US 14 NW Hwy	Plum Grove Rd	CO
TS1190	L1633	XZ	US 14 NW Hwy	Benton St	CO
TS3620	L1737	BO	IL 171	Forest Ave Ridgewood Rd	CO
TS1640	L1863	ZP	US 45 LaGrange Rd	131 <sup>st</sup> St	CO
TS1710	L1864	ZQ	US 45 LaGrange Rd	Southmoor Dr Carl Sandburg School Ent.	CO
TS1645	L1865	ZR	US 45 LaGrange Rd	135 <sup>th</sup> St	CO
TS1750	L1866	ZS	US 45 LaGrange Rd	144 <sup>th</sup> PL	CO
TS1655	L1867	ZT	US 45 LaGrange Rd	147 <sup>th</sup> St	CO

Various Routes  
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TS1660	L1868	ZU	US 45 LaGrange Rd	149 <sup>th</sup> St	CO
TS1665	L1869	ZV	US 45 LaGrange Rd	151 <sup>st</sup> St	CO
TS1670	L1870	ZW	US 45 LaGrange Rd	153 <sup>rd</sup> St	CO
	L1871	ZX	US 45 LaGrange Rd	154 <sup>th</sup> PL Davin Ent.	CO
TS1668	L1872	ZY	US 45 LaGrange Rd	156 <sup>th</sup> St Lowe's Ent.	CO
TS1701	L1873	ZZ	US 45 LaGrange Rd	163 <sup>rd</sup> St	CO
TS12045	L1904	UY	IL 19 Irving Park Rd	York Rd	DU
TS9455	L1932	UG	IL 59	Brookdale Rd Bruce Ln	DU
TS6380	L1933	UH	IL 59	North Aurora Rd	DU
TS20360	L1934	UJ	IL 59	Meridian Parkway Glacier Park Ave	DU
TS12140	L1948	UK	IL 59	Liberty St Jefferson Ave	DU
TS21930	L1949	UL	IL 59	Meijer Ent. Westridge Ct	DU
TS20620	L1950	DC	IL 59	Aurora Rd	DU
TS7825	L2287	VH	IL 83 Barron Blvd	Rollins Rd	LA
TS7514	L2406	HW	IL 7 159 <sup>th</sup> St	Bell Rd S	WI
TS7520	L2407	HX	IL 7 159 <sup>th</sup> St	Bell Rd N	WI
TS7626	L2408	HY	IL 7 159 <sup>th</sup> St	Parker Rd	WI
TS7525	L2409	HZ	IL 7 159 <sup>th</sup> St	Cedar Rd	WI
TS7478	L2416	HE	US 30	Ridgemore Rd	WI
TS7475	L2417	HC	US 30	Wolf Rd	WI
	L2451	HO	US 6 Eames St	I-55 W Fontage Rd	WI

## **SECTION 4 - BDE SPECIAL PROVISIONS**

### **COMPENSABLE DELAY COSTS (BDE)**

Effective: June 2, 2017

Revise Article 107.40(b) of the Standard Specifications to read:

“(b) Compensation. Compensation will not be allowed for delays, inconveniences, or damages sustained by the Contractor from conflicts with facilities not meeting the above definition; or if a conflict with a utility in an unanticipated location does not cause a shutdown of the work or a documentable reduction in the rate of progress exceeding the limits set herein. The provisions of Article 104.03 notwithstanding, compensation for delays caused by a utility in an unanticipated location will be paid according to the provisions of this Article governing minor and major delays or reduced rate of production which are defined as follows.

- (1) Minor Delay. A minor delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two hours, but not to exceed two weeks.
- (2) Major Delay. A major delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two weeks.
- (3) Reduced Rate of Production Delay. A reduced rate of production delay occurs when the rate of production on the work in conflict with the utility in an unanticipated location decreases by more than 25 percent and lasts longer than seven calendar days.”

Revise Article 107.40(c) of the Standard Specifications to read:

“(c) Payment. Payment for Minor, Major, and Reduced Rate of Production Delays will be made as follows.

- (1) Minor Delay. Labor idled which cannot be used on other work will be paid for according to Article 109.04(b)(1) and (2) for the time between start of the delay and the minimum remaining hours in the work shift required by the prevailing practice in the area.

Equipment idled which cannot be used on other work, and which is authorized to standby on the project site by the Engineer, will be paid for according to Article 109.04(b)(4).

- (2) Major Delay. Labor will be the same as for a minor delay.

Equipment will be the same as for a minor delay, except Contractor-owned equipment will be limited to two weeks plus the cost of move-out to either the Contractor’s yard or another job and the cost to re-mobilize, whichever is less. Rental equipment may be paid for longer than two weeks provided the Contractor presents adequate support to the Department (including lease agreement) to show retaining equipment on the job is the most economical course to follow and in the public interest.

- (3) Reduced Rate of Production Delay. The Contractor will be compensated for the reduced productivity for labor and equipment time in excess of the 25 percent threshold for that portion of the delay in excess of seven calendar days. Determination of compensation will be in accordance with Article 104.02, except labor and material additives will not be permitted.

Payment for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be determined according to Article 109.13.”

Revise Article 108.04(b) of the Standard Specifications to read:

“(b) No working day will be charged under the following conditions.

- (1) When adverse weather prevents work on the controlling item.
- (2) When job conditions due to recent weather prevent work on the controlling item.
- (3) When conduct or lack of conduct by the Department or its consultants, representatives, officers, agents, or employees; delay by the Department in making the site available; or delay in furnishing any items required to be furnished to the Contractor by the Department prevents work on the controlling item.
- (4) When delays caused by utility or railroad adjustments prevent work on the controlling item.
- (5) When strikes, lock-outs, extraordinary delays in transportation, or inability to procure critical materials prevent work on the controlling item, as long as these delays are not due to any fault of the Contractor.
- (6) When any condition over which the Contractor has no control prevents work on the controlling item.”

Revise Article 109.09(f) of the Standard Specifications to read:

“(f) Basis of Payment. After resolution of a claim in favor of the Contractor, any adjustment in time required for the work will be made according to Section 108. Any adjustment in the costs to be paid will be made for direct labor, direct materials, direct equipment, direct jobsite overhead, direct offsite overhead, and other direct costs allowed by the resolution. Adjustments in costs will not be made for interest charges, loss of anticipated profit, undocumented loss of efficiency, home office overhead and unabsorbed overhead other than as allowed by Article 109.13, lost opportunity, preparation of claim expenses and other consequential indirect costs regardless of method of calculation.

The above Basis of Payment is an essential element of the contract and the claim cost recovery of the Contractor shall be so limited.”

Add the following to Section 109 of the Standard Specifications.

**“109.13 Payment for Contract Delay.** Compensation for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be allowed when such costs result from a delay meeting the criteria in the following table.

Contract Type	Cause of Delay	Length of Delay
Working Days	Article 108.04(b)(3) or Article 108.04(b)(4)	No working days have been charged for two consecutive weeks.
Completion Date	Article 108.08(b)(1) or Article 108.08(b)(7)	The Contractor has been granted a minimum two week extension of contract time, according to Article 108.08.

Payment for each of the various costs will be according to the following.

- (a) Escalated Material and/or Labor Costs. When the delay causes work, which would have otherwise been completed, to be done after material and/or labor costs have increased, such increases will be paid. Payment for escalated material costs will be limited to the increased costs substantiated by documentation furnished by the Contractor. Payment for escalated labor costs will be limited to those items in Article 109.04(b)(1) and (2), except the 35 percent and 10 percent additives will not be permitted.
- (b) Extended Project Overhead. For the duration of the delay, payment for extended project overhead will be paid as follows.
  - (1) Direct Jobsite and Offsite Overhead. Payment for documented direct jobsite overhead and documented direct offsite overhead, including onsite supervisory and administrative personnel, will be allowed according to the following table.

Original Contract Amount	Supervisory and Administrative Personnel
Up to \$5,000,000	One Project Superintendent
Over \$ 5,000,000 - up to \$25,000,000	One Project Manager, One Project Superintendent or Engineer, and One Clerk
Over \$25,000,000 - up to \$50,000,000	One Project Manager, One Project Superintendent, One Engineer, and One Clerk
Over \$50,000,000	One Project Manager, Two Project Superintendents, One Engineer, and One Clerk

- (2) Home Office and Unabsorbed Overhead. Payment for home office and unabsorbed overhead will be calculated as 8 percent of the total delay cost.

- (c) Extended Traffic Control. Traffic control required for an extended period of time due to the delay will be paid. For working day contracts the payment will be made according to Article 109.04. For completion date contracts, an adjustment will be determined as follows.

Extended Traffic Control occurs between April 1 and November 30:

$$\text{ETCP Adjustment (\$)} = \text{TE} \times (\% / 100 \times \text{CUP} / \text{OCT})$$

Extended Traffic Control occurs between December 1 and March 31:

$$\text{ETCP Adjustment (\$)} = \text{TE} \times 1.5 (\% / 100 \times \text{CUP} / \text{OCT})$$

Where: TE = Duration of approved time extension in calendar days.  
 % = Percent maintenance for the traffic control, % (see table below).  
 CUP = Contract unit price for the traffic control pay item in place during the delay.  
 OCT = Original contract time in calendar days.

Original Contract Amount	Percent Maintenance
Up to \$2,000,000	65%
\$2,000,000 to \$10,000,000	75%
\$10,000,000 to \$20,000,000	85%
Over \$20,000,000	90%

When an ETCP adjustment is paid under this provision, an adjusted unit price as provided for in Article 701.20(a) for increase or decrease in the value of work by more than ten percent will not be paid.

Upon payment for a contract delay under this provision, the Contractor shall assign subrogation rights to the Department for the Department’s efforts of recovery from any other party for monies paid by the Department as a result of any claim under this provision. The Contractor shall fully cooperate with the Department in its efforts to recover from another party any money paid to the Contractor for delay damages under this provision.”

**CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE)**

Effective: June 1, 2010

Revised: November 1, 2014

The reduction of emissions of particulate matter (PM) for off-road equipment shall be accomplished by installing retrofit emission control devices. The term “equipment” refers to diesel fuel powered devices rated at 50 hp and above, to be used on the jobsite in excess of seven calendar days over the course of the construction period on the jobsite (including rental equipment).

Contractor and subcontractor diesel powered off-road equipment assigned to the contract shall be retrofitted using the phased in approach shown below. Equipment that is of a model year older than the year given for that equipment's respective horsepower range shall be retrofitted:

Effective Dates	Horsepower Range	Model Year
June 1, 2010 <sup>1/</sup>	600-749	2002
	750 and up	2006
June 1, 2011 <sup>2/</sup>	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006
June 1, 2012 <sup>2/</sup>	50-99	2004
	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006

- 1/ Effective dates apply to Contractor diesel powered off-road equipment assigned to the contract.
- 2/ Effective dates apply to Contractor and subcontractor diesel powered off-road equipment assigned to the contract.

The retrofit emission control devices shall achieve a minimum PM emission reduction of 50 percent and shall be:

- a) Included on the U.S. Environmental Protection Agency (USEPA) *Verified Retrofit Technology List* (<http://www.epa.gov/cleandiesel/verification/verif-list.htm>), or verified by the California Air Resources Board (CARB) (<http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm>); or
- b) Retrofitted with a non-verified diesel retrofit emission control device if verified retrofit emission control devices are not available for equipment proposed to be used on the project, and if the Contractor has obtained a performance certification from the retrofit device manufacturer that the emission control device provides a minimum PM emission reduction of 50 percent.

Note: Large cranes (Crawler mounted cranes) which are responsible for critical lift operations are exempt from installing retrofit emission control devices if such devices adversely affect equipment operation.

Diesel powered off-road equipment with engine ratings of 50 hp and above, which are unable to be retrofitted with verified emission control devices or if performance certifications are not available which will achieve a minimum 50 percent PM reduction, may be granted a waiver by the Department if documentation is provided showing good faith efforts were made by the Contractor to retrofit the equipment.

Construction shall not proceed until the Contractor submits a certified list of the diesel powered off-road equipment that will be used, and as necessary, retrofitted with emission control devices. The list(s) shall include (1) the equipment number, type, make, Contractor/rental company name; and (2) the emission control devices make, model, USEPA or CARB verification number, or performance certification from the retrofit device manufacturer. Equipment reported as fitted with emissions control devices shall be made available to the Engineer for visual inspection of the device installation, prior to being used on the jobsite.

The Contractor shall submit an updated list of retrofitted off-road construction equipment as retrofitted equipment changes or comes on to the jobsite. The addition or deletion of any diesel powered equipment shall be included on the updated list.

If any diesel powered off-road equipment is found to be in non-compliance with any portion of this special provision, the Engineer will issue the Contractor a diesel retrofit deficiency deduction.

Any costs associated with retrofitting any diesel powered off-road equipment with emission control devices shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall not be grounds for a claim.

#### **Diesel Retrofit Deficiency Deduction**

When the Engineer determines that a diesel retrofit deficiency exists, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be \$1,000.00 for each deficiency identified.

The deficiency will be based on lack of diesel retrofit emissions control.

If a Contractor accumulates three diesel retrofit deficiency deductions for the same piece of equipment in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of the contract time, waiver of penalties, or be grounds for any claim.

#### **DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)**

Effective: September 1, 2000

Revised: April 2, 2018

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR Part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.



STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract that the Contractor signs with a subcontractor.

The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (a) Withholding progress payments;
- (b) Assessing sanctions;
- (c) Liquidated damages; and/or
- (d) Disqualifying the Contractor from future bidding as non-responsible.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR Part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. The determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform **0.00%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

- (a) The bidder documents that enough DBE participation has been obtained to meet the goal or,
- (b) The bidder documents that a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders shall consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217) 785-4611, or by visiting the Department's website at:

<http://www.idot.illinois.gov/doing-business/certifications/disadvantaged-business-enterprise-certification/il-ucp-directory/index>.

BIDDING PROCEDURES. Compliance with this Special Provision is required prior to the award of the contract and the failure of the low bidder to comply will render the bid not responsive.

In order to assure the timely award of the contract, the low bidder shall submit:

- (a) The bidder shall submit a DBE Utilization Plan on completed Department forms SBE 2025 and 2026.
  - (1) The final Utilization Plan must be submitted within five calendar days after the date of the letting in accordance with subsection (a)(2) of Bidding Procedures herein.
  - (2) To meet the five day requirement, the bidder may send the Utilization Plan electronically by scanning and sending to **DOT.DBE.UP@illinois.gov** or faxing to (217) 785-1524. The subject line must include the bid Item Number and the Letting date. The Utilization Plan should be sent as one .pdf file, rather than multiple files and emails for the same Item Number. It is the responsibility of the bidder to obtain confirmation of email or fax delivery.

Alternatively, the Utilization Plan may be sent by certified mail or delivery service within the five calendar day period. If a question arises concerning the mailing date of a Utilization Plan, the mailing date will be established by the U.S. Postal Service postmark on the certified mail receipt from the U.S. Postal Service or the receipt issued by a delivery service when the Utilization Plan is received by the Department. It is the responsibility of the bidder to ensure the postmark or receipt date is affixed within the five days if the bidder intends to rely upon mailing or delivery to satisfy the submission day requirement. The Utilization Plan is to be submitted to:

Illinois Department of Transportation  
Bureau of Small Business Enterprises  
Contract Compliance Section  
2300 South Dirksen Parkway, Room 319  
Springfield, Illinois 62764

The Department will not accept a Utilization Plan if it does not meet the five day submittal requirement and the bid will be declared not responsive. In the event the bid is declared not responsive due to a failure to submit a Utilization Plan or failure to comply with the bidding procedures set forth herein, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty, and may deny authorization to bid the project if re-advertised for bids. The Department reserves the right to invite any other bidder to submit a Utilization Plan at any time for award consideration.

- (b) The Utilization Plan shall indicate that the bidder either has obtained sufficient DBE participation commitments to meet the contract goal or has not obtained enough DBE participation commitments in spite of a good faith effort to meet the goal. The Utilization Plan shall further provide the name, telephone number, and telefax number of a responsible official of the bidder designated for purposes of notification of Utilization Plan approval or disapproval under the procedures of this Special Provision.
- (c) The Utilization Plan shall include a DBE Participation Commitment Statement, Department form SBE 2025, for each DBE proposed for the performance of work to achieve the contract goal. For bidding purposes, submission of the completed SBE 2025 forms, signed by the DBEs and scanned or faxed to the bidder will be acceptable as long as the original is available and provided upon request. All elements of information indicated on the said form shall be provided, including but not limited to the following:
  - (1) The names and addresses of DBE firms that will participate in the contract;
  - (2) A description, including pay item numbers, of the work each DBE will perform;
  - (3) The dollar amount of the participation of each DBE firm participating. The dollar amount of participation for identified work shall specifically state the quantity, unit price, and total subcontract price for the work to be completed by the DBE. If partial pay items are to be performed by the DBE, indicate the portion of each item, a unit price where appropriate and the subcontract price amount;

- (4) DBE Participation Commitment Statements, form SBE 2025, signed by the bidder and each participating DBE firm documenting the commitment to use the DBE subcontractors whose participation is submitted to meet the contract goal;
- (5) If the bidder is a joint venture comprised of DBE companies and non-DBE companies, the Utilization Plan must also include a clear identification of the portion of the work to be performed by the DBE partner(s); and,
- (6) If the contract goal is not met, evidence of good faith efforts; the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor is selected over a DBE for work on the contract.

GOOD FAITH EFFORT PROCEDURES. The contract will not be awarded until the Utilization Plan submitted by the apparent successful bidder is approved. All information submitted by the bidder must be complete, accurate and adequately document that enough DBE participation has been obtained or document that good faith efforts of the bidder, in the event enough DBE participation has not been obtained, before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan documents sufficient commercially useful DBE work to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A. The Utilization Plan will not be approved by the Department if the Utilization Plan does not document sufficient DBE participation to meet the contract goal unless the apparent successful bidder documented in the Utilization Plan that it made a good faith effort to meet the goal. This means that the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts that the bidder has made. Mere *pro forma* efforts, in other words, efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

- (a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases, and will be considered by the Department.
  - (1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.

- (2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime Contractor might otherwise prefer to perform these work items with its own forces.
- (3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.
  - b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable. In accordance with subsection (c)(6) of the above Bidding Procedures, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.
- (5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
- (6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.
- (7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.

- (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.
- (b) If the Department determines that the apparent successful bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided that it is otherwise eligible for award. If the Department determines that the bidder has failed to meet the requirements of this Special Provision or that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification shall include a statement of reasons for the determination. If the Utilization Plan is not approved because it is deficient as a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no more than a five calendar day period in order to cure the deficiency.
- (c) The bidder may request administrative reconsideration of a determination adverse to the bidder within the five working days after the receipt of the notification date of the determination by delivering the request to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217) 785-1524). Deposit of the request in the United States mail on or before the fifth business day shall not be deemed delivery. The determination shall become final if a request is not made and delivered. A request may provide additional written documentation or argument concerning the issues raised in the determination statement of reasons, provided the documentation and arguments address efforts made prior to submitting the bid. The request will be forwarded to the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person in order to consider all issues of documentation and whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR Part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR Part 26.55, the provisions of which govern over the summary contained herein.

- (a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.
- (b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.
- (c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the prime Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.
- (d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contract. Credit will be given for the following:
  - (1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
  - (2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission is receives as a result of the lease arrangement.

(e) DBE as a material supplier:

- (1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.
- (2) 100 percent goal credit for the cost of materials of supplies obtained from a DBE manufacturer.
- (3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a DBE regular dealer or DBE manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal. All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the DBE Participation Commitment Statement.

- (a) NO AMENDMENT. No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764. Telephone number (217) 785-4611. Telefax number (217) 785-1524.
- (b) CHANGES TO WORK. Any deviation from the DBE condition-of-award or contract plans, specifications, or special provisions must be approved, in writing, by the Department as provided elsewhere in the Contract. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract. Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A or AER 260A, must be signed and submitted. If the commitment of work is in the form of additional tasks assigned to an existing subcontract, then a new Request for Approval of Subcontractor shall not be required. However, the Contractor must document efforts to assure that the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.



- (c) SUBCONTRACT. The Contractor must provide DBE subcontracts to IDOT upon request. Subcontractors shall ensure that all lower tier subcontracts or agreements with DBEs to supply labor or materials be performed in accordance with this Special Provision.
- (d) ALTERNATIVE WORK METHODS. In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:
- (1) That the replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or
  - (2) That the DBE is aware that its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or
  - (3) That the DBE is not capable of performing the replacement work or has declined to perform the work at a reasonable competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.
- (e) TERMINATION AND REPLACEMENT PROCEDURES. The Contractor shall not terminate or replace a DBE listed on the approved Utilization Plan, or perform with other forces work designated for a listed DBE except as provided in this Special Provision. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the Department's written consent as provided in subsection (a) of this part. Unless Department consent is provided for termination of a DBE subcontractor, the Contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the DBE in the Utilization Plan.

As stated above, the Contractor shall not terminate or replace a DBE subcontractor listed in the approved Utilization Plan without prior written consent. This includes, but is not limited to, instances in which the Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Written consent will be granted only if the Bureau of Small Business Enterprises agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate or replace the DBE firm. Before transmitting to the Bureau of Small Business Enterprises any request to terminate and/or substitute a DBE subcontractor, the Contractor shall give notice in writing to the DBE subcontractor, with a copy to the Bureau, of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor shall give the DBE five days to respond to the Contractor's notice. The DBE so notified shall advise the Bureau and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Bureau should not approve the Contractor's action. If required in a particular case as a matter of public necessity, the Bureau may provide a response period shorter than five days.

For purposes of this paragraph, good cause includes the following circumstances:

- (1) The listed DBE subcontractor fails or refuses to execute a written contract;
- (2) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
- (3) The listed DBE subcontractor fails or refuses to meet the prime Contractor's reasonable, nondiscriminatory bond requirements;
- (4) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (5) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1200 or applicable state law.
- (6) You have determined that the listed DBE subcontractor is not a responsible contractor;
- (7) The listed DBE subcontractor voluntarily withdraws from the projects and provides to you written notice of its withdrawal;
- (8) The listed DBE is ineligible to receive DBE credit for the type of work required;
- (9) A DBE owner dies or becomes disabled with the result that the listed DBE subcontractor is unable to complete its work on the contract;
- (10) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the prime Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the prime Contractor can self-perform the work for which the DBE contractor was engaged or so that the prime Contractor can substitute another DBE or non-DBE contractor after contract award.

When a DBE is terminated, or fails to complete its work on the Contract for any reason the Contractor shall make a good faith effort to find another DBE to substitute for the original DBE to perform at least the same amount of work under the contract as the terminated DBE to the extent needed to meet the established Contract goal. The good faith efforts shall be documented by the Contractor. If the Department requests documentation under this provision, the Contractor shall submit the documentation within seven days, which may be extended for an additional seven days if necessary at the request of the Contractor. The Department shall provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

- (f) **FINAL PAYMENT.** After the performance of the final item of work or delivery of material by a DBE and final payment therefore to the DBE by the Contractor, but not later than thirty calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Agreement on Department form SBE 2115 to the Resident Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes that the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (h) of this part.
- (g) **ENFORCEMENT.** The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.
- (h) **RECONSIDERATION.** Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of "Good Faith Effort Procedures" of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

#### **EQUIPMENT PARKING AND STORAGE (BDE)**

Effective: November 1, 2017

Replace the first paragraph of Article 701.11 of the Standard Specifications with the following.

**"701.11 Equipment Parking and Storage.** During working hours, all vehicles and/or nonoperating equipment which are parked, two hours or less, shall be parked at least 8 ft (2.5 m) from the open traffic lane. For other periods of time during working and for all nonworking hours, all vehicles, materials, and equipment shall be parked or stored as follows.

- (a) When the project has adequate right-of-way, vehicles, materials, and equipment shall be located a minimum of 30 ft (9 m) from the pavement.
- (b) When adequate right-of-way does not exist, vehicles, materials, and equipment shall be located a minimum of 15 ft (4.5 m) from the edge of any pavement open to traffic.

(c) Behind temporary concrete barrier, vehicles, materials, and equipment shall be located a minimum of 24 in. (600 mm) behind free standing barrier or a minimum of 6 in. (150 mm) behind barrier that is either pinned or restrained according to Article 704.04. The 24 in. or 6 in. measurement shall be from the base of the non-traffic side of the barrier.

(d) Behind other man-made or natural barriers meeting the approval of the Engineer.”

**LIGHTS ON BARRICADES (BDE)**

Effective: January 1, 2018

Revise Article 701.16 of the Standard Specifications to read:

“**701.16 Lights.** Lights shall be used on devices as required in the plans, the traffic control plan, and the following table.

Circumstance	Lights Required
Daylight operations	None
First two warning signs on each approach to the work involving a nighttime lane closure and “ROUGH GROOVED SURFACE” (W8-I107) signs	Flashing mono-directional lights
Devices delineating isolated obstacles, excavations, or hazards at night (Does not apply to patching)	Flashing bi-directional lights
Devices delineating obstacles, excavations, or hazards exceeding 100 ft (30 m) in length at night (Does not apply to widening)	Steady burn bi-directional lights
Channelizing devices for nighttime lane closures on two-lane roads	None
Channelizing devices for nighttime lane closures on multi-lane roads	None
Channelizing devices for nighttime lane closures on multi-lane roads separating opposing directions of traffic	None
Channelizing devices for nighttime along lane shifts on multilane roads	Steady burn mono-directional lights
Channelizing devices for night time along lane shifts on two lane roads	Steady burn bi-directional lights
Devices in nighttime lane closure tapers on Standards 701316 and 701321	Steady burn bi-directional lights
Devices in nighttime lane closure tapers	Steady burn mono-directional lights
Devices delineating a widening trench	None
Devices delineating patches at night on roadways with an ADT less than 25,000	None
Devices delineating patches at night on roadways with an ADT of 25,000 or more	None

Batteries for the lights shall be replaced on a group basis at such times as may be specified by the Engineer.”

Delete the fourth sentence of the first paragraph of Article 701.17(c)(2) of the Standard Specifications.

Revise the first paragraph of Article 603.07 of the Standard Specifications to read:

“**603.07 Protection Under Traffic.** After the casting has been adjusted and Class SI concrete has been placed, the work shall be protected by a barricade for at least 72 hours.”

**PAYMENTS TO SUBCONTRACTORS (BDE)**

Effective: November 2, 2017

Add the following to the end of the fourth paragraph of Article 109.11 of the Standard Specifications:

“If reasonable cause is asserted, written notice shall be provided to the applicable subcontractor and/or material supplier and the Engineer within five days of the Contractor receiving payment. The written notice shall identify the contract number, the subcontract or material purchase agreement, a detailed reason for refusal, the value of payment being withheld, and the specific remedial actions required of the subcontractor and/or material supplier so that payment can be made.”

**PORTLAND CEMENT CONCRETE (BDE)**

Effective: November 1, 2017

Revise the Air Content % of Class PP Concrete in Table 1 Classes of Concrete and Mix Design Criteria in Article 1020.04 of the Standard Specifications to read:

"TABLE 1. CLASSES OF CONCRETE AND MIX DESIGN CRITERIA		
Class of Conc.	Use	Air Content %
PP	Pavement Patching	4.0 - 8.0"
	Bridge Deck Patching (10)	
	PP-1	
	PP-2	
	PP-3	
	PP-4	
	PP-5	

Revise Note (4) at the end of Table 1 Classes of Concrete and Mix Design Criteria in Article 1020.04 of the Standard Specifications to read:

“(4) For all classes of concrete, the maximum slump may be increased to 7 in (175 mm) when a high range water-reducing admixture is used. For Class SC, the maximum slump may be increased to 8 in. (200 mm). For Class PS, the maximum slump may be increased to 8 1/2 in. (215 mm) if the high range water-reducing admixture is the polycarboxylate type.”

**PROGRESS PAYMENTS (BDE)**

Effective: November 2, 2013

Revise Article 109.07(a) of the Standard Specifications to read:

- “(a) Progress Payments. At least once each month, the Engineer will make a written estimate of the quantity of work performed in accordance with the contract, and the value thereof at the contract unit prices. The amount of the estimate approved as due for payment will be vouchered by the Department and presented to the State Comptroller for payment. No amount less than \$1000.00 will be approved for payment other than the final payment.

Progress payments may be reduced by liens filed pursuant to Section 23(c) of the Mechanics’ Lien Act, 770 ILCS 60/23(c).

If a Contractor or subcontractor has defaulted on a loan issued under the Department’s Disadvantaged Business Revolving Loan Program (20 ILCS 2705/2705-610), progress payments may be reduced pursuant to the terms of that loan agreement. In such cases, the amount of the estimate related to the work performed by the Contractor or subcontractor, in default of the loan agreement, will be offset, in whole or in part, and vouchered by the Department to the Working Capital Revolving Fund or designated escrow account. Payment for the work shall be considered as issued and received by the Contractor or subcontractor on the date of the offset voucher. Further, the amount of the offset voucher shall be a credit against the Department’s obligation to pay the Contractor, the Contractor’s obligation to pay the subcontractor, and the Contractor’s or subcontractor’s total loan indebtedness to the Department. The offset shall continue until such time as the entire loan indebtedness is satisfied. The Department will notify the Contractor and Fund Control Agent in a timely manner of such offset. The Contractor or subcontractor shall not be entitled to additional payment in consideration of the offset.

The failure to perform any requirement, obligation, or term of the contract by the Contractor shall be reason for withholding any progress payments until the Department determines that compliance has been achieved.”

**SUBCONTRACTOR AND DBE PAYMENT REPORTING (BDE)**

Effective: April 2, 2018

Add the following to Section 109 of the Standard Specifications.

**“109.14 Subcontractor and Disadvantaged Business Enterprise Payment Reporting.**  
 The Contractor shall report all payments made to the following parties:

- (a) first tier subcontractors;
- (b) lower tier subcontractors affecting disadvantaged business enterprise (DBE) goal credit;
- (c) material suppliers or trucking firms that are part of the Contractor’s submitted DBE utilization plan.

The report shall be made through the Department’s on-line subcontractor payment reporting system within 21 days of making the payment.”

**SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)**

Effective: November 2, 2017

Replace the second paragraph of Article 109.12 of the Standard Specifications with the following:

“This mobilization payment shall be made at least 14 days prior to the subcontractor starting work. The amount paid shall be at the following percentage of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor’s work.

Value of Subcontract Reported on Form BC 260A	Mobilization Percentage
Less than \$10,000	25%
\$10,000 to less than \$20,000	20%
\$20,000 to less than \$40,000	18%
\$40,000 to less than \$60,000	16%
\$60,000 to less than \$80,000	14%
\$80,000 to less than \$100,000	12%
\$100,000 to less than \$250,000	10%
\$250,000 to less than \$500,000	9%
\$500,000 to \$750,000	8%
Over \$750,000	7%”

**WEEKLY DBE TRUCKING REPORTS (BDE)**

Effective: June 2, 2012

Revised: April 2, 2015

The Contractor shall submit a weekly report of Disadvantaged Business Enterprise (DBE) trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) that are used for DBE goal credit.

The report shall be submitted to the Engineer on Department form "SBE 723" within ten business days following the reporting period. The reporting period shall be Monday through Sunday for each week reportable trucking activities occur.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.



## **REVISIONS TO THE ILLINOIS PREVAILING WAGE RATES**

The Prevailing rates of wages are included in the Contract proposals which are subject to Check Sheet #5 of the Supplemental Specifications and Recurring Special Provisions. The rates have been ascertained and certified by the Illinois Department of Labor for the locality in which the work is to be performed and for each craft or type of work or mechanic needed to execute the work of the Contract. As required by Prevailing Wage Act (820 ILCS 130/0.01, et seq.) and Check Sheet #5 of the Contract, not less than the rates of wages ascertained by the Illinois Department of Labor and as revised during the performance of a Contract shall be paid to all laborers, workers and mechanics performing work under the Contract. Post the scale of wages in a prominent and easily accessible place at the site of work.

If the Illinois Department of Labor revises the prevailing rates of wages to be paid as listed in the specification of rates, the contractor shall post the revised rates of wages and shall pay not less than the revised rates of wages. Current wage rate information shall be obtained by visiting the Illinois Department of Labor web site at <http://www.state.il.us/agency/idol/> or by calling 312-793-2814. It is the responsibility of the contractor to review the rates applicable to the work of the contract at regular intervals in order to insure the timely payment of current rates. Provision of this information to the contractor by means of the Illinois Department of Labor web site satisfies the notification of revisions by the Department to the contractor pursuant to the Act, and the contractor agrees that no additional notice is required. The contractor shall notify each of its subcontractors of the revised rates of wages.