



# Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

February 15, 2008

SUBJECT: FAP Route 318 (IL 6)  
Project ACNHF-ACHSIP-0318 (011)  
Section 72-(6-1)RS  
Peoria County  
Contract No. 68110  
Item No. 66, March 7, 2008 Letting  
Addendum A

## NOTICE TO PROSPECTIVE BIDDERS:

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

1. Deleted sheets 64 and 65 of the Plans.
2. Revised pages 18, 20, 22, 32 – 37, 39 and 41 – 46 of the Special Provisions.

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

Bidders using computer-generated bids are cautioned to reflect any and all Schedule of Prices changes, if involved, into their computer programs.

Very truly yours,

Eric E. Harm  
Interim Bureau Chief  
Bureau of Design and Environment

A handwritten signature in cursive script, reading "Ted B. Walschleger P.E.".

By: Ted B. Walschleger, P. E.  
Engineer of Project Management

cc: J. E. Crowe, Region 3, District 4; Roger Driskell; Estimates

TBW:RS:jc

The detector amplifier shall be equipped with relay or solid state outputs to ensure that the detectors fail in a constant call mode.

The RENO A&E Model C-1200 Series, EDI Oracle Series, and Naztec Model 772 are currently approved for use within the District.

Basis of Payment: This work shall be paid for at the contract unit price each for INDUCTIVE LOOP DETECTOR which price shall be payment in full for all labor, equipment, and materials required to supply and install the inductive loop detector described above, complete.

### **FULL ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL**

This work shall be in accordance with Sections 857, 1073, and 1074 of the Standard Specifications except as modified herein.

The cabinet and controller shall be compatible with Naztec Streetwise Lite remote monitoring software.

Controller: The controller shall be a Naztec model 2070L TS-2 Type 1 with the following configuration:

- 2070-1B CPU Module – Qty. 1
- 2070-2N TS-2 Type 1 Field I/O Module – Qty. 1
- 2070-3B Front Panel Display Module, 8 Line x 40 Character LCD – Qty. 1
- 2070-4B 3.5 Amp Power Supply Module – Qty. 1
- 2070-7A Dual Serial Port Module – Qty. 1
- Lite Unit Chassis – Qty. 1
- Licensed Copy of OS-9 Operating System – Qty. 1
- Licensed Copy of Apogee Software – Qty. 1
- Licensed Copy of Val-Suite Software –Qty. 1

Controller Cabinet Components: The cabinet shall include the following components:

- Naztec TS-2 MMU-516E Tri-Color Monitor – Qty. 1
- Naztec TS-2 BIU Card – As Required
- Naztec TS-2 Cabinet Power Supply – Qty. 1
- Load Switches – As Required
- Flasher – Qty. 1
- Flash Transfer Relays – As Required

Controller Cabinet: The cabinet shall include the following items:

- Type “P44” Enclosure with dimensions of 54” (H) x 44” (W) x 26” (D), Natural Aluminum Finish, Three Point Latching System on Main Door with Corbin #2 Lock, One Police Door with Lock, Signals On/Off Switch, Manual Enable Switch, Auto/Flash Switch, and Interval Advance Button – Qty. 1
- 16 Position TS-2 Type 1 Back Panel with 6 SDLC Cables – Qty. 1

Revised 02/15/2008

## **FULL ACTUATED CONTROLLER AND TYPE V CABINET, SPECIAL**

This work shall be in accordance with Sections 857, 1073, and 1074 of the Standard Specifications except as modified herein.

The Contractor shall remove the battery backup system cabinet and components from the existing signal cabinet at the intersection of IL 6 & IL 29 and install them on or in the proposed cabinet. This work will not be paid for separately, but shall be included in the bid price for this pay item.

The cabinet and controller shall be compatible with Naztec Streetwise Lite remote monitoring software.

Controller: The controller shall be a Naztec model 2070L TS-2 Type 1 with the following configuration:

- 2070-1B CPU Module – Qty. 1
- 2070-2N TS-2 Type 1 Field I/O Module – Qty. 1
- 2070-3B Front Panel Display Module, 8 Line x 40 Character LCD – Qty. 1
- 2070-4B 3.5 Amp Power Supply Module – Qty. 1
- 2070-7A Dual Serial Port Module – Qty. 1
- Lite Unit Chassis – Qty. 1
- Licensed Copy of OS-9 Operating System – Qty. 1
- Licensed Copy of Apogee Software with DCS Module – Qty. 1
- Licensed Copy of Val-Suite Software – Qty. 1

Controller Cabinet Components: The cabinet shall include the following components:

- Naztec TS-2 MMU-516E Tri-Color Monitor – Qty. 1
- Naztec TS-2 BIU Card – As Required
- Naztec TS-2 Cabinet Power Supply – Qty. 1
- Load Switches – As Required
- Flasher – Qty. 1
- Flash Transfer Relays – As Required

Controller Cabinet: The cabinet shall include the following items:

- Type “R” Enclosure with dimensions of 77” (H) x 44” (W) x 26” (D), Natural Aluminum Finish, Three Point Latching System on Main Door with Corbin #2 Lock, One Police Door with Lock, Signals On/Off Switch, Manual Enable Switch, Auto/Flash Switch, and Interval Advance Button – Qty. 1
- 16 Position TS-2 Type 1 Back Panel with 6 SDLC Cables – Qty. 1
- 16 Loop Input Detector Panel – As Required (Min. Qty. 1)
- 8 Position Detector Rack Wired For Dual Channel TS-2 Detector Cards – As Required (Min. Qty. 1)
- Power Panel Assembly with One GFCI Outlet – Qty. 1
- Tech Panel with Stop Time Switch, Flash Switch, Controller On/Off Switch – Qty. 1
- “D” Panel – Qty. 1

Revised 02/15/2008

The master controller shall be compatible with the remote monitoring equipment at the Department of Transportation's remote monitoring facility which is currently equipped with Naztec Streetwise Lite remote monitoring software. The master controller shall be equipped with the latest firmware revisions and additional surge protection for the modem line and main power facility.

The master controller shall be a Naztec 2070 equipped with master controller software. The master controller shall be a separate component from the local controller.

The master controller shall be equipped with all components required for RS-232 or Ethernet and an industrial (hardened) 56K Dial-Up external modem that will be used to communicate with the Streetwise Lite software at the remote monitoring facility.

A Transtector DSSLNFX telephone (RJ11)/power surge suppressor or approved equivalent shall be included with the master controller.

Basis of Payment: This work will be paid for at the contract unit price each for MASTER CONTROLLER, SPECIAL and shall be payment in full for all labor, materials, and equipment required to provide, test, and install the equipment described above, complete.

**FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F, SM12F**

This work shall be in accordance with Section 871 and 1076 of the Standard Specifications except as modified herein.

The fiber optic cable shall be a 24 fiber hybrid cable with 12 multi-mode and 12 single mode fibers.

Six multi-mode fibers shall be terminated in each traffic signal cabinet. All terminated fibers shall be clearly labeled. Any necessary fiber optic cables, connectors, and hardware shall be included in this pay item to provide the six fibers at each intersection as specified.

Article 815.03(d) calls for cable marking tape to be installed as part of “trench and backfill for electrical work”. This requirement is waived and the following section shall apply:

12 Ga., stranded THHN, insulated orange tracer cable is to be pulled into all conduits that contain fiber optic cable. This work shall be done at the same time the fiber optic cable is pulled. There will be no additional compensation for this work.

The amount of slack cable listed in Article 873.03 shall be revised as follows:

Location	Length of Slack Cable	
	Meters	Feet
Gulfbox	2.0	6.0
Junction Box	2.0	6.0
Handhole	5.0	16.0
Double Handhole	11.0	36.0
Controller Cabinet	4.0	13.0

Revised 02/15/2008

The LED assemblies for the red, yellow, and green solid and arrow indications shall meet or exceed the following minimum specifications:

### RED LED ASSEMBLY

Currently, only the following models are approved by the Department for use provided that they meet the minimum specifications listed below:

GELcore            Model DR6-RTFB-17A

Dialight            Model DURALED 433-1210-003

The LED assembly must conform to the following minimum specifications:

Lens : 300mm (12") Diameter, Red, Hard Coated for Abrasion Resistance, UV Stabilized Dome, Designed to Evenly Distribute Light Across the Entire Face of the Lens to Provide a Uniform Illuminance Across the Face of The LED, Provide a Wide Angle For Viewing, And Eliminate any "Dotty" or Grainy Appearance.

LEDS: Interconnected to minimize the effect of single LED failures, Nominal Wattage : 6 - 10 W or less, Nominal Wavelength : 625-626nm

Minimum Luminous Intensity (cd): 365

Product Warranty: 5 Year Replacement (Materials, Workmanship, and Intensity)

The assembly shall be capable of operating from 80 to 135 VAC with less than 10% variation in intensity, shall have an operating temperature range of -40° to 74°C, and shall be sealed and highly resistant to water intrusion.

The assembly shall conform to the latest applicable (Part II) ITE color requirements and meet ITE VTCSH LED Circular Signal Supplement June 2005 specifications for LED traffic signals, including intensity requirements at -40° to 74°C.

The assembly shall be compatible with signal control equipment per NEMA TS-2, NEMA TS-1 standards, and include transient voltage protection and fusing to withstand high-repetition noise transients and low repetition high energy transients per NEMA standard 1992 and ITE VTCSH - STD PART 2.

### YELLOW LED ASSEMBLY

Currently, only the following models are approved by the Department for use provided that they meet the minimum specifications listed below:

GELcore            Model DR6-YTFB-17A

Dialight            Model DURALED 433-3230-001XL

The LED assembly must conform to the following minimum specifications:

Revised 02/15/2008

Lens : 300mm (12") Diameter, Clear or Yellow, Hard Coated for Abrasion Resistance, UV Stabilized Dome, Designed to Evenly Distribute Light Across the Entire Face of the Lens to Provide a Uniform Illuminance Across the Face of The LED, Provide a Wide Angle For Viewing, And Eliminate any "Dotty" or Grainy Appearance

LEDS: Interconnected to minimize the effect of single LED failures, Nominal Wattage : 19 W or less, Nominal Wavelength : 589-590nm

Minimum Luminous Intensity (cd): 910

Product Warranty: 5 Year Replacement (Materials, Workmanship, and Intensity)

The assembly shall be capable of operating from 80 to 135 VAC with less than 10% variation in intensity, shall have an operating temperature range of -40° to 74°C, and shall be sealed and highly resistant to water intrusion.

The assembly shall conform to the latest applicable (Part II) ITE color requirements and meet ITE VTCSH LED Circular Signal Supplement June 2005 specifications for LED traffic signals, including intensity requirements at -40° to 74°C, except for when its terms are in conflict with the terms contained in this special provision. In such cases, this special provision shall supersede the contrary ITE specification.

The assembly shall be compatible with signal control equipment per NEMA TS-2, NEMA TS-1 standards, and include transient voltage protection and fusing to withstand high-repetition noise transients and low repetition high energy transients per NEMA standard 1992 and ITE VTCSH - STD PART 2.

### GREEN LED ASSEMBLY

Currently, only the following models are approved by the Department for use provided that they meet the minimum specifications listed below:

GELcore Model DR6-GCFB-17A (Clear)

Dialight Model 433-2220-001XL (Tinted Lens)

The LED assembly must conform to the following minimum specifications:

Lens : 300mm (12") Diameter, Hard Coated for Abrasion Resistance, UV Stabilized Dome, Designed to Evenly Distribute Light Across the Entire Face of the Lens to Provide a Uniform Illuminance Across the Face of The LED, Provide a Wide Angle For Viewing, And Eliminate any "Dotty" or Grainy Appearance

LEDS: Interconnected to minimize the effect of single LED failures, Nominal Wattage : 9-13 W or less, Nominal Wavelength : 500nm

Minimum Luminous Intensity (cd): 475

Product Warranty: 5 Year Replacement (Materials, Workmanship, and Intensity)

Revised 02/15/2008

The assembly shall be capable of operating from 80 to 135 VAC with less than 10% variation in intensity, shall have an operating temperature range of -40° to 74°C, and shall be sealed and highly resistant to water intrusion.

The assembly shall conform to the latest applicable (Part II) ITE color requirements and meet ITE VTCSH LED Circular Signal Supplement June, 2005 specifications for LED traffic signals, including intensity requirements at -40° to 74°C.

The assembly shall be compatible with signal control equipment per NEMA TS-2, NEMA TS-1 standards, and include transient voltage protection and fusing to withstand high-repetition noise transients and low repetition high energy transients per NEMA standard 1992 and ITE VTCSH - STD Part 2

### GREEN ARROW LED ASSEMBLY

Currently, only the following models are approved by the Department for use provided that they meet the minimum specifications listed below:

GELcore            Model DR6-GCAAN-17A

Dialight            Model 432-2374-001 (XOD)

The LED assembly must conform to the following minimum specifications:

Lens : 300mm (12") Diameter, Hard Coated for Abrasion Resistance, UV Stabilized Dome, Designed to Evenly Distribute Light Across the Entire Face of the Lens to Provide a Uniform Illuminance Across the Face of The LED, Provide a Wide Angle For Viewing, And Eliminate any "Dotty" or Grainy Appearance.

LEDs: Interconnected to minimize the effect of single LED failures, Nominal Wattage: 5-6 W or less, Nominal Wavelength: 500nm, Shall Have a Full Profile Arrow Indication (No Outlined or 2 Row Indications)

Minimum Luminous Intensity (cd): 176

Product Warranty: 5 Year Replacement (Materials, Workmanship, and Intensity)

The assembly shall be capable of operating from 80 to 135 VAC with less than 10% variation in intensity, shall have an operating temperature range of -40° to 74°C, and shall be sealed and highly resistant to water intrusion.

The assembly shall conform to the latest applicable (Part II) ITE color requirements and meet ITE VTCSH LED Vehicle Arrow Traffic Signal Supplement July 1, 2007 specifications for LED traffic signals, including intensity requirements at -40° to 74°C.

The assembly shall be compatible with signal control equipment per NEMA TS-2, NEMA TS-1 standards, and include transient voltage protection and fusing to withstand high-repetition noise transients and low repetition high energy transients per NEMA standard 1992 per ITE VTCSH - STD Part 3.

Revised 02/15/2008

YELLOW ARROW LED ASSEMBLY

Currently, only the following models are approved by the Department for use provided that they meet the minimum specifications listed below:

GELcore                    Model DR6-YTAAN-17A  
Dialight                    Model 431-3334-001 (XOD)

The LED assembly must conform to the following minimum specifications:

Lens : 300mm (12") Diameter, Clear or Yellow, Hard Coated for Abrasion Resistance, UV Stabilized Dome, Designed to Evenly Distribute Light Across the Entire Face of the Lens to Provide a Uniform Illuminance Across the Face of The LED, Provide a Wide Angle For Viewing, And Eliminate any "Dotty" or Grainy Appearance

LEDS: Interconnected to minimize the effect of single LED failures, Nominal Wattage: 12 W or less, Nominal Wavelength: 590-592nm, Shall Have a Full Profile Arrow Indication (No Outlined or 2 Row Indications)

Minimum Luminous Intensity (cd): 141.6-146

Product Warranty: 5 Year Replacement (Materials, Workmanship, and Intensity)

The assembly shall be capable of operating from 80 to 135 VAC with less than 10% variation in intensity, shall have an operating temperature range of -40° to 74°C, and shall be sealed and highly resistant to water intrusion.

The assembly shall conform to the latest applicable (Part II) ITE color requirements and meet ITE VTCSH LED Vehicle Arrow Traffic Signal Supplement July 1, 2007 specifications for LED traffic signals, including intensity requirements at -40° to 74°C, except for when its terms are in conflict with the terms contained in this special provision. In such cases, this special provision shall supersede the contrary ITE specification.

The assembly shall be compatible with signal control equipment per NEMA TS-2, NEMA TS-1 standards, and include transient voltage protection and fusing to withstand high-repetition noise transients and low repetition high energy transients per NEMA standard 1992 per ITE VTCSH - STS Part 3.

RED ARROW LED ASSEMBLY

Currently, only the following models are approved by the Department for use provided that they meet the minimum specifications listed below:

GELcore                    Model DR6-RTAAN-17A  
Dialight                    Model 432-1314-001XOD

The LED assembly must conform to the following minimum specifications:

Lens : 300mm (12") Diameter, Hard Coated for Abrasion Resistance, UV Stabilized Dome, Designed to Evenly Distribute Light Across the Entire Face of the Lens to Provide a Uniform Illuminance Across the Face of The LED, Provide a Wide Angle For Viewing, And Eliminate any "Dotty" or Grainy Appearance.

LEDS: Interconnected to minimize the effect of single LED failures, Nominal Wattage: 5-6 W or less, Nominal Wavelength: 626-628nm, Shall Have a Full Profile Arrow Indication (No Outlined or 2 Row Indications)

Minimum Luminous Intensity (cd): 56.8-58

Product Warranty: 5 Year Replacement (Materials, Workmanship, and Intensity)

Revised 02/15/2008



The assembly shall be capable of operating from 80 to 135 VAC with less than 10% variation in intensity, shall have an operating temperature range of -40° to 74°C, and shall be sealed and highly resistant to water intrusion.

The assembly shall conform to the latest applicable (Part II) ITE color requirements and meet ITE VTCSH LED Vehicle Arrow Traffic Signal Supplement July 1, 2007 specifications for LED traffic signals, including intensity requirements at -40° to 74°C.

The assembly shall be compatible with signal control equipment per NEMA TS-2, NEMA TS-1 standards, and include transient voltage protection and fusing to withstand high-repetition noise transients and low repetition high energy transients per NEMA standard 1992 per ITE VTCSH - STD Part 3.

#### YELLOW/GREEN BI-MODAL ARROW

Currently, only the following models are approved by the Department for use provided that they meet the minimum specifications listed below:

GELcore	Model DR6-ECA6-01A (Outline Profile)
Dialight	Model 430-6370-001

The LED assembly must conform to the following minimum specifications:

Lens : 12" Diameter, Hard Coated for Abrasion Resistance, UV Stabilized Dome

LEDs: Interconnected to minimize the effect of single LED failures, Nominal Wattage: 10 W Green, 10 W Yellow or less, Nominal Wavelength: 505 -508 nm Green, 590-592 nm Yellow

Product Warranty: 5 Year Replacement (Materials, Workmanship, and Intensity)

The assembly shall be capable of operating from 80 to 135 VAC with less than 10% variation in intensity, shall have an operating temperature range of 40° to 74°C, and shall be sealed and highly resistant to water intrusion.

The assembly shall conform to the latest applicable (Part II) ITE color requirements and meet ITE specifications for LED traffic signals, including intensity requirements at -40° to 74°C.

The assembly shall be compatible with signal control equipment per NEMA TS-2, NEMA TS-1 standards, and include transient voltage protection and fusing to withstand high-repetition noise transients and low repetition high energy transients per NEMA standard 1992 per ITE VTCSH - STD Part 2.

Basis of Payment: This work will be paid for at the contract unit prices each for SIGNAL HEAD, LED of the type specified and shall be payment in full for all labor, materials, and equipment required to provide and install the traffic signal heads described above, complete.

### **TRAFFIC SIGNAL DETECTION CONTROL SYSTEM, LOCATION 1**

#### PROPOSED TRAFFIC SIGNAL CONTROL EQUIPMENT AND TRAFFIC SIGNAL DETECTION CONTROL SYSTEM

The Contractor shall provide the following systems:

- Naztec D-CS (Consists of Naztec traffic signal control equipment and detector loops installed in the pavement)

Revised 02/15/2008

The traffic signal controller, cabinet, components, and vehicle detectors shall form a complete system. All components supplied under this pay item shall be new and have a two year manufacturer's warranty (parts and labor). All quantities shown on the plan sheets have been calculated and have been deemed to be reliable, however, it is the Contractor's sole responsibility to verify these quantities prior to bidding. There will be no additional compensation for increases over the quantities shown on the plan detail sheets for this pay item.

The system (including the controller cabinet and components) shall be subject to a 60 day burn-in period. The Contractor shall notify the Department a minimum of three days in advance to schedule turn-on. The Contractor and equipment manufacturer's representative shall demonstrate the system to the Engineer to show that it meets all of the required design and installation parameters. After, the system has been accepted by the Engineer, the system shall begin a sixty-day "burn-in" period. During the "burn-in" period, the components shall perform continuously, without any interruption of operation, for a period of sixty days. In the event that there are operational problems during the burn-in period, the burn-in period shall reset back to day one.

After the successful completion of the burn-in period, the system will have completed final acceptance.

#### OPTION "A" – NAZTEC DETECTION CONTROL SYSTEM

- **DETECTION CONTROL SYSTEM (D-CS) OPERATIONAL PARAMETERS**

The detection control system (D-CS) was developed by the Texas Transportation Institute to minimize delay and crash frequency at rural intersections. An algorithm was created to calculate and vary the dilemma zone protection based upon vehicle location, speed, and classification. This algorithm was implemented by Naztec Inc. to run on a Type 2070 controller platform as part of an engineered system that includes a traffic signal controller, cabinet, and other system components.

The D-CS uses vehicle speed and length information to predict the "best" time to end a phase that is being serviced. The traffic signal controller is equipped with a D-CS software module that utilizes information obtained from the detector loops to predict the arrival of a vehicle in the dilemma zone. The system has been designed to identify the best time to end the major-road through phase based on consideration of the number of vehicles in the dilemma zone, the number of trucks in the dilemma zone, and the waiting time of vehicles in conflicting phases.

The system uses two detectors per lane (in a speed trap configuration) that are located between 700 to 1000 feet in advance of the intersection. The D-CS uses detector information to calculate vehicle length, speed, and lane location and uses this information to make decisions about whether to hold a current phase in green or to terminate it. The system will search for a time when each vehicle that is being served is outside of its respective dilemma zone. In the event that this time can not be found, the D-CS system will seek a time when the fewest vehicles will be in the dilemma zone, relative to the duration of the look-ahead time window.

The final report and supporting documents from the Texas Transportation Institute can be found at <http://tcd.tamu.edu/Documents/4022-2.pdf>

The Naztec D-CS system (OPTION "A") shall include the following items:

- TRAFFIC CONTROL

The contractor shall provide all applicable traffic control (including all signs, arrow boards, lane closures, etc.) required to install the components included in this pay item.

Traffic control shall conform to the Standard Specifications and applicable Highway Standards.

Revised 02/15/2008

## 2.0 VEHICLE DETECTION SYSTEM COMPONENTS

### 2.1 Materials and Hardware

2.1.1 Inductive Loop Detectors: The detection-control system uses two 6 ft. by 6 ft. inductive loops in each through travel lane, placed upstream of the intersection. Each loop shall have six (6) turns of wire. Detector loop wire shall be stranded copper No. 14 AWG XHHW cross-linked thermosetting-polyethylene insulated conductor conforming to IMSA 51-3 or Detecta Duct.

2.1.2 Detector Loop Lead-In Cable: One separate lead-in cable shall be provided from each detector loop to the controller. The detector loop lead-in cable shall be No. 12 AWG twisted/shielded cable (Belden, 603378, NO. 12 AWG, 2/C, IMSA 50-2, Shielded Cable with Drain Wire or approved equal). The design shall meet all the requirements of IMSA 50-2. Slack cable lengths shall be in accordance with Section 873.

2.1.3 Loop Amplifier: A two-channel loop amplifier shall be provided for each pair of inductive loop detectors (i.e., one amplifier per through travel lane). The amplifier shall be rack mounted on a rack separate from any other loop amplifiers in the cabinet. Detector loop amplifiers shall conform to the requirements listed for the pay item INDUCTIVE LOOP DETECTOR. The Contractor shall also supply all equipment, including but not limited to additional detector racks, bus interface units, cables, etc. that is required for a complete DCS system.

2.2 Installation and Testing of D-CS Loop Detectors: There shall be two loops per travel lane. The spacing of the loops shall be 20 ft trailing edge to trailing edge and the loops shall be centered in each through lane. The trailing edge of the trailing loop shall be at a distance from the stop line specified on the plan sheets.

2.2.1 Inductive Loop Layout: Each detector loop shall be 6.0 ft by 6.0 ft square with 8.5 ft between each pair of diagonally opposite corners. When cutting the pavement, the contractor shall not deviate more than 0.5 inch from the chalk line on leading edges of loops and no more than 1.0 inch on all other sides of the square loops. The Contractor shall round all corners to a minimum 1.0-inch radius for the full depth of the cuts. All sharp edges at corners and elsewhere shall be removed. The contractor shall not create excessive "gaps" at loop corners. All saw cuts shall be filled with loop sealant flush with the pavement surface.

2.2.2 Inductive Loop Saw Cuts: The saw cut depth shall allow for six (6) turns of loop wire to be placed such that each turn in the leading edge of each loop is "stacked" on the previous turn. Each successive wire turn shall touch the one installed below it (or before it) and the wire turns shall remain contiguous following the application of the loop sealant. Backer rod is not required. The Contractor shall install all turns in a clockwise direction and mark the beginning end on each loop.

The loop saw cuts shall be vertical and shall be at least wider than the diameter of the loop wire, up to a maximum of 0.375 inch. The top wire may be as much as 1.5 inches below the surface, but not less than 1.0 inch below the surface. The saw cut depth shall be a minimum of 2.5 inches and a maximum of 3.0 inches measured at any point along the loop perimeter. The width of home-run saw cuts shall be at least 0.25 inch wider than twice the diameter of the loop wire, up to a maximum of 0.5 inch. The top wire in the home-run cut may be as much as 1.5 inches below the surface, but not less than 1.0 inch below the surface.

Revised 02/15/2008

Basis of Payment: This work will not be paid for separately, but shall be included in the cost of TRAFFIC SIGNAL DETECTION CONTROL SYSTEM, LOCATION 1.

- INDUCTIVE LOOP DETECTOR

The Contractor shall furnish and install rack mounted inductive loop detectors for the eight 6'x6' advanced detector loops and the four 6'x20' stop bar loops located along IL 29. The inductive loop detectors shall conform to the special provisions contained within the plans. Each detector loop shall be assigned to a separate detector channel.

Basis of Payment: This work will not be paid for separately, but shall be included in the cost of TRAFFIC SIGNAL DETECTION CONTROL SYSTEM, LOCATION 1.

- CONDUIT IN TRENCH, 2" DIA., PVC

The Contractor shall furnish and install 2" PVC conduit in trench in at the locations shown on the plan sheets. The conduit and installation shall conform to the Standard Specifications contained in Sections 810 and 1088.

Basis of Payment: This work will not be paid for separately, but shall be included in the cost of TRAFFIC SIGNAL DETECTION CONTROL SYSTEM, LOCATION 1.

- TRENCH AND BACKFILL FOR ELECTRICAL WORK

The Contractor shall provide trench and backfill for all trenched conduit installed under this pay item. Trench and backfill shall conform to the Standard Specifications contained in Sections 819, 1003, and 1066.

Basis of Payment: This work will not be paid for separately, but shall be included in the cost of TRAFFIC SIGNAL DETECTION CONTROL SYSTEM, LOCATION 1.

- HANDHOLE, PORTLAND CEMENT CONCRETE

The Contractor shall furnish and install two concrete handholes at the locations shown on the plan sheets. The handhole and installation shall conform to the Standard Specifications and project special provisions. If the voltage of the electrical conductors contained in the handhold exceeds 50 VAC, the Contractor shall ground the handholes in accordance with NEC requirements. The handhole and installation shall conform to the Standard Specifications contained in Sections 814, 1004, 1020, and 1088.

Basis of Payment: This work will not be paid for separately, but shall be included in the cost of TRAFFIC SIGNAL DETECTION CONTROL SYSTEM, LOCATION 1.

- ELECTRIC CABLES

The Contractor shall furnish and install all necessary electric cables (in conduit, cabinets, etc.) required for a completely functional system. The electrical cables and installation shall conform to the applicable portions of the Standard Specifications contained in Section 873, 1076, and 1088.

Revised 02/15/2008

Basis of Payment: This work will not be paid for separately, but shall be included in the cost of TRAFFIC SIGNAL DETECTION CONTROL SYSTEM, LOCATION 1.

- TRENCH AND BACKFILL FOR ELECTRICAL WORK, SPECIAL (FOR CONDUIT INTALLATION BENEATH BITUMINOUS SHOULDERS)

This work shall consist of constructing a trench beneath the bituminous paved shoulder and backfilling it.

The trench shall be constructed in accordance with and at the locations specified in the plans or as directed by the Engineer. The sides of the trench shall be saw-cut through the full depth of the bituminous shoulder material.

The trench shall be not less than 24" in depth. The width shall be as required to accommodate the appropriate number of conduits required at each specified location. The bottom of the trench shall be tamped and the trench inspected by the Engineer before the conduits are placed in the trench.

All trenches shall be backfilled as soon as possible after the installation of the conduits. The trench shall be backfilled in accordance with Section 208 of the Standard Specifications.

Cinders, rocks, or other deleterious materials will not be permitted in the backfilling material. Backfilling materials shall be deposited in the trench in layers not to exceed 150 mm (6") in depth, and shall be thoroughly compacted with a mechanical tamper before the next layer is deposited in the trench.

Bituminous surfacing shall be used to restore the shoulders to the existing grade. The bituminous material shall be compacted and finished as directed by the Engineer.

All surplus material shall be disposed of in accordance with Article 202.03

Basis of Payment: This work will not be paid for separately, but shall be included in the cost of TRAFFIC SIGNAL DETECTION CONTROL SYSTEM, LOCATION 1.

Revised 02/15/2008

Revised 02/15/2008

Revised 02/15/2008

Revised 02/15/2008



Basis of Payment: This work will be paid for at the contract unit price lump sum for TRAFFIC SIGNAL DETECTION CONTROL SYSTEM, LOCATION 1 which shall be payment in full for all labor, equipment, and materials required to provide the detection control system described above complete. There will be no additional compensation.

**ALKALI-SILICA REACTION FOR CAST-IN-PLACE CONCRETE (BDE)**

Effective: August 1, 2007

Description. This special provision is intended to reduce the risk of a deleterious alkali-silica reaction in concrete exposed to humid or wet conditions. The special provision is not intended or adequate for concrete exposed to potassium acetate, potassium formate, sodium acetate or sodium formate. The special provision shall not apply to the dry environment (humidity less than 60 percent) found inside buildings for residential or commercial occupancy. The special provision shall also not apply to precast products or precast prestressed products.

Aggregate Expansion Values. Each coarse and fine aggregate will be tested by the Department for alkali reaction according to ASTM C 1260. The test will be performed with Type I or II cement having a total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) of 0.90 percent or greater. The Engineer will determine the assigned expansion value for each aggregate, and these values will be made available on the Department’s Alkali-Silica Potential Reactivity Rating List. The Engineer may differentiate aggregate based on ledge, production method, gradation number, or other factors. An expansion value of 0.05 percent will be assigned to limestone or dolomite coarse aggregates and 0.03 percent to limestone or dolomite fine aggregates (manufactured stone sand); however the Department reserves the right to perform the ASTM C 1260 test.

Aggregate Groups. Each combination of aggregates used in a mixture will be assigned to an aggregate group. The point at which the coarse aggregate and fine aggregate expansion values intersect in the following table will determine the group.

AGGREGATE GROUPS			
Coarse Aggregate or Coarse Aggregate Blend  ASTM C 1260 Expansion	Fine Aggregate or Fine Aggregate Blend  ASTM C 1260 Expansion		
	≤ 0.16%	> 0.16% - 0.27%	> 0.27%
≤ 0.16%	Group I	Group II	Group III
> 0.16% - 0.27%	Group II	Group II	Group III
> 0.27%	Group III	Group III	Group IV

Revised 02/15/2008