

## **INSTRUCTIONS**

**ABOUT IDOT PROPOSALS:** All proposals are potential bidding proposals. Each proposal contains all certifications and affidavits, a proposal signature sheet and a proposal bid bond.

### **PREQUALIFICATION**

Any contractor who desires to become pre-qualified to bid on work advertised by IDOT must submit the properly completed pre-qualification forms to the Bureau of Construction no later than 4:30 p.m. prevailing time twenty-one days prior to the letting of interest. This pre-qualification requirement applies to first time contractors, contractors renewing expired ratings, contractors maintaining continuous pre-qualification or contractors requesting revised ratings. To be eligible to bid, existing pre-qualification ratings must be effective through the date of letting.

### **WHO CAN BID ?**

Bids will be accepted from only those companies that request and receive written Authorization to Bid from IDOT's Central Bureau of Construction. This does not apply to Small Business Set-Asides.

### **REQUESTS FOR AUTHORIZATION TO BID**

Contractors wanting to bid on items included in a particular letting must submit the properly completed "Request for Authorization to Bid/or Not For Bid Status" (BDE 124) and the ORIGINAL "Affidavit of Availability" (BC 57) to the proper office no later than 4:30 p.m. prevailing time, three (3) days prior to the letting date. This does not apply to Small Business Set-Asides.

**WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?:** When a prospective prime bidder submits a "Request for Authorization to Bid/or Not For Bid Status"(BDE 124) he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued an **Authorization to Bid or Not for Bid Report**, approved by the Central Bureau of Construction and the Chief Procurement Officer that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Authorization to Bid or Not for Bid Report** will indicate the reason for denial.

**ABOUT AUTHORIZATION TO BID:** Firms that have not received an Authorization to Bid or Not For Bid Report within a reasonable time of complete and correct original document submittal should contact the department as to the status. Firms unsure as to authorization status should call the Prequalification Section of the Bureau of Construction at the number listed at the end of these instructions. These documents must be received three days before the letting date.

**ADDENDA AND REVISIONS:** It is the bidder's responsibility to determine which, if any, addenda or revisions pertain to any project they may be bidding. Failure to incorporate all relevant addenda or revisions may cause the bid to be declared unacceptable.

Each addendum or revision will be included with the Electronic Plans and Proposals. Addenda and revisions will also be placed on the Addendum/Revision Checklist and each subscription service subscriber will be notified by e-mail of each addendum and revision issued.

The Internet is the Department's primary way of doing business. The subscription server e-mails are an added courtesy the Department provides. It is suggested that bidders check IDOT's website at <http://www.dot.il.gov/desenv/delett.html> before submitting final bid information.

### ***IDOT IS NOT RESPONSIBLE FOR ANY E-MAIL FAILURES.***

Addenda questions may be directed to the Contracts Office at (217)782-7806 or [D&Econtracts@dot.il.gov](mailto:D&Econtracts@dot.il.gov)

Technical questions about downloading these files may be directed to Tim Garman at (217)524-1642 or [Timothy.Garman@illinois.gov](mailto:Timothy.Garman@illinois.gov).

## **BID SUBMITTAL GUIDELINES AND CHECKLIST**

In an effort to eliminate confusion and standardize the bid submission process the Contracts Office has created the following guidelines and checklist for submitting bids.

This information has been compiled from questions received from contractors and from inconsistencies noted on submitted bids. If you have additional questions please refer to the contact information listed below.

**ABOUT SUBMITTING BIDS:** It is recommended that bidders deliver bid proposals in person to ensure they arrive at the proper location prior to the time specified for the receipt of bids. Any proposals received at the place of letting after the time specified will not be read.

### **STANDARD GUIDELINES FOR SUBMITTING BIDS**

- All pages should be single sided.
- Use the Cover Page that is provided in the Bid Proposal (posted on the IDOT Web Site) as the first page of your submitted bid. This page has the Item number in the upper left-hand corner and lines provided for your company name and address in the upper right-hand corner.
- Do not use report covers, presentation folders or special bindings and do not staple multiple times on left side like a book. Use only 1 staple in the upper left hand corner. Make sure all elements of your bid are stapled together including the bid bond or guaranty check (if required).
- Do not include any certificates of eligibility, your authorization to bid, Addendum Letters or affidavit of availability.
- Do not include the Subcontractor Documentation with your bid (pages i – iii and pages a – g). This documentation is required only after you are awarded the contract.
- Use the envelope cover sheet (provided with the proposal) as the cover for the proposal envelope.
- Do not rely on overnight services to deliver your proposal prior to 10 AM on letting day. It will not be read if it is delivered after 10 AM.
- Do not submit your Substance Abuse Prevention Program (SAPP) with your bid. If you are awarded the contract this form is to be submitted to the district engineer at the pre-construction conference.

### **Use the following checklist to ensure completeness and the correct order in assembling your bid**

**Illinois Office Affidavit** (Not applicable to federally funded projects) insert your affidavit after page 4 along with your Cost Adjustments for Steel, Bituminous and Fuel (if applicable).

**Cover page** (the sheet that has the item number on it) **followed by your bid (the Pay Items)**. If you are using special software or CBID to generate your schedule of prices, do not include the blank pages of the schedule of prices that came with the proposal package.

**Page 4 (Item 9)** – Check “YES” if you will use a subcontractor(s). Include the subcontractor(s) name, address, general type of work to be performed and the dollar amount (if over \$50,000). If you will use subcontractor(s) but are uncertain who or the dollar amount; check “YES” but leave the lines blank.

**Page 10 (Paragraph J)** – Check “YES” or “NO” whether your company has any business in Iran.

**Page 10 (Paragraph K)** – (Not applicable to federally funded projects) List the Union Local Name and number or certified training programs that you have in place. **Your bid will not be read if this is not completed.** Do not include certificates with your bid. Keep the certificates in your office in case they are requested by IDOT.

**Page 11 (Paragraph L)** - A copy of your State Board of Elections certificate of registration is no longer required with your bid.

**Page 11 (Paragraph M)** – Indicate if your company has hired a lobbyist in connection with the job for which you are submitting the bid proposal.

**Page 12 (Paragraph C)** – This is a work sheet to determine if a completed Form A is required. It is not part of the form and you do not need to make copies for each Form A that is filled out.

**Pages 14-17 (Form A)** – One Form A (4 pages) is required for each applicable person in your company. Copies of the Forms can be used and only need to be changed when the financial information changes. The certification signature and date must be original for each letting. Do not staple the forms together.

If you answered “NO” to all of the questions in Paragraph C (page 12), complete the first section (page 14) with your company information and then sign and date the Not Applicable statement on page 17.

**Page 18 (Form B)** - If you check “YES” to having other current or pending contracts it is acceptable to use the phrase, “See Affidavit of Availability on file”. **Ownership Certification** (at the bottom of the page) - Check N/A if the Form A you submitted accounts for 100 percent of the company ownership. Check YES if any percentage of ownership falls outside of the parameters that require reporting on the Form A. Checking NO indicates that the Form A you submitted is not correct and you will be required to submit a revised Form A.

**Page 20 (Workforce Projection)** – Be sure to include the Duration of the Project. It is acceptable to use the phrase “Per Contract Specifications”.

**Bid Bond** – Submit your bid bond using the current Bid Bond Form provided in the proposal package. The Power of Attorney page should be stapled to the Bid Bond. If you are using an electronic bond, include your bid bond number on the form and attach the Proof of Insurance printed from the Surety 2000 Web Site.

**Disadvantaged Business Utilization Plan and/or Good Faith Effort** – The last item in your bid should be the DBE Utilization Plan (SBE 2026), followed by the DBE Participation Statement (SBE 2025) and supporting paperwork. If you have documentation for a Good Faith Effort, it should follow the SBE Forms.

**The Bid Letting is now available in streaming Audio/Video from the IDOT Web Site.** A link to the stream will be placed on the main page of the current letting on the day of the Letting. The stream will not begin until 10 AM. The actual reading of the bids does not begin until approximately 10:20 AM.

Following the Letting, the As-Read Tabulation of Bids will be posted by the end of the day. You will find the link on the main page of the current letting.

**QUESTIONS: pre-letting up to execution of the contract**

Contractor/Subcontractor pre-qualification -----217-782-3413  
Small Business, Disadvantaged Business Enterprise (DBE) -----217-785-4611  
Contracts, Bids, Letting process or Internet downloads-----217-782-7806  
Estimates Unit -----217-785-3483  
Aeronautics -----217-785-8515  
IDNR (Land Reclamation, Water Resources, Natural Resources) -----217-782-6302

**QUESTIONS: following contract execution**

Including Subcontractor documentation, payments-----217-782-3413  
Railroad Insurance -----217-785-0275

RETURN WITH BID

1X

|                       |
|-----------------------|
| Proposal Submitted By |
| Name                  |
| Address               |
| City                  |

Letting September 21, 2012

**NOTICE TO PROSPECTIVE BIDDERS**

This proposal can be used for bidding purposes by only those companies that request and receive written AUTHORIZATION TO BID from IDOT's Central Bureau of Construction. This does not apply to Small Business Set-Asides.

**BIDDERS NEED NOT RETURN THE ENTIRE PROPOSAL**

# Notice to Bidders, Specifications, Proposal, Contract and Contract Bond



**Illinois Department  
of Transportation**

Springfield, Illinois 62764

Contract No. 68620  
TAZEWELL County  
Section 90-[14R;(14HB-4,14,14HVB)BR]  
Route FAI 74/155  
Project ACIM-ACBRI-000S(907)  
District 4 Construction Funds

PLEASE MARK THE APPROPRIATE BOX BELOW:

- A Bid Bond is included.
- A Cashier's Check or a Certified Check is included

Prepared by

Checked by

F

(Printed by authority of the State of Illinois)

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RETURN WITH BID



PROPOSAL

TO THE DEPARTMENT OF TRANSPORTATION

1. Proposal of \_\_\_\_\_  
\_\_\_\_\_

Taxpayer Identification Number (Mandatory) \_\_\_\_\_

For the improvement identified and advertised for bids in the Invitation for Bids as:

**Contract No. 68620  
TAZEWELL County  
Section 90-[14R;(14HB-4,14,14HVB)BR]  
Project ACIM-ACBRI-000S(907)  
Route FAI 74/155  
District 4 Construction Funds**

**This project consists of the reconstruction of the Interstate 74 and Interstate 155 interchange and the reconfiguration of the Interstate 74 and Morton Avenue interchange. This project begins west of Pleasant Hill Road and continues to just west of Main Steet and on Interstate 155 beginning north of the Birchwood interchange and ending at Interstate 74 in Tazewell County.**

2. The undersigned bidder will furnish all labor, material and equipment to complete the above described project in a good and workmanlike manner as provided in the contract documents provided by the Department of Transportation. This proposal will become part of the contract and the terms and conditions contained in the contract documents shall govern performance and payments.



**RETURN WITH BID**

6. **COMBINATION BIDS.** The undersigned further agrees that if awarded the contract for the sections contained in the following combination, he/she will perform the work in accordance with the requirements of each individual proposal comprising the combination bid specified in the schedule below, and that the combination bid shall be prorated against each section in proportion to the bid submitted for the same. If an error is found to exist in the gross sum bid for one or more of the individual sections included in a combination, the combination bid shall be corrected as provided in the specifications.

**When a combination bid is submitted, the schedule below must be completed in each proposal comprising the combination.**

**If alternate bids are submitted for one or more of the sections comprising the combination, a combination bid must be submitted for each alternate.**

**Schedule of Combination Bids**

| Combination No. | Sections Included in Combination | Combination Bid |       |
|-----------------|----------------------------------|-----------------|-------|
|                 |                                  | Dollars         | Cents |
|                 |                                  |                 |       |
|                 |                                  |                 |       |
|                 |                                  |                 |       |
|                 |                                  |                 |       |

7. **SCHEDULE OF PRICES.** 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. The unit prices bid are in U.S. dollars and cents, and all extensions and summations have been made. The bidder understands that the quantities appearing in the bid schedule are approximate and are provided for the purpose of obtaining a gross sum for the comparison of bids. If there is an error in the extension of the unit prices, the unit prices shall govern. 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 as provided elsewhere in the contract.
8. **AUTHORITY TO DO BUSINESS IN ILLINOIS.** Section 20-43 of the Illinois Procurement Code (the Code) (30 ILCS 500/20-43) provides that a person (other than an individual acting as a sole proprietor) must be a legal entity authorized to do business in the State of Illinois prior to submitting the bid.
9. **The services of a subcontractor will be used.**

Check box Yes   
 Check box No

For known subcontractors with subcontracts with an annual value of more than \$50,000, the contract shall include their name, address, general type of work to be performed, and the dollar allocation for each subcontractor.  
 (30 ILCS 500/20-120)

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10. **EXECUTION OF CONTRACT:** The Department of Transportation will, in accordance with the rules governing Department procurements, execute the contract and shall be the sole entity having the authority to accept performance and make payments under the contract. Execution of the contract by the Chief Procurement Officer (CPO) or the State Purchasing Officer (SPO) is for approval of the procurement process and execution of the contract by the Department. Neither the CPO nor the SPO shall be responsible for administration of the contract or determinations respecting performance or payment there under except as otherwise permitted in the Code.

ILLINOIS DEPARTMENT OF TRANSPORTATION  
 SCHEDULE OF PRICES  
 CONTRACT  
 NUMBER - 68620

State Job # - C-94-154-06

County Name - TAZEWELL - -

Code - 179 - -

District - 4 - -

Section Number - 90-[14R;(14HB-4,14,14HVB)BR]

Project Number  
 ACIM-ACBRI005(/907/)

Route  
 FAI 74  
 FAI 155

| Item Number | Pay Item Description  | Unit of Measure | Quantity    | x | Unit Price | = | Total Price |
|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| A2007674    | T-TAXODIUM DIS CL 10' | EACH            | 42.000      |   |            |   |             |
| X0301242    | PIEZO AXLE SEN CL 2   | FOOT            | 66.000      |   |            |   |             |
| X0321809    | PERMANENT GRND ANCHOR | EACH            | 86.000      |   |            |   |             |
| X0323160    | VIDEO INSP OF SS      | FOOT            | 1,105.000   |   |            |   |             |
| X0323265    | REMOVE EXIST RIPRAP   | SQ YD           | 1,208.000   |   |            |   |             |
| X0323388    | TRAFFIC COUNTER       | EACH            | 5.000       |   |            |   |             |
| X0323909    | DATA NETWORK PORT ADP | EACH            | 8.000       |   |            |   |             |
| X0323917    | CABINET MODEL 334     | EACH            | 3.000       |   |            |   |             |
| X0323920    | POLE MT EQUIP CAB TB  | EACH            | 2.000       |   |            |   |             |
| X0323923    | SUPPORT EQUIP & MAINT | L SUM           | 1.000       |   |            |   |             |
| X0324159    | WHITEWASH CONC PAVT   | SQ YD           | 267,195.000 |   |            |   |             |
| X0325318    | LT WT CELL CONC FILL  | CU YD           | 474.000     |   |            |   |             |
| X0325485    | TR MTD LED DYN MSG SN | EACH            | 1.000       |   |            |   |             |
| X0325810    | WIRELESS ETHERNET RAD | EACH            | 1.000       |   |            |   |             |
| X0325833    | WICK DRAINS           | FOOT            | 391,859.000 |   |            |   |             |

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Section Number - 90-[14R;(14HB-4,14,14HVB)BR]

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Route

FAI 74

FAI 155

| Item Number | Pay Item Description  | Unit of Measure | Quantity    | x | Unit Price | = | Total Price |
|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| X0325922    | CELLULAR MODEM        | EACH            | 2.000       |   |            |   |             |
| X0326337    | DRAINAGE CONTROL STR  | EACH            | 1.000       |   |            |   |             |
| X0326812    | CAT 5 ETHERNET CABLE  | FOOT            | 249.000     |   |            |   |             |
| X0326905    | CCTV DOME CAM IP BASE | EACH            | 4.000       |   |            |   |             |
| X0326906    | CCTV DM CAM IP BAS MO | EACH            | 3.000       |   |            |   |             |
| X0327116    | SOLAR POWER ASSEMBLY  | EACH            | 1.000       |   |            |   |             |
| X0327121    | CAMERA POLE 55 FT     | EACH            | 3.000       |   |            |   |             |
| X0327423    | CONNECT EXIST CULVERT | EACH            | 5.000       |   |            |   |             |
| X0327466    | TRAF COUNTER POST GS  | EACH            | 4.000       |   |            |   |             |
| X4400110    | TEMP PAVT REMOVAL     | SQ YD           | 129,532.000 |   |            |   |             |
| X4421000    | PARTIAL DEPTH PATCH   | TON             | 127.000     |   |            |   |             |
| X4810200    | AGGREGATE SHLD REMOVL | CU YD           | 1,923.000   |   |            |   |             |
| X5121800    | PERM STEEL SHT PILING | SQ FT           | 24,711.000  |   |            |   |             |
| X5210120    | HLMR BRG GUID EXP 250 | EACH            | 8.000       |   |            |   |             |

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|-------------|-----------------------|-----------------|-----------|---|------------|---|-------------|
| X5210780    | HLMR BRG N-G EXP 250  | EACH            | 12.000    |   |            |   |             |
| X5210850    | HLMR BRG N-G EXP 600  | EACH            | 4.000     |   |            |   |             |
| X5426018    | PRC FLAR DBES 18      | EACH            | 1.000     |   |            |   |             |
| X5426030    | PRC FLAR DBES 30      | EACH            | 1.000     |   |            |   |             |
| X550A562    | TEMP SS CL A 2 12     | FOOT            | 489.000   |   |            |   |             |
| X550A566    | TEMP SS CL A 2 15     | FOOT            | 1,108.000 |   |            |   |             |
| X550A570    | TEMP SS CL A 2 18     | FOOT            | 1,488.000 |   |            |   |             |
| X550A576    | TEMP SS CL A 2 24     | FOOT            | 453.000   |   |            |   |             |
| X5860110    | GRANULAR BACKFILL STR | CU YD           | 1,143.000 |   |            |   |             |
| X6020290    | MAN TA 7D SPL F&G     | EACH            | 1.000     |   |            |   |             |
| X6020296    | MAN TA 8D SPL F&G     | EACH            | 1.000     |   |            |   |             |
| X6021065    | INLETS TG-1 SPL       | EACH            | 10.000    |   |            |   |             |
| X6021824    | INL-MN G-1 4D SPL     | EACH            | 4.000     |   |            |   |             |
| X6022930    | MAN TA 5 DIA SPL F&G  | EACH            | 1.000     |   |            |   |             |
| X6028104    | TEMP MAN TA 4D T1F OL | EACH            | 16.000    |   |            |   |             |

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|-------------|-----------------------|-----------------|------------|---|------------|---|-------------|
| X6028404    | TEMP INLETS TA T1F OL | EACH            | 16.000     |   |            |   |             |
| X6029001    | JUNCTION BOX N1       | L SUM           | 1.000      |   |            |   |             |
| X6029002    | JUNCTION BOX N2       | L SUM           | 1.000      |   |            |   |             |
| X6029003    | JUNCTION BOX N3       | L SUM           | 1.000      |   |            |   |             |
| X6050700    | REMOVE INLET BOX      | EACH            | 5.000      |   |            |   |             |
| X6330725    | SPBGR (SHORT RADIUS)  | FOOT            | 50.000     |   |            |   |             |
| X6350120    | DELINEATOR REMOVAL    | EACH            | 159.000    |   |            |   |             |
| X6380200    | REL MOD GLAR SCRNSYS  | FOOT            | 32,588.000 |   |            |   |             |
| X6700410    | ENGR FLD OFF A SPL    | CAL MO          | 32.000     |   |            |   |             |
| X6700600    | ENGR FIELD LAB SPL    | CAL MO          | 32.000     |   |            |   |             |
| X7010216    | TRAF CONT & PROT SPL  | L SUM           | 1.000      |   |            |   |             |
| X7010240    | TR CONT SURVEILL SPL  | CAL DA          | 562.000    |   |            |   |             |
| X7200056    | TEMP SIGN PANEL ASBLY | SQ FT           | 3,156.000  |   |            |   |             |
| X7200057    | TEMP SIGN PAN OVERLAY | SQ FT           | 528.000    |   |            |   |             |
| X7350100    | REL OSS-SPAN SPL      | EACH            | 1.000      |   |            |   |             |

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FAI 74

FAI 155

| Item Number | Pay Item Description  | Unit of Measure | Quantity    | x | Unit Price | = | Total Price |
|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| X7830068    | GRV RCSD PVT LT N SYM | SQ FT           | 982.000     |   |            |   |             |
| X7830070    | GRV RCSD PVT MRKG 5   | FOOT            | 141,981.000 |   |            |   |             |
| X7830074    | GRV RCSD PVT MRKG 7   | FOOT            | 21,093.000  |   |            |   |             |
| X7830076    | GRV RCSD PVT MRKG 9   | FOOT            | 22,316.000  |   |            |   |             |
| X7830078    | GRV RCSD PVT MRKG 13  | FOOT            | 3,034.000   |   |            |   |             |
| X7830090    | GRV RCSD PVT MRKG 25  | FOOT            | 371.000     |   |            |   |             |
| X8110521    | CON AT ST 1 SS        | FOOT            | 501.000     |   |            |   |             |
| X8110522    | CON AT ST 2 SS        | FOOT            | 515.000     |   |            |   |             |
| X8110551    | CON FLX NON-MET WP1.0 | FOOT            | 60.000      |   |            |   |             |
| X8360110    | LIGHT POLE FDN SPL    | FOOT            | 260.000     |   |            |   |             |
| X8360310    | LIGHT POLE FDN 30D SP | FOOT            | 24.000      |   |            |   |             |
| X8410102    | TEMP LIGHTING SYSTEM  | L SUM           | 1.000       |   |            |   |             |
| X8570226    | FAC T4 CAB SPL        | EACH            | 1.000       |   |            |   |             |
| X8570231    | FAC T5 CAB SPL        | EACH            | 1.000       |   |            |   |             |
| X8710030    | FIB OPT CBL 48F SM    | FOOT            | 17,729.000  |   |            |   |             |
| X8710050    | FO ETN DROP REPEAT SW | EACH            | 13.000      |   |            |   |             |

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FAI 74

FAI 155

| Item Number | Pay Item Description  | Unit of Measure | Quantity   | x | Unit Price | = | Total Price |
|-------------|-----------------------|-----------------|------------|---|------------|---|-------------|
| X8730810    | EC C CONOGA 30003     | FOOT            | 2,000.000  |   |            |   |             |
| X8780107    | CONC FDN SPL          | FOOT            | 11.000     |   |            |   |             |
| Z0001002    | GDRL AGG EROS CONT    | TON             | 1,519.000  |   |            |   |             |
| Z0013798    | CONSTRUCTION LAYOUT   | L SUM           | 1.000      |   |            |   |             |
| Z0018600    | DRAINAGE STR RECONST  | EACH            | 7.000      |   |            |   |             |
| Z0020800    | EROSION CONTROL CURB  | FOOT            | 11.000     |   |            |   |             |
| Z0022800    | FENCE REMOVAL         | FOOT            | 19,217.000 |   |            |   |             |
| Z0023600    | FILL EXIST CULVERTS   | EACH            | 1.000      |   |            |   |             |
| Z0026407    | TEMP SHT PILING       | SQ FT           | 7,463.000  |   |            |   |             |
| Z0028462    | GEOTEX RETAIN WALL    | SQ FT           | 4,144.000  |   |            |   |             |
| Z0029999    | IMPACT ATTENUATOR REM | EACH            | 6.000      |   |            |   |             |
| Z0030240    | IMP ATTN TEMP NRD TL2 | EACH            | 9.000      |   |            |   |             |
| Z0030250    | IMP ATTN TEMP NRD TL3 | EACH            | 34.000     |   |            |   |             |
| Z0030255    | IMP ATTN TEMP FRN TL2 | EACH            | 7.000      |   |            |   |             |
| Z0030260    | IMP ATTN TEMP FRN TL3 | EACH            | 8.000      |   |            |   |             |

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| Item Number | Pay Item Description  | Unit of Measure | Quantity    | x | Unit Price | = | Total Price |
|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| Z0030320    | IMP ATTN REL FRD TL2  | EACH            | 1.000       |   |            |   |             |
| Z0030330    | IMP ATTN REL FRD TL3  | EACH            | 4.000       |   |            |   |             |
| Z0030340    | IMP ATTN REL NRD TL2  | EACH            | 3.000       |   |            |   |             |
| Z0030350    | IMP ATTN REL NRD TL3  | EACH            | 27.000      |   |            |   |             |
| Z0032400    | JOINT REPAIR          | EACH            | 20.000      |   |            |   |             |
| Z0033052    | COMMUNICATIONS VAULT  | EACH            | 6.000       |   |            |   |             |
| Z0033068    | TS BATT BACKUP SYSTEM | EACH            | 2.000       |   |            |   |             |
| Z0046304    | P UNDR FOR STRUCT 4   | FOOT            | 1,596.000   |   |            |   |             |
| Z0048665    | RR PROT LIABILITY INS | L SUM           | 1.000       |   |            |   |             |
| Z0056100    | SAND DRAINAGE BLANKET | CU YD           | 74,619.000  |   |            |   |             |
| Z0062456    | TEMP PAVEMENT         | SQ YD           | 129,532.000 |   |            |   |             |
| Z0065100    | SETTLEMENT PLATFORMS  | EACH            | 13.000      |   |            |   |             |
| Z0065745    | SLOT DR 12" W/2.5" SL | FOOT            | 325.000     |   |            |   |             |
| Z0073002    | TEMP SOIL RETEN SYSTM | SQ FT           | 2,492.000   |   |            |   |             |
| Z0076600    | TRAINEES              | hour            | 2,000.000   |   | 0.800      |   | 1,600.000   |

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|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| Z0076604    | TRAINEES TPG          | HOOR            | 2,000.000   |   | 10.000     |   | 20,000.000  |
| 20100110    | TREE REMOV 6-15       | UNIT            | 2,011.000   |   |            |   |             |
| 20100210    | TREE REMOV OVER 15    | UNIT            | 911.000     |   |            |   |             |
| 20100500    | TREE REMOV ACRES      | ACRE            | 0.500       |   |            |   |             |
| 20200100    | EARTH EXCAVATION      | CU YD           | 468,371.000 |   |            |   |             |
| 20400100    | BORROW EXCAVATION     | CU YD           | 317,782.000 |   |            |   |             |
| 20700220    | POROUS GRAN EMBANK    | CU YD           | 1,544.000   |   |            |   |             |
| 20800150    | TRENCH BACKFILL       | CU YD           | 6,982.000   |   |            |   |             |
| 21001000    | GEOTECH FAB F/GR STAB | SQ YD           | 258,244.000 |   |            |   |             |
| 21101505    | TOPSOIL EXC & PLAC    | CU YD           | 196,909.000 |   |            |   |             |
| 21400100    | GRADING & SHAP DITCH  | FOOT            | 2,306.000   |   |            |   |             |
| 25000210    | SEEDING CL 2A         | ACRE            | 27.750      |   |            |   |             |
| 25000300    | SEEDING CL 3          | ACRE            | 27.250      |   |            |   |             |
| 25000312    | SEEDING CL 4A         | ACRE            | 40.750      |   |            |   |             |
| 25000322    | SEEDING CL 5A         | ACRE            | 68.000      |   |            |   |             |

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|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| 25000350    | SEEDING CL 7          | ACRE            | 191.500     |   |            |   |             |
| 25000400    | NITROGEN FERT NUTR    | POUND           | 4,954.000   |   |            |   |             |
| 25000500    | PHOSPHORUS FERT NUTR  | POUND           | 4,954.000   |   |            |   |             |
| 25000600    | POTASSIUM FERT NUTR   | POUND           | 4,954.000   |   |            |   |             |
| 25000750    | MOWING                | ACRE            | 96.000      |   |            |   |             |
| 25100115    | MULCH METHOD 2        | ACRE            | 191.500     |   |            |   |             |
| 25100630    | EROSION CONTR BLANKET | SQ YD           | 17,323.000  |   |            |   |             |
| 28000250    | TEMP EROS CONTR SEED  | POUND           | 28,725.000  |   |            |   |             |
| 28000305    | TEMP DITCH CHECKS     | FOOT            | 6,204.000   |   |            |   |             |
| 28000400    | PERIMETER EROS BAR    | FOOT            | 21,686.000  |   |            |   |             |
| 28000500    | INLET & PIPE PROTECT  | EACH            | 234.000     |   |            |   |             |
| 28100705    | STONE DUMP RIP CL A3  | SQ YD           | 2,674.000   |   |            |   |             |
| 28200200    | FILTER FABRIC         | SQ YD           | 2,674.000   |   |            |   |             |
| 30300108    | AGG SUBGRADE IMPR 8   | SQ YD           | 43,512.000  |   |            |   |             |
| 30300112    | AGG SUBGRADE IMPR 12  | SQ YD           | 267,195.000 |   |            |   |             |

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|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| 31100300    | SUB GRAN MAT A 4      | SQ YD           | 21,088.000  |   |            |   |             |
| 31100910    | SUB GRAN MAT A 12     | SQ YD           | 25,419.000  |   |            |   |             |
| 31200500    | STAB SUBBASE HMA 4    | SQ YD           | 267,195.000 |   |            |   |             |
| 35300400    | PCC BSE CSE 9         | SQ YD           | 76.000      |   |            |   |             |
| 40600200    | BIT MATLS PR CT       | TON             | 526.000     |   |            |   |             |
| 40600215    | P BIT MATLS PR CT     | TON             | 2.300       |   |            |   |             |
| 40600895    | CONSTRUC TEST STRIP   | EACH            | 3.000       |   |            |   |             |
| 40600982    | HMA SURF REM BUTT JT  | SQ YD           | 4,222.000   |   |            |   |             |
| 40600990    | TEMPORARY RAMP        | SQ YD           | 6,505.000   |   |            |   |             |
| 40603080    | HMA BC IL-19.0 N50    | TON             | 1,714.000   |   |            |   |             |
| 40603335    | HMA SC "D" N50        | TON             | 416.000     |   |            |   |             |
| 40603360    | HMA SC "E" N50        | TON             | 708.200     |   |            |   |             |
| 40702700    | FURNISH PROFILOGRAPH  | L SUM           | 1.000       |   |            |   |             |
| 42000501    | PCC PVT 10 JOINTED    | SQ YD           | 27,244.000  |   |            |   |             |
| 42000506    | PCC PVT 10 1/4 JOINTD | SQ YD           | 35,903.000  |   |            |   |             |

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|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| 42001300    | PROTECTIVE COAT       | SQ YD           | 286,779.000 |   |            |   |             |
| 42001420    | BR APPR PVT CON (PCC) | SQ YD           | 4,987.000   |   |            |   |             |
| 42100320    | CONT REINF PCC PVT 11 | SQ YD           | 103,750.000 |   |            |   |             |
| 42100615    | PAVT REINFORCEMENT    | SQ YD           | 103,750.000 |   |            |   |             |
| 42101090    | TRANS TERM JT COMP 24 | EACH            | 2.000       |   |            |   |             |
| 42101436    | LUG SYSTEM COMPL 36   | EACH            | 5.000       |   |            |   |             |
| 42101447    | LUG SYSTEM COMPL 47   | EACH            | 1.000       |   |            |   |             |
| 44000100    | PAVEMENT REM          | SQ YD           | 157,445.000 |   |            |   |             |
| 44000154    | HMA SURF REM 1 1/4    | SQ YD           | 1,263.000   |   |            |   |             |
| 44000200    | DRIVE PAVEMENT REM    | SQ YD           | 470.000     |   |            |   |             |
| 44000500    | COMB CURB GUTTER REM  | FOOT            | 7,451.000   |   |            |   |             |
| 44003100    | MEDIAN REMOVAL        | SQ FT           | 34,533.000  |   |            |   |             |
| 44004000    | PAVED DITCH REMOVAL   | FOOT            | 1,447.000   |   |            |   |             |
| 44004250    | PAVED SHLD REMOVAL    | SQ YD           | 88,002.000  |   |            |   |             |
| 44022025    | PARTIAL DEPTH REM 2   | SQ YD           | 1,132.000   |   |            |   |             |

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|-------------|----------------------|-----------------|------------|---|------------|---|-------------|
| 44201721    | CL D PATCH T3 6      | SQ YD           | 22.000     |   |            |   |             |
| 44201845    | CL D PATCH T4 16     | SQ YD           | 80.000     |   |            |   |             |
| 48101500    | AGGREGATE SHLDS B 6  | SQ YD           | 18,515.000 |   |            |   |             |
| 48300500    | PCC SHOULDERS 10     | SQ YD           | 8,613.000  |   |            |   |             |
| 48300505    | PCC SHOULDERS 10 1/4 | SQ YD           | 29,289.000 |   |            |   |             |
| 48300600    | PCC SHOULDERS 11     | SQ YD           | 68,449.000 |   |            |   |             |
| 50100300    | REM EXIST STRUCT N1  | EACH            | 1.000      |   |            |   |             |
| 50100400    | REM EXIST STRUCT N2  | EACH            | 1.000      |   |            |   |             |
| 50100500    | REM EXIST STRUCT N3  | EACH            | 1.000      |   |            |   |             |
| 50100600    | REM EXIST STRUCT N4  | EACH            | 1.000      |   |            |   |             |
| 50100700    | REM EXIST STRUCT N5  | EACH            | 1.000      |   |            |   |             |
| 50100800    | REM EXIST STRUCT N6  | EACH            | 1.000      |   |            |   |             |
| 50100900    | REM EXIST STRUCT N7  | EACH            | 1.000      |   |            |   |             |
| 50102400    | CONC REM             | CU YD           | 149.700    |   |            |   |             |
| 50104400    | CONC HDWL REM        | EACH            | 29.000     |   |            |   |             |

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|-------------|-----------------------|-----------------|---------------|---|------------|---|-------------|
| 50105220    | PIPE CULVERT REMOV    | FOOT            | 3,142.000     |   |            |   |             |
| 50157300    | PROTECTIVE SHIELD     | SQ YD           | 870.000       |   |            |   |             |
| 50200100    | STRUCTURE EXCAVATION  | CU YD           | 3,991.000     |   |            |   |             |
| 50300225    | CONC STRUCT           | CU YD           | 2,217.300     |   |            |   |             |
| 50300255    | CONC SUP-STR          | CU YD           | 3,460.300     |   |            |   |             |
| 50300260    | BR DECK GROOVING      | SQ YD           | 9,451.000     |   |            |   |             |
| 50300285    | FORM LINER TEX SURF   | SQ FT           | 8,943.000     |   |            |   |             |
| 50300300    | PROTECTIVE COAT       | SQ YD           | 11,806.000    |   |            |   |             |
| 50500105    | F & E STRUCT STEEL    | L SUM           | 1.000         |   |            |   |             |
| 50500405    | F & E STRUCT STEEL    | POUND           | 4,010.000     |   |            |   |             |
| 50500505    | STUD SHEAR CONNECTORS | EACH            | 29,134.000    |   |            |   |             |
| 50800205    | REINF BARS, EPOXY CTD | POUND           | 1,040,980.000 |   |            |   |             |
| 50800515    | BAR SPLICERS          | EACH            | 4,856.000     |   |            |   |             |
| 50800530    | MECHANICAL SPLICERS   | EACH            | 348.000       |   |            |   |             |
| 51100100    | SLOPE WALL 4          | SQ YD           | 2,191.000     |   |            |   |             |

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|-------------|-----------------------|-----------------|------------|---|------------|---|-------------|
| 51200957    | FUR M S PILE 12X0.250 | FOOT            | 5,134.000  |   |            |   |             |
| 51201600    | FUR STL PILE HP12X53  | FOOT            | 6,277.000  |   |            |   |             |
| 51201900    | FUR STL PILE HP14X89  | FOOT            | 8,327.000  |   |            |   |             |
| 51202305    | DRIVING PILES         | FOOT            | 19,738.000 |   |            |   |             |
| 51203200    | TEST PILE MET SHELLS  | EACH            | 2.000      |   |            |   |             |
| 51203600    | TEST PILE ST HP12X53  | EACH            | 4.000      |   |            |   |             |
| 51203900    | TEST PILE ST HP14X89  | EACH            | 2.000      |   |            |   |             |
| 51204650    | PILE SHOES            | EACH            | 138.000    |   |            |   |             |
| 51500100    | NAME PLATES           | EACH            | 4.000      |   |            |   |             |
| 52000110    | PREF JT STRIP SEAL    | FOOT            | 588.000    |   |            |   |             |
| 52100520    | ANCHOR BOLTS 1        | EACH            | 96.000     |   |            |   |             |
| 52100530    | ANCHOR BOLTS 1 1/4    | EACH            | 20.000     |   |            |   |             |
| 52100540    | ANCHOR BOLTS 1 1/2    | EACH            | 148.000    |   |            |   |             |
| 54210182    | PIPE ELBOW 12         | EACH            | 6.000      |   |            |   |             |
| 54213657    | PRC FLAR END SEC 12   | EACH            | 1.000      |   |            |   |             |

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|-------------|-----------------------|-----------------|----------|---|------------|---|-------------|
| 54213660    | PRC FLAR END SEC 15   | EACH            | 8.000    |   |            |   |             |
| 54213663    | PRC FLAR END SEC 18   | EACH            | 6.000    |   |            |   |             |
| 54213669    | PRC FLAR END SEC 24   | EACH            | 8.000    |   |            |   |             |
| 54213675    | PRC FLAR END SEC 30   | EACH            | 3.000    |   |            |   |             |
| 54213681    | PRC FLAR END SEC 36   | EACH            | 13.000   |   |            |   |             |
| 54213687    | PRC FLAR END SEC 42   | EACH            | 1.000    |   |            |   |             |
| 54215424    | CIP RC END SEC 24     | EACH            | 2.000    |   |            |   |             |
| 54215430    | CIP RC END SEC 30     | EACH            | 2.000    |   |            |   |             |
| 54215436    | CIP RC END SEC 36     | EACH            | 3.000    |   |            |   |             |
| 54215547    | MET END SEC 12        | EACH            | 3.000    |   |            |   |             |
| 54245405    | INLET BOX 542506      | EACH            | 2.000    |   |            |   |             |
| 54247090    | GRATING-C FL END S 12 | EACH            | 1.000    |   |            |   |             |
| 54247100    | GRATING-C FL END S 15 | EACH            | 8.000    |   |            |   |             |
| 54247110    | GRATING-C FL END S 18 | EACH            | 6.000    |   |            |   |             |
| 54247130    | GRATING-C FL END S 24 | EACH            | 8.000    |   |            |   |             |

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| 54247150    | GRATING-C FL END S 30 | EACH            | 3.000     |   |            |   |             |
| 54247170    | GRATING-C FL END S 36 | EACH            | 13.000    |   |            |   |             |
| 54247180    | GRATING-C FL END S 42 | EACH            | 1.000     |   |            |   |             |
| 54248510    | CONCRETE COLLAR       | CU YD           | 3.000     |   |            |   |             |
| 550A0070    | STORM SEW CL A 1 15   | FOOT            | 1,800.000 |   |            |   |             |
| 550A0090    | STORM SEW CL A 1 18   | FOOT            | 1,787.000 |   |            |   |             |
| 550A0110    | STORM SEW CL A 1 21   | FOOT            | 393.000   |   |            |   |             |
| 550A0120    | STORM SEW CL A 1 24   | FOOT            | 422.000   |   |            |   |             |
| 550A0160    | STORM SEW CL A 1 36   | FOOT            | 309.000   |   |            |   |             |
| 550A0180    | STORM SEW CL A 1 42   | FOOT            | 31.000    |   |            |   |             |
| 550A0340    | STORM SEW CL A 2 12   | FOOT            | 304.000   |   |            |   |             |
| 550A0360    | STORM SEW CL A 2 15   | FOOT            | 2,276.000 |   |            |   |             |
| 550A0380    | STORM SEW CL A 2 18   | FOOT            | 3,707.000 |   |            |   |             |
| 550A0400    | STORM SEW CL A 2 21   | FOOT            | 487.000   |   |            |   |             |
| 550A0410    | STORM SEW CL A 2 24   | FOOT            | 1,014.000 |   |            |   |             |

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|-------------|----------------------|-----------------|-----------|---|------------|---|-------------|
| 550A0430    | STORM SEW CL A 2 30  | FOOT            | 1,685.000 |   |            |   |             |
| 550A0450    | STORM SEW CL A 2 36  | FOOT            | 1,628.000 |   |            |   |             |
| 550A0470    | STORM SEW CL A 2 42  | FOOT            | 743.000   |   |            |   |             |
| 550A0680    | STORM SEW CL A 3 18  | FOOT            | 16.000    |   |            |   |             |
| 550A0710    | STORM SEW CL A 3 24  | FOOT            | 26.000    |   |            |   |             |
| 550A0730    | STORM SEW CL A 3 30  | FOOT            | 90.000    |   |            |   |             |
| 550A0750    | STORM SEW CL A 3 36  | FOOT            | 1,540.000 |   |            |   |             |
| 550A0770    | STORM SEW CL A 3 42  | FOOT            | 706.000   |   |            |   |             |
| 550A0960    | STORM SEW CL A 4 15  | FOOT            | 44.000    |   |            |   |             |
| 550A0980    | STORM SEW CL A 4 18  | FOOT            | 64.000    |   |            |   |             |
| 55100500    | STORM SEWER REM 12   | FOOT            | 511.000   |   |            |   |             |
| 55100700    | STORM SEWER REM 15   | FOOT            | 1,127.000 |   |            |   |             |
| 55100900    | STORM SEWER REM 18   | FOOT            | 60.000    |   |            |   |             |
| 55101200    | STORM SEWER REM 24   | FOOT            | 1,117.000 |   |            |   |             |
| 55101400    | STORM SEWER REM 30   | FOOT            | 101.000   |   |            |   |             |

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|-------------|-----------------------|-----------------|------------|---|------------|---|-------------|
| 55101600    | STORM SEWER REM 36    | FOOT            | 297.000    |   |            |   |             |
| 55101900    | STORM SEWER REM 48    | FOOT            | 200.000    |   |            |   |             |
| 55200400    | STORM SEWERS JKD 15   | FOOT            | 66.000     |   |            |   |             |
| 55200600    | STORM SEWERS JKD 18   | FOOT            | 173.000    |   |            |   |             |
| 55201100    | STORM SEWERS JKD 30   | FOOT            | 310.000    |   |            |   |             |
| 55201300    | STORM SEWERS JKD 36   | FOOT            | 269.000    |   |            |   |             |
| 58700300    | CONCRETE SEALER       | SQ FT           | 16,084.000 |   |            |   |             |
| 59100100    | GEOCOMPOSITE WALL DR  | SQ YD           | 951.000    |   |            |   |             |
| 60100060    | CONC HDWL FOR P DRAIN | EACH            | 97.000     |   |            |   |             |
| 60100925    | PIPE DRAINS 8         | FOOT            | 15.000     |   |            |   |             |
| 60100935    | PIPE DRAINS 10        | FOOT            | 15.000     |   |            |   |             |
| 60105000    | PIPE DRAINS CS/AA 12  | FOOT            | 309.000    |   |            |   |             |
| 60107600    | PIPE UNDERDRAINS 4    | FOOT            | 53,339.000 |   |            |   |             |
| 60107700    | PIPE UNDERDRAINS 6    | FOOT            | 32,019.000 |   |            |   |             |
| 60108100    | PIPE UNDERDRAIN 4 SP  | FOOT            | 3,113.000  |   |            |   |             |

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Section Number - 90-[14R;(14HB-4,14,14HVB)BR]

Project Number  
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Route  
 FAI 74  
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| Item Number | Pay Item Description | Unit of Measure | Quantity  | x | Unit Price | = | Total Price |
|-------------|----------------------|-----------------|-----------|---|------------|---|-------------|
| 60108200    | PIPE UNDERDRAIN 6 SP | FOOT            | 1,021.000 |   |            |   |             |
| 60207605    | CB TC T8G            | EACH            | 2.000     |   |            |   |             |
| 60218400    | MAN TA 4 DIA T1F CL  | EACH            | 17.000    |   |            |   |             |
| 60219510    | MAN TA 4 DIA T20F&G  | EACH            | 1.000     |   |            |   |             |
| 60221100    | MAN TA 5 DIA T1F CL  | EACH            | 3.000     |   |            |   |             |
| 60221700    | MAN TA 5 DIA T8G     | EACH            | 1.000     |   |            |   |             |
| 60223700    | MAN TA 6 DIA T1F OL  | EACH            | 4.000     |   |            |   |             |
| 60223800    | MAN TA 6 DIA T1F CL  | EACH            | 7.000     |   |            |   |             |
| 60224005    | MAN TA 6 DIA T8G     | EACH            | 1.000     |   |            |   |             |
| 60224445    | MAN TA 7 DIA T1F OL  | EACH            | 1.000     |   |            |   |             |
| 60224446    | MAN TA 7 DIA T1F CL  | EACH            | 1.000     |   |            |   |             |
| 60234200    | INLETS TA T1F OL     | EACH            | 1.000     |   |            |   |             |
| 60236200    | INLETS TA T8G        | EACH            | 1.000     |   |            |   |             |
| 60237420    | INLETS TA T20F&G     | EACH            | 2.000     |   |            |   |             |
| 60257900    | MAN RECONST          | EACH            | 3.000     |   |            |   |             |

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|-------------|-----------------------|-----------------|------------|---|------------|---|-------------|
| 60270050    | DR STR T4 W/2 T20F&G  | EACH            | 56.000     |   |            |   |             |
| 60500040    | REMOV MANHOLES        | EACH            | 5.000      |   |            |   |             |
| 60500050    | REMOV CATCH BAS       | EACH            | 9.000      |   |            |   |             |
| 60500060    | REMOV INLETS          | EACH            | 30.000     |   |            |   |             |
| 60603500    | COMB CC&G TB6.06      | FOOT            | 76.000     |   |            |   |             |
| 60603800    | COMB CC&G TB6.12      | FOOT            | 22.000     |   |            |   |             |
| 60604400    | COMB CC&G TB6.18      | FOOT            | 39.000     |   |            |   |             |
| 60605000    | COMB CC&G TB6.24      | FOOT            | 5,757.000  |   |            |   |             |
| 60618300    | CONC MEDIAN SURF 4    | SQ FT           | 22,041.000 |   |            |   |             |
| 60619600    | CONC MED TSB6.12      | SQ FT           | 191.000    |   |            |   |             |
| 60620000    | CONC MED TSB6.24      | SQ FT           | 3,963.000  |   |            |   |             |
| 60624600    | CORRUGATED MED        | SQ FT           | 6,299.000  |   |            |   |             |
| 60900515    | CONC THRUST BLOCKS    | EACH            | 3.000      |   |            |   |             |
| 61000225    | TY F INLET BOX 610001 | EACH            | 1.000      |   |            |   |             |
| 61100500    | EXPLOR TRENCH 52      | FOOT            | 1,100.000  |   |            |   |             |

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|-------------|-----------------------|-----------------|------------|---|------------|---|-------------|
| 61101007    | STORM SEW PROT A 6    | FOOT            | 660.000    |   |            |   |             |
| 61101009    | STORM SEW PROT A 8    | FOOT            | 1,355.000  |   |            |   |             |
| 61101011    | STORM SEW PROT A 10   | FOOT            | 1,813.000  |   |            |   |             |
| 61101013    | STORM SEW PROT A 12   | FOOT            | 110.000    |   |            |   |             |
| 61133100    | FLD TILE JUN VAULT 2D | EACH            | 11.000     |   |            |   |             |
| 61139900    | STORM SEWER SPEC 6    | FOOT            | 525.000    |   |            |   |             |
| 61140000    | STORM SEWER SPEC 8    | FOOT            | 2,298.000  |   |            |   |             |
| 63000001    | SPBGR TY A 6FT POSTS  | FOOT            | 6,278.000  |   |            |   |             |
| 63100045    | TRAF BAR TERM T2      | EACH            | 13.000     |   |            |   |             |
| 63100070    | TRAF BAR TERM T5      | EACH            | 4.000      |   |            |   |             |
| 63100085    | TRAF BAR TERM T6      | EACH            | 7.000      |   |            |   |             |
| 63100167    | TR BAR TRM T1 SPL TAN | EACH            | 16.000     |   |            |   |             |
| 63200310    | GUARDRAIL REMOV       | FOOT            | 20,776.000 |   |            |   |             |
| 63200400    | CABLE ROAD GD REM     | FOOT            | 9,839.000  |   |            |   |             |
| 63301210    | REM RE-E SPBGR TY A   | FOOT            | 37.500     |   |            |   |             |

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|-------------|-----------------------|-----------------|------------|---|------------|---|-------------|
| 63301990    | REM RE-E T B TERM T1  | EACH            | 2.000      |   |            |   |             |
| 63500105    | DELINEATORS           | EACH            | 449.000    |   |            |   |             |
| 63700175    | CONC BAR 1F 42HT      | FOOT            | 1,127.000  |   |            |   |             |
| 63700275    | CONC BAR 2F 42HT      | FOOT            | 1,216.000  |   |            |   |             |
| 63700285    | CONC BAR 2F 48HT      | FOOT            | 10,792.000 |   |            |   |             |
| 63700805    | CONC BAR TRANS        | FOOT            | 137.000    |   |            |   |             |
| 63700900    | CONC BARRIER BASE     | FOOT            | 13,135.000 |   |            |   |             |
| 63801200    | MOD GLARE SCRNSYS     | FOOT            | 22,657.000 |   |            |   |             |
| 64200116    | SHOULDER RUM STRIP 16 | FOOT            | 56,891.000 |   |            |   |             |
| 64300260    | IMP ATTEN FRD NAR TL3 | EACH            | 2.000      |   |            |   |             |
| 64300370    | IMP ATTEN FRD WID TL3 | EACH            | 3.000      |   |            |   |             |
| 64300450    | IMP ATTEN NRD TL3     | EACH            | 2.000      |   |            |   |             |
| 64301090    | ATTENUATOR BASE       | SQ YD           | 236.000    |   |            |   |             |
| 66400105    | CH LK FENCE 4         | FOOT            | 17,903.000 |   |            |   |             |
| 66600105    | FUR ERECT ROW MARKERS | EACH            | 100.000    |   |            |   |             |

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| Item Number | Pay Item Description  | Unit of Measure | Quantity    | x | Unit Price | = | Total Price |
|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| 66700205    | PERM SURV MKRS T1     | EACH            | 22.000      |   |            |   |             |
| 66700305    | PERM SURV MKRS T2     | EACH            | 9.000       |   |            |   |             |
| 67100100    | MOBILIZATION          | L SUM           | 1.000       |   |            |   |             |
| 70106800    | CHANGEABLE MESSAGE SN | CAL MO          | 385.500     |   |            |   |             |
| 70200100    | NIGHT WORK ZONE LIGHT | L SUM           | 1.000       |   |            |   |             |
| 70300100    | SHORT TERM PAVT MKING | FOOT            | 50,883.000  |   |            |   |             |
| 70300510    | PAVT MARK TAPE T3 L&S | SQ FT           | 1,392.000   |   |            |   |             |
| 70300520    | PAVT MARK TAPE T3 4   | FOOT            | 604,485.000 |   |            |   |             |
| 70300550    | PAVT MARK TAPE T3 8   | FOOT            | 51,510.000  |   |            |   |             |
| 70300560    | PAVT MARK TAPE T3 12  | FOOT            | 26,822.000  |   |            |   |             |
| 70300570    | PAVT MARK TAPE T3 24  | FOOT            | 1,251.000   |   |            |   |             |
| 70301000    | WORK ZONE PAVT MK REM | SQ FT           | 341,170.000 |   |            |   |             |
| 70400100    | TEMP CONC BARRIER     | FOOT            | 60,837.500  |   |            |   |             |
| 70400200    | REL TEMP CONC BARRIER | FOOT            | 122,450.000 |   |            |   |             |
| 72000100    | SIGN PANEL T1         | SQ FT           | 125.000     |   |            |   |             |

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|-------------|-----------------------|-----------------|------------|---|------------|---|-------------|
| 72000200    | SIGN PANEL T2         | SQ FT           | 344.000    |   |            |   |             |
| 72000300    | SIGN PANEL T3         | SQ FT           | 7,231.000  |   |            |   |             |
| 72400100    | REMOV SIN PAN ASSY TA | EACH            | 20.000     |   |            |   |             |
| 72400200    | REMOV SIN PAN ASSY TB | EACH            | 30.000     |   |            |   |             |
| 72400310    | REMOV SIGN PANEL T1   | SQ FT           | 22.000     |   |            |   |             |
| 72400330    | REMOV SIGN PANEL T3   | SQ FT           | 137.000    |   |            |   |             |
| 72600100    | MILEPOST MKR ASSEMBLY | EACH            | 8.000      |   |            |   |             |
| 72700100    | STR STL SIN SUP BA    | POUND           | 42,492.000 |   |            |   |             |
| 72800100    | TELES STL SIN SUPPORT | FOOT            | 38.000     |   |            |   |             |
| 73000100    | WOOD SIN SUPPORT      | FOOT            | 682.000    |   |            |   |             |
| 73100100    | BASE TEL STL SIN SUPP | EACH            | 4.000      |   |            |   |             |
| 73300100    | OVHD SIN STR-SPAN T1A | FOOT            | 204.000    |   |            |   |             |
| 73300200    | OVHD SIN STR-SPAN T2A | FOOT            | 155.000    |   |            |   |             |
| 73300300    | OVHD SIN STR-SPAN T3A | FOOT            | 152.000    |   |            |   |             |
| 73301810    | OSS WALKWAY TY A      | FOOT            | 343.000    |   |            |   |             |

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|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| 73302110    | OSS CANT 1CA 2-0X4-6  | FOOT            | 24.000      |   |            |   |             |
| 73302210    | OSS CANT 3CA 3-0X7-0  | FOOT            | 32.000      |   |            |   |             |
| 73400100    | CONC FOUNDATION       | CU YD           | 85.500      |   |            |   |             |
| 73400200    | DRILL SHAFT CONC FDN  | CU YD           | 214.900     |   |            |   |             |
| 73600100    | REMOV OH SIN STR-SPAN | EACH            | 6.000       |   |            |   |             |
| 73600200    | REMOV OH SIN STR-CANT | EACH            | 1.000       |   |            |   |             |
| 73602000    | REM OVHD SN STR-BR MT | EACH            | 1.000       |   |            |   |             |
| 73700100    | REM GR MT SIN SUPPORT | EACH            | 59.000      |   |            |   |             |
| 73700200    | REM CONC FDN-GR MT    | EACH            | 59.000      |   |            |   |             |
| 73700300    | REM CONC FDN-OVHD     | EACH            | 13.000      |   |            |   |             |
| 78003130    | PREF PL PM TB LINE 6  | FOOT            | 21,093.000  |   |            |   |             |
| 78003140    | PREF PL PM TB LINE 8  | FOOT            | 1,693.000   |   |            |   |             |
| 78008310    | POLYUREA PM T2 LN 4   | FOOT            | 299,689.000 |   |            |   |             |
| 78008340    | POLYUREA PM T2 LN 8   | FOOT            | 24,730.000  |   |            |   |             |
| 78008350    | POLYUREA PM T2 LN 12  | FOOT            | 9,180.000   |   |            |   |             |

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|-------------|-----------------------|-----------------|-------------|---|------------|---|-------------|
| 78009000    | MOD URETH PM LTR-SYM  | SQ FT           | 1,002.000   |   |            |   |             |
| 78009004    | MOD URETH PM LINE 4   | FOOT            | 144,345.000 |   |            |   |             |
| 78009008    | MOD URETH PM LINE 8   | FOOT            | 22,174.000  |   |            |   |             |
| 78009012    | MOD URETH PM LINE 12  | FOOT            | 3,252.000   |   |            |   |             |
| 78009024    | MOD URETH PM LINE 24  | FOOT            | 371.000     |   |            |   |             |
| 78100100    | RAISED REFL PAVT MKR  | EACH            | 3,273.000   |   |            |   |             |
| 78100105    | RAISED REF PVT MKR BR | EACH            | 67.000      |   |            |   |             |
| 78200100    | MONODIR PRIS BAR REFL | EACH            | 119.000     |   |            |   |             |
| 78200300    | PRISMATIC CURB REFL   | EACH            | 173.000     |   |            |   |             |
| 78200410    | GUARDRAIL MKR TYPE A  | EACH            | 84.000      |   |            |   |             |
| 78201000    | TERMINAL MARKER - DA  | EACH            | 16.000      |   |            |   |             |
| 78300100    | PAVT MARKING REMOVAL  | SQ FT           | 38,525.000  |   |            |   |             |
| 80400100    | ELECT SERV INSTALL    | EACH            | 4.000       |   |            |   |             |
| 80500200    | SERV INSTALL TY B     | EACH            | 2.000       |   |            |   |             |
| 81028340    | UNDRGRD C PVC 1 1/2   | FOOT            | 45,711.000  |   |            |   |             |

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|-------------|-----------------------|-----------------|------------|---|------------|---|-------------|
| 81028350    | UNDRGRD C PVC 2       | FOOT            | 22,358.000 |   |            |   |             |
| 81028370    | UNDRGRD C PVC 3       | FOOT            | 430.000    |   |            |   |             |
| 81028380    | UNDRGRD C PVC 3 1/2   | FOOT            | 433.000    |   |            |   |             |
| 81028400    | UNDRGRD C PVC 5       | FOOT            | 290.000    |   |            |   |             |
| 81028730    | UNDRGRD C CNC 1 1/4   | FOOT            | 250.000    |   |            |   |             |
| 81028770    | UNDRGRD C CNC 3       | FOOT            | 300.000    |   |            |   |             |
| 81200230    | CON EMB STR 2 PVC     | FOOT            | 15,989.000 |   |            |   |             |
| 81300555    | JUN BX SS AS 12X12X8  | EACH            | 24.000     |   |            |   |             |
| 81304035    | JUN BOX EM S 8X24X10  | EACH            | 6.000      |   |            |   |             |
| 81400200    | HD HANDHOLE           | EACH            | 24.000     |   |            |   |             |
| 81400700    | HANDHOLE PCC          | EACH            | 15.000     |   |            |   |             |
| 81400710    | HD HANDHOLE PCC       | EACH            | 1.000      |   |            |   |             |
| 81400720    | DBL HANDHOLE PCC      | EACH            | 2.000      |   |            |   |             |
| 81603010    | UD 2#10#10GXLPUSE 3/4 | FOOT            | 262.000    |   |            |   |             |
| 81603032    | UD 2#4#6G XLPUSE 1.25 | FOOT            | 17,041.000 |   |            |   |             |

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|-------------|------------------------|-----------------|------------|---|------------|---|-------------|
| 81603070    | UD 2#2#4GXLP USE 1 1/4 | FOOT            | 10,425.000 |   |            |   |             |
| 81603095    | UD 4#2#4GXLP USE 1 1/2 | FOOT            | 1,193.000  |   |            |   |             |
| 81603100    | UD 4#6#6GXLP USE 1 1/4 | FOOT            | 145.000    |   |            |   |             |
| 81603110    | UD 4#4#6GXLP USE 1 1/2 | FOOT            | 2,221.000  |   |            |   |             |
| 81702110    | EC C XLP USE 1C 10     | FOOT            | 1,815.000  |   |            |   |             |
| 81702120    | EC C XLP USE 1C 8      | FOOT            | 4,258.000  |   |            |   |             |
| 81702130    | EC C XLP USE 1C 6      | FOOT            | 30,930.000 |   |            |   |             |
| 81702140    | EC C XLP USE 1C 4      | FOOT            | 24,939.000 |   |            |   |             |
| 81702150    | EC C XLP USE 1C 2      | FOOT            | 1,124.000  |   |            |   |             |
| 81702180    | EC C XLP USE 1C 3/0    | FOOT            | 855.000    |   |            |   |             |
| 82102250    | LUM SV HOR MT 250W     | EACH            | 123.000    |   |            |   |             |
| 82102400    | LUM SV HOR MT 400W     | EACH            | 138.000    |   |            |   |             |
| 82107200    | UNDERPAS LUM 100W HPS  | EACH            | 8.000      |   |            |   |             |
| 82500380    | LT CONT BASEM 480V200  | EACH            | 3.000      |   |            |   |             |
| 83060345    | LT P GS 40MH 12MA-TW   | EACH            | 11.000     |   |            |   |             |

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|-------------|-----------------------|-----------------|-----------|---|------------|---|-------------|
| 83060350    | LT P GS 40MH 15MA     | EACH            | 101.000   |   |            |   |             |
| 83060543    | LT P GS 50MH 12MA-TW  | EACH            | 48.000    |   |            |   |             |
| 83060550    | LT P GS 50MH 15MA     | EACH            | 39.000    |   |            |   |             |
| 83600300    | LIGHT POLE FDN 30D    | FOOT            | 867.000   |   |            |   |             |
| 83800205    | BKWY DEV TR B 15BC    | EACH            | 138.000   |   |            |   |             |
| 84200600    | REM LT U NO SALV      | EACH            | 38.000    |   |            |   |             |
| 84200804    | REM POLE FDN          | EACH            | 38.000    |   |            |   |             |
| 84500110    | REMOV LIGHTING CONTR  | EACH            | 2.000     |   |            |   |             |
| 84500120    | REMOV ELECT SERV INST | EACH            | 2.000     |   |            |   |             |
| 84500130    | REMOV LTG CONTR FDN   | EACH            | 2.000     |   |            |   |             |
| 86300300    | CONT CAB TYPE III     | EACH            | 1.000     |   |            |   |             |
| 87100020    | FOCC62.5/125 MM12SM12 | FOOT            | 5,342.000 |   |            |   |             |
| 87301245    | ELCBL C SIGNAL 14 5C  | FOOT            | 2,566.000 |   |            |   |             |
| 87301255    | ELCBL C SIGNAL 14 7C  | FOOT            | 893.000   |   |            |   |             |
| 87301515    | ELCBL C LEAD 18 3PR   | FOOT            | 2,627.000 |   |            |   |             |

ILLINOIS DEPARTMENT OF TRANSPORTATION  
 SCHEDULE OF PRICES  
 CONTRACT  
 NUMBER - 68620

State Job # - C-94-154-06

County Name - TAZEWELL - -

Code - 179 - -

District - 4 - -

Section Number - 90-[14R;(14HB-4,14,14HVB)BR]

Project Number  
 ACIM-ACBRI005(/907/)

Route

FAI 74

FAI 155

| Item Number | Pay Item Description  | Unit of Measure | Quantity | x | Unit Price | = | Total Price |
|-------------|-----------------------|-----------------|----------|---|------------|---|-------------|
| 87301732    | ELCBL C COMM 20 3C    | FOOT            | 913.000  |   |            |   |             |
| 87502490    | TS POST GALVS 15      | EACH            | 5.000    |   |            |   |             |
| 87700400    | S MAA & P 60          | EACH            | 1.000    |   |            |   |             |
| 87702218    | S MAA & P DMA 20 & 36 | EACH            | 1.000    |   |            |   |             |
| 87702960    | STL COMB MAA&P 46     | EACH            | 1.000    |   |            |   |             |
| 87704519    | S C MAA&P DMA 48 & 36 | EACH            | 1.000    |   |            |   |             |
| 87800100    | CONC FDN TY A         | FOOT            | 15.000   |   |            |   |             |
| 87800200    | CONC FDN TY D         | FOOT            | 7.000    |   |            |   |             |
| 87800215    | CONC FDN TY D         | EACH            | 1.000    |   |            |   |             |
| 87800400    | CONC FDN TY E 30D     | FOOT            | 20.000   |   |            |   |             |
| 87800415    | CONC FDN TY E 36D     | FOOT            | 99.000   |   |            |   |             |
| 87800420    | CONC FDN TY E 42D     | FOOT            | 21.000   |   |            |   |             |
| 87900200    | DRILL EX HANDHOLE     | EACH            | 6.000    |   |            |   |             |
| 88030020    | SH LED 1F 3S MAM      | EACH            | 12.000   |   |            |   |             |
| 88030050    | SH LED 1F 3S BM       | EACH            | 5.000    |   |            |   |             |

ILLINOIS DEPARTMENT OF TRANSPORTATION  
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Section Number - 90-[14R;(14HB-4,14,14HVB)BR]

Project Number  
 ACIM-ACBRI005(/907/)

Route  
 FAI 74  
 FAI 155

| Item Number | Pay Item Description  | Unit of Measure | Quantity  | x | Unit Price | = | Total Price |
|-------------|-----------------------|-----------------|-----------|---|------------|---|-------------|
| 88030070    | SH LED 1F 4S BM       | EACH            | 3.000     |   |            |   |             |
| 88030100    | SH LED 1F 5S BM       | EACH            | 2.000     |   |            |   |             |
| 88200310    | TS BACKPLATE LOU PLAS | EACH            | 19.000    |   |            |   |             |
| 88500100    | INDUCTIVE LOOP DETECT | EACH            | 15.000    |   |            |   |             |
| 88600100    | DET LOOP T1           | FOOT            | 2,644.000 |   |            |   |             |
| 88700200    | LIGHT DETECTOR        | EACH            | 4.000     |   |            |   |             |
| 88700300    | LIGHT DETECTOR AMP    | EACH            | 2.000     |   |            |   |             |
| 89000100    | TEMP TR SIG INSTALL   | EACH            | 2.000     |   |            |   |             |
| 89501250    | RELOC EX TS EQUIP     | EACH            | 1.000     |   |            |   |             |



## RETURN WITH BID

### **STATE REQUIRED ETHICAL STANDARDS GOVERNING CONTRACT PROCUREMENT: ASSURANCES, CERTIFICATIONS AND DISCLOSURES**

#### **I. GENERAL**

**A.** Article 50 of the Code establishes the duty of all State CPOs, SPOs, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

**B.** In order to comply with the provisions of Article 50 and to carry out the duty established therein, all bidders are to adhere to ethical standards established for the procurement process, and to make such assurances, disclosures and certifications required by law. Except as otherwise required in subsection III, paragraphs J-M, by execution of the Proposal Signature Sheet, the bidder indicates that each of the mandated assurances have been read and understood, that each certification is made and understood, and that each disclosure requirement has been understood and completed.

**C.** In addition to all other remedies provided by law, failure to comply with any assurance, failure to make any disclosure or the making of a false certification shall be grounds for the CPO to void the contract, and may result in the suspension or debarment of the bidder or subcontractor. If a false certification is made by a subcontractor the contractor's submitted bid and the executed contract may not be declared void unless the contractor refuses to terminate the subcontract upon the State's request after a finding that the subcontractor's certification was false.

#### **II. ASSURANCES**

The assurances hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder.

##### **A. Conflicts of Interest**

1. The Code provides in pertinent part:

Section 50-13. Conflicts of Interest.

(a) Prohibition. It is unlawful for any person holding an elective office in this State, holding a seat in the General Assembly, or appointed to or employed in any of the offices or agencies of state government and who receives compensation for such employment in excess of 60% of the salary of the Governor of the State of Illinois, or who is an officer or employee of the Capital Development Board or the Illinois Toll Highway Authority, or who is the spouse or minor child of any such person to have or acquire any contract, or any direct pecuniary interest in any contract therein, whether for stationery, printing, paper, or any services, materials, or supplies, that will be wholly or partially satisfied by the payment of funds appropriated by the General Assembly of the State of Illinois or in any contract of the Capital Development Board or the Illinois Toll Highway authority.

(b) Interests. It is unlawful for any firm, partnership, association or corporation, in which any person listed in subsection (a) is entitled to receive (i) more than 7 1/2% of the total distributable income or (ii) an amount in excess of the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(c) Combined interests. It is unlawful for any firm, partnership, association, or corporation, in which any person listed in subsection (a) together with his or her spouse or minor children is entitled to receive (i) more than 15%, in the aggregate, of the total distributable income or (ii) an amount in excess of 2 times the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(d) Securities. Nothing in this Section invalidates the provisions of any bond or other security previously offered or to be offered for sale or sold by or for the State of Illinois.

(e) Prior interests. This Section does not affect the validity of any contract made between the State and an officer or employee of the State or member of the General Assembly, his or her spouse, minor child or any combination of those persons if that contract was in existence before his or her election or employment as an officer, member, or employee. The contract is voidable, however, if it cannot be completed within 365 days after the officer, member, or employee takes office or is employed.

The current salary of the Governor is \$177,412.00. Sixty percent of the salary is \$106,447.20.

## RETURN WITH BID

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-13, or that an effective exemption has been issued by the Board of Ethics to any individual subject to the Section 50-13 prohibitions pursuant to the provisions of Section 50-20 of the Code and Executive Order Number 3 (1998). Information concerning the exemption process is available from the Department upon request.

### **B. Negotiations**

1. The Code provides in pertinent part:

Section 50-15. Negotiations.

(a) It is unlawful for any person employed in or on a continual contractual relationship with any of the offices or agencies of State government to participate in contract negotiations on behalf of that office or agency with any firm, partnership, association, or corporation with whom that person has a contract for future employment or is negotiating concerning possible future employment.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-15, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

### **C. Inducements**

1. The Code provides:

Section 50-25. Inducement. Any person who offers or pays any money or other valuable thing to any person to induce him or her not to bid for a State contract or as recompense for not having bid on a State contract is guilty of a Class 4 felony. Any person who accepts any money or other valuable thing for not bidding for a State contract or who withholds a bid in consideration of the promise for the payment of money or other valuable thing is guilty of a Class 4 felony.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-25, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

### **D. Revolving Door Prohibition**

1. The Code provides:

Section 50-30. Revolving door prohibition. CPOs, SPOs, procurement compliance monitors, their designees whose principal duties are directly related to State procurement, and executive officers confirmed by the Senate are expressly prohibited for a period of 2 years after terminating an affected position from engaging in any procurement activity relating to the State agency most recently employing them in an affected position for a period of at least 6 months. The prohibition includes, but is not limited to: lobbying the procurement process; specifying; bidding; proposing bid, proposal, or contract documents; on their own behalf or on behalf of any firm, partnership, association, or corporation. This Section applies only to persons who terminate an affected position on or after January 15, 1999.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-30, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

### **E. Reporting Anticompetitive Practices**

1. The Code provides:

Section 50-40. Reporting anticompetitive practices. When, for any reason, any vendor, bidder, contractor, CPO, SPO, designee, elected official, or State employee suspects collusion or other anticompetitive practice among any bidders, offerors, contractors, proposers, or employees of the State, a notice of the relevant facts shall be transmitted to the Attorney General and the CPO.

2. The bidder assures the Department that it has not failed to report any relevant facts concerning the practices addressed in Section 50-40 which may involve the contract for which the bid is submitted.

### **F. Confidentiality**

1. The Code provides:

Section 50-45. Confidentiality. Any CPO, SPO, designee, or executive officer who willfully uses or allows the use of specifications, competitive bid documents, proprietary competitive information, proposals, contracts, or selection information to compromise the fairness or integrity of the procurement, bidding, or contract process shall be subject to immediate dismissal, regardless of the Personnel code, any contract, or any collective bargaining agreement, and may in addition be subject to criminal prosecution.

2. The bidder assures the Department that it has no knowledge of any fact relevant to the practices addressed in Section 50-45 which may involve the contract for which the bid is submitted.

## RETURN WITH BID

### **G. Insider Information**

1. The Code provides:

Section 50-50. Insider information. It is unlawful for any current or former elected or appointed State official or State employee to knowingly use confidential information available only by virtue of that office or employment for actual or anticipated gain for themselves or another person.

2. The bidder assures the Department that it has no knowledge of any facts relevant to the practices addressed in Section 50-50 which may involve the contract for which the bid is submitted.

### **III. CERTIFICATIONS**

The certifications hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. Section 50-2 of the Code provides that every person that has entered into a multi-year contract and every subcontractor with a multi-year subcontract shall certify, by July 1 of each fiscal year covered by the contract after the initial fiscal year, to the responsible CPO whether it continues to satisfy the requirements of Article 50 pertaining to the eligibility for a contract award. If a contractor or subcontractor is not able to truthfully certify that it continues to meet all requirements, it shall provide with its certification a detailed explanation of the circumstances leading to the change in certification status. A contractor or subcontractor that makes a false statement material to any given certification required under Article 50 is, in addition to any other penalties or consequences prescribed by law, subject to liability under the Whistleblower Reward and Protection Act for submission of a false claim.

#### **A. Bribery**

1. The Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government, or subcontracting under such a contract, as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, or which is signatory to the contract which the subcontract relates, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State, and every subcontract subject to Section 20-120 of the Code shall contain a certification by the contractor or the subcontractor, respectively, that the contractor or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the CPO may declare the related contract void if any certifications required by this Section are false. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50.5.

#### **B. Felons**

1. The Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any State agency, or enter into a subcontract, from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

1. Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Code shall contain a certification by the bidder or contractor or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the CPO may declare the related contract void if any of the certifications required by this Section are false.

## RETURN WITH BID

### **C. Debt Delinquency**

1. The Code provides:

Section 50-11 and 50-12. Debt Delinquency.

The contractor or bidder or subcontractor, respectively, certifies that it, or any affiliate, is not barred from being awarded a contract or subcontract under the Code. Section 50-11 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The bidder or contractor or subcontractor, respectively, further acknowledges that the CPO may declare the related contract void if this certification is false or if the bidder, contractor, or subcontractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

### **D. Prohibited Bidders, Contractors and Subcontractors**

1. The Code provides:

Section 50-10.5 and 50-60(c). Prohibited bidders, contractors and subcontractors.

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 or if in violation of Subsection (c) for a period of five years from the date of conviction. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Code shall contain a certification by the bidder, contractor, or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the CPO shall declare the related contract void if any of the certifications completed pursuant to this Section are false.

### **E. Section 42 of the Environmental Protection Act**

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-12 that the bidder, contractor, or subcontractor, is not barred from being awarded a contract or entering into a subcontract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency, or entering into any subcontract, that is subject to the Code by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The bidder or contractor or subcontractor, respectively, acknowledges that the CPO may declare the contract void if this certification is false.

### **F. Educational Loan**

1. Section 3 of the Educational Loan Default Act provides:

§ 3. No State agency shall contract with an individual for goods or services if that individual is in default, as defined in Section 2 of this Act, on an educational loan. Any contract used by any State agency shall include a statement certifying that the individual is not in default on an educational loan as provided in this Section.

2. The bidder, if an individual as opposed to a corporation, partnership or other form of business organization, certifies that the bidder is not in default on an educational loan as provided in Section 3 of the Act.

### **G. Bid-Rigging/Bid Rotating**

1. Section 33E-11 of the Criminal Code of 1961 provides:

§ 33E-11. (a) Every bid submitted to and public contract executed pursuant to such bid by the State or a unit of local government shall contain a certification by the prime contractor that the prime contractor is not barred from contracting with any unit of State or local government as a result of a violation of either Section 33E-3 or 33E-4 of this Article. The State and units of local government shall provide the appropriate forms for such certification.

- (b) A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

A violation of Section 33E-3 would be represented by a conviction of the crime of bid-rigging which, in addition to Class 3 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be barred for 5 years from the date of conviction from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

## RETURN WITH BID

A violation of Section 33E-4 would be represented by a conviction of the crime of bid-rotating which, in addition to Class 2 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be permanently barred from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

2. The bidder certifies that it is not barred from contracting with the Department by reason of a violation of either Section 33E-3 or Section 33E-4.

### **H. International Anti-Boycott**

1. Section 5 of the International Anti-Boycott Certification Act provides:

§ 5. State contracts. Every contract entered into by the State of Illinois for the manufacture, furnishing, or purchasing of supplies, material, or equipment or for the furnishing of work, labor, or services, in an amount exceeding the threshold for small purchases according to the purchasing laws of this State or \$10,000.00, whichever is less, shall contain certification, as a material condition of the contract, by which the contractor agrees that neither the contractor nor any substantially-owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the U.S. Export Administration Act of 1979 or the regulations of the U.S. Department of Commerce promulgated under that Act.

2. The bidder makes the certification set forth in Section 5 of the Act.

### **I. Drug Free Workplace**

1. The Illinois "Drug Free Workplace Act" applies to this contract and it is necessary to comply with the provisions of the "Act" if the contractor is a corporation, partnership, or other entity (including a sole proprietorship) which has 25 or more employees.

2. The bidder certifies that if awarded a contract in excess of \$5,000 it will provide a drug free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance, including cannabis, is prohibited in the contractor's workplace; specifying the actions that will be taken against employees for violations of such prohibition; and notifying the employee that, as a condition of employment on such contract, the employee shall abide by the terms of the statement, and notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.

(b) Establishing a drug free awareness program to inform employees about the dangers of drug abuse in the workplace; the contractor's policy of maintaining a drug free workplace; any available drug counseling, rehabilitation, and employee assistance programs; and the penalties that may be imposed upon employees for drug violations.

(c) Providing a copy of the statement required by subparagraph (1) to each employee engaged in the performance of the contract and to post the statement in a prominent place in the workplace.

(d) Notifying the Department within ten (10) days after receiving notice from an employee or otherwise receiving actual notice of the conviction of an employee for a violation of any criminal drug statute occurring in the workplace.

(e) Imposing or requiring, within 30 days after receiving notice from an employee of a conviction or actual notice of such a conviction, an appropriate personnel action, up to and including termination, or the satisfactory participation in a drug abuse assistance or rehabilitation program approved by a federal, state or local health, law enforcement or other appropriate agency.

(f) Assisting employees in selecting a course of action in the event drug counseling, treatment, and rehabilitation is required and indicating that a trained referral team is in place.

(g) Making a good faith effort to continue to maintain a drug free workplace through implementation of the actions and efforts stated in this certification.

RETURN WITH BID

J. Disclosure of Business Operations in Iran

Section 50-36 of the Code, 30ILCS 500/50-36 provides that each bid, offer, or proposal submitted for a State contract shall include a disclosure of whether or not the Company acting as the bidder, offeror, or proposing entity, or any of its corporate parents or subsidiaries, within the 24 months before submission of the bid, offer, or proposal had business operations that involved contracts with or provision of supplies or services to the Government of Iran, companies in which the Government of Iran has any direct or indirect equity share, consortiums or projects commissioned by the Government of Iran, or companies involved in consortiums or projects commissioned by the Government of Iran and either of the following conditions apply:

- (1) More than 10% of the Company's revenues produced in or assets located in Iran involve oil-related activities or mineral-extraction activities; less than 75% of the Company's revenues produced in or assets located in Iran involve contracts with or provision of oil-related or mineral-extraction products or services to the Government of Iran or a project or consortium created exclusively by that government; and the Company has failed to take substantial action.
(2) The Company has, on or after August 5, 1996, made an investment of \$20 million or more, or any combination of investments of at least \$10 million each that in the aggregate equals or exceeds \$20 million in any 12-month period, which directly or significantly contributes to the enhancement of Iran's ability to develop petroleum resources of Iran.

The terms "Business operations", "Company", "Mineral-extraction activities", "Oil-related activities", "Petroleum resources", and "Substantial action" are all defined in the Code.

Failure to make the disclosure required by the Code shall cause the bid, offer or proposal to be considered not responsive. The disclosure will be considered when evaluating the bid, offer, or proposal or awarding the contract. The name of each Company disclosed as doing business or having done business in Iran will be provided to the State Comptroller.

Check the appropriate statement:

/\_\_\_/ Company has no business operations in Iran to disclose.

/\_\_\_/ Company has business operations in Iran as disclosed the attached document.

K. Apprenticeship and Training Certification (Does not apply to federal aid projects)

In accordance with the provisions of Section 30-22 (6) of the Code, the bidder certifies that it is a participant, either as an individual or as part of a group program, in the approved apprenticeship and training programs applicable to each type of work or craft that the bidder will perform with its own forces. The bidder further certifies for work that will be performed by subcontract that each of its subcontractors submitted for approval either (a) is, at the time of such bid, participating in an approved, applicable apprenticeship and training program; or (b) will, prior to commencement of performance of work pursuant to this contract, begin participation in an approved apprenticeship and training program applicable to the work of the subcontract. The Department, at any time before or after award, may require the production of a copy of each applicable Certificate of Registration issued by the United States Department of Labor evidencing such participation by the contractor and any or all of its subcontractors. Applicable apprenticeship and training programs are those that have been approved and registered with the United States Department of Labor. The bidder shall list in the space below, the official name of the program sponsor holding the Certificate of Registration for all of the types of work or crafts in which the bidder is a participant and that will be performed with the bidder's forces. Types of work or craft work that will be subcontracted shall be included and listed as subcontract work. The list shall also indicate any type of work or craft job category that does not have an applicable apprenticeship or training program. The bidder is responsible for making a complete report and shall make certain that each type of work or craft job category that will be utilized on the project as reported on the Construction Employee Workforce Projection (Form BC-1256) and returned with the bid is accounted for and listed.

NA-FEDERAL

The requirements of this certification and disclosure are a material part of the contract, and the contractor shall require this certification provision to be included in all approved subcontracts. In order to fulfill this requirement, it shall not be necessary that an applicable program sponsor be currently taking or that it will take applications for apprenticeship, training or employment during the performance of the work of this contract.

**RETURN WITH BID**

**L. Political Contributions and Registration with the State Board of Elections**

Sections 20-160 and 50-37 of the Code regulate political contributions from business entities and any affiliated entities or affiliated persons bidding on or contracting with the state. Generally under Section 50-37, any business entity, and any affiliated entity or affiliated person of the business entity, whose current year contracts with all state agencies exceed an awarded value of \$50,000, are prohibited from making any contributions to any political committees established to promote the candidacy of the officeholder responsible for the awarding of the contracts or any other declared candidate for that office for the duration of the term of office of the incumbent officeholder or a period 2 years after the termination of the contract, whichever is longer. Any business entity and affiliated entities or affiliated persons whose state contracts in the current year do not exceed an awarded value of \$50,000, but whose aggregate pending bids and proposals on state contracts exceed \$50,000, either alone or in combination with contracts not exceeding \$50,000, are prohibited from making any political contributions to any political committee established to promote the candidacy of the officeholder responsible for awarding the pending contract during the period beginning on the date the invitation for bids or request for proposals is issued and ending on the day after the date of award or selection if the entity was not awarded or selected. Section 20-160 requires certification of registration of affected business entities in accordance with procedures found in Section 9-35 of The Election Code.

By submission of a bid, the contractor business entity acknowledges and agrees that it has read and understands Sections 20-160 and 50-37 of the Code, and that it makes the following certification:

**The undersigned business entity certifies that it has registered as a business with the State Board of Elections and acknowledges a continuing duty to update the registration in accordance with the above referenced statutes. If the business entity is required to register, the CPO shall verify that it is in compliance on the date the bid or proposal is due. The CPO shall not accept a bid or proposal if the business entity is not in compliance with the registration requirements.**

These requirements and compliance with the above referenced statutory sections are a material part of the contract, and any breach thereof shall be cause to void the contract under Section 50-60 of the Code. This provision does not apply to Federal-aid contracts.

**M. Lobbyist Disclosure**

Section 50-38 of the Code requires that any bidder or offeror on a State contract that hires a person required to register under the Lobbyist Registration Act to assist in obtaining a contract shall:

- (i) Disclose all costs, fees, compensation, reimbursements, and other remunerations paid or to be paid to the lobbyist related to the contract,
- (ii) Not bill or otherwise cause the State of Illinois to pay for any of the lobbyist's costs, fees, compensation, reimbursements, or other remuneration, and
- (iii) Sign a verification certifying that none of the lobbyist's costs, fees, compensation, reimbursements, or other remuneration were billed to the State.

This information, along with all supporting documents, shall be filed with the agency awarding the contract and with the Secretary of State. The CPO shall post this information, together with the contract award notice, in the online Procurement Bulletin.

Pursuant to Subsection (c) of this Section, no person or entity shall retain a person or entity to attempt to influence the outcome of a procurement decision made under the Code for compensation contingent in whole or in part upon the decision or procurement. Any person who violates this subsection is guilty of a business offense and shall be fined not more than \$10,000.

Bidder acknowledges that it is required to disclose the hiring of any person required to register pursuant to the Illinois Lobbyist Registration Act (25 ILCS 170) in connection with this contract.

Bidder has not hired any person required to register pursuant to the Illinois Lobbyist Registration Act in connection with this contract.

Or

Bidder has hired the following persons required to register pursuant to the Illinois Lobbyist Registration Act in connection with the contract:

Name and address of person: \_\_\_\_\_  
All costs, fees, compensation, reimbursements and other remuneration paid to said person: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## RETURN WITH BID

### IV. DISCLOSURES

- A. The disclosures hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The bidder further certifies that the Department has received the disclosure forms for each bid.

The CPO may void the bid, or contract, respectively, if it is later determined that the bidder or subcontractor rendered a false or erroneous disclosure. A contractor or subcontractor may be suspended or debarred for violations of the Code. Furthermore, the CPO may void the contract and the surety providing the performance bond shall be responsible for completion of the contract.

### B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Code provides that all bids of more than \$25,000 shall be accompanied by disclosure of the financial interests of the bidder. This disclosed information for the successful bidder, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act, filed with the Procurement Policy Board, and shall be incorporated as a material term of the contract. Furthermore, pursuant to Section 5-5, the Procurement Policy Board may review a proposal, bid, or contract and issue a recommendation to void a contract or reject a proposal or bid based on any violation of the Code or the existence of a conflict of interest as provided in subsections (b) and (d) of Section 50-35.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the bidding entity or its parent entity, whichever is less, unless the contractor or bidder is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 200 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form. **The current annual salary of the Governor is \$177,412.00.**

In addition, all disclosures shall indicate any other current or pending contracts, proposals, leases, or other ongoing procurement relationships the bidding entity has with any other unit of state government and shall clearly identify the unit and the contract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. A separate Disclosure Form A must be submitted with the bid for each individual meeting the above requirements. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies and a total ownership certification. **The forms must be included with each bid.**

### C. Disclosure Form Instructions

#### Form A Instructions for Financial Information & Potential Conflicts of Interest

If the bidder is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 200 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a bidder is not subject to Federal 10K reporting, the bidder must determine if any individuals are required by law to complete a financial disclosure form. To do this, the bidder should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on Form A must be signed and dated by a person that is authorized to execute contracts for the bidding company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES \_\_\_ NO \_\_\_
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than 60% of the annual salary of the Governor? YES \_\_\_ NO \_\_\_
3. Does anyone in your organization receive more than 60% of the annual salary of the Governor of the bidding entity's or parent entity's distributive income? YES \_\_\_ NO \_\_\_
4. Does anyone in your organization receive greater than 5% of the bidding entity's or parent entity's total distributive income, but which is less than 60% of the annual salary of the Governor? YES \_\_\_ NO \_\_\_

(Note: Only one set of forms needs to be completed per person per bid even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The bidder must determine each individual in the bidding entity or the bidding entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable.** The person signing can be, but does not have to be, the person for which the form is being completed. The bidder is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

## RETURN WITH BID

### **Form B: Instructions for Identifying Other Contracts & Procurement Related Information**

Disclosure Form B must be completed for each bid submitted by the bidding entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the bidder to ignore Form B. Form B must be completed, checked, and dated or the bidder may be considered nonresponsive and the bid will not be accepted.*

The Bidder shall identify, by checking Yes or No on Form B, whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the bidder only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the bidder must do one of the following:

Option I: If the bidder did not submit an Affidavit of Availability to obtain authorization to bid, the bidder must list all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Do not include IDOT contracts. Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included. Bidders who submit Affidavits of Availability are suggested to use Option II.

Option II: If the bidder is required and has submitted an Affidavit of Availability in order to obtain authorization to bid, the bidder may write or type "See Affidavit of Availability" which indicates that the Affidavit of Availability is incorporated by reference and includes all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. For any contracts that are not covered by the Affidavit of Availability, the bidder must identify them on Form B or on an attached sheet(s). These might be such things as leases.

RETURN WITH BID

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form A Financial Information & Potential Conflicts of Interest Disclosure

Contractor Name, Legal Address, City, State, Zip, Telephone Number, Email Address, Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Code (30 ILCS 500). Vendors desiring to enter into a contract with the State of Illinois must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of \$25,000, and for all open-ended contracts. A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.

The current annual salary of the Governor is \$177,412.00.

DISCLOSURE OF FINANCIAL INFORMATION

- 1. Disclosure of Financial Information. The individual named below has an interest in the BIDDER (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than 60% of the annual salary of the Governor. (Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)

FOR INDIVIDUAL (type or print information) NAME: ADDRESS Type of ownership/distributable income share: stock sole proprietorship Partnership other: (explain on separate sheet): % or \$ value of ownership/distributable income share:

- 2. Disclosure of Potential Conflicts of Interest. Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services. Yes \_\_\_ No \_\_\_

If your answer is yes, please answer each of the following questions.

- 1. Are you currently an officer or employee of either the Capitol Development Board or the Illinois State Toll Highway Authority? Yes \_\_\_ No \_\_\_
2. Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds 60% of the annual salary of the Governor provide the name the State agency for which you are employed and your annual salary.

**RETURN WITH BID**

- 3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds 60% of the annual salary of the Governor, are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 100% of the annual salary of the Governor? Yes \_\_\_ No \_\_\_
- 4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds 60% of the annual salary of the Governor, are you and your spouse or minor children entitled to receive (i) more than 15% in aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of two times the salary of the Governor? Yes \_\_\_ No \_\_\_

---

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment for services in the previous 2 years.

Yes \_\_\_ No \_\_\_

If your answer is yes, please answer each of the following questions.

- 1. Is your spouse or any minor children currently an officer or employee of the Capitol Development Board or the Illinois State Toll Highway Authority? Yes \_\_\_ No \_\_\_
- 2. Is your spouse or any minor children currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds 60% of the annual salary of the Governor, provide the name of the spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary. \_\_\_\_\_

- 3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds 60% of the annual salary of the Governor, are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess 100% of the annual salary of the Governor? Yes \_\_\_ No \_\_\_
- 4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds 60% of the annual salary of the Governor, are you and your spouse or any minor children entitled to receive (i) more than 15% in the aggregate of the total distributable income from your firm, partnership, association or corporation, or (ii) an amount in excess of two times the salary of the Governor? Yes \_\_\_ No \_\_\_

---

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years. Yes \_\_\_ No \_\_\_

---

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes \_\_\_ No \_\_\_

---

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United State of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years. Yes \_\_\_ No \_\_\_

---

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes \_\_\_ No \_\_\_

---

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government. Yes \_\_\_ No \_\_\_

---

**RETURN WITH BID**

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes \_\_\_ No \_\_\_

---

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes \_\_\_ No \_\_\_

---

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes \_\_\_ No \_\_\_

---

**3. Communication Disclosure.**

Disclose the name and address of each lobbyist and other agent of the bidder or offeror who is not identified in Section 2 of this form, who is has communicated, is communicating, or may communicate with any State officer or employee concerning the bid or offer. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the process and throughout the term of the contract. If no person is identified, enter "None" on the line below:

Name and address of person(s): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**RETURN WITH BID**

**4. Debarment Disclosure.** For each of the persons identified under Sections 2 and 3 of this form, disclose whether any of the following has occurred within the previous 10 years: debarment from contracting with any governmental entity; professional licensure discipline; bankruptcies; adverse civil judgments and administrative findings; and criminal felony convictions. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the procurement process and term of the contract. If no person is identified, enter "None" on the line below:

Name of person(s): \_\_\_\_\_

Nature of disclosure: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**APPLICABLE STATEMENT**

**This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page. Under penalty of perjury, I certify the contents of this disclosure to be true and accurate to the best of my knowledge.**

Completed by:  \_\_\_\_\_  
Signature of Individual or Authorized Representative Date

**NOT APPLICABLE STATEMENT**

**Under penalty of perjury, I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.**

**This Disclosure Form A is submitted on behalf of the CONTRACTOR listed on the previous page.**

\_\_\_\_\_  
Signature of Authorized Representative Date

The bidder has a continuing obligation to supplement these disclosures under Sec. 50-35 of the Code.

RETURN WITH BID

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form B Other Contracts & Financial Related Information Disclosure

Contractor Name, Legal Address, City, State, Zip, Telephone Number, Email Address, Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Code (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of \$25,000, and for all open-ended contracts.

DISCLOSURE OF OTHER CONTRACTS AND PROCUREMENT RELATED INFORMATION

1. Identifying Other Contracts & Procurement Related Information. The BIDDER shall identify whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes \_\_\_ No \_\_\_

If "No" is checked, the bidder only needs to complete the signature box on the bottom of this page.

2. If "Yes" is checked. Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

THE FOLLOWING STATEMENT MUST BE CHECKED

Signature of Authorized Representative, Date

OWNERSHIP CERTIFICATION

Please certify that the following statement is true if the individuals for all submitted Form A disclosures do not total 100% of ownership.

Any remaining ownership interest is held by individuals receiving less than \$106,447.20 of the bidding entity's or parent entity's distributive income or holding less than a 5% ownership interest.

Yes No N/A (Form A disclosure(s) established 100% ownership)

## **RETURN WITH BID**

### **SPECIAL NOTICE TO CONTRACTORS**

The following requirements of the Illinois Department of Human Rights' Rules and Regulations are applicable to bidders on all construction contracts advertised by the Illinois Department of Transportation:

#### **CONSTRUCTION EMPLOYEE UTILIZATION PROJECTION**

- (a) All bidders on construction contracts shall complete and submit, along with and as part of their bids, a Bidder's Employee Utilization Form (Form BC-1256) setting forth a projection and breakdown of the total workforce intended to be hired and/or allocated to such contract work by the bidder including a projection of minority and female employee utilization in all job classifications on the contract project.
- (b) The Department of Transportation shall review the Employee Utilization Form, and workforce projections contained therein, of the contract awardee to determine if such projections reflect an underutilization of minority persons and/or women in any job classification in accordance with the Equal Employment Opportunity Clause and Section 7.2 of the Illinois Department of Human Rights' Rules and Regulations for Public Contracts adopted as amended on September 17, 1980. If it is determined that the contract awardee's projections reflect an underutilization of minority persons and/or women in any job classification, it shall be advised in writing of the manner in which it is underutilizing and such awardee shall be considered to be in breach of the contract unless, prior to commencement of work on the contract project, it submits revised satisfactory projections or an acceptable written affirmative action plan to correct such underutilization including a specific timetable geared to the completion stages of the contract.
- (c) The Department of Transportation shall provide to the Department of Human Rights a copy of the contract awardee's Employee Utilization Form, a copy of any required written affirmative action plan, and any written correspondence related thereto. The Department of Human Rights may review and revise any action taken by the Department of Transportation with respect to these requirements.



**RETURN WITH BID**

**Contract No. 68620  
TAZEWELL County  
Section 90-[14R;(14HB-4,14,14HVB)BR]  
Project ACIM-ACBRI-000S(907)  
Route FAI 74/155  
District 4 Construction Funds**

**PART II. WORKFORCE PROJECTION - continued**

- B. Included in "Total Employees" under Table A is the total number of **new hires** that would be employed in the event the undersigned bidder is awarded this contract.

The undersigned bidder projects that: (number) \_\_\_\_\_ new hires would be recruited from the area in which the contract project is located; and/or (number) \_\_\_\_\_ new hires would be recruited from the area in which the bidder's principal office or base of operation is located.

- C. Included in "Total Employees" under Table A is a projection of numbers of persons to be employed directly by the undersigned bidder as well as a projection of numbers of persons to be employed by subcontractors.

The undersigned bidder estimates that (number) \_\_\_\_\_ persons will be directly employed by the prime contractor and that (number) \_\_\_\_\_ persons will be employed by subcontractors.

**PART III. AFFIRMATIVE ACTION PLAN**

- A. The undersigned bidder understands and agrees that in the event the foregoing minority and female employee utilization projection included under **PART II** is determined to be an underutilization of minority persons or women in any job category, and in the event that the undersigned bidder is awarded this contract, he/she will, prior to commencement of work, develop and submit a written Affirmative Action Plan including a specific timetable (geared to the completion stages of the contract) whereby deficiencies in minority and/or female employee utilization are corrected. Such Affirmative Action Plan will be subject to approval by the contracting agency and the **Department of Human Rights**.
- B. The undersigned bidder understands and agrees that the minority and female employee utilization projection submitted herein, and the goals and timetable included under an Affirmative Action Plan if required, are deemed to be part of the contract specifications.

Company \_\_\_\_\_ Telephone Number \_\_\_\_\_

Address \_\_\_\_\_

**NOTICE REGARDING SIGNATURE**

The Bidder's signature on the Proposal Signature Sheet will constitute the signing of this form. The following signature block needs to be completed only if revisions are required.

Signature:  \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

- Instructions: All tables must include subcontractor personnel in addition to prime contractor personnel.
- Table A - Include both the number of employees that would be hired to perform the contract work and the total number currently employed (Table B) that will be allocated to contract work, and include all apprentices and on-the-job trainees. The "Total Employees" column should include all employees including all minorities, apprentices and on-the-job trainees to be employed on the contract work.
- Table B - Include all employees currently employed that will be allocated to the contract work including any apprentices and on-the-job trainees currently employed.
- Table C - Indicate the racial breakdown of the total apprentices and on-the-job trainees shown in Table A.

## RETURN WITH BID

### ADDITIONAL FEDERAL REQUIREMENTS

In addition to the Required Contract Provisions for Federal-Aid Construction Contracts (FHWA 1273), all bidders make the following certifications.

- A. By the execution of this proposal, the signing bidder certifies that the bidding entity has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid. This statement made by the undersigned bidder is true and correct under penalty of perjury under the laws of the United States.
- B. CERTIFICATION, EQUAL EMPLOYMENT OPPORTUNITY:
1. Have you participated in any previous contracts or subcontracts subject to the equal opportunity clause. YES \_\_\_\_\_ NO \_\_\_\_\_
  2. If answer to #1 is yes, have you filed with the Joint Reporting Committee, the Director of OFCC, any Federal agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements of those organizations? YES \_\_\_\_\_ NO \_\_\_\_\_

**RETURN WITH BID**

**Contract No. 68620  
TAZEWELL County  
Section 90-[14R;(14HB-4,14,14HVB)BR]  
Project ACIM-ACBRI-000S(907)  
Route FAI 74/155  
District 4 Construction Funds**

PROPOSAL SIGNATURE SHEET

The undersigned bidder hereby makes and submits this bid on the subject Proposal, thereby assuring the Department that all requirements of the Invitation for Bids and rules of the Department have been met, that there is no misunderstanding of the requirements of paragraph 3 of this Proposal, and that the contract will be executed in accordance with the rules of the Department if an award is made on this bid.

(IF AN INDIVIDUAL)

Firm Name \_\_\_\_\_  
Signature of Owner \_\_\_\_\_  
Business Address \_\_\_\_\_  
\_\_\_\_\_

(IF A CO-PARTNERSHIP)

Firm Name \_\_\_\_\_  
By \_\_\_\_\_  
Business Address \_\_\_\_\_  
Name and Address of All Members of the Firm: \_\_\_\_\_  
\_\_\_\_\_

(IF A CORPORATION)

Corporate Name \_\_\_\_\_  
By \_\_\_\_\_  
Signature of Authorized Representative \_\_\_\_\_  
Typed or printed name and title of Authorized Representative \_\_\_\_\_

(IF A JOINT VENTURE, USE THIS SECTION FOR THE MANAGING PARTY AND THE SECOND PARTY SHOULD SIGN BELOW)

Attest \_\_\_\_\_  
Signature \_\_\_\_\_  
Business Address \_\_\_\_\_

(IF A JOINT VENTURE)

Corporate Name \_\_\_\_\_  
By \_\_\_\_\_  
Signature of Authorized Representative \_\_\_\_\_  
Typed or printed name and title of Authorized Representative \_\_\_\_\_

Attest \_\_\_\_\_  
Signature \_\_\_\_\_  
Business Address \_\_\_\_\_

If more than two parties are in the joint venture, please attach an additional signature sheet.



Return with Bid

Division of Highways  
Proposal Bid Bond  
(Effective November 1, 1992)

Item No. \_\_\_\_\_

Letting Date \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, That We \_\_\_\_\_

as PRINCIPAL, and \_\_\_\_\_

\_\_\_\_\_ as SURETY, are held jointly, severally and firmly bound unto the STATE OF ILLINOIS in the penal sum of 5 percent of the total bid price, or for the amount specified in the bid proposal under "Proposal Guaranty" in effect on the date of the Invitation for Bids, whichever is the lesser sum, well and truly to be paid unto said STATE OF ILLINOIS, for the payment of which we bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH, that whereas, the PRINCIPAL has submitted a bid proposal to the STATE OF ILLINOIS, acting through the Department of Transportation, for the improvement designated by the Transportation Bulletin Item Number and Letting Date indicated above.

NOW, THEREFORE, if the Department shall accept the bid proposal of the PRINCIPAL; and if the PRINCIPAL shall, within the time and as specified in the bidding and contract documents, submit a DBE Utilization Plan that is accepted and approved by the Department; and if, after award by the Department, the PRINCIPAL shall enter into a contract in accordance with the terms of the bidding and contract documents including evidence of the required insurance coverages and providing such bond as specified with good and sufficient surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof; or if, in the event of the failure of the PRINCIPAL to make the required DBE submission or to enter into such contract and to give the specified bond, the PRINCIPAL pays to the Department the difference not to exceed the penalty hereof between the amount specified in the bid proposal and such larger amount for which the Department may contract with another party to perform the work covered by said bid proposal, then this obligation shall be null and void, otherwise, it shall remain in full force and effect.

IN THE EVENT the Department determines the PRINCIPAL has failed to comply with any requirement as set forth in the preceding paragraph, then Surety shall pay the penal sum to the Department within fifteen (15) days of written demand therefor. If Surety does not make full payment within such period of time, the Department may bring an action to collect the amount owed. Surety is liable to the Department for all its expenses, including attorney's fees, incurred in any litigation in which it prevails either in whole or in part.

In TESTIMONY WHEREOF, the said PRINCIPAL and the said SURETY have caused this instrument to be signed by

their respective officers this \_\_\_\_\_ day of \_\_\_\_\_ A.D., \_\_\_\_\_.

**PRINCIPAL**

**SURETY**

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Company Name)

By \_\_\_\_\_  
(Signature & Title)

By: \_\_\_\_\_  
(Signature of Attorney-in-Fact)

**Notary Certification for Principal and Surety**

STATE OF ILLINOIS,  
County of \_\_\_\_\_

I, \_\_\_\_\_, a Notary Public in and for said County, do hereby certify that

\_\_\_\_\_ and \_\_\_\_\_  
(Insert names of individuals signing on behalf of PRINCIPAL & SURETY)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of PRINCIPAL and SURETY, appeared before me this day in person and acknowledged respectively, that they signed and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this \_\_\_\_\_ day of \_\_\_\_\_ A.D. \_\_\_\_\_

My commission expires \_\_\_\_\_

\_\_\_\_\_  
Notary Public

In lieu of completing the above section of the Proposal Bid Form, the Principal may file an Electronic Bid Bond. By signing the proposal and marking the check box next to the Signature and Title line below, the Principal is ensuring the identified electronic bid bond has been executed and the Principal and Surety are firmly bound unto the State of Illinois under the conditions of the bid bond as shown above.

\_\_\_\_\_  
Electronic Bid Bond ID#

\_\_\_\_\_  
Company / Bidder Name



\_\_\_\_\_  
Signature and Title

**(1) Policy**

It is public policy that disadvantageded businesses as defined in 49 CFR Part 26 and the Special Provision shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal or State funds. Consequently the requirements of 49 CFR Part 26 apply to this contract.

**(2) Obligation**

The contractor agrees to ensure that disadvantageded businesses as defined in 49 CFR Part 26 and the Special Provision have the maximum opportunity to participate in the performance of contracts or subcontracts financed in whole or in part with Federal or State funds. The contractor shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 and the Special Provision to ensure that said businesses have the maximum opportunity to compete for and perform under this contract. The contractor shall not discriminate on the basis of race, color, national origin or sex in the award and performance of contracts.

**(3) Project and Bid Identification**

Complete the following information concerning the project and bid:

|                        |  |
|------------------------|--|
| Route _____            | Total Bid _____                                |
| Section _____          | Contract DBE Goal _____                        |
| Project _____          | (Percent)                      (Dollar Amount) |
| County _____           |  |
| Letting Date _____     |  |
| Contract No. _____     |  |
| Letting Item No. _____ |  |

**(4) Assurance**

I, acting in my capacity as an officer of the undersigned bidder (or bidders if a joint venture), hereby assure the Department that on this project my company : (check one)

Meets or exceeds contract award goals and has provided documented participation as follows:  
Disadvantaged Business Participation \_\_\_\_\_ percent

Attached are the signed participation statements, forms SBE 2025, required by the Special Provision evidencing availability and use of each business participating in this plan and assuring that each business will perform a commercially useful function in the work of the contract.

Failed to meet contract award goals and has included good faith effort documentation to meet the goals and that my company has provided participation as follows:

Disadvantaged Business Participation \_\_\_\_\_ percent

The contract goals should be accordingly modified or waived. Attached is all information required by the Special Provision in support of this request including good faith effort. Also attached are the signed participation statements, forms SBE 2025, required by the Special Provision evidencing availability and use of each business participating in this plan and assuring that each business will perform a commercially useful function in the work of the contract.

\_\_\_\_\_  
Company

By \_\_\_\_\_

Title \_\_\_\_\_

Date \_\_\_\_\_

The "as read" Low Bidder is required to comply with the Special Provision.

Submit only one utilization plan for each project. The utilization plan shall be submitted in accordance with the special provision.

Bureau of Small Business Enterprises                      **Local Let Projects**  
2300 South Dirksen Parkway                                      Submit forms to the  
Springfield, Illinois 62764    Local Agency

The Department of Transportation is requesting disclosure of information that is necessary to accomplish the purpose as outlined under State and Federal law. Disclosure of this information is **REQUIRED**. Failure to provide any information will result in the contract not being awarded. This form has been approved by the State Forms Manager Center.



# PROPOSAL ENVELOPE



# PROPOSALS

for construction work advertised for bids by the  
Illinois Department of Transportation

| Item No. | Item No. | Item No. |
|----------|----------|----------|
|          |          |          |
|          |          |          |
|          |          |          |
|          |          |          |

Submitted By:

|           |
|-----------|
| Name:     |
| Address:  |
|           |
|           |
| Phone No. |

Bidders should use an IDOT proposal envelope or affix this form to the front of a 10" x 13" envelope for the submittal of bids. If proposals are mailed, they should be enclosed in a second or outer envelope addressed to:

Engineer of Design and Environment - Room 326  
Illinois Department of Transportation  
2300 South Dirksen Parkway  
Springfield, Illinois 62764

## **NOTICE**

**Individual bids, including Bid Bond and/or supplemental information if required, should be securely stapled.**

# CONTRACTOR OFFICE COPY OF CONTRACT SPECIFICATIONS

## NOTICE

None of the following material needs to be returned with the bid package unless the special provisions require documentation and/or other information to be submitted.

**Contract No. 68620  
TAZEWELL County  
Section 90-[14R;(14HB-4,14,14HVB)BR]  
Project ACIM-ACBRI-000S(907)  
Route FAI 74/155  
District 4 Construction Funds**



**Illinois Department of Transportation**

## **SUBCONTRACTOR DOCUMENTATION**

Public Acts 96-0795, 96-0920, and 97-0895 enacted substantial changes to the provisions of the Code (30 ILCS 500). Among the changes are provisions affecting subcontractors. The Contractor awarded this contract will be required as a material condition of the contract to implement and enforce the contract requirements applicable to subcontractors that entered into a contractual agreement with a total value of \$50,000 or more with a person or entity who has a contract subject to the Code and approved in accordance with article 108.01 of the Standard Specifications for Road and Bridge Construction.

If the Contractor seeks approval of subcontractors to perform a portion of the work, and approval is granted by the Department, the Contractor shall provide a copy of the subcontract to the Illinois Department of Transportation's CPO upon request within 15 calendar days after execution of the subcontract.

Financial disclosures required pursuant to Sec. 50-35 of the Code must be submitted for all applicable subcontractors. The subcontract shall contain the certifications required to be made by subcontractors pursuant to Article 50 of the Code. This Notice to Bidders includes a document incorporating all required subcontractor certifications and disclosures for use by the Contractor in compliance with this mandate. The document is entitled State Required Ethical Standards Governing Subcontractors.

## RETURN WITH SUBCONTRACT

### STATE ETHICAL STANDARDS GOVERNING SUBCONTRACTORS

Article 50 of the Code establishes the duty of all State CPOs, SPOs, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

The certifications hereinafter made by the subcontractor are each a material representation of fact upon which reliance is placed should the Department approve the subcontractor. The CPO may terminate or void the contract approval if it is later determined that the bidder or subcontractor rendered a false or erroneous certification. If a false certification is made by a subcontractor the contractor's submitted bid and the executed contract may not be declared void unless the contractor refuses to terminate the subcontract upon the State's request after a finding that the subcontractor's certification was false.

Section 50-2 of the Code provides that every person that has entered into a multi-year contract and every subcontractor with a multi-year subcontract shall certify, by July 1 of each fiscal year covered by the contract after the initial fiscal year, to the responsible CPO whether it continues to satisfy the requirements of Article 50 pertaining to the eligibility for a contract award. If a contractor or subcontractor is not able to truthfully certify that it continues to meet all requirements, it shall provide with its certification a detailed explanation of the circumstances leading to the change in certification status. A contractor or subcontractor that makes a false statement material to any given certification required under Article 50 is, in addition to any other penalties or consequences prescribed by law, subject to liability under the Whistleblower Reward and Protection Act for submission of a false claim.

#### **A. Bribery**

1. The Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government, or subcontracting under such a contract, as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, or which is signatory to the contract to which the subcontract relates, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State, and every subcontract subject to Section 20-120 of the Code shall contain a certification by the contractor or the subcontractor, respectively, that the contractor or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the CPO may declare the related contract void if any certifications required by this Section are false. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50.5.

#### **B. Felons**

1. The Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any State agency, or enter into a subcontract, from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

2. Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Code shall contain a certification by the bidder or contractor or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the CPO may declare the related contract void if any of the certifications required by this Section are false.

## RETURN WITH SUBCONTRACT

### **C. Debt Delinquency**

1. The Code provides:

Section 50-11 and 50-12. Debt Delinquency.

The contractor or bidder or subcontractor, respectively, certifies that it, or any affiliate, is not barred from being awarded a contract or subcontract under the Code. Section 50-11 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The bidder or contractor or subcontractor, respectively, further acknowledges that the CPO may declare the related contract void if this certification is false or if the bidder, contractor, or subcontractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

### **D. Prohibited Bidders, Contractors and Subcontractors**

1. The Code provides:

Section 50-10.5 and 50-60(c). Prohibited bidders, contractors and subcontractors.

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 or if in violation of Subsection (c) for a period of five years from the date of conviction. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Code shall contain a certification by the bidder, contractor, or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the CPO shall declare the related contract void if any of the certifications completed pursuant to this Section are false.

### **E. Section 42 of the Environmental Protection Act**

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-12 that the bidder, contractor, or subcontractor, is not barred from being awarded a contract or entering into a subcontract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency, or entering into any subcontract, that is subject to the Code by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The bidder or contractor or subcontractor, respectively, acknowledges that the CPO may declare the contract void if this certification is false.

**The undersigned, on behalf of the subcontracting company, has read and understands the above certifications and makes the certifications as required by law.**

\_\_\_\_\_  
Name of Subcontracting Company

\_\_\_\_\_  
Authorized Officer

\_\_\_\_\_  
Date

**RETURN WITH SUBCONTRACT**  
**SUBCONTRACTOR DISCLOSURES**

**I. DISCLOSURES**

- A. The disclosures hereinafter made by the subcontractor are each a material representation of fact upon which reliance is placed. The subcontractor further certifies that the Department has received the disclosure forms for each subcontract.

The CPO may void the bid, contract, or subcontract, respectively, if it is later determined that the bidder or subcontractor rendered a false or erroneous disclosure. A contractor or subcontractor may be suspended or debarred for violations of the Code. Furthermore, the CPO may void the contract.

**B. Financial Interests and Conflicts of Interest**

1. Section 50-35 of the Code provides that all subcontracts with a total value of \$50,000 or more, from subcontractors identified in Section 20-120 of the Code, shall be accompanied by disclosure of the financial interests of the subcontractor. This disclosed information for the subcontractor, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act, filed with the Procurement Policy Board, and shall be incorporated as a material term of the Prime Contractor's contract. Furthermore, pursuant to this Section, the Procurement Policy Board may recommend to allow or void a contract or subcontract based on a potential conflict of interest.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the subcontracting entity or its parent entity, whichever is less, unless the subcontractor is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a subcontractor is a privately held entity that is exempt from Federal 10K reporting, but has more than 200 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

**The current annual salary of the Governor is \$177,412.00.**

In addition, all disclosures shall indicate any other current or pending contracts, subcontracts, proposals, leases, or other ongoing procurement relationships the subcontracting entity has with any other unit of state government and shall clearly identify the unit and the contract, subcontract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. A separate Disclosure Form A must be submitted with the bid for each individual meeting the above requirements. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies and a total ownership certification. **The forms must be included with each bid.**

**C. Disclosure Form Instructions**

**Form A Instructions for Financial Information & Potential Conflicts of Interest**

If the subcontractor is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a subcontractor is a privately held entity that is exempt from Federal 10K reporting, but has more than 200 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a subcontractor is not subject to Federal 10K reporting, the subcontractor must determine if any individuals are required by law to complete a financial disclosure form. To do this, the subcontractor should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the **NOT APPLICABLE STATEMENT** on the second page of Form A must be signed and dated by a person that is authorized to execute contracts for the subcontracting company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES \_\_\_ NO \_\_\_
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than 60% of the annual salary of the Governor? YES \_\_\_ NO \_\_\_
3. Does anyone in your organization receive more than 60% of the annual salary of the Governor of the subcontracting entity's or parent entity's distributive income? YES \_\_\_ NO \_\_\_

(Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.)

4. Does anyone in your organization receive greater than 5% of the subcontracting entity's or parent entity's total distributive income, but which is less than 60% of the annual salary of the Governor? YES \_\_\_ NO \_\_\_

(Note: Only one set of forms needs to be completed per person per subcontract even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The subcontractor must determine each individual in the subcontracting entity or the subcontracting entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable.** The person signing can be, but does not have to be, the person for which the form is being completed. The subcontractor is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the **NOT APPLICABLE STATEMENT** on page 2 of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

## RETURN WITH SUBCONTRACT

### **Form B: Instructions for Identifying Other Contracts & Procurement Related Information**

Disclosure Form B must be completed for each subcontract submitted by the subcontracting entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the subcontractor to ignore Form B. Form B must be completed, checked, and dated or the subcontract will not be approved.*

The Subcontractor shall identify, by checking Yes or No on Form B, whether it has any pending contracts, subcontracts, leases, bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the subcontractor only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the subcontractor must list all non-IDOT State of Illinois agency pending contracts, subcontracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts or subcontracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included.

**ILLINOIS DEPARTMENT  
OF TRANSPORTATION**

**Form A  
Subcontractor: Financial  
Information & Potential Conflicts  
of Interest Disclosure**

|                    |               |                           |
|--------------------|---------------|---------------------------|
| Subcontractor Name |               |                           |
| Legal Address      |               |                           |
| City, State, Zip   |               |                           |
| Telephone Number   | Email Address | Fax Number (if available) |

Disclosure of the information contained in this Form is required by the Section 50-35 of the Code (30 ILCS 500). Subcontractors desiring to enter into a subcontract of a State of Illinois contract must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for subcontracts with a total value of \$50,000 or more, from subcontractors identified in Section 20-120 of the Code, and for all open-ended contracts. **A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.**

*The current annual salary of the Governor is \$177,412.00.*

**DISCLOSURE OF FINANCIAL INFORMATION**

**1. Disclosure of Financial Information.** The individual named below has an interest in the SUBCONTRACTOR (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than 60% of the annual salary of the Governor. **(Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)**

|   |       |
|---|-------|
| <b>FOR INDIVIDUAL (type or print information)</b>   |       |
| <b>NAME:</b>  | _____ |
| <b>ADDRESS</b>  | _____ |
| <b>Type of ownership/distributable income share:</b>  |       |
| stock _____ sole proprietorship _____ Partnership _____ other: (explain on separate sheet): |       |
| % or \$ value of ownership/distributable income share:                                      | _____ |

**2. Disclosure of Potential Conflicts of Interest.** Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services.

Yes \_\_\_ No \_\_\_

If your answer is yes, please answer each of the following questions.

1. Are you currently an officer or employee of either the Capitol Development Board or the Illinois State Toll Highway Authority? Yes \_\_\_ No \_\_\_

2. Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds 60% of the annual salary of the Governor, provide the name the State agency for which you are employed and your annual salary. \_\_\_\_\_

**RETURN WITH SUBCONTRACT**

3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds 60% of the annual salary of the Governor, are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 100% of the annual salary of the Governor?  
Yes \_\_\_ No \_\_\_

4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds 60% of the annual salary of the Governor, are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of two times the salary of the Governor?  
Yes \_\_\_ No \_\_\_

---

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment services in the previous 2 years.

Yes \_\_\_ No \_\_\_

If your answer is yes, please answer each of the following questions.

1. Is your spouse or any minor children currently an officer or employee of the Capitol Development Board or the Illinois State Toll Highway Authority?  
Yes \_\_\_ No \_\_\_

2. Is your spouse or any minor children currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds 60% of the annual salary of the Governor, provide the name of your spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary. \_\_\_\_\_

---

3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds 60% of the annual salary of the Governor, are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 100% of the annual salary of the Governor?  
Yes \_\_\_ No \_\_\_

4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds 60% of the annual salary of the Governor, are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of two times the salary of the Governor?  
Yes \_\_\_ No \_\_\_

---

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years.  
Yes \_\_\_ No \_\_\_

---

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter.  
Yes \_\_\_ No \_\_\_

---

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United States of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years.  
Yes \_\_\_ No \_\_\_

---

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter.  
Yes \_\_\_ No \_\_\_

---

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government.  
Yes \_\_\_ No \_\_\_

---

**RETURN WITH SUBCONTRACT**

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes \_\_\_ No \_\_\_

---

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes \_\_\_ No \_\_\_

---

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes \_\_\_ No \_\_\_

---

**3 Communication Disclosure.**

Disclose the name and address of each lobbyist and other agent of the bidder or offeror who is not identified in Section 2 of this form, who is has communicated, is communicating, or may communicate with any State officer or employee concerning the bid or offer. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the process and throughout the term of the contract. If no person is identified, enter "None" on the line below:

Name and address of person(s): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**RETURN WITH SUBCONTRACT**

**4. Debarment Disclosure.** For each of the persons identified under Sections 2 and 3 of this form, disclose whether any of the following has occurred within the previous 10 years: debarment from contracting with any governmental entity; professional licensure discipline; bankruptcies; adverse civil judgments and administrative findings; and criminal felony convictions. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the procurement process and term of the contract. If no person is identified, enter "None" on the line below:

Name of person(s): \_\_\_\_\_

Nature of disclosure: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**APPLICABLE STATEMENT**

**This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page. Under penalty of perjury, I certify the contents of this disclosure to be true and accurate to the best of my knowledge.**

Completed by:  \_\_\_\_\_ Date \_\_\_\_\_  
Signature of Individual or Authorized Officer

**NOT APPLICABLE STATEMENT**

**Under penalty of perjury, I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.**

**This Disclosure Form A is submitted on behalf of the SUBCONTRACTOR listed on the previous page.**

\_\_\_\_\_ Date \_\_\_\_\_  
Signature of Authorized Officer

RETURN WITH SUBCONTRACT

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form B Subcontractor: Other Contracts & Financial Related Information Disclosure

Form with fields: Subcontractor Name, Legal Address, City, State, Zip, Telephone Number, Email Address, Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Code (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for subcontracts with a total value of \$50,000 or more, from subcontractors identified in Section 20-120 of the Code, and for all open-ended contracts.

DISCLOSURE OF OTHER CONTRACTS, SUBCONTRACTS, AND PROCUREMENT RELATED INFORMATION

1. Identifying Other Contracts & Procurement Related Information. The SUBCONTRACTOR shall identify whether it has any pending contracts, subcontracts, including leases, bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes \_\_\_ No \_\_\_

If "No" is checked, the subcontractor only needs to complete the signature box on the bottom of this page.

2. If "Yes" is checked. Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

THE FOLLOWING STATEMENT MUST BE CHECKED

Signature box with fields for Signature of Authorized Officer and Date

OWNERSHIP CERTIFICATION

Please certify that the following statement is true if the individuals for all submitted Form A disclosures do not total 100% of ownership

Any remaining ownership interest is held by individuals receiving less than \$106,447.20 of the bidding entity's or parent entity's distributive income or holding less than a 5% ownership interest.

Yes No N/A (Form A disclosure(s) established 100% ownership)



## NOTICE TO BIDDERS

- 1. TIME AND PLACE OF OPENING BIDS.** Sealed proposals for the improvement described herein will be received by the Department of Transportation at the Harry R. Hanley Building, 2300 South Dirksen Parkway, in Springfield, Illinois until 10:00 o'clock a.m. September 21, 2012. All bids will be gathered, sorted, publicly opened and read in the auditorium at the Department of Transportation's Harry R. Hanley Building shortly after the 10:00 a.m. cut off time.
- 2. DESCRIPTION OF WORK.** The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

**Contract No. 68620  
TAZEWELL County  
Section 90-[14R;(14HB-4,14,14HVB)BR]  
Project ACIM-ACBRI-000S(907)  
Route FAI 74/155  
District 4 Construction Funds**

**This project consists of the reconstruction of the Interstate 74 and Interstate 155 interchange and the reconfiguration of the Interstate 74 and Morton Avenue interchange. This project begins west of Pleasant Hill Road and continues to just west of Main Steet and on Interstate 155 beginning north of the Birchwood interchange and ending at Interstate 74 in Tazewell County.**

- 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

Ann L. Schneider,  
Secretary

INDEX  
FOR  
SUPPLEMENTAL SPECIFICATIONS  
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2012

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

SUPPLEMENTAL SPECIFICATIONS

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No.

No Supplemental Specifications this year.

RECURRING SPECIAL PROVISIONS

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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 January 1, 2012", 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 FAI Routes 74 & 155 (I-74 & I-155), Project ACIM-ACBRI-000S(907), Section 90[14R;(14-HB-4,14,14HVB)BR] in Tazewell County, Contract No. 68620 and in case of conflict with any part, or parts, of said Specifications, the said Special Provisions shall take precedence and shall govern.

#### LOCATION OF PROJECT

This project is located on Interstate 74 starting west of Pleasant Hill Road and ending west of Main Street and on Interstate 155 starting north of the Birchwood interchange and ending at Interstate 74 in Tazewell County.

#### DESCRIPTION OF PROJECT

The improvements on this project consists of the reconstruction of the Interstate 74 and Interstate 155 interchange and the reconfiguration of the Interstate 74 and Morton Avenue interchange, including pavement reconstruction, bridge reconstruction, drainage modifications, pavement marking and other collateral work necessary to complete the project.

#### AGGREGATE OPTIMIZATION OF CLASS PV MIX FOR SLIPFORM PAVING

Effective August 3, 2012

Delete Note 8/ of Article 1004.01(c) and replace Article 1004.02(d)(1) with the following:  
For the slipform paving of concrete pavement, the Class PV concrete shall be uniformly graded. This may be accomplished by using a uniformly graded single coarse aggregate, or by blending two or more coarse aggregate sizes. As a minimum for multiple coarse aggregate sizes, CA 7 or CA 11 shall be blended with CA 13, CA 14, or CA 16. The final single coarse aggregate or combined coarse aggregate gradation shall have minimum 45 percent and maximum 60 percent passing the 1/2 in. (12.5 mm) sieve. However, the Contractor may propose for approval by the Engineer an alternate uniformly graded concrete mixture using the information in the "Portland Cement Concrete Level III Technician Course – Manual of Instructions for Design of Concrete Mixtures".

## **CONCRETE SUPERSTRUCTURE AGGREGATE OPTIMIZATION**

Effective: August 4, 2006      Revised: August 3, 2012

Delete Note 8/ of Article 1004.01(c) and replace Article 1004.02(d)(1) with the following:

For the bridge superstructure and bridge approach slab, the Class BS concrete shall be uniformly graded.

This may be accomplished by using a uniformly graded single coarse aggregate, or by blending two or more coarse aggregate sizes. As a minimum for multiple coarse aggregate sizes, CA 7 or CA 11 shall be blended with CA 13, CA 14, or CA 16. The final single coarse aggregate or combined coarse aggregate gradation shall have minimum 45 percent and maximum 60 percent passing the 1/2 in. (12.5 mm) sieve. However, the Contractor may propose for approval by the Engineer an alternate uniformly graded concrete mixture using the information in the "Portland Cement Concrete Level III Technician Course – Manual of Instructions for Design of Concrete Mixtures".

Concrete Superstructures Aggregate Optimization will not be paid for separately, but shall be considered as included in the unit cost of CONCRETE SUPERSTRUCTURES.

## **PRESTAGE SITE CONSTRUCTION MEETINGS**

Effective June 1, 1992

This work shall consist of meetings with all concerned parties prior to each construction stage. The meetings shall be set up and conducted by the Contractor and shall include all Subcontractors connected with the particular stage. The Department's project staff and all concerned parties, as directed by the Engineer, shall be invited to attend.

The meetings are intended to help improve the coordination and quality of construction, personnel safety on the project site, and safety of the traveling public.

At each meeting, the Contractor shall indicate the current construction schedule for the particular stage, discuss maintenance of traffic, traffic control, project site personnel safety, compliance with the plans and specifications including quality construction, and all other pertinent subjects. Minutes of the meetings will be taken by the Resident Engineer and distributed to those persons in attendance.

The prestage site construction meetings will not be paid for separately but shall be included in the cost of the traffic control item(s) in the contract.

## **LOCATION OF UNDERGROUND STATE MAINTAINED FACILITIES**

Effective August 3, 2007      Revised July 31, 2009

The Contractor shall be responsible for locating existing and proposed IDOT electrical facilities (traffic signal, overhead lighting, Intelligent Transportation System, etc.) prior to performing any work at his/her own expense if required. The Contractor shall also be liable for any damage to IDOT facilities resulting from inaccurate locating.

The Contractor may obtain, on request, plans for existing electrical facilities from the Department.

The Contractor shall also be responsible for locating and providing protection for IDOT facilities during all phases of construction. If at any time the facilities are damaged, the Contractor shall immediately notify the Department and make all necessary arrangements for repair to the satisfaction of the Engineer. This work will not be paid for separately, but shall be included in the contract bid price.

## **DATE OF COMPLETION (PLUS WORKING DAYS)**

Effective March 1, 1990      Revised July 1, 1994

The Contractor shall schedule his operations so as to complete all work, except as specified below, and open all the roadway to traffic on or before July 15, 2015. The Contractor shall note that this completion date is based on an expedited work schedule. The Contractor will be allowed 15 working days, after the July 15, 2015 completion date, to complete any remaining planting, seeding and sodding work.

## **PCC AUTOMATIC BATCHING EQUIPMENT**

Effective April 23, 2010

Portland cement concrete provided shall be produced from batch plants that conform to the requirements of Article 1103.03 (a) and (b) of the Standard Specifications for Road and Bridge Construction. Semi-automatic batching will not be allowed.

In addition, the batching plant shall be a computerized plant interfaced with a printer and shall print actual batch weights, added water, tempering water, mixing time, and amount of each additive per batch. At the discretion of the Engineer, archived electronic versions of batch proportions will be acceptable. Truck delivery tickets will still be required as per Article 1020.11 (a)(7).

**BORROW AND FURNISHED EXCAVATION**

Effective March 7, 2000      Revised April 27, 2007

Add the following to the requirements of Article 204:

“Soils which demonstrate the following properties shall be restricted to the interior of the embankment and shall be covered on both sides and top with a minimum of 3 feet (900mm) of non-restricted soil not considered detrimental in terms of erosion potential or excess volume change. A restricted soil is defined as having any one of the following properties:”

- A grain size distribution with less than 35% passing the number 75um (#200) sieve.
- A plasticity index of less than 12.
- A liquid limit in excess of 50.

“All restricted and non-restricted embankment materials shall have the following minimum strengths for the indicated moistures:”

| Immediate Bearing Value | Shear Strength At 95% Density * | Moisture |
|-------------------------|---------------------------------|----------|
| 3.0                     | 1000PSF (50 Kpa)                | 120%     |
| 4.0                     | 1300 PSF (62 Kpa)               | 110%     |

\*Granular Soils  $\phi=35^\circ$

**EMBANKMENT (RESTRICTIONS)**

Effective January 21, 2005      Revised August 3, 2007

Add the following to the requirements of Article 205.04:

Gravel, crushed stone or soils having less than 35% passing the number 200 sieve and other materials as allowed by Article 202.03 of the standard specifications are further restricted. These further restricted materials are also limited to the interior of the embankment and shall have a minimum cover of 3' (1 m) of non-restricted soil (see “Borrow and Furnished Excavation” Special Provision). Alternating layers of further restricted material and cohesive soil will not be permitted. The further restricted materials may only be incorporated into the embankment by using one of the following procedures:

- a. The further restricted materials shall be placed in 4" lifts and disked with the underlying lift material until a uniform and homogenous material is formed having more than 35% passing the number 200 sieve.
- b. Sand, gravel or crushed stone embankment when placed on the existing ground surface will be drained using a 10' (3 m) by 10' (3 m) french drain consisting of nonwoven geotechnical fabric with 12" (0.3 m) of B-3 riprap. This shall be constructed on both sides of the embankment at the toe of the foreslope spaced 150' (46 m) apart. At locations requiring a French drain the 3' (1 m) cohesive cap shall not be installed within the 10' by 10' riprap area. If the Engineer determines that the existing ground is a granular free draining soil, the french drain may be deleted.
- c. Sand, gravel or crushed stone embankment when placed on top of a cohesive embankment will be drained with a permanent 4" (100 mm) underdrain system. The underdrain system shall consist of a longitudinal underdrain on both sides of the embankment and transverse underdrains spaced at 250' (75 m) centers. The underdrain shall consist of a 2' (0.6 m) deep by 1' (0.3 m) wide trench, backfilled with FA4 sand and a 4" (100 mm) diameter underdrain. In addition, both sides of the embankment will have a 6" (150 mm) diameter pipe drain which will drain the underdrain system and outletted into a permanent drainage structure or outletted by a headwall at the toe of the embankment.

The above work will not be paid for separately but shall be included in the cost of Earth Excavation, Furnished Excavation, or Borrow Excavation.

## **EMBANKMENT**

Effective: July 1, 1990      Revised: November 1, 2007

Revise the third paragraph of Article 205.06 of the Standard Specifications to read:

All embankment shall be constructed with not more than 110% of optimum moisture content, determined according to AASHTO T 99 (Method C). The 110% of optimum moisture limit may be waived in free draining granular material when approved by the Engineer.

The Contractor may, at his option, add a drying agent to lower the moisture content as specified above. The drying agent must be approved by the Engineer prior to use. Extra compensation will not be allowed for the use of a drying agent but will be considered included in the cost of the various items of excavation.

## **PROOF ROLLING**

Effective April 23, 2004      Revised January 1, 2007

This work shall consist of proof rolling the subgrade with a fully loaded tandem axle dump truck and driver at the direction of the Engineer. The truck shall travel the subgrade in all of the proposed lanes of traffic in the presence of the Engineer.

This work will not be paid for separately, but considered included in the various earthwork pay items.

## **SUBGRADE TREATMENT**

Effective July 1, 1990      Revised April 25, 2008

Revise first sentence of first paragraph of Article 301.04 as follows:

“When compacted, the subgrade shall have a minimum dry density of 95 percent of the standard laboratory dry density and a minimum immediate bearing value (IBV) of 4.0.”

Delete the second paragraph (including subparagraphs a, b, and c) of Article 301.04 of the Standard Specifications and replace it with the following:

“In cut sections the contractor responsible for the rough grading shall obtain not less than 95% of the standard laboratory density and not more than 110% of the optimum moisture for the top 1' (300mm) of the subgrade.

The Contractor may, at his/her option, add a drying agent to lower the moisture content as specified. The drying agent must be approved by the Engineer prior to use. Additional compensation will not be allowed for the use of a drying agent, but will be considered as included in the cost of the various earthwork items.”

In the first sentence of the third paragraph delete “above steps have” and replace with “work has.”

## **SUBBASE GRANULAR MATERIAL**

Effective: November 5, 2004

This work shall be in accordance with Section 311 of the Standard Specifications and as specified herein.

All Subbase Granular Material shall have a minimum IBR of 40.

## **ANTI-STRIP ADDITIVE FOR HOT-MIX ASPHALT**

Effective July 30, 2010

If an anti-stripping additive is required for any hot-mix asphalt in accordance with Article 1030.04(c), the cost of the additive will not be paid for separately, but shall be considered as included in the contract unit price bid for the hot-mix asphalt item(s) involved.

## **HOT-MIX ASPHALT – PRIME COAT**

Effective: April 29, 2011

Revise the second paragraph of Article 406.02 of the Standard Specifications to read:

“When emulsified asphalts are used, any dilution with water must be performed by the manufacturer. The emulsified asphalt shall be thoroughly agitated within 24 hours of application and show no separation of water and emulsion.”

Revise the first paragraph of Article 406.05(b) of the Standard Specifications to read:

“Prime Coat. The base, or base and gutter shall be clean and dry. The bituminous priming material shall be prepared according to Article 403.05 and applied according to Article 403.10.”

Revise the first paragraph of Article 406.05(b)(1) of the Standard Specifications to read:

“(1) Brick, Concrete or HMA Bases. The prime shall be applied uniformly at a residual asphalt rate of 0.02 to 0.06 gal/sq yd (0.1 to 0.3 L/sq m). The exact residual asphalt rate will be specified by the Engineer, typically 0.04 gal/sq yd for milled surfaces and 0.025 gal/sq yd for smooth surfaces. Prior to priming, the residual asphalt rate shall be verified by passing the applicator truck over a 1 ft x 1 ft pre-weighed cardboard square, drying the cardboard and prime to a constant mass, and determining the final dry weight. The difference between the two weights will be the residual asphalt weight per square foot. The residual asphalt weight per square foot shall be converted to gallons per square yard using a residual asphalt specific gravity of 1.03.”

Add the following to the second paragraph of Article 406.05(b)(1):

“When prime coat is applied on two lane roadways, the pavement shall be primed one lane at a time. The primed lane shall remain closed for a minimum of one hour and shall remain closed until the prime does not pickup under traffic. On multi-lane pavements, traffic will not be allowed on the primed surface until it is fully cured, such that it does not pickup under traffic.”

Replace the last sentence of the third paragraph of Article 406.05(b)(1) with the following:

“Prime coat shall be fully cured prior to placement of HMA to prevent pickup by haul trucks or paving equipment. If pickup occurs, paving shall cease in order to provide additional cure time, or an approved release agent may be applied to the tires of the haul trucks or paving equipment as needed to prevent pickup of the prime coat.”

### **GROOVED-IN RUMBLE STRIP**

Effective: November 16, 2007

Revised: July 30, 2010

This work shall consist of the construction of grooved-in rumble strips at locations as detailed in the plans.

The equipment shall be a self-propelled milling machine with a rotary-type cutting head(s). The cutting head(s) shall be suspended from the machine such that it can align itself with the slope of the pavement and any surface irregularities. The teeth of the cutting head(s) shall be arranged to provide a smooth cut, with no more than an 1/8 in. (3 mm) difference between peaks and valleys.

Prior to commencement of the work, the Contractor shall demonstrate the ability of the equipment to achieve the desired results without damaging the pavement.

The rumble strips shall be cut to the dimensions shown on the plans. Guides shall be used to ensure consistent alignment, spacing and depth. In Portland cement concrete, rumble strips may be formed according to the details shown on the plans immediately after the application of the final finish.

Rumble strips shall be omitted within the limits of structures, entrances and side roads. In Portland cement concrete pavement, rumble strips shall not be placed within 6 in. (150 mm) of transverse joints.

This work will be measured for payment in square feet (square meters). Measurement will include both the cut and uncut (formed and unformed) sections of the rumble strips.

This work will be paid for at the contract unit price per square feet (square meter) of the actual treated area for RUMBLE STRIP.

## **HOT-MIX ASPHALT SURFACE REMOVAL, 1¼" (32 MM)**

Effective February 5, 1993

Revised July 31, 2009

Description: This work shall consist of removing a portion of the existing hot-mix asphalt concrete surface course in accordance with the applicable portions of Section 440 and 1101 of the Standard Specifications, this special provision, details in the plans and as directed by the Engineer. The cold milled salvaged aggregate resulting from this operation shall become the property of the Contractor.

When the teeth become worn so that they do not produce a uniform surface texture, they shall all be changed at the same time (as a unit). Occasionally, individual teeth may be changed if they lock up or break, but this method shall not be used to avoid changing the set of teeth as a unit.

The moldboard is critical in obtaining the desired surface texture. It shall be straight, true, and free of excessive nicks or wear, and it shall be replaced as necessary to uniformly produce the required surface texture. Gouging of the pavement by more than 1/4 inch (6 mm) shall be sufficient cause to require replacement of all teeth. Occasional gouges, due to deteriorated pavement condition, or separation of lifts will not be cause to replace all teeth. The Engineer will be the sole judge of the cause of the pavement gouging and the corrective work required. Corrective work due to negligence or poor workmanship will be at the Contractor's expense.

### Construction Requirements

General: Weather conditions, when milling work is performed, must be such that short term or temporary pavement markings can be placed the day the surface is milled in accordance with Section 703 "Work Zone Pavement Markings."

An automatic grade control device shall be used when milling mainline pavement and shall be capable of controlling the elevation of the drum relative to either a preset grade control stringline or a grade reference device traveling on the adjacent pavement surface. The automatic grade control device may be utilized on only one side of the machine with an automatic slope control device controlling the opposite side. The traveling grade reference device shall not be less than 30 feet (9 m) in length for rural areas. For urban areas, a device not less than 20 feet (6 m) in length will be required. When milling cross roads, turn lanes, intersections, crossovers, or other miscellaneous areas, the Engineer may permit the use of a matching shoe.

The Contractor shall mill 1¼" inches (32 mm) at the centerline and project the proposed cross slope to the edge of pavement. In the event the milling at the outer edge of the lane would exceed 1.5 inches (40 mm); then the Contractor shall reduce the cut at the centerline to provide the maximum cut of 1.5 inches (40 mm) at the edge of pavement. If deemed necessary, the Contractor may reduce the cross slope from normal to 1.5% to 1%.

Surface tests will be performed according to Article 407.09(a) of the Standard Specifications. The profile will be taken 3 ft. (0.9 m) from and parallel to each edge of pavement and 3 ft. (0.9 m) from and parallel to the centerline on each side. If a shadow area is found at the 3 ft. (0.9 m) points, the pavement smoothness tester will be moved sufficient distance either side to measure the Contractor's milling efforts. If any (milled) surface variations found to be over 1/4" in 10' (6 mm in 3 m), then the roadway shall be reprofiled at no additional cost. In addition, the Contractor shall be responsible for refilling, with approved hot-mix asphalt mixtures, any area that lowered the pavement profile as a result of his faulty milling operations if directed by the Engineer. The Contractor shall be responsible for providing the pavement smoothness tester described elsewhere to retest the pavement profile obtained.

If the milling depth is intended to expose the original concrete pavement, then additional hand or machine work may be necessary to remove any remaining veneer of bituminous pavement which may be left in place behind the milling machine. Such work will be at the direction of the Engineer and at no extra cost to the State.

The Contractor shall provide a 10' (3 m) straightedge equipped with a carpenter's level or a 7' (2.1 m) electronic straightedge to check the cross slope of the roadway at regular intervals as directed by the Engineer.

Surface Texture: Each tooth on the cutting drum shall produce a series of discontinuous longitudinal striations. There shall be 16 to 20 striations (tooth marks) for each tooth for each 6' (1.8 m) in the longitudinal direction, and each striation shall be 1.7 inches +/- 0.2 inch (43 +/- 5 mm) in length after the area is planed by the moldboard. Thus, the planed length between each pair of striations shall be 2.3 inches +/- 0.2 inch (58 +/- 5 mm). There shall be 80 to 96 rows of discontinuous longitudinal striations for each 5' (1.5 m) in the transverse dimension. The areas between the striations in both the longitudinal and transverse directions shall be flat topped and coplaner. The moldboard shall be used to cut this plane; and any time the operation fails to produce this flat plane interspersed with a uniform pattern of discontinuous longitudinal striations, the operation shall be stopped and the cause determined and corrected before recommencing. Other similar patterns of uniform discontinuous longitudinal striations interspersed on a flat plane may be approved by the Engineer.

The startup milling speed shall be limited to a maximum of 50' (15 m) per minute. The Contractor shall limit his operations to this speed to demonstrate his ability to obtain the striations and rideability as described above. If the Contractor is able to demonstrate that he can consistently obtain the desired striations and rideability at a greater speed he will be permitted to run at the increased speed.

Cleanup: After cold milling a traffic lane and before opening the lane to traffic, the pavement shall be swept by a mechanical broom to prevent compaction of the cuttings onto the pavement. All loose material shall be removed from the roadway. Before the prime coat is placed, the pavement shall be cleaned of all foreign material to the satisfaction of the Engineer.

This cleanup work shall be considered included in the contract unit price per Square Yard (square meter) for HOT-MIX ASPHALT SURFACE REMOVAL of the depth specified, and no additional compensation will be allowed.

Method of Measurement:

- (a) Contract Quantities. The requirements for the use of Contract Quantities shall be Article 202.07(a) of the Standard Specifications.
- (b) Measured Quantities. Cold milling and planing will be measured and the area computed in square yards (square meters) of surface.

Areas not milled (shadow areas) due to rutting in the existing pavement surface will be included in the area measured for payment.

Basis of Payment: The cold milling and planing will be paid for at the contract unit price per Square Yard (square meter) for HOT-MIX ASPHALT SURFACE REMOVAL of the depth specified. Payment as specified will include variations in depth of cuts due to rutting, superelevations, and pavement crown and no additional compensation will be allowed.

**PAVEMENT DRAINAGE AFTER COLD MILLING**

Effective March 15, 1996      Revised January 1, 2007

This work shall consist of cold milling a 1.5" (40 mm) deep and 2' (0.6 m) wide drainage channel through the existing shoulder at locations as directed by the Engineer and replacing the mix after the surface has been placed.

To prevent pooling of water in the milled surface, a drainage channel shall be cut in the shoulder at low spots in superelevated curves and other locations where pooling of water may occur as specified by the Engineer.

After the surface has been placed on the adjacent through lane, the drainage channel shall be primed and then filled with a hot-mix asphalt shoulder mix approved by the Engineer and compacted to the satisfaction of the Engineer.

This work shall be paid for under the provisions of Article 109.04.

**CONCRETE HEADWALL REMOVAL**

Effective July 1, 1990

This work shall consist of the removal of existing concrete headwalls at various locations as shown on the plans and shall be done in accordance with the applicable portions of Section 501 of the Standard Specifications.

The above work shall include the removal of the first section of pipe with the headwall. The removal of the first section of pipe will not be paid for separately, but shall be included in the unit price Each for CONCRETE HEADWALL REMOVAL, and no additional compensation will be allowed due to the various sizes of pipes and headwalls.

**PIPE CULVERTS**

Effective July 1, 1990      Revised January 1, 2007

Add the following sentence to the sixth paragraph of Article 542.04(d): "All connecting bands shall be a minimum of 24" (600 mm) wide".

**PIPE UNDERDRAIN**

Effective: August 1, 2003

This work shall be according to Section 601 of the Standard Specifications except that FA 4 or FM 4 meeting the following gradations shall be used for backfilling the underdrain trench:

| Sieve Size       | Percent Passing |             |
|------------------|-----------------|-------------|
|                  | <u>FA 4</u>     | <u>FM 4</u> |
| 3/8" (9.5 mm)    | 100             | 100         |
| No. 4 (4.75 mm)  |                 | 97 ± 3      |
| No. 8 (2.36 mm)  |                 | 5 ± 5       |
| No. 10 (2 mm)    | 21% max         |             |
| No. 16 (1.18 mm) | 5 ± 5           | 2 ± 2       |
| No. 200 (75)     | 2% max          | 2% max      |

Only natural sands and gravel shall be used. A pipe slot of 1.75mm± 0.25mm shall be used. The number of slots and the slot length may be manipulated to maintain the inlet flow specified in AASHTO M 252-96 as long as it does not compromise any other requirements specified in AASHTO M 252-96. No fabric envelope for the pipe underdrain or the trench shall be used. The District may conduct a number of Ploog Washer tests, using this pipe with random samples of the backfill material. The loss of fines through the pipe slot in the Ploog Washer tests shall not exceed 4%.

**INLETS, TYPE G-1, SPECIAL**

Effective October 1, 1995      Revised January 1, 2007

This work shall consist of furnishing all labor, equipment, and material for the construction of Type G-1, Special inlets and Combination Concrete Curb and Gutter in accordance with Sections 602 and 606 of the Standard Specifications and the details in the plans.

Add "INLETS, G-1, SPECIAL" to Article 602.16 of the Standard Specifications. Delete the first paragraph in Articles 606.14 and 606.15.

Payment for transitional Combination Concrete Curb and Gutter will be included in "INLETS, TYPE G-1, SPECIAL" in accordance with details shown in the plans.

This work will be paid for at the contract unit price Each for INLETS, TYPE G-1, SPECIAL.

### **INLET-MANHOLE, TYPE G-1, 4' (1.2 M) DIAMETER, SPECIAL**

Effective October 1, 1995

Revised January 1, 2007

This work shall consist of all labor, equipment, and material for the construction of Inlet-Manhole, Type G-1, 4' (1.2 m) Diameter, Special and Combination Concrete Curb and Gutter in accordance with Section 602 and 606 of the Standard Specifications and the details in the plans.

Add "INLET-MANHOLE, TYPE G-1, 4' (1.2 m) DIAMETER, SPECIAL" to Article 602.16 of the Standard Specifications. Delete the first paragraph of Articles 606.14 and 606.15.

Payment for transitional Combination Concrete Curb and Gutter will be included in "INLET-MANHOLE, TYPE G-1, 4' (1.2 m) DIAMETER, SPECIAL" in accordance with details shown in the plans.

This work will be paid for at the contract unit price Each for INLET-MANHOLE, TYPE G-1, 4' (1.2 m) DIAMETER, SPECIAL.

### **GUARDRAIL AGGREGATE EROSION CONTROL**

Effective February 1, 1993

Revised January 1, 2007

This work shall consist of furnishing, placing, and shaping crushed aggregate placed around and behind guardrail posts in accordance with plan details.

Method of Measurement: The aggregate for constructing the Guardrail Aggregate Erosion Control will be measured in tons (metric tons).

The Geotextile Fabric will not be measured for payment.

Basis of Payment: Guardrail Aggregate Erosion Control will be paid for at the contract unit price per ton (metric ton) for GUARDRAIL AGGREGATE EROSION CONTROL measured as specified herein. The Geotextile Fabric will not be measured for payment, but shall be included in the cost per ton (metric ton) for GUARDRAIL AGGREGATE EROSION CONTROL.

### **EQUIPMENT VAULT FOR NUCLEAR TESTING EQUIPMENT**

Effective June 24, 1993

Revised July 1, 1994

Add the following to the list of equipment and furniture to be furnished under Article 670.05 Engineer's Field Laboratory.

A cabinet or vault shall be provided for the nuclear density equipment which shall have a suitable barrier system of concrete, steel, lead, or other radiation barrier material and shall remain at the job site. It shall have a dimension capable of holding the number of units being stored at the site and shall have a lock for security to prevent intruders from gaining access to this equipment. All walls and doors of the unit shall be sufficient thickness to prevent any radiation leakage from the equipment should a malfunction result which would allow this leakage.

The cost of furnishing the equipment vault will not be paid for separately but shall be considered as included in the unit cost for ENGINEER'S FIELD LABORATORY.

## **TRAFFIC CONTROL PLAN**

Effective July 23, 2012

Traffic control shall be in accordance with the applicable sections of the "Standard Specifications for Road and Bridge Construction," the applicable guidelines contained in the "Illinois Manual on Uniform Traffic Control Devices for Streets and Highways," these Special Provisions, and any special details and Highway Standards contained herein and in the plans.

Special attention is called to Section 701 and Articles 107.09 and 107.14 of the "Standard Specifications for Road and Bridge Construction" and the following Highway Standards relating to traffic control:

|        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|
| 701006 | 701011 | 701101 | 701106 | 701201 | 701301 |
| 701306 | 701311 | 701326 | 701400 | 701401 | 701402 |
| 701406 | 701411 | 701416 | 701421 | 701422 | 701423 |
| 701426 | 701451 | 701456 | 701601 | 701602 | 701701 |
| 701901 | 704001 |        |        |        |        |

### District Four Standards:

701416 Special      701501 Special      701606 Special      702001

The governing factor in the execution and staging of work for this project is to provide the motoring public with the safest possible travel conditions through the work zone.

The Contractor shall be responsible for the proper location, installation and arrangement of all traffic control devices. Special attention shall be given to existing guide signs and warning signs during the construction operations. Warning signs and existing guide signs with down arrows shall be kept consistent with the barricade placement at all times. The Contractor shall immediately remove, completely cover or turn from motorists view all signs which are inconsistent with lane assignment patterns.

Temporary concrete barrier shall be in place prior to beginning the removal of existing bridge piers, abutments, or removing the guardrail attached to either. Temporary concrete barrier shall be in place to separate opposing I-74 or I-155 mainline traffic at locations prior to permitting opposing traffic on the roadway.

Temporary lighting as shown on the plans shall be in place and operational before existing permanent lighting is taken out of service. Lighting will be provided on all I-74 and I-155 roadways and ramps throughout the duration of the project.

Special attention is called to Article 701.07 of the Standard Specifications for pavement and shoulder drop-offs.

### **Signing**

No bracing shall be allowed on post-mounted temporary signs.

All signs are required on both sides of the roadway when the median is greater than 10' in width.

When covering the existing signs, no tape shall be used on the reflective portion of the sign. Contact the District 4 Traffic Building (Bill Harrmann, Telephone: (309) 693-5176) for covering techniques.

### **General**

In addition to this special provision, the special provisions entitled, "Working Restrictions", "Traffic Control and Protection (Special)", "Contractor Access", "Vertical Clearance", "Borrow Site", "Contractor Staging Area" and "Removal and Setting of Bridge Beams" provide additional traffic control directives that the Contractor shall be aware of.

## **TRAFFIC CONTROL AND PROTECTION (SPECIAL)**

This work shall consist of furnishing, installing, maintaining, relocating and removal of all traffic control required for the purpose of regulating, warning or directing traffic for construction activities on the I-474 mainline and ramps, I-74 mainline and ramps, I-155 mainline and ramps, the I-74/Morton Avenue interchange mainline and ramps, the I-74/Pinecrest Drive interchange mainline and ramps, Jefferson Street in Morton and US Route 150 (Jackson Street) in Morton. This work shall be done in accordance with Article 107.14 and Section 701 of the Standard Specifications, the staging details and notes in the plans, applicable Highway Standards, the Special Provisions and as specified herein.

The plan details present a suggested means for implementing the necessary traffic control for this project. The plans do not attempt to detail or define all construction conditions which may require installation of traffic controls. The Contractor may revise or modify the traffic control as shown in the plans with the written permission of the Engineer. The cost of any traffic control devices that must remain upon completion of the contract shall be included in this work.

Existing regulatory traffic signing shall be relocated as needed for each stage of construction. In addition, the Contractor shall furnish and install temporary regulatory signing at the locations shown in the plans. The Contractor shall maintain all temporarily relocated signs until the new permanent signing has been installed. The temporary relocation and maintenance of any regulatory or warning traffic signs will not be paid for separately but shall be governed by Article 107.25 of the Standard Specifications. The Contractor shall not be responsible for maintaining temporary signs after completion of this contract.

Method of Measurement: All traffic control and protection required by this provision will be measured for payment on a lump sum basis. No additional payment will be made for any alterations, modifications, or additions necessary to construct the various work items shown in the plans.

Basis of Payment: Work required by this provision will be paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL). There will be no adjustment of payment allowed for any change in work items associated with this item.

The furnishing and installation of temporary regulatory signing at the locations indicated in the plans will not be paid for separately, but shall be considered included in the cost of TRAFFIC CONTROL AND PROTECTION (SPECIAL).

Temporary pavement markings will be measured and paid for according to Section 703 and Section 780.

Pavement marking removal will be measured and paid for according to Section 703 and Section 783.

Temporary concrete barrier and relocate temporary concrete barrier will be measured and paid for according to Section 704.

When changeable message signs are referenced within a traffic control and protection highway standard listed in the plans, this work shall not be paid for separately, but shall be included within the TRAFFIC CONTROL AND PROTECTION (SPECIAL) pay item.

## **SPEEDING PENALTY**

Effective: January 21, 2005

For traffic control standards containing Illinois Sign Standard R2-I106. The dollar amount to be placed on the sign is \$375. Therefore, the sign shall read "\$375 FINE MINIMUM."

The cost of this work shall be included in the cost of the traffic control standard.

## **WIDTH RESTRICTION SIGNING**

Effective: November 1, 2007

Revised: January 1, 2012

Description. This work shall consist of providing, placing, maintaining, and removing width restriction signing as shown on the plans and special provisions. Width restriction signing is required when the roadway width will be less than 16'-0" as measured from face to face of temporary concrete barrier and a concrete parapet, guardrail or other fixed, immovable barrier. The Contractor shall furnish all materials, equipment, labor, and other essentials necessary to accomplish this work and all other work described herein and as directed by the Engineer.

Materials. All sign post materials shall be in accordance with Articles/Sections: 1093.01(a), 10007.05. Galvanizing will not be required. The nominal size of wood posts shall be 4 x 4 in. (100 x 100mm).

Equipment. All equipment shall be in accordance with Article/Section 1106.01.

Notification. The Contractor shall notify the Traffic Control Supervisor, in writing, when the Contractor receives an award letter for the contract. The letter shall state the anticipated start date of lane width restrictions. The twenty-one (21) day notice will start from the Award date. No width restrictions will be allowed until twenty-one (21) days after receiving notice from the Contractor. The contractor may elect to provide the anticipated start date of lane width restrictions at the Preconstruction meeting so long as there is a minimum of twenty-one (21) days advanced notice.

Traffic Control Supervisor                      Don Hoffman                      (309) 671-4488

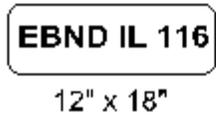
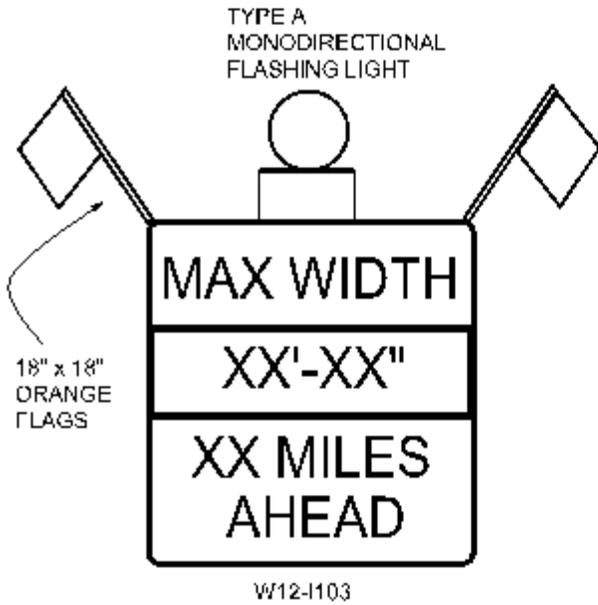
Failure to provide required advanced notice may delay project at the expense of the Contractor.

General. The Contractor shall provide the route and directional (North, South, East and West or NBND, SBND, EBND, or WBND) signage. The route and directional signage shall be placed, maintained, and removed by the Contractor. The route sign shall visually be the same as the existing route signs as posted by IDOT or lettered at a four (4) inch height. The directional signage shall be black lettering on a white background and have a minimum four (4) inch height. The route and directional signage shall be placed below sign W12-I103.

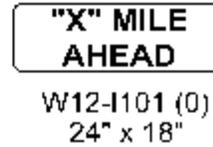
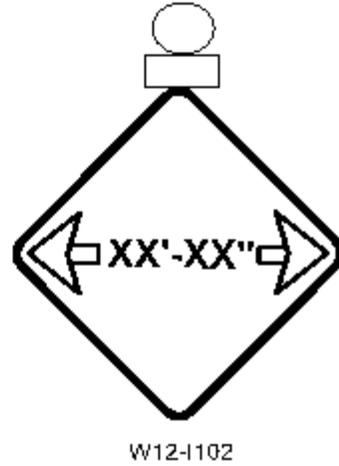
Locations, distances and quantity of signs and shall be as shown on the plan sheets or in the traffic control plan. All final field locations will be marked by the Bureau of Operations, Traffic Control Supervisor.

It shall be the Contractor's responsibility to make arrangements for the J.U.L.I.E. locates.

Basis of Payment: This work will not be paid for separately, but will be included in the cost of Traffic Control and Protection pay items. This work shall consist of providing, placing, maintaining, and removing width restriction signing as shown on the plans and special provisions and no additional compensation will be allowed.



EASTBOUND= EBND  
 WESTBOUND=WBND  
 NORTHBOUND=NBND  
 SOUTHBOUND=SBND



## **PAVEMENT MARKING REMOVAL/WORK ZONE PAVEMENT MARKING REMOVAL**

Effective: April 29, 2005

Description: This work shall consist of removing all permanent or work zone pavement marking, painted pavement markings, epoxy paint pavement markings, thermoplastic pavement marking, or pavement marking tape type III by hydro-blasting in accordance with the applicable portions of Section 783 and 703 of the Standard Specifications and described herein. Pavement marking tape type III may be peeled or burned off. However, all remnants or burn marks shall be hydro-blasted.

Equipment Requirements: All equipment shall be of sufficient capacity to efficiently and economically clean the roadway surface to the specified cleanliness. Equipment shall be power driven and in good operating condition. Equipment shall utilize moisture and oil traps, in working order, of sufficient capacity to remove contaminants from the water and prevent deposition of oil and other contaminants on the roadway surface.

Removal Requirements: Removal requirements shall be as follows:

- a) The existing paint pavement markings or epoxy paint pavement markings shall be removed without pavement surface damage to the satisfaction of the Engineer.
- b) A high pressure water spray or "hydro-blast" shall be used during the removal, the pressure at the nozzle shall be approximately 172,000 kPa (25,000 psi) with maximum flow rate of 56 L/min (15 gal/min). The nozzle shall be in close proximity to the pavement surface.
- c) Over cleaning to the extent of possible damage to the roadway surface shall be held to a minimum. Very small particles of tightly adhering existing markings may remain in place, if in the opinion of the Engineer, complete removal of the small particles will result in pavement surface damage.

Method of Measurement: The removal of permanent or work zone pavement marking, painted pavement markings, epoxy paint pavement markings, thermoplastic pavement marking, or pavement marking tape type III will be measured in square feet (square meter).

Basis of Payment: This work will be paid for at the contract unit price per Square Foot (square meter) for PAVEMENT MARKING REMOVAL or WORK ZONE PAVEMENT MARKING REMOVAL.

## **GROOVING FOR RECESSED PAVEMENT MARKING**

Effective January 1, 2011

This work shall consist of all materials, equipment, and labor necessary to groove the surface of the pavement prior to the pavement marking placement. The depth of the groove shall be in accordance with the pavement marking manufacturer's recommendations.

This work will be paid for at the contract unit price for GROOVING FOR RECESSED PAVEMENT MARKING of the dimension specified.

## **WORKING RESTRICTIONS**

The Contractor should note that this provision is based on an expedited work schedule.

The stage construction and traffic control for this project is designed to function as a single unit. Any proposed changes to the proposed staging must be considered, as those changes may affect the overall project traffic control and future staged construction. Any proposed traffic control changes must be submitted to the Engineer in writing a minimum of 10 calendar days prior to the proposed change. All changes must be approved by the Engineer prior to their implementation.

If the Contractor elects to change the proposed staging and/or traffic control plan, the Contractor shall incur all additional cost to facilitate the change. No additional compensation will be made for any staging or traffic control alterations, modifications or additions initiated by the Contractor.

For any change in the traffic control, the number of traffic lanes must not be less than those shown in the Maintenance of Traffic plans and as noted in this special provision.

Notification by the Contractor shall be given to the Engineer a minimum of ten (10) calendar days before, or as specified by the Engineer for the closure or lane reduction of any lane, shoulder or ramp closure or lane reduction.

During the construction seasons, a single traffic lane is defined as an 11' or greater open traveled width of the roadway. Any lane width less than 11' shall be considered obstructed.

During the winter shutdown seasons, a single traffic lane is defined as a 12' or greater open traveled width of the roadway. Any lane width less than 12' shall be considered obstructed.

### **Construction Season 2013**

Traffic staging cannot take place before April 1, 2013 unless approved by the Engineer.

**I-74:** Due to the high traffic volumes on the I-74 mainline, a minimum of two westbound and two eastbound lanes of traffic shall be open to traffic at all times Monday through Friday from 6:30 AM to 5:30 PM. At all other times a minimum of one lane of traffic westbound and one lane of traffic eastbound shall be open at all times. Lane closures during the timeframe from 5:30 PM to 6:30 AM will not be allowed to extend for the entire length of the project, but will be limited to the location of work along the project.

**I-155:** Due to the high traffic volumes on the I-155 mainline, intermittent single lane and/or shoulder closure(s) will be permitted for one lane of traffic in the northbound lane and one lane of traffic in the southbound lane of I-155 with the exception that two northbound lanes shall be open to traffic Monday through Friday between the hours of 6:30 AM to 8:30 AM and two southbound lanes shall be open to traffic between the hours of 3:30 PM to 5:30 PM.

The intermittent closure(s) will be allowed only if the closure(s) is needed to accommodate the work. The closure(s) will not be allowed to extend for an entire lane of traffic in any direction, but will be limited to the location of work along the project.

**Ramps:** A minimum of one traffic lane shall be open at all times at each ramp location with the exception of work for the ramp carrying northbound I-155 to eastbound I-74 (Ramp E) at the I-74/I-155 interchange. Ramp E may be closed, and traffic detoured as shown in the plans, for a maximum period of two consecutive months during the 2013 construction season.

**Morton Avenue:** Due to the high traffic volumes on Morton Avenue, a maximum of one lane in either the northbound or southbound direction shall be closed at any one time Monday through Friday from 6:30 AM to 5:30 PM. At all other times a minimum of one lane of traffic northbound and one lane of traffic southbound shall be open at all times.

The lane closure(s) will be allowed only if the closure(s) is needed to accommodate the work. The closure(s) will not be allowed to extend for an entire lane of traffic in any direction, but will be limited to the location of work along the project.

**Failure to Open Traffic Lanes To Traffic:** Should the Contractor fail to completely open any lane(s) of traffic in accordance with the limitations specified above, the Contractor shall be liable to the Department in the amount of **\$10,000** for any portion of the first hour lane(s) are closed or obstructed on I-74, **\$8,000** for any portion of the first hour lane(s) are closed or obstructed on I-155, **\$2,000** for any portion of the first hour lane(s) are closed or obstructed on Morton Avenue, and **\$2,500** every 15 minutes thereafter on I-74, **\$2,000** every 15 minutes thereafter on I-155, **\$500** every 15 minutes thereafter on Morton Avenue, as a monetary deduction from the contract. Such monetary deductions will be applied by the Department from the monies due the Contractor. These deductions shall apply during the contract time including any extensions of the contract time.

In fixing the monetary deductions as set out herein, the desire is to establish a certain mode of calculation for the traffic delay because the Departments actual loss, in the event of delay, cannot be predetermined, would be difficult of ascertainment, and a matter of argument and unprofitable litigation. This mode is an equitable rule for measurement of the Departments actual loss and fairly takes into account the loss of the roadway. The Department shall not be required to provide any actual loss to recover these monetary deductions provided herein, as these damages are difficult to ascertain. Furthermore, no provision of this clause shall be construed as a penalty. As such is not the intention of the parties.

**Interim Completion:** The Contractor shall schedule their operations to have the Pre-Stage through Stage 4 work completed and three traffic lanes on eastbound I-74 west of the I-74/I-155 interchange Ramp F, three traffic lanes on eastbound I-74 between the I-74/I-155 interchange Ramp E and the I-74/Morton Avenue interchange Ramp F, three traffic lanes on westbound I-74 west of the I-74/I-155 interchange Ramp H, two traffic lanes in both the eastbound and westbound lanes of the remaining sections of I-74, two traffic lanes in both the northbound and southbound lanes of I-155, two traffic lanes both northbound and southbound on Morton Avenue, one traffic lane in all ramp directions at the I-74/ I-155 interchange, one traffic lane in all ramp directions at the I-74/Morton Avenue interchange, and Jefferson Street beneath the new I-74 structure open to traffic on or before **November 20, 2013**.

Full or partial closure and traffic detour of the northbound I-155 to westbound I-74 ramp (Ramp H), or westbound I-74 to southbound I-155 ramp (Ramp G) using either the I-74/Pinecrest Drive or I-74/Morton Avenue detours will not be permitted during this construction season.

Should the Contractor fail to have work completed for the Prestage through Stage 4 work, and fail to have all lanes, structures and ramps open to traffic on or before the **November 20, 2013** date the Contractor shall be subject to a monetary deduction of **\$5,800** per calendar day for every day, or portion thereof, that work is not completed and lanes open.

#### **Winter Shutdown 2013 – 2014**

During the winter period from **November 21, 2013** through **March 31, 2014** the Contractor shall schedule their work operations to provide for all lanes and ramps to be open to traffic at all times as noted in the Construction Season 2013 section of this special provision.

Should the Contractor desire to proceed with advance work for the future stages of construction, and such work would require an extension to the **November 21, 2013** deadline, the Contractor shall request the extension, in writing, to the Engineer for review and final decision.

Should the Contractor fail to adhere to this specification, the Contractor shall be subject to a monetary deduction of **\$5,800** per calendar day, whereas the monetary amount per calendar day will be assessed for each day, or any portion thereof, that any roadway, or any portion thereof, is obstructed by the Contractors operation.

#### **Construction Season 2014**

The Contractor shall schedule their operations to resume work on or after **April 1, 2014**. Traffic staging cannot take place before April 1, 2014 unless approved by the Engineer.

**I-74:** Due to the high traffic volumes on the I-74 mainline, two westbound lanes shall be open to traffic at all times Monday through Friday between the hours of 6:30 AM to 5:30 PM with the exception that three westbound lanes shall be open to traffic between the westbound I-74 structure over US 150 (Jackson Street) and the I-74/Morton Avenue interchange Ramp E entrance ramp between those hours.

Two eastbound lanes shall be open to traffic at all times Monday through Friday between the hours of 6:30 AM to 5:30 PM with the exception that three eastbound lanes shall be open to traffic between the I-74/I-155 interchange Ramp E and the I-74/Morton Avenue interchange Ramp C between those hours.

At all other times a minimum of one lane of traffic westbound and one lane of traffic eastbound shall be open at all times. Lane closures during the timeframe from 5:30 PM to 6:30 AM will not be allowed to extend for the entire length of the project, but will be limited to the location of work along the project.

In addition, two westbound lanes and two eastbound lanes of traffic shall remain open at all times on the I-74 temporary runaround pavement at the I-74/I-155 interchange. Construction shall not begin on Ramp G, Ramp H, I-155 structures, or I-74 pavement at the I-74/I-155 interchange until the temporary I-74 pavement is complete and the I-74/Morton Avenue and I-74/Pinecrest Drive interchanges detours are complete.

**I-155:** Due to the high traffic volumes on the I-155 mainline, a minimum of one northbound and one southbound lane shall remain open to traffic at all times.

**Ramps:** Ramps G and H at the I-74/I-155 interchange are closed for a duration of this construction season. At all other locations, a minimum of one traffic lane shall be open at all times at each ramp location with the exception that the I-74/Morton Avenue interchange Ramp F shall maintain a minimum of one right turn lane and one left turn lane at the Morton Avenue approach.

**Morton Avenue:** Due to the high traffic volumes on Morton Avenue, a maximum of one lane in either the northbound or southbound direction shall be closed at any one time Monday through Friday from 6:30 AM to 5:30 PM. At all other times a minimum of one lane of traffic northbound and one lane of traffic southbound shall be open at all times.

The lane closure(s) will be allowed only if the closure(s) is needed to accommodate the work. The closure(s) will not be allowed to extend for an entire lane of traffic in any direction, but will be limited to the location of work along the project.

**Failure to Open Traffic Lanes to Traffic:** Should the Contractor fail to completely open any lane(s) of traffic in accordance with the limitations specified above, the Contractor shall be liable to the Department in the amount of **\$10,000** for any portion of the first hour lane(s) are closed or obstructed on I-74, **\$8,000** for any portion of the first hour lane(s) are closed or obstructed on I-155, **\$2,000** for any portion of the first hour lane(s) are closed or obstructed on Morton Avenue, and **\$2,500** every 15 minutes thereafter on I-74, **\$2,000** every 15 minutes thereafter on I-155, **\$500** every 15 minutes thereafter on Morton Avenue, as a monetary deduction from the contract. Such monetary deductions will be applied by the Department from the monies due the Contractor. These deductions shall apply during the contract time including any extensions of the contract time.

In fixing the monetary deductions as set out herein, the desire is to establish a certain mode of calculation for the traffic delay because the Departments actual loss, in the event of delay, cannot be predetermined, would be difficult of ascertainment, and a matter of argument and unprofitable litigation. This mode is an equitable rule for measurement of the Departments actual loss and fairly takes into account the loss of the roadway. The Department shall not be required to provide any actual loss to recover these monetary deductions provided herein, as these damages are difficult to ascertain. Furthermore, no provision of this clause shall be construed as a penalty. As such is not the intention of the parties.

**Interim Completion:** The Contractor shall complete, as a minimum, the construction of Ramps G and H at the I-74/I-155 interchange and the structures carrying I-155 over I-74 at the I-74/I-155 interchange.

The Pinecrest Drive and Morton Avenue interchange traffic detours used for the construction shall be removed, the temporary I-74 pavement not required for the 2015 Construction Season shall be removed and all other interim work completed to allow for three traffic lanes both in the eastbound and westbound lanes of I-74 west of the I-74/I-155 interchange Ramp F and Ramp H, two traffic lanes in both the eastbound and westbound lanes of the remaining sections of I-74, two traffic lanes in both the northbound and southbound lanes of I-155, two traffic lanes both northbound and southbound on Morton Avenue, one traffic lane in all ramp directions at the I-74/ I-155 interchange, and one traffic lane in all ramp directions at the I-74/Morton Avenue interchange to be open to traffic on or before **November 19, 2014**.

Should the Contractor fail to have all lanes, structures and ramps open to traffic on or before **the November 19, 2014** date the Contractor shall be subject to a monetary deduction of **\$5,800** per calendar day for every day, or portion thereof, that work is not completed and lanes open.

#### **Winter Shutdown 2014 – 2015**

During the winter period from **November 20, 2014** through **March 31, 2015** the Contractor shall schedule their work operations to provide for all lanes and ramps to be open to traffic at all times as noted in the Construction Season 2014 section of this special provision.

Should the Contractor desire to proceed with advance work for the future stages of construction, and such work would require an extension to the **November 20, 2014** deadline, the Contractor shall request the extension, in writing, to the Engineer for review and final decision.

Should the Contractor fail to adhere to this specification, the Contractor shall be subject to a monetary deduction of **\$5,800** per calendar day, whereas the monetary amount per calendar day will be assessed for each day, or any portion thereof, that any roadway, or any portion thereof, is obstructed by the Contractors operation.

#### **Construction Season 2015**

The Contractor shall schedule their operations to resume work on or after **April 1, 2015**. Traffic staging cannot take place before **April 1, 2015** unless approved by the Engineer.

**I-74:** Due to the high traffic volumes on the I-74 mainline, three westbound lanes of traffic and three eastbound lanes of traffic west of the I-74/I-155 interchange Ramp H and Ramp F shall be open to traffic at all times Monday through Friday between the hours of 6:30 AM to 5:30 PM. Two westbound and two eastbound lanes of traffic shall be open to traffic on the remaining sections of I-74 at all times Monday through Friday between the hours of 6:30 AM to 5:30 PM.

At all other times a minimum of one lane of traffic westbound and one lane of traffic eastbound shall be open at all times. Lane closures during the timeframe from 5:30 PM to 6:30 AM will not be allowed to extend for the entire length of the project, but will be limited to the location of work along the project.

**I-155:** Due to the high traffic volumes on the I-155 mainline, intermittent single lane and/or shoulder closure(s) will be permitted for one lane of traffic in the northbound lane and one lane of traffic in the southbound lane of I-155 with the exception that two northbound lanes shall be open to traffic Monday through Friday between the hours of 6:30 AM to 8:30 AM and two southbound lanes shall be open to traffic between the hours of 3:30 PM to 5:30 PM.

The intermittent closure(s) will be allowed only if the closure(s) is needed to accommodate the work. The closure(s) will not be allowed to extend for an entire lane of traffic in any direction, but will be limited to the location of work along the project.

**Ramps:** A minimum of one traffic lane shall be open at all times at each ramp location.

Separate right and left turn lanes shall be open at all times at the I-74/Morton Avenue interchange Ramp F approach to Morton Avenue.

**Morton Avenue:** Due to the high traffic volumes on Morton Avenue, a maximum of one lane in either the northbound or southbound direction shall be closed at any one time Monday through Friday from 6:30 AM to 5:30 PM. At all other times a minimum of one lane of traffic northbound and one lane of traffic southbound shall be open at all times.

The lane closure(s) will be allowed only if the closure(s) is needed to accommodate the work. The closure(s) will not be allowed to extend for an entire lane of traffic in any direction, but will be limited to the location of work along the project.

**Failure to Open Traffic Lanes to Traffic:** Should the Contractor fail to completely open any lane(s) of traffic in accordance with the limitations specified above, the Contractor shall be liable to the Department in the amount of **\$10,000** for any portion of the first hour lane(s) are closed or obstructed on I-74, **\$8,000** for any portion of the first hour lane(s) are closed or obstructed on I-155, **\$2,000** for any portion of the first hour lane(s) are closed or obstructed on Morton Avenue, and **\$2,500** every 15 minutes thereafter on I-74, **\$2,000** every 15 minutes thereafter on I-155, **\$500** every 15 minutes thereafter on Morton Avenue, as a monetary deduction from the contract. Such monetary deductions will be applied by the Department from the monies due the Contractor. These deductions shall apply during the contract time including any extensions of the contract time.

In fixing the monetary deductions as set out herein, the desire is to establish a certain mode of calculation for the traffic delay because the Departments actual loss, in the event of delay, cannot be predetermined, would be difficult of ascertainment, and a matter of argument and unprofitable litigation. This mode is an equitable rule for measurement of the Departments actual loss and fairly takes into account the loss of the roadway. The Department shall not be required to provide any actual loss to recover these monetary deductions provided herein, as these damages are difficult to ascertain. Furthermore, no provision of this clause shall be construed as a penalty. As such is not the intention of the parties.

## **DATE OF COMPLETION FOR ITS ELEMENTS**

The staged construction of the I-74/I-155 interchange Reconstruction Project requires the following permanent ITS elements to be installed, tested, and fully operational on or before **April 30, 2013**:

- CCTV Camera located along I-155 near the end of the WB Ramp from IL 98 (Birchwood) along with all associated work required to power the camera and connect the camera to a DSL service located in the existing traffic signal cabinet at IL 98 (Birchwood) & Detroit. Refer to ITS Plan Sheets 20 and 21 for additional details.
- CCTV Camera located along I-74 at the N. Morton Ave. interchange along with all along with all associated work required to power the camera and connect it to the proposed wireless Ethernet Radio link. Refer to ITS Plan Sheets 12 and 13 for additional details.
- Wireless Ethernet radio link between the proposed camera pole located along I-74 at the N. Morton Ave. interchange and the existing CCTV camera pole located approximately ¼-mile east of the Muller Rd. overpass along I-74 along with all associated work required to power the facilities. Refer to plan sheet 12 for additional details.

Should the Contractor fail to complete the work on or before the date specified in these Special Provisions, or within such extended time allowed by the Department, the Contractor shall be liable to the Department in the amount of \$500 not as a penalty but as liquidated and ascertained damages for each calendar day beyond the date of completion or extended time as may be allowed.

Such damages may be deducted by the Department from any monies due the Contractor.

In fixing the damages as set out herein, the desire is to establish a certain mode of calculation for the work because the Department's actual loss, in the event of delay, cannot be predetermined, would be difficult of ascertainment, and a matter of argument and unprofitable litigation. This mode is an equitable rule for measurement of the Department's actual loss and fairly takes into account the loss of use of the roadway if the project is delayed in completion. The Department shall not be required to provide any actual loss to recover these liquidated damages provided herein, as these damages are very difficult to ascertain. Furthermore, no provision of this clause shall be construed as a penalty, as such is not the intention of the parties.

A calendar day is every day on the calendar and starts at 12:00 midnight and ends at the following 12:00 midnight, twenty-four hours later. Liquidated damages will not be assessed for any day less than twenty-four hours.

For all other ITS work under this contract not specified in the previous paragraph and required to be coordinated with the above referenced contracts, the Contractor shall have all required equipment and materials installed, tested and operational within the time frames specified for the roadway construction project.

## **BORROW SITE**

Description: State of Illinois property located at the Southeast Quarter of Section 7 and Southwest Quarter of Section 8, T25N R4W 3PM in Groveland Township, Tazewell County is made available to the Contractor, at their option, to use as an approved borrow site for construction of the project. The site is located adjacent to I-474 at approximate Mile Marker 10 from eastbound Station 17+071± to Station 17+997±. Access to and from the site is gained from eastbound I-474 at an existing aggregate entrance located at the outside edge of shoulder at Station 18+082±.

The borrow material at the site is being provided free of charge to the Contractor for use exclusively for this project.

General Requirements: The use of the site by the Contractor shall conform to the applicable articles of Section 204 of the Standard Specifications. Special attention is given to Article 204.02 of the Standard Specifications. The first sentence of Article 204.02 and paragraphs 2 and 6 of Article 204.02 shall not apply for this site. The final general topography of the site shall not change the general drainage pattern of the existing drainage and be maintained at the close of the site as was existing prior to its use. It shall not be the intent to create a pond, lake, or depression(s) at the site at the close of the project.

It shall be the Contractors responsibility to submit a topographic map to the Engineer for approval no later than 30 calendar days after award of the contract. The topographic map shall show the existing and proposed final conditions of the entire site. The topographic map shall be drawn at a minimum horizontal scale of 1" = 250' with a 1'-foot contour intervals indicated.

Site Preparation: Prior to beginning excavation, the existing topsoil shall be excavated and stockpiled at a location(s) on site as approved by the Engineer. The topsoil shall be used for placement on the finished grade of the site.

Special attention is called to Article 204.04 for clearing prior to excavation and Article 204.05 for excavation of the site.

Traffic Control and Protection: The traffic control and protection on I-474 to and from the site shall be in accordance with the applicable Articles of Section 701 of the Standard Specifications. Special attention is called to Articles 701.08 and 701.11 of the Standard Specifications. Highway Standards 701400-05 and 701401-06 shall apply.

The site shall be closed to access for construction vehicles during winter shutdown. Traffic control items shall be removed from the roadway during winter shutdown. All existing travel lanes shall be open during winter shutdown.

The Contractor shall be responsible for keeping the pavement adjacent to the entrance and access areas free from dirt and debris in accordance with Article 107.15 of the Standard Specifications.

Erosion Control: The Contractor shall develop an erosion control plan for the site. This plan will be subject to approval by the Engineer and will become part of the Storm Water Pollution Prevention Plan, subject to NPDES requirements.

Any erosion control items required at the site that are needed to comply with the Storm Water Pollution Prevention Plan shall be included in the cost of the contract.

The Contractor shall be responsible for controlling the dust and airborne dirt generated at the site in accordance with Article 107.36 of the Standard Specifications.

Roadway: The existing traffic lane(s) and shoulder on I-474 used by the Contractor's construction equipment, haul trucks and vehicles for ingress and egress to the borrow site shall remain stable and structurally sound both during the operation of the borrow site and upon closure and abandonment of the borrow site. Any deterioration of the I-474 roadway and/or shoulder deemed unstable by the Engineer shall be repaired or replaced by the Contractor immediately upon notification by the Engineer. The repair or replacement shall be completed in accordance with the applicable portions of Section 300 and Section 400 of the Standard Specifications and to the satisfaction of the Engineer.

Site Restoration: The site shall be dismantled and restored to proposed final grade and vegetated condition immediately upon completion of the project in accordance with the applicable sections of Article 204.02 and 204.05 of the Standard Specifications. The site shall be graded to the satisfaction of the Engineer prior to, and after final topsoil placement.

Excess embankment and/or topsoil material available at the completion of the project shall become the property of the state and shall be transported to the borrow site by the Contractor, placed, graded and seeded in accordance with the site restoration directive shown above and as directed by the Engineer.

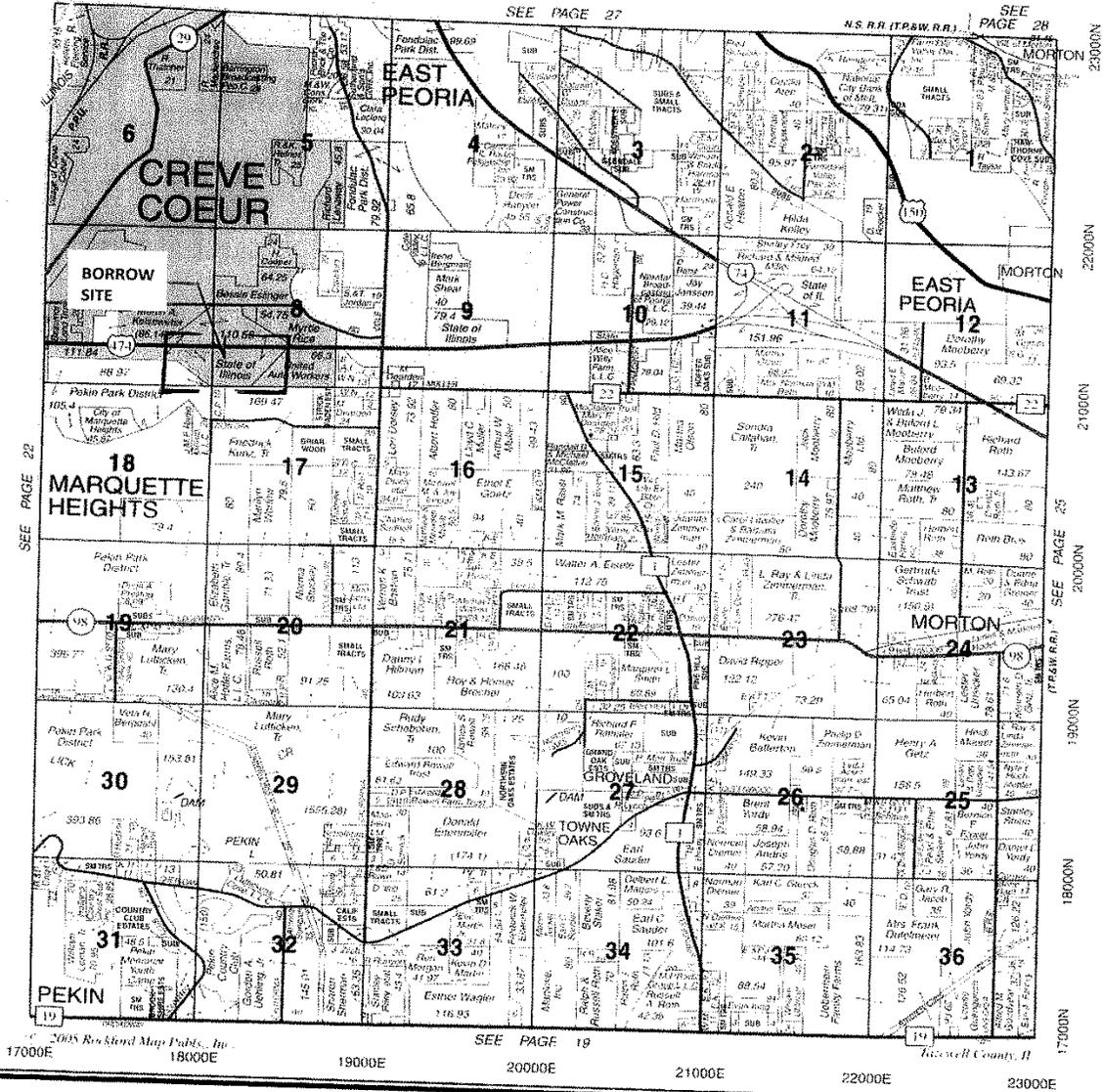
Soil Information: Subsurface soil information for the borrow site is made available to the Contractor to view prior to and after award of the contract. Information in the form of soil borings and a soil report of the borrow site is made available for the Contractor to view at the District Four Headquarters in downtown Peoria. The Contractor should contact the District Materials Section at 309-671-3671 to make an appointment to view the information.

Method of Measurement: This work shall not be measured for payment.

Basis of Payment: All labor, material and equipment required to establish, maintain, excavate and restore the borrow site, roadway, shoulder, and provide traffic control at the site will not be paid for separately but shall be included in the cost of the contract.

# GROVELAND

# T.25N.-R.4W.



FAI Routes 74 & 155 (I-74 & I-155)  
 Project ACIM-ACBRI-000S(907)  
 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620

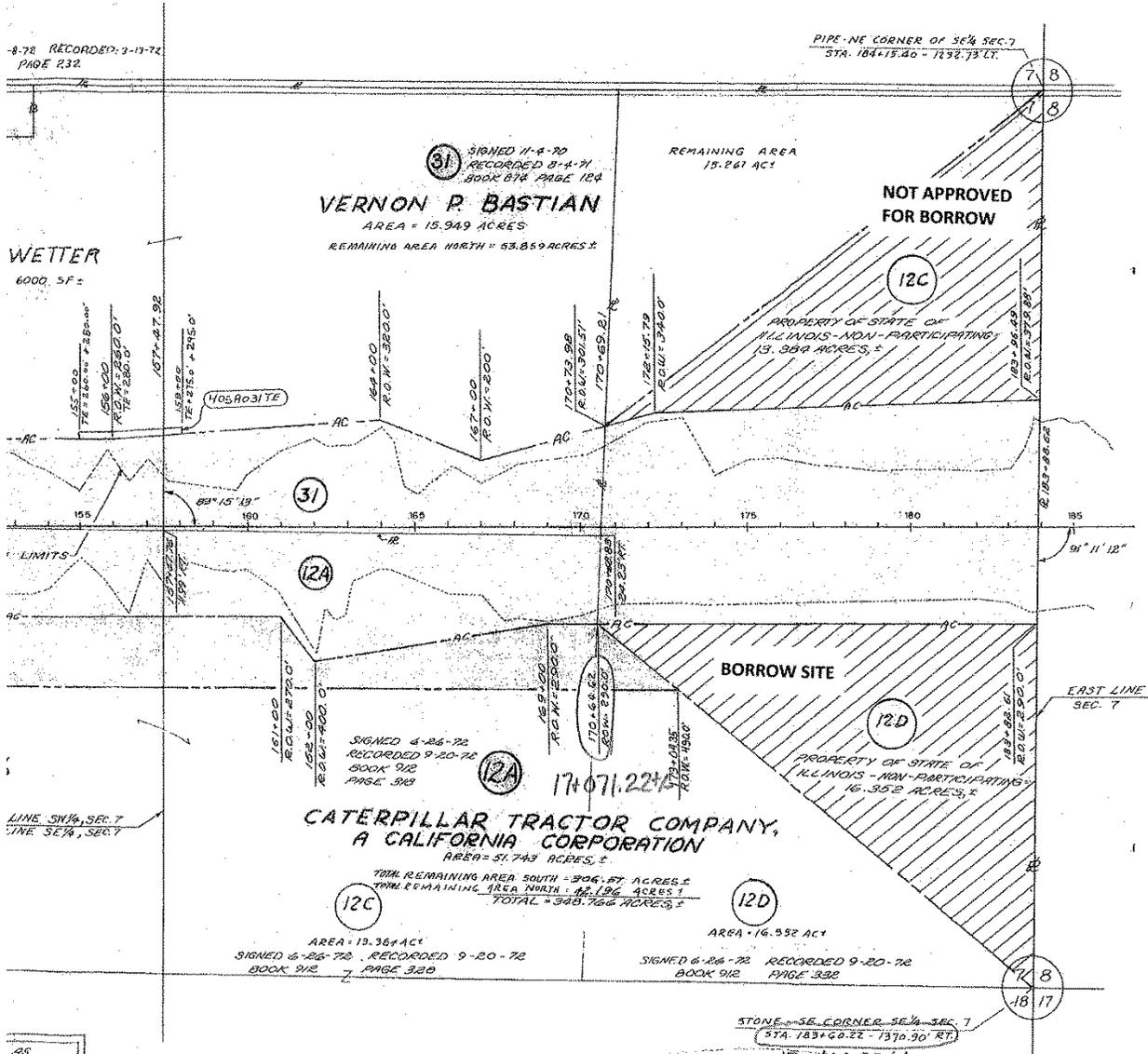
**JENNETTE STROJAN**  
 AREA = 0.055 ACRES ±  
 FOR CONSTRUCTION OF  
 DRIVEWAY ENTRANCE AND  
 NECESSARY BACKSLOPE  
 GRADING

SIGNED: 3-7-72 RECORDED: 4-7-72  
 BOOK: 835 PAGE: 406

**DONALD J. GILBERT**

AREA = 0.997 ACRES ±  
 REMAINING AREA = 1.140 ACRES ±  
 SIGNED: 2-9-72 RECORDED: 3-30-72  
 BOOK: 835 PAGE: 45

**T25N R4W 3PM  
 SEC 7**

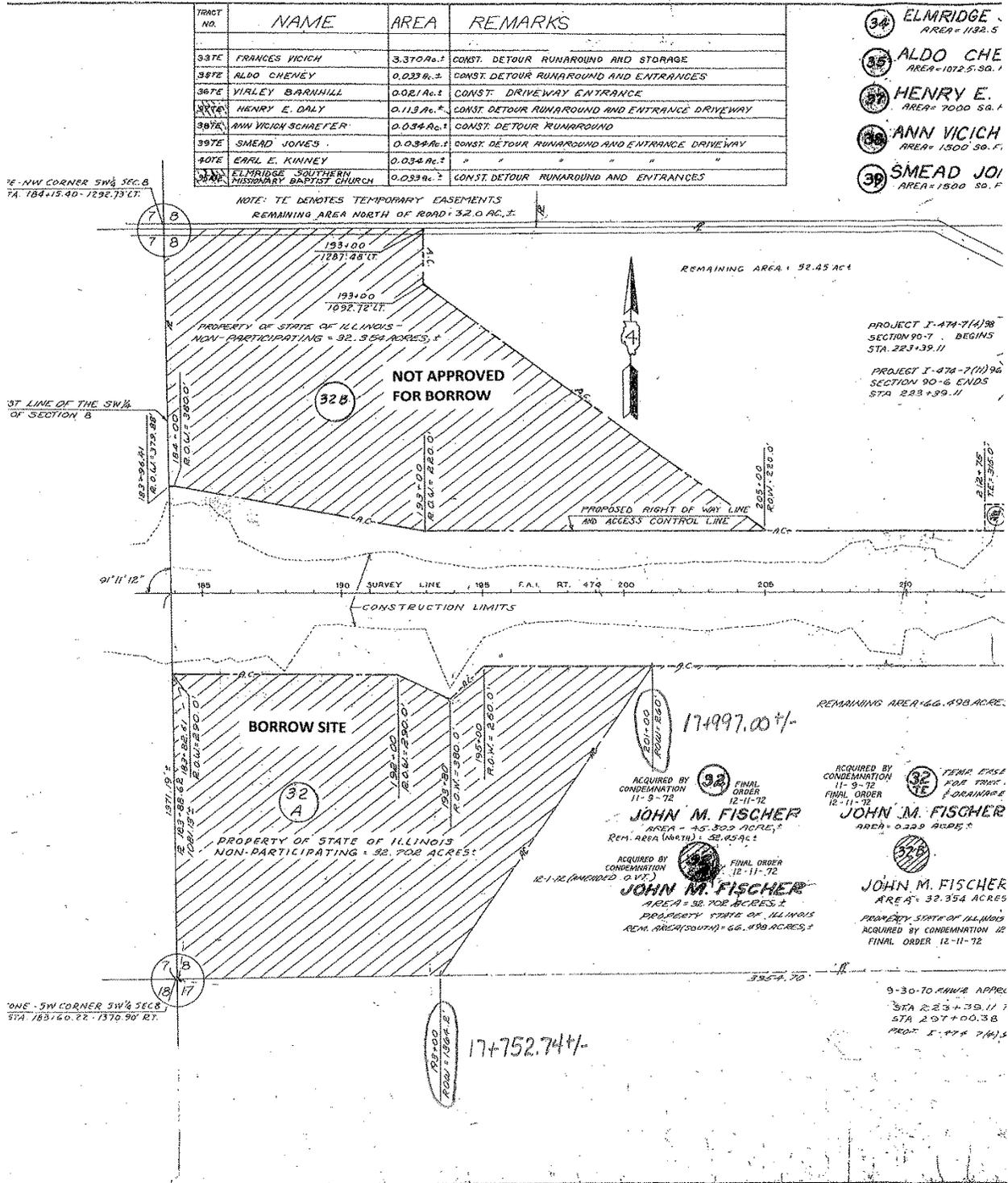


75  
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Part of 90-5 in  
 in 90-7

RIGHT OF WAY PLANS 4  
 F.A.I. ROUTE 474  
 CONST. SECTION 90-6  
 TAZEWELL COUNTY  
 STA. 130+55.17 TO STA. 183+88.62  
 SCALE: 1" = 200' DATE: JUNE 1971

FAI Routes 74 & 155 (I-74 & I-155)  
 Project ACIM-ACBRI-000S(907)  
 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620



## **REMOVAL AND SETTING OF BRIDGE BEAMS**

The removal, delivery and erection of bridge beam for all structures on the project shall be limited to the hours of 8:30 PM to 5:30 AM on weekdays or weekends beginning at 8:30 PM Friday and extending to 5:30 AM on Monday or as specified by the Engineer.

The Contractor may temporarily stop traffic on I-74, Jackson Street and the adjacent bicycle path for a maximum of 20 minutes at a time to remove or set the beams. The Engineer shall be notified a minimum of seven (7) calendar days prior to work operations that will stop traffic. See commitments to the Morton Park District for restrictions on bicycle path detour or closure.

Any expenses incurred by the Contractor in order to comply with this special provision will not be paid for separately, but shall be included in the contract price.

## **VERTICAL CLEARANCE**

The Contractor shall maintain, at a minimum, the existing vertical clearances at all structures crossing over I-74 and I-155 at all times during construction of the project. It shall be the Contractor's responsibility to determine the existing vertical clearances prior to the start of any construction operation that may impact the structures and provide for the proper clearance beneath each structure. The Contractor shall provide the clearance measurements to the Engineer no later than seven (7) calendar days prior to the start of any construction activity that will involve any structure.

Any expenses incurred by the Contractor in order to comply with this special provision will not be paid for separately, but shall be included in the contract price.

## **PROSECUTION OF WORK**

In order to assure the timely completion of the work involved in this project, it may be necessary for the Contractor to work extended work hours. Any expenses incurred by the Contractor in order to comply with this special provision will not be paid for separately, but shall be included in the contract price.

## **COORDINATION MEETINGS**

The Contractor will be required to participate in weekly coordination meetings with Department staff and other attendees deemed appropriate by the Department. This coordination will not be paid for separately but will be included in the cost of the contract.

## **COMPLIANCE WITH LOCAL LAWS, ORDINANCES AND REGULATIONS (VILLAGE OF MORTON)**

This project is located within the Village Of Morton corporate limits. The Contractor is advised to coordinate with the Village of Morton to determine the requirements for the placement of trailers, material storage, staging areas and work areas outside the right-of-way.

The Contractor may contact the Village Of Morton Public Works Department, which is located at 120 N. Main Street, Morton IL to discuss the use of the areas located outside the right-of-way.

The storage or staging of any materials or equipment on the public right-of-way outside of the I-74 access control limits must be coordinated with the Village Of Morton. The Contractor shall contact Mr. Craig Loudermilk, Director of Public Works, at (309) 266-5361, prior to the start of any work involving staging/storage of equipment and/or materials in these areas.

## **NOISE RESTRICTIONS**

Special attention is called to Article 107.35 of the Standard Specifications and as specified herein:

Several residences are located in close proximity to the project site. Construction will be permitted 24 hours a day; however, in no case will pavement breaking, sawing, pile driving, or other high noise volume operations be allowed between 10:00 PM and 6:00 AM unless approved by the Engineer.

## **CONTRACTOR ACCESS**

The Contractor shall locate construction access points as approved by the Engineer.

Traffic control at access points will be in accordance with the details in the plans and as approved by the Engineer. Flagger(s) will be required for intermittent closures at access points in accordance with the applicable portions of Articles 701.13 and 701.18(a) of the Standard Specifications. A pair of 48-inch signs shall be located 1,500 feet in advance stating, "TRUCKS ENTERING (LEAVING) ON RIGHT (LEFT)". In addition, if two or more lanes are open to traffic, a pair of 48-inch signs shall be located 1000 feet in advance stating, "MERGE RIGHT (LEFT)".

When gaps must be created in the existing access control fence to allow the Contractor access to the work areas, the Contractor shall erect and maintain temporary fencing meeting the approval of the Engineer to securely close the gaps when work in those areas is not in progress.

The Contractor will be responsible for keeping the pavement adjacent to work areas and access areas free from dirt and debris in accordance with Article 107.15 and Article 107.36 of the Standard Specifications.

At road closure locations where Type III Barricades are installed in a manner that will not allow Contractor access to the project without relocation of one or more of the barricades, the arrangement of the barricades at the beginning of each work day may be relocated, when approved by the Engineer, in the manner shown on Highway Standard 701901 for Road Closed to Thru Traffic. "Road Closed" signs (R11-2), supplemented by "Except Authorized Vehicles" signs (R3-I101), shall be mounted on both the near-right and far-left barricade(s). At the end of each workday, the barricades shall be returned to their in-line positions.

All vehicles, materials and equipment parked or stored during non-working hours within 15 feet from any roadway or ramp pavement that is open to traffic shall be protected by temporary concrete barrier or other barrier with an approved Test Level 3 attenuator. No vehicles, materials or equipment shall be parked or stored within 4 feet of the backside of the barrier.

This work will not be paid for separately but will be considered included in the contract. No additional compensation will be allowed.

## **CONTRACTOR STAGING AREA**

Description: Infield location(s) at the I-74/I-474 interchange may be made available to the Contractor, at their option, to store materials, equipment, articles of construction, batching and weighing equipment during the construction of the project.

General Requirements: It shall be the Contractor's responsibility to submit a staging site(s) plan to the Engineer for approval of the location(s) for such use no later than 10 calendar days after award of the contract. The Department will provide approval/denial of the site(s) or recommendations for revision of the plan for approval of the site(s). The plan shall show the proposed area(s) of use, site(s) grading and surfacing plan, traffic control plan with traffic control signing for access to and from the site(s), and schedule of operation at the site(s).

Site Preparation: The site work consists of preparing and restoring the areas designated on the plans as Staging Area, if used by the Contractor, in accordance with the applicable Articles of Sections 201, 211, 250 and 280 of the Standard Specifications. The work includes clearing and grubbing, temporary grading to facilitate construction, removal of materials brought to the site, and restoration of all affected areas to their original condition.

The areas designated on the plans as Staging Areas are the approximate footprint available to the Contractor for their use. The Contractor shall be responsible for determining the actual areas and shall submit any revisions to the Staging and Erosion Control plans for the approval of the Engineer.

As noted on the plans, portions of the Staging Areas are within the floodplain boundaries. Storage of erodible materials within the floodplain shall not be allowed.

The Contractor will be responsible to grade the Staging Areas with no compensation allowed for this activity.

The Contractor is advised that the intent is to restore the Staging Areas after the project to a vegetative cover. To that end, the Contractor shall take positive measures to prevent aggregate or other foreign materials from penetrating the ground.

Traffic Control and Protection: The traffic control and protection will be in accordance with the applicable Articles of Section 701 of the Standard Specifications. Special attention is called to Articles 701.08 and 701.11 of the Standard Specifications.

At no time shall the Contractor be allowed direct access to or from the site(s) from the I-74 mainline pavement. At no time shall the Contractor be allowed to directly cross any ramp or mainline pavement to obtain access to or from the site(s). The site(s) shall be closed to access for construction vehicles during winter shutdown. Should the Contractor fail to adhere to these roadway restrictions, the site(s) shall be deemed unsafe for the commuting public by the Department and it shall be the Contractor's responsibility to dismantle and restore the site(s).

The site(s) shall provide a hard surfaced entrance of a minimum width of 30 feet and extend a minimum of 50 feet into the infield. The Contractor shall be responsible for keeping the pavement adjacent to the entrance and access areas free from dirt and debris in accordance with Article 107.15 of the Standard Specifications. The Contractor shall be responsible for controlling the dust and airborne dirt generated at the site(s) in accordance with Article 107.36 of the Standard Specifications.

Erosion Control: The Contractor shall develop an erosion control plan for any modifications to the Staging Areas. This plan will be subject to approval by the Engineer and will become part of the Storm Water Pollution Prevention Plan, subject to NPDES requirements.

Any additional erosion control devices required as a result of the Contractor's modifications to the staging areas shall not be paid for separately but shall be included in the cost of the contract.

Roadway: The existing traffic lane(s) and shoulder on I-474 and ramps used by the Contractor's construction equipment, haul trucks and vehicles for ingress and egress to the Staging Areas shall remain stable and structurally sound both during the operation of the Staging Areas and upon closure and abandonment of the Staging Areas. Any deterioration of the I-474 roadway and/or shoulder or ramps deemed unstable by the Engineer shall be repaired or replaced by the Contractor immediately upon notification by the Engineer. The repair or replacement shall be completed in accordance with the applicable portions of Section 300 and Section 400 of the Standard Specifications and to the satisfaction of the Engineer.

Site Restoration: Upon completion of the use of the staging area, the Contractor shall remove all non-native materials from the site. After removal of the non-native materials, the Contractor shall grade and scarify the ground, furnish and place topsoil and place a seeding mixture consistent with the surrounding area.

Materials: Materials shall meet the requirements of the following articles of the Standard

Specifications:

|         |                     |
|---------|---------------------|
| Topsoil | Article 1081.05(a)  |
| Seeding | Article 1081.04 (7) |
| Mulch   | Section 251         |

Construction Requirements: Removal: The Contractor shall remove and dispose of all equipment, debris, and material brought to the site, including, but not limited to stone, fabric and concrete. Protection of existing plant material shall comply with Article 201.05 of the Standard Specifications. Removal and disposal shall comply with Article 202.03 of the Standard Specifications.

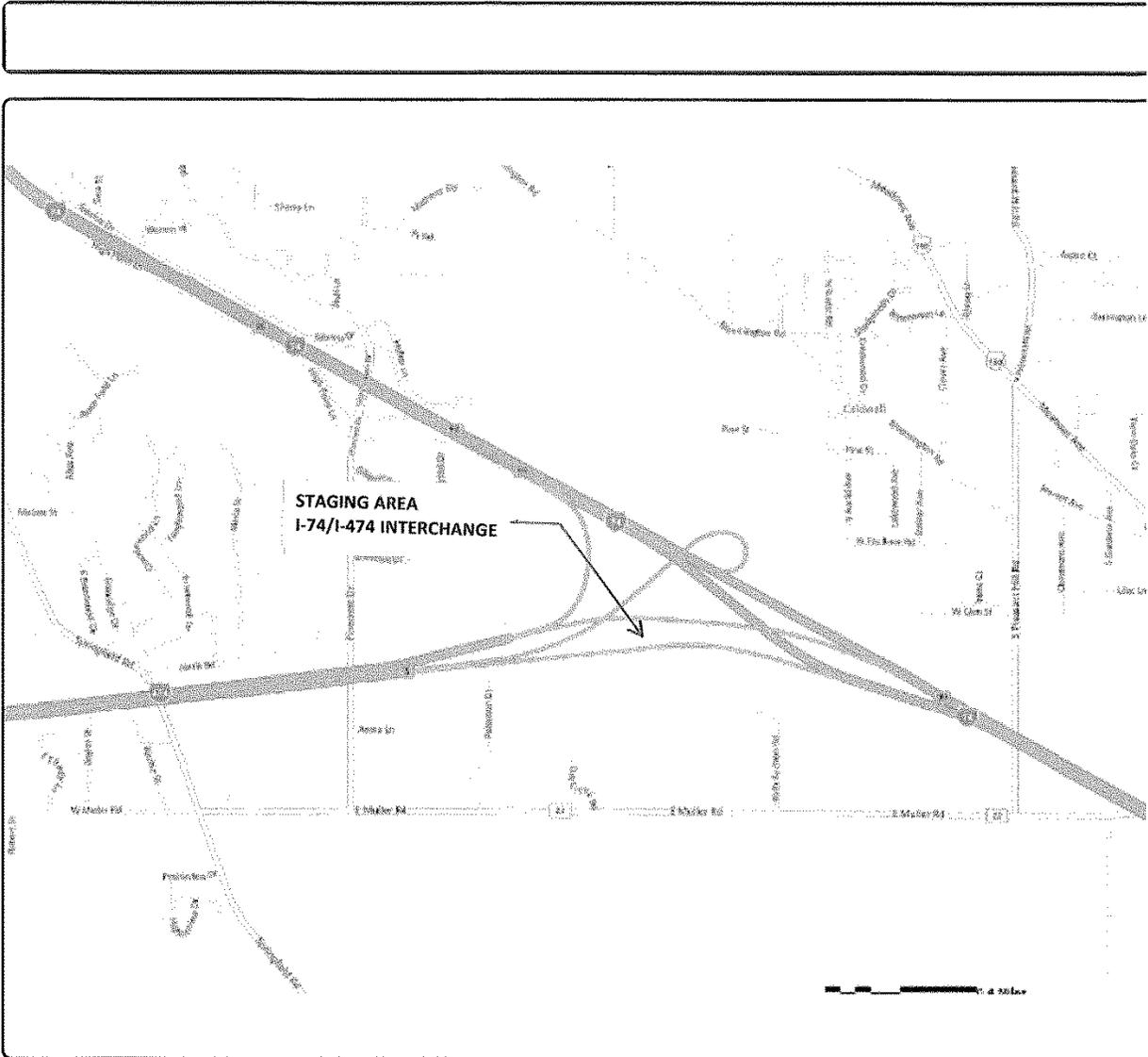
Grading and Scarification: The Contractor shall grade and scarify any areas which had been covered with material, or used during the construction operations, upon completion of the removal action. Scarification shall be to a depth of 12 inches. Scarification shall consist of penetration of the soil with a curved or straight shank ripping implement (harrow) to a depth of 12 inches. Spacing of ripping shanks shall be 24-30 inches apart, or set so that the outer shanks rip at the midpoint of the implement's tracks, with a third shank in between tracks. Ripping shanks shall have typical ripping wings or points attached to the tip. Scarification shall be performed in two directions, with the second pass bisecting the first. Only one pass shall be made in each direction to the maximum depth to avoid re-compaction. Construction debris and material which is dislodged during the scarification process shall be removed and disposed offsite per Article 202.03 of the Standard Specifications. The site(s) shall be graded to re-establish the original lines and grades of the site(s).

Furnishing and Placing Topsoil: Furnishing and placing topsoil may be required if the stockpiled topsoil is not of sufficient quantity to cover the disturbed ground. Furnishing and placing topsoil shall conform to Section 211 of the Standard Specifications. Topsoil shall be placed to a 1' depth, placed in 6" lifts. Upon completion of the first lift, the Contractor shall incorporate the placed material into the existing surface to a minimum depth of 6 inches below finished grade by disking or tilling. Upon completion, the second 6" lift shall be placed. The Contractor shall take care to avoid rutting of material.

Seeding and Mulch: Seeding and Mulch shall conform to Section 250, 251 and Article 1081.04 (7) of the Standard Specifications.

Method of Measurement: This work shall not be measured for payment.

Basis of Payment: All labor, material and equipment required to construct, maintain, remove and restore the site(s), provide traffic control at the site(s), and restore the I-474 mainline, shoulders and ramps, if required, will not be paid for separately but shall be included in the cost of the contract.



Illinois Dept. Transportation - IRoads

## **OVERSIZED LOADS**

The Contractor is advised that the Department has restrictions on the movement of oversized loads at night and on weekends. The Contractor may be required to stage loads in the Peoria area during daylight hours. The Contractor may be required to use additional escort vehicles when transporting oversized loads from the staging area to the job site at night. The Contractor may contact Permits Unit at (217) 785-8967 regarding requirements for transporting oversized loads. No additional compensation will be considered because of these requirements.

## **PROGRESS SCHEDULE**

Description: This work shall consist of preparing, revising and updating a detailed progress schedule based upon the Critical Path Method (CPM). This work shall also consist of performing time impact analysis of the progress schedule based upon the various revisions and updates as they occur.

Requirements: The software shall be, at a minimum, Primavera SureTrak Project Manager, or equivalent software.

### **Progress Schedule Requirements**

Preliminary Progress Schedule: At the preconstruction conference, the Contractor shall submit to the district for review and acceptance a Preliminary Progress Schedule. The Preliminary Progress Schedule shall be sufficiently complete to indicate the sequence of operations, submittals, critical material deliveries and durations showing the first 60 Days of work. Work beyond 60 Days shall be in summary form.

The Preliminary Progress Schedule shall be prepared to the same level of effort required to produce the Detailed Progress Schedule. The Schedule shall be a summary level schedule for completion of the entire work in accordance with the contract milestones, which incorporates the Contractor's detailed work activities for the first 60 days of the contract.

The Preliminary Progress Schedule will be used for a period not to exceed 60 days as measured from the date the Contract is executed. The Contractor will be required to make corrections to the schedule as necessary to comply with the contract requirements and will adjust the schedule to incorporate any missing information requested by the Engineer. Contractor payments will not be processed until the Department receives and approves the Preliminary Progress Schedule.

Detailed Progress Schedule: At the preconstruction meeting, the Contractor shall submit the proposed Scheduling Engineer's qualifications for approval by the Engineer. The Scheduling Engineer shall have experience in developing and updating project schedules of similar magnitude and scope and will be responsible for developing the initial Detailed Progress Schedule submittal and subsequent Revised Detailed Progress Schedule submittals as required.

Within 60 days from the execution of the contract, the Contractor shall provide a Detailed Progress Schedule in accordance with the provisions outlined herein. Contractor payments would cease at this time until the Department receives and approves the Detailed Project Schedule. The Detailed Progress Schedule shall clearly and separately define the progression of Work from the date the Contract is signed to Final Acceptance by using separate activities for all work components. The schedule shall be in sufficient detail to allow evaluation of progress and to facilitate payment of all work items.

The Detailed Progress Schedule submittal is to be accompanied by a narrative that describes the critical path(s) of the project, outlines the Contractors approach to the work, defines the project calendars and identifies critical items.

Revised Detailed Progress Schedule: If the Contractor requests changes to the accepted Detailed Progress Schedule, or, in the sole judgment of the Engineer, such changes become necessary in the best interest of the project, the Contractor shall submit a Revised Detailed Progress Schedule, which shall show how the Contractor proposes to complete the balance of The Work by the Completion Date. The Revised Detailed Progress Schedule shall be submitted within 10 Days of an Engineer's request for an Adjustment and shall be subject to the acceptance of the Engineer. Upon Acceptance of the Revised Detailed Progress Schedule, this schedule will be deemed the current Detailed Progress Schedule and used for all future Monthly Progress Schedule updates. The Revised Detailed Progress Schedule submittal shall be consistent with the requirements of the Detailed Progress Schedule submittal.

Monthly Progress Schedule: After acceptance of the Contractor's Detailed Progress Schedule, the Contractor shall monitor progress of Work and update the schedule to reflect actual progress for each pay period. The Monthly Progress Schedule will be used as the basis for managing the weekly progress and for evaluating job progress and time extension requests. Monthly Progress Schedule submittals are required at minimum every 30 Days.

A Monthly Progress Report shall be submitted along with the Contractor's schedule update. The Engineer will not release the progress payments until the progress schedule update has been accepted. The Contractor shall make every Monthly Progress Schedule submitted consistent with all Contract requirements. Every Monthly Progress Schedule submittal shall be accompanied with a schedule narrative, which describes progress made since the last Monthly Progress Schedule submittal with special emphasis on critical and near critical activities, actual and potential delays to contract milestones and the utilization of any critical resources.

If the Contractor falls behind the scheduled progress, it shall take such measures as necessary to bring its work into compliance with the latest accepted Detailed Progress Schedule. The Contractor shall identify and promptly report to the Engineer progress delays during the prosecution of the work. The contractor shall promptly take appropriate action to provide schedule recovery plans whenever the Contractor's actual physical progress is 14 calendar days behind schedule.. The Contractor must demonstrate through the submission of a progress schedule and narrative how it intends to modify production to achieve the necessary schedule gains to complete the affected milestone completion dates.

The Contractor shall not be entitled to payment for any work performed if the Contractor is delinquent in the submission of a Monthly Progress Schedule which is acceptable to the Engineer. The Contractor will be responsible for requesting a time extension for any delay or occurrence that, in the opinion of the Contractor, impacts the critical path of the Monthly Progress Schedule update. Delays to non-critical activities will not be the basis for a time extension. The Engineer will not be liable for any additional costs associated with the Contractor's obligation to complete the project in accordance with the contract requirements.

Schedule Development: The detailed progress schedule shall incorporate the entire contract time. The schedule shall be limited exclusively to Finish-to-Start (FS) relationships with no lead or lag duration between schedule activities. Activity constraints shall not be used without the approval of the Engineer.

The following shall be depicted in the schedule for each activity:

- (a) Activity Identification (ID) Numbers. The Contractor shall utilize numerical designations to identify each activity.
- (b) A description of the work represented by the activity. Separate activities shall be included to represent different elements of multi-element items (i.e., forms, reinforcing, concrete, etc.). Multiple activities with the same work description shall include a location as part of the description.
- (c) Proposed activity duration shall be shown in whole days. The Contractor shall provide production rates to justify the activity duration. Consideration should be given to activities that are required for multiple stages, and the production rates shall be specific to those individual stages.

The schedule shall indicate the sequence and interdependence of activities required for the prosecution of the work. The critical path shall be identified by a separate colored bar and must be continuous from start to finish.

Total Float shall be calculated as finish float. The schedule shall be calculated using retained logic. The Contractor shall not sequester float by calendar manipulation or extended duration. Float is not for the exclusive use or benefit of either the Department or the Contractor.

The following shall apply:

- (a) A classic Gantt type schedule will be required for all submittals.
- (b) The heading of each submitted schedule shall include, but not be limited to, award date, execution date, start date, number of working days or completion date, estimated completion date, job stamp information, the project name, Contractor name, report date, report title and page number.

(c) Each of the schedules shall also contain the following minimum information for each activity.

- (1) Activity ID
  - (2) Activity Description
  - (3) Original Duration (calendar day/working day)
  - (4) Remaining Duration (calendar day/working day)
  - (5) Activity Description
  - (6) Early Start Date
  - (7) Late Start Date
  - (8) Early Finish Date
  - (9) Late Finish Date
  - (10) Percent Complete
  - (11) Total Float
  - (12) Production Rates
  - (13) Work performed by DBE Subcontractors and Trainees shall be shown in the schedule.
- (d) Schedules shall be printed in color on 11 in x 17 in. (minimum) size sheets.

Submission Requirements: The initial schedules shall be submitted as noted above. Updated schedules shall be submitted according to Article 108.02 and/or as noted above except that, as a minimum, updated schedules will be required at the 25, 50, and 75 percent completion points of the contract.

The schedule shall be submitted in the Sorted by Activity Layout. The activities on the schedule shall be plotted using early start, late start, early finish, late finish and total float.

For every schedule submission, the Contractor shall submit to the Engineer, four IBM compatible compact disks in CD/R or DVD/R of all schedule data. Included on the disks shall be all of the tabular and graphic reports, network diagrams and bar chart data. In addition, four plots of the schedule shall be submitted with the disks. When reviewed and approved by the Engineer, the disks will be the approved initial or revised progress schedule for the contract. The approval will be documented by the Engineer on a corresponding plot of the schedule and returned to the Contractor.

Four copies of each schedule submission shall be printed in color on 11 in x 17 in. (minimum) size sheets showing all columns, bars, column headings at the top, time scale at the top and showing relationships.

Basis of Payment: This work will not be paid for separately, but shall be considered as included in the cost of the various items of work in the contract.

## **PROCEDURE FOR SUBMITTAL AND RESPONSE TO PLAN QUESTIONS**

General: Contractors are reminded to read and understand all special provisions and plan sheets for this contract. Special attention is given to the Working Restrictions, Completion Date (Plus Working Days), Traffic Control Plan and Traffic Control related special provisions.

Contractor Questions: Questions regarding the clarification of the contract plans, special provisions, and contract documents will be answered by the Department to those contractors who supply an e-mail address.

Contractors are requested to submit contract plan and special provision-related questions to IDOT, District 4 at the following e-mail address: [DOT.I74-I155@illinois.gov](mailto:DOT.I74-I155@illinois.gov)

Questions may also be mailed to the Illinois Department of Transportation, District Four Office at 401 North Main Street, Peoria, Illinois 61602; Attn. Mr. Chris Maushard.

Please include a telephone number, fax number, mailing address, and contact person with all questions.

**Questions must be received on or before October 31, 2012.** Any questions received after October 31, 2012 cannot be guaranteed to be addressed due to time constraints.

A response to **all** submitted questions will be provided on or about November 2, 2012 by e-mail address to all contractors who have provided an e-mail address. All contractors interested in bidding on the contract on the November 9, 2012 letting are requested to supply an e-mail address to be used as a contact to receive question responses. This e-mail address should be sent to: [DOT.I74-I155@illinois.gov](mailto:DOT.I74-I155@illinois.gov).

## **CONNECTION OF PIPE DRAINS AND UNDERDRAINS TO DRAINAGE STRUCTURES**

When required, pipe drains and underdrains shall be connected to existing and proposed drainage structures. The Contractor shall exercise proper care so as not damage drainage structures when cutting holes for pipe drains or underdrains. Pipe drains and underdrains shall be grouted in place. The method and materials used to cut holes in drainage structures and grout pipes shall be approved by the Engineer.

Pipe underdrains shall be placed a minimum of 200 mm (8 in.) above the top of the highest pipe in a drainage structure.

This work will not be paid for separately, but shall be considered as included in the contract unit price bid for the associated pipe drain or pipe underdrain items.

### **EXISTING BITUMINOUS MIXES CONTAINING STEEL SLAG**

The Contractor is reminded to verify the existence of bituminous surface course mixes that may contain steel slag prior to removal and recycling. Some of the bituminous to be milled or otherwise removed within the project limits contains steel slag. The use of RAP containing steel slag shall be in accordance with the Standard Specifications and Special Provisions

### **GEOTECHNICAL FABRIC FOR GROUND STABILIZATION**

The fabric shall be a woven geotextile fabric conforming to Article 1080.02 of the Standard Specifications.

### **SETTLEMENT PLATFORMS**

This work shall be done according to Article 204.06 of the Standard Specifications for Road and Bridge Construction and the Settlement Platform Detail in the District Details section of the plans except as herein modified.

The Contractor shall install settlement platforms at the locations shown on the plans or as directed by the Engineer. The settlement platforms will be used by the Engineer to determine when sub-base placement, pavement and shoulder construction, and drainage structure and pipe installations can commence. The area of concern covered by the settlement platforms includes all areas within the boundaries of the wick drain installations as outlined on the wick drain plan. No sub-base placement, pavement or shoulder construction, drainage structure or pipe installation shall begin in these areas until the Engineer grants the approval based on settlement platform readings.

The settlement platform 4' x 4' steel base plate shall be 1/4" thick.

Settlement readings shall be taken a minimum of once each week, or more frequently, to expedite production rates, as approved by the Engineer.

Upon completion of the embankment, the settlement readings will continue to be taken by the Engineer until no more than 0.01' of settlement occurs per week for a minimum of two (2) weeks in a row. Once this occurs and the Engineer determines, based on the Geotechnical Report, the total anticipated future settlement of the embankment is 1 inch or less then approval will be given to the Contractor to commence drainage structure and pipe installation, sub-base placement, and the construction of the pavement and shoulders.

The duration of settlement monitoring is at the discretion of the Engineer.

Method of Measurement: This work will be measured per each for the settlement platform.

Basis of Payment: This work shall be paid for at the contract unit price per Each for SETTLEMENT PLATFORMS, which price shall include all labor, equipment, and materials necessary to install, maintain, and partially remove and cap the settlement platforms. Additional settlement platforms requested by the Engineer to aid in the determination of settlement rate and amount shall be paid at the contract unit price per Each for SETTLEMENT PLATFORMS. If the Contractor requests a credit for the placement of additional embankment due to settlement during construction, the Engineer may require additional settlement platforms be installed for quantity determination. Settlement platforms installed for quantity determination shall not be paid for separately but shall be considered included in the cost of FURNISHED EXCAVATION.

## **WICK DRAINS**

Description: This work shall consist of all labor, materials, equipment and services necessary to complete the wick drain installation according to the details and dimensions shown on the plans, this specification, and as directed by the Engineer.

### Submittals:

- A. Within two weeks of the preconstruction meeting, the Contractor shall submit to the Engineer the following for review:
  1. Details of the equipment, sequence, and method of installation.
  2. Wick Drain samples indicating the source of the materials.
  3. List of a minimum of three projects of similar size and scope, where the same type of wick drains were installed, including details of the performance on those projects.
  4. Manufacturer's literature documenting the physical and mechanical properties of the wick drains recommended, including a letter of certification from the manufacturer documenting test results showing the required wick drain materials are in accordance with this specification.
- B. Four weeks prior to installation, the Contractor shall submit the wick drain detailed drawings to the Engineer for review. The detailed plans shall indicate the wick drain layout and spacing, within the limits as shown on the plans and tied to the roadway alignment baseline. Top and bottom elevations of the wick drains shall also be listed on the plan.
- C. At the end of each working day, the Contractor shall supply a daily summary of the wick drain installation. The summary shall include the drain type, locations, and quantity, (i.e. length to the nearest 4 inches). In addition, the documentation shall include any field adjustments/decisions/approvals, and splicing information at each location.

Materials:

A. The materials used for construction of the wick drains shall satisfy the following requirements:

1. Wick drains shall be of newly-manufactured materials and shall consist of a core enclosed in, or integrated with, a jacket. The jacket shall allow free passage of pore water to the core without loss of soil material or piping. The core shall provide continuous vertical draining.
2. The wick drains shall be a pre-fabricated band-shaped drain with an aspect ratio (width divided by thickness) not exceeding 50.
3. The jacket material shall be a synthetic non-woven geotextile capable of resisting all bending, punching, and tensile forces imposed during installation and during the design life of the wick drain, including localized damage (e.g. punching through the filter by sand/gravel particles).
4. The jacket shall be sufficiently rigid to withstand lateral earth pressures due to embedment and surcharge so that the vertical flow capacity through the core will not be adversely affected.
5. The jacket shall be sufficiently flexible to bend smoothly during installation and induced consolidation settlement without damage.
6. The jacket shall not undergo cracking and peeling during installation of the wickdrain.
7. The jacket shall conform to the following additional criteria:

| TEST PROPERTY         | TEST METHOD | MINIMUM VALUE* |
|-----------------------|-------------|----------------|
| GRAB TENSILE STRENGTH | ASTM D4632  | 80 LBS.        |
| TRAPEZOIDAL TEAR      | ASTM D4533  | 25 LBS.        |
| PUNCTURE STRENGTH     | ASTM D4833  | 50 LBS.        |
| MULLEN BURST STRENGTH | ASTM D3786  | 130 PSI        |

\* The jacket material shall be tested in saturated and dry conditions. These requirements apply to the lower of the two tested conditions.

These criteria must be demonstrated by manufacturer's test results and a letter of certification, as requested under the **submittals** section above.

The core shall be a continuous plastic material fabricated to promote drainage along the axis of the vertical wick drain.

Assembly:

A. The mechanical properties (strength and modulus) of the assembled wick drain shall be equal or exceed those specified for the jacket and core.

- B. The assembled wick drain shall be resistant against wet rot, mildew, bacterial action, insects, salts in the groundwater, acids, alkalis, solvents, and any other significant ingredients in the site groundwater.
- C. One single type of assembled wick drain should be used on the project unless otherwise directed by the Engineer.
- D. The assembled wick drain shall have a minimum equivalent diameter of 2.1 inches using the following definition of equivalent diameter:

$$DW = (A + B)/2$$

DW = DIAMETER OF A CIRCULAR DRAIN EQUIVALENT TO THE BAND SHAPED DRAIN

A = WIDTH OF A BAND SHAPED DRAIN

B = THICKNESS OF A BAND SHAPED DRAIN

Protection of Materials: During shipment and on-site storage, the wick drain shall be wrapped in heavy paper, burlap, or similar protective covering and protected from sunlight, mud, dirt, dust, debris, or other detrimental substances until installation.

Installation: Wick drains shall be installed with approved modern equipment, which will minimize disturbance of the subsoil during installation. The wick installation rig shall utilize either vibratory or static push methods. Installation shall be in accordance with the following procedure:

- A. Wick drains shall be staked out by the Contractor. The locations of the wick drains shall not vary by more than 6-inches from the locations on the drawings, as specified, or as directed by the Engineer. Wick drains that are out of their proper location by more than 6 inches, are damaged during installation, or are improperly completed, will be abandoned in-place and no compensation will be allowed for any material furnished or for work performed on such wick drains.
- B. The Engineer may vary the depths, spacing, or the number of wick drains to be installed, and may revise the plan limits for this work, as necessary.
- C. The drainage wick shall be installed using a mandrel or sleeve that is continuously vibrated or statically pushed into the soil. The sleeve shall protect the wick material from tears, cuts, or abrasion during installation, and shall be retracted after each drainage wick is installed. The sleeve shall be rhombic or rectangular in shape, and of a cross-sectional area not to exceed 10 square inches. To minimize disturbance to the subsoil, the sleeve shall not be advanced into the subsoil using impact methods. In no case will alternate raising and lowering of the mandrel be permitted. Raising of the mandrel will only be permitted after completion of a wick drain installation. The equipment must be carefully checked for plumpness prior to advancing each wick, and must not deviate more than one inch per five feet from vertical.
- D. Wick drains shall completely penetrate the compressible soft to stiff clay overburden at the site.

- E. The Contractor is permitted to use augering or other methods to loosen stiff upper fill soils, such as existing pavement fragments or granular sub-bases, prior to wick drain installation. No additional compensation will be made for augering or loosening of the existing fill soils.
- F. Where obstructions other than existing pavement fragments or existing granular sub-bases are encountered below the working surface, which cannot easily be removed or penetrated using normal and accepted procedures, the Contractor shall complete the wick drain from the elevation of the obstruction to the working surface and notify the Engineer immediately.
- G. Splices or connections of wick drain material shall be done by stapling in a workman-like manner so as to assure structural and hydraulic continuity of the wick drain. The jacket and core shall be overlapped a minimum of 6-inches at any splice. A maximum of one splice per drain installed will be permitted, unless otherwise directed by the Engineer.
- H. The installed wick drains shall be neatly cut at its upper end with 12 inches protruding above the working surface at each drain location.

Quality Assurance:

- A. Prior to the installation of wick drains within the designated areas, the Contractor shall demonstrate his equipment, methods, and materials, to produce a satisfactory installation in accordance with these specifications. For this purpose, the Contractor shall install 6 trial wick drains totaling approximately 170 linear feet at locations designated by the Engineer. Payment will be made at the bid price per linear foot for wick drains. Payment will not be made for unsatisfactory trial wick drains.
- B. Approval by the Engineer of the method and equipment to install the trial wicks shall not necessarily constitute acceptance of the means and methods for the remainder of the project. If, at any time, the Engineer considers that the method of installation does not produce a satisfactory wick, the Contractor shall alter his method and/or equipment as necessary to comply with these specifications.
- C. Wick drain materials shall be labeled or tagged in such a manner that the information for sample identification and other quality control purposes can be read. As a minimum, each roll shall be identified by the manufacturer as to lot or control numbers, individual roll number, date of manufacture, manufacturer and product identification of the jacket and core.
- D. The Contractor shall provide the Engineer with suitable means of making a linear determination of the quantity of wick material used in each wick location. During installation, the Contractor shall provide suitable means of determining the depths of the wick drains at any given time.

Measurement of Quantities: Wick drains will be measured for payment in feet in-place for the full length of wick drain complete and in-place. Wick drains that are out of the proper location by more than 6 inches, or wick drains that are damaged in construction, or wick drains that are improperly completed will not be measured for payment, and no compensation will be allowed for any material furnished, or for work performed on such wick drains.

**Basis of Payment:** This work will be paid for at the contract unit price per Foot for WICK DRAINS. The prices shall be full compensation for the cost of furnishing the full length of wick drain material, installing the wick drains, altering of the equipment and methods of installation in order to produce the required end result and shall also include the cost of furnishing all tools, materials, labor, equipment, services and all other costs necessary to complete the required work.

No direct payment will be made for unacceptable wick drains or for any delays or expenses incurred through change necessitated by improper or unacceptable material or equipment, but the costs of such shall be included in the Unit Prices bid for this work. No additional compensation will be allowed for the cost of constructing any work platform to provide stability for the wick drain installation equipment and to allow movement of the wick drain installation equipment across the site.

### **SAND DRAINAGE BLANKET**

The work of this item consists of furnishing all materials and equipment necessary for the construction of a sand drainage blanket to form a horizontal drainage layer between the proposed embankment and the existing or prepared ground surface after installation of the wick drains is completed.

**Materials:** The sand for the drainage blanket shall conform to Section 1003 of the Standard Specifications. The gradation shall be FA 6, except that the percentage passing the No. 200 sieve shall be a maximum of 6 percent.

The non-woven geotechnical fabric to contain the sand layer shall conform to Section 1080 of the Standard Specifications.

The crushed stone and or crushed gravel of the gradation specified shall conform to Section 1004 of the Standard Specifications.

**Construction Requirements:** The sand drainage blanket shall be constructed to the thickness and within the lines and grades shown on the plans. Sand may be placed by end dumping or other approved method, and spread uniformly over the site to the neat lines shown on the plans. The working edge of the sand blanket should be maintained out in front of any dozing or blading equipment during placement so as to not disturb the integrity of the protruding wick drains. At no time should grading equipment be traversing the working surface of protruding wick drains, prior to sand drainage blanket installation.

The sand shall be compacted to a minimum of 70 percent of the relative density (ASTM D4253 and D4254) in order to provide a stable base for embankment.

Prior to placement of the embankment, the sand drainage blanket shall be reshaped if necessary to conform to the lines shown on the plans.

The edge of the sand blanket at the toe of the slope shall be stabilized with a geotechnical fabric and course aggregate as shown on the plans.

Method of Measurement: The sand drainage blanket will be measured as cubic yards of sand placed and no allowance will be made for any sand placed outside the lines specified herein or as directed by the Engineer.

Basis of Payment: The sand drainage blanket will be paid for at the contract unit price per cubic yard of SAND DRAINAGE BLANKET. No additional payment will be made for additional sand blanket placed because of settlement.

## **TEMPORARY PAVEMENT SUBGRADE**

This work shall consist of preparing the completed or existing earthwork subgrade prior to constructing the temporary pavement.

This work shall be completed for all temporary pavement locations with the exceptions of the temporary pavement to be used for the Temporary I-74 Runaround pavement, the Temporary I-155 Ramp F pavement, and the temporary intersection pavement placed between Morton Avenue and Morton Avenue Ramp E.

This work shall conform to the applicable articles of Section 301 of the Standard Specifications and as approved by the Engineer.

This work shall not be measured or paid for separately, but shall be included in the cost of the temporary pavement pay item.

## **AGGREGATE SUBGRADE IMPROVEMENT 8"**

This work shall consist of providing all material equipment and labor to place subgrade material beneath the temporary pavement on the Temporary I-74 Runaround pavement, the Temporary I-155 Ramp F pavement, and the temporary intersection pavement placed between Morton Avenue and Morton Ramp E.

Following the completion of the traffic staging for which the temporary pavement is used, the material shall be removed and disposed of in accordance with Article 202.03 of the Standard Specifications.

The Contractor shall have the option of material type and placement as given:

- Aggregate Subgrade shall consist of a minimum aggregate thickness of 8" with a geotextile fabric for ground stabilization fabric layer placed between the embankment and aggregate. This work shall be performed in accordance with the applicable articles of Section 311 of the Standard Specifications and the special provision entitled, "Aggregate Subgrade Improvement".
- Lime Stabilized Subgrade shall consist of a minimum thickness of 12" of stabilized soil that has a minimum immediate bearing (IBV) value of 11.0. This work shall be performed in accordance with the applicable articles of Section 302 of the Standard Specifications and as noted herein:

The Lime Slurry application method shall be the only method acceptable for the subgrade application.

- Embankment shall consist of a minimum compacted thickness of 12" that has an IBV value of 8.0. This work shall be performed in accordance with the applicable articles of Section 205 of the Standard Specifications.

This work will be measured for payment in square yards of material placed.

This work shall be paid for at the contract unit price per Square Yard for AGGREGATE SUBGRADE IMPROVEMENT 8", which price shall include all equipment, material and labor required to place the subgrade and remove and dispose of it at the end of the construction.

### **WHITEWASHING FOR CONCRETE PAVEMENT**

Description: This work shall consist of furnishing, preparing, and applying an aqueous solution of white pigment in a uniform coat to the top of the bituminous concrete base or subbase prior to placing the portland cement concrete (PCC) pavement reinforcement or load transfer devices. This work shall be according to the Standard Specifications for Road and Bridge Construction and as follows:

Materials:

White pigmented materials shall meet the following requirements:

Hydrated Lime ..... 1012.01  
Calcium Carbonate Pigments ..... (Note 1)

Note 1. ASTM D-1199, Type GC or PC, Grade II or finer. Other materials or grades may be used with the approval of the Engineer provided the resulting coating is bright white and uniform in nature. By-product lime will not be allowed.

Equipment: Equipment shall be capable of mixing, continuously agitating, and applying the prepared solution in a uniform manner.

Construction Requirements: If the PCC pavement or shoulders will be placed between the dates of May 15<sup>th</sup> and October 15<sup>th</sup>, the top of the bituminous concrete base or subbase shall be whitewashed. All milling, patching, overlaying, and cleaning shall be completed prior to whitewashing. No work shall be started if local conditions indicate that rain is imminent.

The whitewash mixture shall be prepared by mixing water and white pigment at a ratio of 2 parts water to 1 part pigment by weight until smooth in consistency and free of lumps. If sufficient coating can be demonstrated, the ratio may be increased up to 3 parts water to 1 part pigment by weight with the approval of the Engineer. After mixing, the mixture shall be continually agitated either mechanically or by continuously circulating the mixture until applied.

The mixture shall be applied in a uniform manner at a rate of 0.35 liters per square meter (0.075 gallons per square yard) to coat over 95 percent of the area with a thin, white film. If the coating is insufficient, additional material shall be applied. If sufficient application can be demonstrated at lower rates, they may be allowed with the approval of the Engineer. Application shall be by spraying, distributor truck, or water truck or other methods approved by the Engineer. All methods shall produce a uniform coating free of streaks and spills. If a truck is used to apply the mixture, a medium to long nap carpet, weighted sufficiently, shall be dragged behind the spray bar to ensure uniform application. The carpet shall be pre-wetted with the coating mixture slightly before application. Excessive materials shall not be applied. Thick films from spills or over-application shall be removed by broom or other means that does not damage the bituminous concrete base or subbase. Reapplication of whitewash may be required prior to placement of the reinforcing steel or load transfer devices as directed by the Engineer.

Once the whitewash mixture is placed, traffic shall be kept to a minimum on the bituminous concrete base or subbase. The whitewash shall be maintained until placement of the PCC pavement and shoulders.

Method of Measurement: Whitewashing the bituminous concrete base or subbase will be measured for payment in place and the area computed in square yards. The width for measurement will be the width of concrete pavement and shoulders to be placed. The length for measurement will be as shown on the plans or as directed by the Engineer. The white pigment and water for the whitewash mixture will not be measured for payment.

Basis of Payment: This work will be paid for at the contract unit price per Square Yard for WHITEWASHING FOR CONCRETE PAVEMENTS of the coating specified.

## **PERMANENT GROUND ANCHOR**

Description: This work shall consist of designing, furnishing, installing, testing and stressing permanent cement-grouted ground anchors according to the plans and the special provisions. This work also includes the furnishing and installing of the anchorage head assemblies.

This is a performance specification for a single ground anchor. The Contractor is given the responsibility for the ground anchor design, construction and performance. The anchor bond lengths shown on the plans are estimated based on the soil data and were determined according to AASHTO LRFD Specifications. The Contractor shall select the ground anchor type, the installation method and determine the bond length and anchor diameter. The Contractor shall be responsible for installing ground anchors that will develop the design capacity indicated on the Contract Plans according to the testing subsection of this Specification.

ADDITIONAL REFERENCE: Post-Tensioning Institute, Recommendations for Prestressed Rock and Soil Anchors, Latest Edition.

SITE GEOLOGY AND SOILS CONDITIONS: The geologic conditions for this project are represented by the boring information shown on the plans. The Contractor, utilizing his/her expertise, shall be responsible for interpreting the data, including but not limited to, the making of additional borings as necessary to be fully familiar with the existing conditions in order to design and successfully install the permanent ground anchors as specified. Variations in geologic deposits, rock surface or ground water elevations, etc., are to be expected between borings and shall not be considered a change in site conditions as defined by Article 104.03 of the Standard Specifications.

SUBMITTALS:

Qualifications: The Contractor performing the work described in this Specification shall have installed permanent ground anchors for a minimum of three (3) years. At the time of the preconstruction meeting, the Contractor shall submit a list containing at least five (5) projects, completed within the last three (3) years, where the Contractor has installed permanent ground anchors. A brief description of each project and a reference shall be included for each project listed. As a minimum, the reference shall include an individual's name, company and current phone number.

The Contractor shall submit a list identifying the Engineer, drill operators and on-site supervisors who shall be assigned to the project. The list shall contain a summary of each individual's experience and it shall be complete enough for the Engineer to determine whether or not each individual has satisfied the following qualifications.

The Contractor shall assign an Engineer to supervise the work with at least three (3) years of experience in the design and construction of permanently anchored structures. The Contractor may not use consultants or manufacturer's representatives in order to meet the requirements of this section. Drill operators and on-site supervisors shall have a minimum of one (1)-year experience installing permanent ground anchors with the Contractor's organization.

Work shall not be started on any ground anchor wall system, nor materials ordered, until approval of the Contractor's qualifications is given. The Engineer may suspend the ground anchor work if the Contractor substitutes unqualified personnel for approved personnel during construction. If work is suspended due to the substitution of unqualified personnel, the Contractor shall be fully liable for additional costs resulting from the suspension of work and no adjustments to contract time resulting from suspension will be allowed.

Shop Plans

At least four weeks before work is to begin, the Contractor shall submit to the Engineer for review and approval complete shop plans describing the ground anchor system or systems intended for use. In addition, design calculations shall be submitted for any elements of the system not shown, or differing from, the contract plans. The plans and calculations shall be sealed by an Illinois Licensed Structural Engineer. The submittal shall include the following:

- (1) A ground anchor schedule giving:
  - (a) Ground anchor number
  - (b) Ground anchor design load
  - (c) Type and size of tendon
  - (d) Minimum total anchor length
  - (e) Minimum bond length
  - (f) Minimum tendon length
  - (g) Minimum unbonded length
  
- (2) A drawing of the ground anchor tendon and the corrosion protection system, including details for the following:
  - (a) Spacers separating elements of tendon and their location
  - (b) Centralizers and their location
  - (c) Unbonded length corrosion protection system
  - (d) Bond length corrosion protection system
  - (e) Anchorage and trumpet
  - (f) Anchorage corrosion protection system
  - (g) Drilled or formed hole size
  - (h) Level of each stage of grouting
  - (i) Any revisions to structure details necessary to accommodate the ground anchor system intended for use.
  
- (3) The grout mix design, including material certification for all grout components, and procedures for placing the grout.

If the Contractor selects a ground anchor type different than shown on the plans, complete calculations supporting the design sealed by a Structural Engineer licensed in the state of Illinois shall be submitted to the Engineer for review and approval.

No work on ground anchors shall begin until shop plans and installation plans have been approved in writing by the Engineer. Such approval shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work.

#### Installation Plans

Installation plans shall include the following:

- (1) Sequence of construction
- (2) Equipment to be used for testing and stressing
- (3) Equipment to be used for measuring movements including calibration records
- (4) Test record and sample of graph formats

#### MATERIALS:

Prestressing Steel: Ground anchor tendons shall consist of steel bars conforming to ASTM A722, Grade 150 ksi.

Prestressing Steel Couplers: Prestressing steel couplers shall be capable of developing 95 percent of the minimum specified ultimate tensile strength of the prestressing steel.

Grout: Cement shall be Type I, II or III Portland cement conforming to Section 1001 of the Standard Specifications. Cement used for grouting shall be fresh and shall not contain any lumps or other indications of hydration or "pack set."

Aggregate shall conform to the requirements for fine aggregate Section 1003.02 of the Standard Specifications.

Admixtures may be used in the grout subject to the approval of the Engineer. Expansive admixtures may only be added to the grout used for filling sealed encapsulations, trumpets, anchorage head assemblies and covers. Accelerators shall not be used.

Water for mixing grout shall be according to Section 1002 of the Standard Specifications.

Steel Elements: Bearing plates shall be fabricated from steel conforming to AASHTO A572, Grade 36.

Trumpets used to provide a transition from the anchorage head assembly to the unbonded length corrosion protection shall be fabricated from a steel pipe or tube conforming to the requirements of ASTM A53 (A53M) for pipe or ASTM A500 for tubing. Minimum wall thickness shall be 0.20 inch (5 mm).

Anchorage covers used to enclose exposed anchorages shall be fabricated from steel, steel pipe, steel tube, or ductile cast iron conforming to the requirement of AASHTO M270 (M270M) Grade 36 (250) for steel, ASTM A53 (A53M) for pipe, ASTM A500 for tubing, and ASTM A536 for ductile cast iron. Minimum thickness shall be 0.10 inch (2.5 mm).

Corrosion Protection Elements: Corrosion inhibiting grease shall conform to the requirements of the Post Tensioning Institute's "Specifications for Unbonded Single Strand Tendons," Section 3.2.5.

The sheath for the unbonded length of a tendon shall consist of one of the following:

- (1) Seamless polyethylene (PE) tube having a minimum wall thickness of 60 mils (1525 microns) plus or minus 10 mils (250 microns). The polyethylene shall be classified by ASTM D3350.
- (2) Seamless polypropylene tube having a minimum wall thickness of 60 mils (1525 microns) plus or minus 10 mils (255 microns). The polypropylene shall be classified by ASTM D4101.
- (3) Heat shrinkable tube consisting of a radiation crosslinked polyolefin tube internally coated with an adhesive sealant. The minimum tube wall thickness before shrinking shall be 24 mils (610 microns). The minimum adhesive sealant thickness shall be 20 mils (510 microns).
- (4) A corrugated tube conforming to the requirement of the encapsulation for the tendon bond length.

Encapsulation for the tendon bond length shall consist of one of the following:

- (1) Corrugated high density polyethylene (HDPE) tube having a minimum wall thickness of 30 mils (760 microns) and conforming to AASHTO M252 requirements.
- (2) Deformed steel tube or pipe having a minimum wall thickness of 25 mils (635 microns).
- (3) Corrugated polyvinyl chloride (PVC) tube having a minimum wall thickness of 30 mils (760 microns). (ASTM D1784) class 13464-B.
- (4) Fusion-bonded epoxy conforming to the requirements of AASHTO M284 (M284M), except that it shall have a film thickness of 15 mils (380 microns).

Miscellaneous Elements: The bond breaker for a tendon shall consist of smooth plastic tube or pipe that is resistant to aging by ultra-violet light and that is capable of withstanding abrasion, impact and bending during handling and installation.

Spacers for separation of elements of a multi-element tendon shall permit the free flow of grout. They shall be fabricated from plastic, steel or material which is not detrimental to the prestressing steel. Wood shall not be used.

Centralizers shall be fabricated from plastic, steel or material which is not detrimental to either the prestressing steel or any element of the tendon corrosion protection. Wood shall not be used. The centralizer shall be able to maintain the position of the tendon so that a minimum of 0.5 in. of grout cover is obtained on the tendons, or over the encapsulation.

## FABRICATION

Tendons for ground anchors may be either shop or field fabricated from materials conforming to this specification's requirements. Tendons shall be fabricated as shown on the approved shop plans.

Bond Length and Tendon Bond Length: The Contractor shall determine the bond length and tendon bond length necessary to satisfy the load test requirements. The minimum bond length must be as shown on the plans.

Spacers shall be placed along the tendon bond length of multi-element tendons so that the prestressing steel will bond to the grout. They shall be located at 10 ft (3 m) maximum centers with the upper one located a maximum of 5 ft (1.5 m) from the top of the tendon bond length and the lower one located a maximum of 5 ft (1.5 m) from the bottom of the tendon bond length.

Centralizers shall be able to maintain the position of the tendon so that a minimum of 0.75 inches (19 mm) of grout cover is obtained on the tendons at all locations along the tendons. They shall be located at 5 ft (1.5 m) maximum centers with the lowest one located 1 ft (305 mm) from the bottom of the bond length. Centralizers are not required on tendons installed utilizing a hollow-stem auger if it is grouted through the auger and the drill hole is maintained full of a stiff grout 9 inch (230 mm) slump or less during extraction of the auger, or when installed utilizing a pressure injection system in coarse grained soils using grout pressures greater than 150 psi (1035 kPa).

Encapsulation Protected Ground Anchor Tendon: The tendon bond length shall be encapsulated by a grout-filled corrugated plastic or deformed steel tube, or by a fusion-bonded epoxy coating. The tendon can be grouted inside the encapsulation either prior to inserting the tendon in the drill hole or after the tendon has been placed in the drill hole. Punching holes in the encapsulation and allowing the grout to flow from the encapsulation to the drill hole, or vice versa, will not be permitted. The tendon shall be centralized within the encapsulation and the tube sized to provide an average of 0.20 inch (5 mm) of grout cover for the prestressing steel. The anchorage device of tendons protected with fusion-bonded epoxy shall be electrically isolated from the structure.

Unbonded Length: The unbonded length of the tendon shall be a minimum of 15 ft (4.6 m) or as indicated on the plans.

Corrosion protection shall be provided by a sheath completely filled with corrosion-inhibiting grout, or a heat-shrinkable tube. Continuity of corrosion protection shall be provided at the transition from the bonded length to unbonded length of the tendon.

If the sheath provided is not a smooth tube, then a separate bond breaker must be provided to prevent the tendon from bonding to the anchor grout surrounding the unbonded length.

Anchorage and Trumpet: Nonrestressable anchorages may be used unless restressable anchorages are specified in the Contract documents.

Bearing plates must be sized so that the bending stresses in the plate and average bearing stress on the concrete, if applicable, do not exceed the nominal resistances described in AASHTO LRFD Bridge Design Specifications, Article 5.10.9.7.2. The size of bearing plates shall not be less than that shown in the Contract documents or on the approved shop plans.

The trumpet shall be welded to the bearing plate. The trumpet shall have an inside diameter at least 0.25 inch greater than the diameter of the tendon at the anchorage. The trumpet shall be long enough to accommodate movements of the structure during testing and stressing. For strand tendons with encapsulation over the unbonded length, the trumpet shall be long enough to enable the tendons to make a transition from the diameter of the tendon in the unbonded length to the diameter of the tendon at the anchorhead without damaging the encapsulation. Trumpets filled with grout shall have a temporary seal provided between the trumpet and the unbonded length corrosion protection.

Tendon Storage and Handling: Tendons shall be stored and handled in such a manner as to avoid damage or corrosion. Damage to tendon prestressing steel as a result of abrasions, cuts, nicks, welds and weld splatter will be cause for rejection by the Engineer. Grounding of welding leads to the prestressing steel is not permitted. Prior to inserting a tendon into the drilled hole, its corrosion protection elements shall be examined for damage. Any damage found shall be repaired in a manner approved by the Engineer.

Repairs to encapsulation shall be in accordance with the tendon Supplier's recommendations.

## INSTALLATION

Two (2) anchors at each abutment wall during Stage 1, one (1) anchor at each abutment wall during Stage 2 and one (1) anchor at each abutment wall during Stage 3 shall be installed and performance tested successfully before drilling any other anchors at that abutment wall. In the event that an anchor fails the performance test, the Contractor shall re-evaluate the installation procedure and take necessary corrective action. In addition, the first two (2) anchors installed after the Contractor takes necessary corrective action shall be performance tested. The above process shall be repeated until these anchors pass the performance test.

The Contractor shall follow the same installation procedures that are used on the successful performance test anchors.

Drilling: The drilling method used may be core drilling, rotary drilling, percussion drilling, auger drilling or driven casing. The method of drilling used shall prevent loss of ground above the drilled hole that may be detrimental to the structure or existing structures. Casing for anchor holes, if used, shall be removed, unless permitted by the Engineer to be left in place. Excessive amounts of water shall not be used in the drilling operation. Inclination and alignment shall be within plus or minus three (3) degrees of the planned angle at the bearing plate, and within plus or minus one (1) ft of the planned location at the ground surface (point of entry).

Tendon Insertion: The tendon shall be inserted into the drilled hole to the desired depth without difficulty. When the tendon cannot be completely inserted, it shall be removed and the drill hole cleaned or re-drilled to permit insertion. Partially inserted tendons shall not be driven or forced into the hole.

Grouting: The grouting equipment shall produce a grout free of lumps and undispersed cement. A positive displacement grout pump shall be used. The pump shall be equipped with a pressure gauge to monitor grout pressures. The pressure gauge shall be capable of measuring pressures of at least 150 psi (1035 kPa) or twice the actual grout pressures used, whichever is greater. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The mixer shall be capable of continuously agitating the grout.

The grout shall be injected from the lowest point of the drilled hole. The grout may be pumped through grout tubes, casing, hollow-stem augers or drill rods. The grout may be placed before or after insertion of the tendon. The quantity of the grout and the grout pressures shall be recorded. The grout pressures and grout takes shall be controlled to prevent excessive heave of the ground or fracturing of rock formations.

Providing the means for post grouting is necessary. This permits additional grouting operations after the primary grout has cured but where tests performed on the anchor reveal that it has not achieved the required design capacity.

Except where indicated below, the grout above the top of the bond length may be placed at the same time as the bond length grout but it shall not be placed under pressure. The grout at the top of the drill hole shall stop 6 inches from the back of the structure or from the bottom of the trumpet, whichever is lower.

If the ground anchor is installed in a fine-grained soil using a drilled hole larger than 6 inches in diameter, then the grout above the top of the bond length shall be placed after the ground anchor has been load-tested. The entire drill hole may be grouted at the same time if it can be demonstrated that the ground anchor system does not derive a significant portion of its load resistance from the soil above the bond length portion of the ground anchor.

If grout protected tendons are used for ground anchors anchored in rock, then pressure grouting techniques shall be utilized. Pressure grouting requires that the drill hole be sealed and that the grout be injected until a 50 psi grout pressure can be maintained on the grout within the bond length for a period of 5 minutes.

Upon completion of grouting, the grout tube may remain in the drill hole provided it is filled with grout. After grouting, the tendon shall not be loaded for a minimum of three days.

Trumpet and Anchorage: The corrosion protection surrounding the unbonded length of the tendon shall extend into the trumpet a minimum of 6 inches beyond the bottom seal in the trumpet.

The corrosion protection surrounding the unbonded length of the tendon shall not contact the bearing plate or anchorhead during load testing or stressing.

The bearing plate and anchor head shall be placed perpendicular to the axis of the tendon.

The trumpet shall be completely filled with corrosion inhibiting grout. The grout shall be placed after the ground anchor has been load tested and locked off at the design load. The Contractor shall demonstrate that the procedures selected for placement of grout will produce a completely filled trumpet and anchorage head assembly.

Anchorage not encased in concrete facing shall be covered with a corrosion-inhibiting grout-filled steel enclosure.

## TESTING AND STRESSING

Each ground anchor shall be load-tested by the Contractor in the presence of the Engineer. No load greater than 10 percent of the design load may be applied to the ground anchor prior to load testing. The test load shall be simultaneously applied to the entire tendon.

Testing Equipment: Two dial gauges or vernier scales capable of measuring displacements to 0.001 inch (25 microns) shall be used to measure ground anchor movement on either side of the jack from two independent points. They shall have adequate travel so total ground anchor movement can be measured without resetting the devices.

A hydraulic jack and pump shall be used to apply the test load. The jack and a calibrated pressure gauge shall be used to measure the applied load. The pressure gauge shall be graduated in 100 psi (690 kPa) increments or less. When the theoretical elastic elongation of the total anchor length at the maximum test load exceeds the ram travel of the jack, the procedure for recycling the jack ram shall be included in the working drawings. Each increment of test load shall be applied in one minute or less.

A calibrated reference pressure gauge shall be available at the site. The reference gauge shall be calibrated with the test jack and pressure gauge.

An electrical resistance load cell and readout shall be provided when performing a creep test.

The stressing equipment shall be placed over the ground anchor tendon in such a manner that the jack, bearing plates, load cell and stressing anchorage are axially aligned with the tendon and the tendon is centered within the equipment.

Performance Test: Two (2) anchors at each abutment wall during Stage 1, one (1) anchor at each abutment wall during Stage 2 and one (1) anchor at each abutment wall during Stage 3 shall be performance-tested according to the following procedures. The Engineer shall select the ground anchors to be performance tested. The remaining anchors shall be tested according to the proof test procedures.

The performance test shall be made by incrementally loading and unloading the ground anchor according to the following schedule.

- The load shall be raised from one increment to another immediately after recording the ground anchor movement.
- The ground anchor movement, on either side of the jack, shall be measured and recorded to the nearest 0.001 inch (25 micron) with respect to the independent fixed reference points at the alignment load and at each load increment.
- The load shall be monitored with a pressure gauge.
- The reference pressure gauge shall be placed in series with the pressure gauge during each performance test.

If the load determined by the reference pressure gauge and the load determined by the pressure gauge differ by more than 10 percent, the jack, pressure gauge and reference pressure gauge shall be recalibrated. At load increments other than the maximum test load, the load shall be held just long enough to obtain the movement reading, but no more than one minute

Performance Test Schedule

| <u>Load</u> | <u>Load (Continued)</u>           |
|-------------|-----------------------------------|
| AL          | AL                                |
| 0.17DL*     | 0.17DL                            |
| AL          | 0.33DL                            |
| 0.17DL      | 0.50DL                            |
| 0.33DL*     | 0.67DL                            |
| AL          | 0.80DL*                           |
| 0.17DL      | AL                                |
| 0.33DL      | 0.17DL                            |
| 0.50DL*     | 0.33DL                            |
| AL          | 0.50DL                            |
| 0.17DL      | 0.67DL                            |
| 0.33DL      | 0.80DL                            |
| 0.50DL      | 0.89DL (Max. test load)*          |
| 0.67DL*     | Reduce to lock-off load (0.67 DL) |

Where: AL = Alignment Load  
 DL = Design load for ground anchor  
 \* = Graph required. See last paragraph in this subsection

The maximum test load in a performance test shall be held for 10 minutes. The jack shall be re-pumped as necessary in order to maintain a constant load. The load-hold period shall start as soon as the maximum test load is applied, and the ground anchor movement shall be measured and recorded at 1, 2, 3, 4, 5, 6 and 10 minutes. If the ground anchor movements between 1 minute and 10 minutes exceed 0.04 inch (1 mm), the maximum test load shall be held for an additional 50 minutes. If the load-hold is extended, the ground anchor movement shall be recorded at 15, 20, 25, 30, 45 and 60 minutes.

A graph shall be constructed showing a plot of ground anchor movement versus load for each load increment marked with an asterisk (\*) in the performance test schedule and a plot of the residual ground anchor movement of the tendon at each alignment load versus the highest previously applied load. Graph format shall be approved by the Engineer prior to use.

Proof Test: Those anchors not subjected to a performance test shall be tested as specified herein.

The proof test shall be performed by incrementally loading the ground anchor according to the following schedule. The load shall be raised from one increment to another immediately after recording the ground anchor movement. The ground anchor movement, on either side of the jack, shall be measured and recorded to the nearest 0.001 inch (25 micron) with respect to the independent fixed reference points at the alignment load and at each increment of load. The load shall be monitored with a pressure gauge. At load increments other than the maximum test load, the load shall be held just long enough to obtain the movement reading.

Proof Test Schedule

| <u>Load</u> | <u>Load (Continued)</u>          |
|-------------|----------------------------------|
| AL          | 0.67 DL                          |
| 0.17DL      | 0.80 DL                          |
| 0.33DL      | 0.89 DL (Max. test load)         |
| 0.50DL      | Reduce to lock-off load (0.67DL) |

Where: AL = Alignment Load  
 DL = Design load for ground anchor

The maximum test load in a proof test shall be held for 10 minutes. The jack shall be re-pumped as necessary in order to maintain a constant load. The load-hold period shall start as soon as the maximum test load is applied, and the ground anchor movement shall be measured and recorded at 1, 2, 3, 4, 5, 6 and 10 minutes. If the ground anchor movement between 1 minute and 10 minutes exceeds 0.04 inch (1 mm), the maximum test load shall be held for an additional 50 minutes. If the load-hold is extended, the ground anchor movement shall be recorded at 15, 20, 30, 45 and 60 minutes. A graph shall be constructed showing a plot of ground anchor movement versus load for each load increment in the proof test. Graph format shall be approved by the Engineer prior to use.

Ground Anchor Load Test Acceptance Criteria

A performance-tested or proof-tested ground anchor with a 10 minute load-hold shall be deemed to be acceptable if the:

- (1) Ground anchor resists the maximum test load with less than 0.04 inch (1 mm) of movement between 1 minute and 10 minutes; and
- (2) Total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length; or
- (3) For a performance-tested ground anchor in competent rock, the total movement at the maximum test load may not exceed the theoretical elastic elongation of the unbonded length plus 50 percent of the theoretical elastic elongation of the bonded length.

A performance-tested or proof-tested ground anchor with a 60 minute load-hold or a creep tested ground anchor shall be deemed acceptable if the:

- (1) Ground anchor resists the maximum test load with a creep rate that does not exceed 0.08 inch (2 mm) in the last log cycle of time; and
- (2) Total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length; and

If the total movement of the ground anchor at the maximum test load does not exceed 80 percent of the theoretical elastic elongation of the unbonded length, the ground anchor shall be replaced at the Contractor's expense.

A ground anchor which has a creep rate greater than 0.08 inch (2 mm) per log cycle of time can be incorporated into the structure, but its design nominal resistance shall be equal to one-half of its failure load. The failure load is the load resisted by the ground anchor after the load has been allowed to stabilize for 10 minutes.

When a ground anchor fails, the Contractor shall modify the design and/or the installation procedures. These modifications may include, but are not limited to, installing a replacement ground anchor, reducing the design load by increasing the number of ground anchors, modifying the installation methods, increasing the bond length or changing the ground anchor type. Any modification which requires changes to the structure shall be approved by the Engineer. Any modifications of design or construction procedures shall be without additional cost to the Department and without extension of contract time.

Retesting of a ground anchor will not be permitted, except that re-grouted ground anchors maybe retested each time they are re-grouted.

Lock Off: Upon successful completion of the load testing, the ground anchor load shall be reduced to the lock-off load indicated in the contract documents and transferred to the anchorage device. The ground anchor may be completely unloaded prior to lock-off. After transferring the load and prior to removing the jack, a lift-off load reading shall be made. The lift-off load shall be within 10 percent of the specified lock-off load. If the load is not within 10 percent of the specified lock-off load, the anchorage shall be reset and another lift-off load reading shall be made. This process shall be repeated until the desired lock-off load is obtained.

#### SURVEY READINGS

Lateral and vertical readings must be taken on PERMANENT SHEET PILE WALLS at the top of the piling, at the elevation of the ground anchors and at ground level immediately after ground anchors have been installed, tested and accepted. These readings will be dated, recorded and reported to the Engineer. The frequency of readings will be dictated by the phase of current construction but must be sufficient to detect serious movements so that corrective measures can be initiated immediately. Readings must be made once per day until settlement is less than 0.125 inches per day, after which the frequency will be once per week for the duration of the project.

#### CLEAN-UP

At the completion of the work, all equipment, debris and surplus and salvaged material must be removed and the site left clean and level.

Method of Measurement: This work will be measured per each permanent ground anchor, installed according to the plans or as approved by the Engineer, and passing the testing program(s) required in this Special Provision.

Basis of Payment: This work will be paid for at the contract unit price Each for PERMANENT GROUND ANCHOR and shall be compensation in full for designing, furnishing, installing and testing the permanent ground anchors and anchorage head assemblies.

## **RUSTICATION FINISH FOR RETAINING WALLS**

Description: This work shall consist of furnishing and installing form liners and forming concrete using form liners to achieve a rustication finish on the concrete wall facing for S.N. 090-0167 as shown in the plans and according to Section 503 of the Standard Specification and as specified herein.

General Requirements: The Contractor shall notify the Engineer at least 48 hours prior to placing concrete. Concrete shall not be placed until the Engineer has inspected the formwork and the placement of reinforcing bars for compliance with the plans.

Submittals: In addition to the requirements of 503.06(a), the Contractor shall submit to the Engineer one (1) specification and catalog cut sheet for the form liner being proposed for use on this project. The form liner shall be selected by the Contractor and approved by the Department.

The submittals shall be made no later than 14 calendar days from the date of notification to proceed with the contract. Upon receipt of the information the Engineer, in consultation with other local government agencies, will have 30 calendar days to select and notify the Contractor of which style of form liner is to be used to prepare a sample section for review and consideration.

Material Testing and Acceptance: Testing and acceptance of the form liner surface shall be according to 506.03(a) except as modified herein. The Contractor shall submit proposed construction procedures for the rustication finish on the outside face of retaining walls. The Contractor's method of obtaining the surface texture specified on the plans shall be subject to approval by the Engineer.

Upon approval of the construction procedures by the Engineer, the Contractor shall supply a 10 feet wide by 4 feet high sample panel of a section of constructed form liner for review and approval prior to beginning work. The Contractor shall construct a test section 10 feet wide by 8 feet high by 1 foot thick at a location approved by the Engineer using two standard sized form liners. After removal of the formwork, the Engineer will examine the test section and instruct the Contractor if the rustication finish is acceptable or if modifications are required. If necessary, the Contractor shall pour additional test sections of wall until a test section meets the Engineer's approval. The rustication finish of all subsequently installed wall sections shall match the approved test section. All deviations from the approved rustication finish shall be repaired by the Contractor at no additional cost to the Department.

Method of Measurement: Rustication finish will be measured in place and the area computed in square feet. The dimensions used to compute the area of rustication will be the dimensions indicated on the plans or directed by the Engineer which outline plane area. Measurement will not be made on the actual surface area of rustication finish.

Basis of Payment: This work will be paid for at the contract unit price per Square Foot for FORM LINER TEXTURED SURFACE, which price includes all work as specified herein.

## **SOIL REINFORCEMENT**

Description: This work shall consist of preparing the design, furnishing the materials, and constructing the soil reinforcement attached to the back of the Jefferson Street bridge abutment caps as shown in the contract plans and as directed by the Engineer.

General Requirements: The soil reinforcement consists of a soil reinforcing system and select fill. The soil reinforcement shall have sufficient strength, quantity, and pullout resistance, beyond the failure surface within the select fill, as required by design. The material, fabrication, and construction shall comply with this Special Provision and the requirements specified by the supplier of the reinforcement system selected by the Contractor for use on the project.

Submittals: The reinforcement system supplier shall submit complete design calculations and shop drawings to the Engineer no later than 90 days prior to installation of the reinforcement. No work or ordering of materials for the structure shall be done by the Contractor until the submittal has been approved in writing by the Engineer. All submittals shall be sealed by an Illinois Licensed Structural Engineer and shall include all details, dimensions, quantities and cross sections necessary to construct the reinforcement system and shall include, but not be limited to, the following items:

- (a) Plan, elevation and cross section sheet(s) for each abutment showing the following:
  - (1) The plan view shall show the limits of soil reinforcement and locations where changes in length and/or size of reinforcement occur. The centerline shall be shown for all drainage structures or pipes behind or passing through and/or under the abutment.
  - (2) An elevation view of the abutment and soil reinforcement indicating the elevations of the reinforcement system. The number, size and length of soil reinforcement connected to the abutment cap shall be designated.
  - (3) A list of quantities shall be provided on the elevation sheet of each wall.
  - (4) Typical cross section(s) showing the limits of the reinforced select fill volume included within the soil reinforcement and embankment material placed behind the select fill, existing soil conditions and the finished grade line.
  - (5) All general notes required for constructing the soil reinforcement system.
- (b) All details of the soil reinforcement placement around all appurtenances located behind, on top of, or passing through the soil reinforcement volume such as parapets with anchorage slabs, coping, foundations, and utilities etc. shall be clearly indicated. Any modifications to the design of these appurtenances to accommodate a particular system shall also be submitted.
- (c) The details for the connection between abutment cap, embed devices, and soil reinforcement shall be shown.

The initial submittal shall include three sets of shop drawings and one set of calculations. One set of drawings will be returned to the Contractor with any corrections indicated. After approval, the Contractor shall furnish the Engineer with ten (10) sets of corrected plan prints for distribution by the Department. No work or ordering of materials for the structure shall be done until the submittal has been approved by the Engineer.

Materials:

The soil reinforcement system shall conform to the supplier's standards and the following:

- (a) The soil reinforcing system, which includes the soil reinforcement, and all connection devices, shall be according to the following:
- (1) Inextensible Soil Reinforcement. Steel reinforcement shall be according ASTM A 572 Grade 65 (450), ASTM A 1011 or ASTM A 463 Grade 50 (345). The steel strips shall be either epoxy coated, aluminized Type 2, or galvanized. Epoxy coatings shall be according to Article 1006.10(a)(2), except the minimum thickness of epoxy coating shall be 18 mils (457 microns). No bend test will be required. Aluminized Type 2-100 shall be according to ASTM A 463. Galvanizing shall be according to AASHTO M 111.
  - (2) Extensible Soil Reinforcement. Geosynthetic reinforcement shall be monolithically fabricated from virgin high density polyethylene (HDPE) or high tenacity polyester (HTPET) resins having the following properties verified by mill certifications:

| <u>Property for Geosynthetic Reinforcement</u> | <u>Value</u> | <u>Test</u> |
|--|--------------|-------------|
| Minimum Tensile Strength                       | **           | ASTM D 6637 |

\*\* as specified in the approved design calculations and shown on the shop drawings.

| <u>Property for HDPE</u> | <u>Value</u> | <u>Test</u>              |
|--------------------------|--------------|--------------------------|
| Melt Flow Rate (g/cm)    | 0.060-0.150  | ASTM D 1238, Procedure B |
| Density (g/cu m)         | 0.941-0.965  | ASTM D 792               |
| Carbon Black             | 2% (min)     | ASTM D 4218              |

| <u>Property for HTPET</u>          | <u>Value</u> | <u>Test</u> |
|------------------------------------|--------------|-------------|
| Carboxyl End Group (max) (mmol/kg) | <30          | GRI-GG7     |
| Molecular Weight (Mn)              | >25,000      | GRI-GG8     |

- (3) Panel Embed/Connection Devices. Panel embeds and connection devices shall be according to the following.
- a. Metallic panel embed/connection devices and connection hardware shall be galvanized according to AASHTO M 232 and shall be according to the following.
 

|                      |   |
|----------------------|---|
| Mesh and Loop Embeds | ASTM A 706 (A 706M)   |
| Tie Strip Embeds     | AASHTO M 270/M 270M Grade 50 (345) or<br>ASTM A 1011 HSLAS Grade 50 (345) Class 2 |
  - b. Non metallic panel embed/connection devices typically used with geosynthetic soil reinforcement shall be manufactured from virgin or recycled polyvinyl chloride having the following properties:

| <u>Property for Polyvinyl Chloride</u>  | <u>Value</u>  | <u>Test</u>             |
|---|---------------|-------------------------|
| Heat Deflection Temperature (°F)        | 155 -164      | ASTM D 1896             |
| Notched IZOD 1/8 inch @ 73°F (ft-lb/in) | 4 – 12        | ASTM D 256              |
| Coefficient of Linear Exp. (in/in/°F)   | 3.5 – 4.5     | ASTM D 696              |
| Hardness, Shore D                       | 79            | ASTM D 2240             |
| <u>Property for Polypropylene</u>       | <u>Value</u>  | <u>Test</u>             |
| Melt Flow Rate (g/cm)                   | 0.060 – 0.150 | ASTM D1238, Procedure B |
| Density (g/cu m)                        | 0.88 – 0.92   | ASTM D 792              |

(b) The select fill, defined as the material placed in the reinforced volume behind the wall, shall be according to Sections 1003 and 1004 of the Standard Specifications and the following:

- (1) Select Fill Gradation. Either a coarse aggregate or a fine aggregate may be used. For coarse aggregate, gradations CA 6 thru CA 16 may be used. If an epoxy coated reinforcing is used, the coarse aggregate gradations shall be limited to CA 12 thru CA 16. For fine aggregate, gradations FA 1, FA 2, or FA 20 may be used.

Other aggregate gradations may be used provided the maximum aggregate size is 1½ in. (38 mm), the maximum material passing the #40 (425 µm) sieve is 60 percent, and the maximum material passing the #200 (75 µm) sieve is 15 percent.

- (2) Select Fill Quality. The coarse or fine aggregate shall be Class B quality or better, except that a maximum of 15 percent of the material may be finer than the #200 (75 µm) sieve.
- (3) Select Fill Internal Friction Angle. The effective internal friction angle for the coarse or fine aggregate shall be a minimum 34 degrees according to AASHTO T 236 on samples compacted to 95 percent density according to Illinois Modified AASHTO T 99. The AASHTO T 296 test with pore pressure measurement may be used in lieu of AASHTO T 236. If the vendor's design uses a friction angle higher than 34 degrees, as indicated on the approved shop drawings, this higher value shall be taken as the minimum required.
- (4) Select Fill and Steel Reinforcing. When steel reinforcing is used, the select fill shall meet the following requirements.
  - a. The pH shall be 5.0 to 10.0 according to AASHTO T 289.
  - b. The resistivity according to AASHTO T 288 shall be greater than 3,000 ohm centimeters for epoxy coated and galvanized reinforcement, and 1,500 ohm centimeters for Aluminized Type 2.
  - c. The chlorides shall be less than 100 parts per million according to AASHTO T 291 or ASTM D 4327. For either test, the sample shall be prepared according to AASHTO T 291.

- d. The sulfates shall be less than 200 parts per million according to AASHTO T 290 or ASTM D 4327. For either test, the sample shall be prepared according to AASHTO T 290.
  - e. The organic content shall be maximum 1.0 percent according to AASHTO T 267.
- (5) Select Fill and Geosynthetic Reinforcing. When geosynthetic reinforcing is used, the select fill pH shall be 4.5 to 9.0 according to AASHTO T 289.
- (6) Test Frequency. Prior to start of construction, the Contractor shall provide internal friction angle, pH, to show the select fill material meets the specification requirements. In addition, resistivity, chlorides, sulfates, and organic content test results will be required if steel reinforcing is used. All test results shall not be older than 12 months. In addition, a sample of select fill material will be obtained for testing and approval by the Department. Thereafter, the minimum frequency of sampling and testing at the jobsite will be one per 20,000 cubic yards of select fill material.
- (c) The embankment material behind the select fill shall be according to Section 202 and/or Section 204. An embankment unit weight of 120 lbs/cubic foot (1921 kg/cubic meter) and an effective friction angle of 30 degrees shall be used in the wall system design, unless otherwise indicated on the plans.

Design Criteria: The design shall be according to the appropriate AASHTO Design Specifications noted on the plans for soil reinforcement except as modified herein. The soil reinforcement supplier shall be responsible for all internal stability aspects of the wall design and shall supply the Department with computations for each designed section.

External loads, such as those applied through structure foundations, from traffic or railroads, slope surcharge etc., shall be accounted for in the internal stability design. The presence of all appurtenances behind, in front of, mounted upon, or passing through the wall volume such as drainage structures, utilities, structure foundation elements or other items shall be accounted for in the internal stability design of soil reinforcement system.

The design of the soil reinforcing system shall be according to the applicable AASHTO or AASHTO LRFD Design Specifications for "Inextensible" steel or "Extensible" geosynthetic reinforcement criteria. The reduced section of the soil reinforcing system shall be sized to allowable stress levels at the end of a 75 year design life.

Steel soil reinforcement systems shall be protected by one of the following; epoxy coating, galvanizing or aluminizing. The design life for epoxy shall be 16 years. The corrosion protection for the balance of the 75-year total design life shall be provided using a sacrificial steel thickness computed for all exposed surfaces according to the applicable AASHTO or AASHTO LRFD Design Specifications.

Geosynthetic soil reinforcing systems shall be designed to account for the strength reduction due to long-term creep, chemical and biological degradation, as well as installation damage.

The abutment embed/soil reinforcement connection capacity shall be determined according to the applicable AASHTO or AASHTO LRFD Design Specifications.

The factor of safety for pullout resistance in the select fill shall not be less than 1.5, based on the pullout resistance at 1/2 in. (13 mm) deformation. Typical design procedures and details, once accepted by the Department, shall be followed. All reinforcement system changes shall be submitted in advance to the Department for approval.

Construction: The Contractor shall obtain technical assistance from the supplier during soil reinforcement installation to demonstrate proper construction procedures and shall include any costs related to this technical assistance in the unit price bid for this item.

When structure excavation is necessary, it shall be made and paid for according to Section 502 except that the horizontal limits for structure excavation shall be from the rear limits of the soil reinforcement to a vertical plane at the back of the abutment. The depth shall be from the top of the original ground surface to the bottom of the abutment. The additional excavation necessary will not be measured for payment but shall be included in this work.

At each soil reinforcement level, the fill material should be roughly leveled and compacted before placing and attaching the soil reinforcing system. The soil reinforcement and the maximum lift thickness shall be placed according to the supplier's recommended procedures except, the lifts for select fill shall not exceed 10 in. (255 mm) loose measurement or as approved by the Engineer. Embankment shall be constructed according to Section 205.

At the end of each day's operations, the Contractor shall shape the last level of select fill to permit runoff of rainwater away from the wall face. Select fill shall be compacted according to the project specifications for embankment except the minimum required compaction shall be 95 percent of maximum density as determined by AASHTO T 99. Select fill compaction shall be accomplished without disturbance or distortion of soil reinforcing system and panels. Compaction in a strip 3 ft. (1 m) wide adjacent to the backside of the panels shall be achieved using a minimum of 3 passes of a light weight mechanical tamper, roller or vibratory system. The Engineer will perform one density test per 5000 cu yd (3800 cu m) and not less than one test per 2 ft (0.6 m) of lift.

Basis of Payment: This work, including placement of the select fill within the soil reinforced volume shown on the approved shop drawings, soil reinforcing system and accessories will not be paid for as a separate item, but shall be included in the cost of CONCRETE STRUCTURES.

Concrete appurtenances such abutment caps will not be included in this work, but will be paid for as specified elsewhere in this contract, unless otherwise noted on the plans.

Excavation necessary to place the select fill for the soil reinforcement system shall be paid for as STRUCTURE EXCAVATION and/or ROCK EXCAVATION FOR STRUCTURES as applicable, according to Section 502.

Embankment placed outside of the select fill volume will be measured and paid for according to Sections 202 and/or 204 as applicable.

**LIGHTWEIGHT CELLULAR CONCRETE FILL**

Description: This work consists of providing lightweight cellular concrete fill at the required location(s) according to the details and dimensions shown in the plans, and as directed by the Engineer.

Materials: The materials shall meet the following requirements:

Cement. Type I or Type III Portland cement shall comply with Section 1001 of the Standard Specifications. Pozzolans and finely divided minerals will not be permitted.

Water. Water shall be potable and shall meet the requirements of Section 1002 of the Standard Specifications.

Foaming Agent. A commercially available product handled in a manner that meets the recommendations of the manufacturer.

Other Concrete Admixtures. Concrete admixtures may be used only when approved by the Engineer. The concrete admixtures shall meet the requirements of Articles 1021.01 - 1021.04 of the Standard Specifications.

Cellular Concrete:

The cellular concrete shall have the following properties:

|   | <u>Class II</u>                        | <u>Class IV</u>                        |
|---|--|--|
| Cast Density ASTM C138  | 24-30 pcf (384-480 kg/m <sup>3</sup> ) | 36-42 pcf (577-673 kg/m <sup>3</sup> ) |
| Minimum Compressive Strength<br>ASTM C495-Modified  |  |  |
| @7 days   | 30 psi (207 kpa)                       | 90 psi (620 kpa)                       |
| @28 days  | 40 psi (276 kpa)                       | 120 psi (827 kpa)                      |
| Freeze-thaw Resistance<br>(min cycles @ relative Pc=70%)<br>per ASTM C666-Modified                      | N/A                                    | 300 cycles                             |
| Coefficient Permeability<br>(cm/sec) per ASTM D2434   |  |  |
| @17 kpa (2.5 psi)   | 1.3 x 10 <sup>-3</sup>                 | 4.4 x 10 <sup>-6</sup>                 |
| @124 kpa (18 psi)   | 1.2 x 10 <sup>-4</sup>                 | 3.1 x 10 <sup>-7</sup>                 |
| Water Absorption<br>Long term immersion<br>As % of cast density<br>(120) days per ASTM<br>C796-Modified | 20% max.                               | 14% max.                               |

Within 15 calendar days after execution of the contract the Contractor shall submit the following:

Manufacturer's specifications, catalog cuts, and other engineering data needed to demonstrate compliance with specified requirements. These shall include test reports by test laboratories.

Written approval of the subcontractor and equipment by the manufacturer of the cellular concrete.

The temperature of the cellular concrete mixture at the point of discharge shall not be below 45 °F (7.2 °C) nor greater than 95 °F (35 °C).

Equipment: Only automated proportioning mixing and placing equipment approved by the manufacturer of the cellular concrete shall be used. The batch plant scales shall be inspected and calibrated by a reputable scale servicing company. Bulk cement shall be weighed on a scale which shall operate within a tolerance of 1½ percent of the weight of the cement per batch. The plant shall be equipped with an automatic batch counter and automatic timer to account for the foam in the mixer.

Construction Requirements:

Prior to installation. The ground surface shall be cleared of debris, sharp objects and trees. Tree stumps shall be either removed or cut to the level of the ground surface. All wheel tracks or ruts in excess of 3 inches (76 mm) in depth shall be graded smooth or otherwise filled with soil to provide a reasonable smooth surface.

If required in the plans, a geotechnical fabric for ground stabilization shall be placed according to Section 210 of the Standard Specifications.

If a geomembrane liner is required in the plans, this work shall be done according to the special provision for "Geomembrane Impermeable Liner."

If any items are to be enclosed in the fill, the items shall be set to the final location both horizontally and vertically prior to installation of the cellular concrete.

There shall be no standing water in the area to be filled. If necessary, dewatering shall be continuous during the time the cellular concrete is constructed.

The air temperature shall not be less than 35 °F (1.7 °C) at the time of placement.

Cellular concrete shall not be placed during periods of precipitation unless placed in an enclosed, covered area.

Installation. The cellular concrete shall be placed in accordance with the installation procedures provided by the manufacturer of the cellular concrete. After mixing, it shall be promptly placed in the final location, and in a manner to prevent segregation. Each lift of the Class II Cellular Concrete shall be placed to a maximum depth of 4 ft (1.2 m) and Class IV Cellular Concrete shall be placed to a maximum depth of 2 ft (0.6 m). Intermediate lifts may be placed horizontal. Only the top lift shall be sloped to grade.

The cellular concrete shall be placed using a hose. It will not be allowed to flow more than 10 feet from where it is deposited to its final position.

The final surface elevation of the cellular concrete shall be within  $0.1 \pm$  ft ( $30 \pm$  mm) of the plan elevation.

The final surface of the cellular concrete shall be covered with a bituminous prime coat meeting the requirements of Article 1032 of the Standard Specifications at a rate of 0.05 to 0.10 gal/sq.yd. (0.2 to 0.5 L/sq m). The prime coat will not be paid for separately but shall be included in the contract unit price for the cellular concrete. The Engineer may waive the requirement for the prime coat based on design and project requirements.

Testing. During placement of the initial batches, the density shall be checked and adjustments made to obtain the specified cast density at the point of placement. Density of the mix shall only be adjusted by increasing or decreasing the foam.

Eight strength test specimens will be required for the first four testing locations and a minimum of four strength test specimens thereafter. Specimens shall be obtained for each 300 cu yd (230 cu m) of engineered fill placed or for each four hours of placement. The Contractor shall supply EPS (expanded polystyrene) four cell molds with EPS tops for 3 in. x 6 in. (75 mm x 150 mm) test specimens. The cylinders will be protected from vandalism or environmental extremes by the use of a cure box in the field. This box will be provided by the Contractor.

The specimens shall be tested by the Department in accordance with ASTM C495, except that they shall be removed from the EPS molds and air dried at a temperature of  $70 \pm 10^\circ\text{F}$  ( $21.1 \pm 5.5^\circ\text{C}$ ) and a relative humidity of  $50 \pm 30\%$  for three days prior to strength testing.

Additional specimens shall be tested to monitor the compressive strength. The last 2 specimens from each series should be tested at 28 days. The manufacturer may require special handling and testing techniques of the engineered fill.

Density tests shall be completed at a minimum rate of one per hour of placement. Additional tests shall be done if adjustments are made to the materials. These tests shall be documented.

Loading. Construction activities may be resumed on the material upon approval by the Engineer when a penetration rate of 1.5 in/blow (38 mm/blow) or less has been obtained with the Dynamic Cone Penetration (DCP) test as described in the Manual of Test Procedures/Geotech Manual.

Method of Measurement: Contract quantity. When the project is constructed essentially to the lines, grades or dimensions shown on the plans and the Contractor and the Engineer have agreed in writing the plan quantities are accurate, no further measurement will be required. Payment will be made for the quantities shown in the contract for the various items involved except that if errors are discovered after work has been started, appropriate adjustments will be made.

When the plans have been altered or when disagreement exists between the Contractor and the Engineer as to the accuracy of the plan quantities, either party shall, before any work is started which would affect the measurement, have the right to request in writing and thereby cause the quantities involved to be measured as hereinafter specified.

Measured Quantities. Lightweight Cellular Concrete Fill will be measured in its final position and the volume in cubic yards (cubic meters) computed by method of average end areas. The dimensions used in calculating the average end areas shall not exceed the neat lines shown in the plans unless ordered in writing by the Engineer.

Basis of Payment: This work will be paid for at the contract unit price per cubic yard (cubic meter) for LIGHTWEIGHT CELLULAR CONCRETE FILL of the class specified.

## **POND SURVEY**

Description. This work shall consist of providing a topographical pond bottom elevation survey of Swartz Pond, which is the finger shaped pond located within Westshore Subdivision, located north of the north ramps of the I-74/I-155 Interchange, approximately 350 feet north of Jefferson Street (Muller Road).

The Contractor shall furnish all labor, equipment, and materials as required to obtain the surveyed pond bottom elevations and process the survey data. The survey shall consist of edge of water shots around the entire perimeter of the pond and a grid to define the bottom elevations of the entire pond. A flat-footed base shall be attached if a prism pole is used for shots taken below the water surface. The grid for the survey of the pond bottom shall consist of cross-sections beginning at approximately 25 feet from the south shore line and taken at subsequent 50 foot intervals along the north/south length of the pond, and ending at approximately 25 feet from the north shore line. The total length of the pond is approximately 1050 foot measured from north to south. The total water area is approximately 10.7 acres. Elevation shots taken across each cross-section shall be taken approximately 25 feet from the shore line and at approximate 25 foot intervals east/west across the width of the pond. Shots shall be recorded to the nearest 0.01 foot of elevation. In addition, the invert elevation of the downstream outlet culvert from the pond shall be surveyed.

The pond survey shall be performed during the final year of construction when directed by the Engineer when it has been determined that adequate landscape cover has been established within the tributary watershed from the project to the pond to contain any erosion of soils leading to the pond.

Horizontal and vertical survey control references for the pond survey shall be furnished by the Engineer. All work shall be according to normally accepted self-checking survey practices. Field notes shall be kept in standard survey field notebooks and those notes shall become the property of the Department at the completion of the project. All notes shall be neat, orderly and in accepted form.

The Contractor shall provide electronic files of all points and a 1"=50' scale plot of the survey information in micro-station V8, or current format.

Measurement and Payment. This work shall not be measured and paid for separately, but shall be included in the cost of the CONSTRUCTION LAYOUT pay item.

## **RELOCATE MODULAR GLARE SCREEN SYSTEM**

Description. This work shall consist of the relocation of glare screen blades previously installed on temporary concrete barrier as part of the temporary modular glare screen system.

The work shall be done in accordance with the applicable portions of the special provision entitled, Temporary Modular Glare Screen System. The work shall be done along with the staged relocation of Temporary Concrete Barrier, when applicable. The Contractor may either remove and reinstall the glare screen blades on relocated Temporary Concrete Barrier or relocate the Temporary Concrete Barrier without detaching the glare screen blades. The Contractor shall furnish and install replacement glare screen blades for all damaged glare screen blades that are scheduled for relocation. The Contractor shall also furnish all hardware required for reinstallation of the glare screen blades.

Method of Measurement. This work will be measured for payment in feet in place, along the centerline of the modular glare screen system for the new construction stage, with the exception of those portions that remained in place from earlier stages, previously measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per Foot for RELOCATE MODULAR GLARE SCREEN SYSTEM.

## **IMPACT ATTENUATOR REMOVAL**

This work consists of the removal, storage or disposal of existing impact attenuators.

The impact attenuators shall be removed so that all material considered suitable by the Engineer for future use shall be salvaged. Impact attenuator elements having salvage value shall be removed without damage and those having no salvage value shall be dismantled with all hardware becoming the property of the Contractor. The salvaged material shall be stored at locations and in a manner approved by the Engineer. Any of this material having salvage value and which has been damaged by the Contractor shall be replaced at his/her own expense with new material of the same kind.

Surplus material shall be disposed of according to Article 202.03. Anti-freeze, when present, shall be disposed of/recycled according to local ordinances.

This work shall be measured for payment as each, where each is defined as one location where the impact attenuator has been previously installed.

This work shall be paid for at the contract unit price per Each for IMPACT ATTENUATOR REMOVAL. Subsequent reinstallation of any removed and salvaged impact attenuator components shall be paid for separately.

## **TEMPORARY SIGN PANEL ASSEMBLY**

This work shall consist of furnishing, fabrications, and installing temporary sign panels, complete with sign faces, legend, and associated supplemental panels, with supports and attachment hardware as may be required.

This work shall include storage of the signs as required and maintaining the sign installation through the duration of the contract.

This work shall also include removal and/or relocation when removal and/or relocation of the temporary sign panel assembly is indicated in the plans.

All signs used for temporary traffic control shall meet the approval of the Engineer.

Temporary Sign Panels. The reflective sheeting shall be mounted on rigid materials such as sheet aluminum meeting Article 1090.02 of the Standard Specifications or exterior grade plywood which meets Article 1090.04 of the Standard Specifications.

Sign Face. The sign face, sign base, and supplemental panel materials shall be in accordance with Article 1091 of the Standard Specifications.

Legend size of temporary sign panels which are to be attached to existing sign panels shall conform to the sizes of comparable legends on the existing sign panel which is being supplemented. The legend size of independently mounted signs shall conform to letter and number sizes as prescribed in the Manual of Uniform Traffic Control Devices.

Sign Panel Installation. Temporary Sign Panel Assemblies shall be attached as extensions to existing sign panels, attached to existing overhead sign supports or installed on temporary wood sign supports as represented in the plans. Temporary Sign Panel Assemblies shall be installed in conformance with Article 720.04 of the Standard Specifications or as directed by the Engineer.

Reinstallation. The reinstallation of temporary sign panel assemblies shall be in accordance with Article 724.04 of the Standard specifications with the exception that existing supports and mounting hardware may be reused when feasible.

Temporary Wood Sign Support. Sign supports shall be in accordance with Section 730 of the Standard Specifications.

Method of Measurement. Temporary Sign Panel Assembly will be measured for payment in square feet of total supplemental sign surface to be installed computed pursuant to Article 720.03 of the Standard Specifications.

Removal and/or relocation of the Temporary Sign Panel Assembly, or a portion thereof, if required during the course of the contract shall be in accordance with Article 724 of the Standard Specifications except that the cost of removal shall be included in the cost of Temporary Sign Panel Assembly.

Basis of Payment. This work will be paid for at the contract unit price per Square Foot for TEMPORARY SIGN PANEL ASSEMBLY which price shall be payment in full for all labor, materials, and equipment required to furnish and install sign panels, posts and supports, maintain the sign assembly through the duration of the contract, and remove the sign panel assembly where applicable. If a subsequent relocation of the Temporary Sign Panel Assembly is required, it shall be considered included in the cost of TEMPORARY SIGN PANEL ASSEMBLY.

### **REMOVE SIGN PANEL ASSEMBLY REMOVE OVERHEAD SIGN STRUCTURE**

Upon permanent removal, existing IDOT owned Overhead, Ground Mounted, and Regulatory and Warning sign panels shall be transported to the Illinois Department of Transportation, District Four, Bureau of Operations, Traffic Operations Building located at 1021 Detweiller Drive, Peoria, Illinois 61615. The Contractor should contact the Traffic Operations Building, Roger Carls at (309) 693-5165 for delivery instructions.

Existing City of Morton owned Regulatory and Warning sign panels that are permanently removed shall be transported to the City of Morton Street Department located at 450 South Detroit Avenue, Morton, Illinois 61550. The Contractor should contact the city of Morton Street Department (309) 266-5361 for delivery instructions.

Transport and delivery of permanent removed sign panels shall not be paid for separately, but shall be included in the associated sign removal pay item, Remove Sign Panel Assembly – Type A, Remove Sign Panel Assembly – Type B, or Remove Overhead Sign Structure.

Overhead sign structural components, and all other mounting hardware, channel, posts, and foundations shall be become the property of the Contractor and shall be removed and disposed of according to the requirement of Article 202.03 of the Standard Specifications. Transport and disposal of overhead sign structural components, and all the other mounting hardware, channels, posts, and foundations shall not be paid for separately, but shall be included in the associated sign removal pay item, Remove Sign Panel Assembly – Type A or Type B, or Remove Overhead Sign Structure.

### **STORM SEWER STAGING**

This work shall consist of providing storm water drainage during construction of the proposed storm sewer system. The construction staging will require a combination of proposed storm sewer items as well as temporary storm sewer items to ensure that positive storm water drainage is maintained throughout all stages of construction. All work shall comply with the applicable Section of the Standard Specifications.

The Contractor shall maintain a fully operational storm sewer system throughout the construction of the project. The phased construction of this project requires installation of storm sewers and connections as summarized in the I-74 Drainage Staging Plan sheets.

The drainage items shown on the sheets are a listing of locations and stage sequencing where drainage items will be required to accommodate the construction staging. It should not be construed as an all-inclusive listing of every location that will require a temporary drainage item to accommodate the storm water drainage during construction.

The storm sewer staging shall not be measured and paid for separately. The cost of this work shall be included in the pay items for the proposed storm sewer items, temporary storm sewer items, and existing storm sewer removal items. No additional payment will be made for alternative construction staging and methods.

### **CAST-IN-PLACE REINFORCED CONCRETE END SECTION**

Description. This work shall consist of constructing reinforced concrete headwalls for multiple-pipe culvert crossings in the project. The structures shall be constructed in accordance with applicable portions of Sections 502, 503 and 508 of the Standard Specifications, Highway Standard 542116-02 (Reinforced Concrete End Sections for Multiple (2 & 3) Pipe Culverts 15" Thru 36" at Right angles with Roadway), which will include all concrete, reinforcing steel, pipe connections, seal coat of concrete, and other miscellaneous structural details as needed. All work shall be completed to the satisfaction of the Engineer.

Method of Measurement. This work will be measured per each for the structure specified.

Basis of Payment. This work will be paid for at the contract price per Each for CAST-IN-PLACE REINFORCED CONCRETE END SECTION with the number of barrels and culvert diameter specified, complete in place and accepted by the Engineer. Work shall include all excavation, disposal, dewatering, shoring and earth retention, formwork, materials, labor and equipment, backfill and cleanup as needed to install the structures and make connections to the culverts, to the satisfaction of the Engineer.

### **FRAMES AND GRATES FOR TYPE G-1 AND TYPE G-1, SPECIAL DRAINAGE STRUCTURES**

Description. This work shall consist of furnishing all labor, equipment, and material for the installation of frames and grates for Type G-1 (Special) Inlets and Inlet-Manholes. Materials shall be in accordance with District Standard 604001-D4 - Frames & Grates for Type G-1 and Type G-1, Special Drainage Structures.

Basis of Payment. Payment for this work will be paid for at the contract unit price Each for FRAMES AND GRATES FOR TYPE G-1 AND TYPE G-1, SPECIAL DRAINAGE STRUCTURES.

### **JOINT REPAIR**

Description: This work shall consist of cleaning, filling and sealing of open joints and voids in pipe culverts. Work shall be performed at the locations shown on the plans or as directed by the Engineer.

Construction Requirements: Remove all existing mortar, mastic, debris, or contaminants in or adjacent to the culvert pipe joints using hand tools or other methods approved by the Engineer. The joints shall be cleaned of debris to the depth of the concrete pipe walls. Surfaces of the existing joints shall be free of standing water.

For joint repairs less than 1" in width place a mastic joint sealer to completely fill the joint.

For joint repairs greater than 1" in width place non-shrink grout to completely fill the joint.

Materials: Mastic Joint Sealer shall meet the requirements of Section 1055 of the Standard Specifications

Grout shall meet the requirements of Section 1024 of the Standard Specifications

Method of Measurement: This work will be measured per each pipe joint repaired. Work shall include all, materials, labor and equipment, and safety measures as required to repair the pipe joints.

Basis of Payment: This work will be paid for at the contract price per each for JOINT REPAIR, complete in place and accepted by the Engineer.

## **JUNCTION BOX**

Description. This work shall consist of constructing reinforced concrete chambers as part of the drainage system for the project. The structures shall be constructed in accordance with applicable portions of Sections 602 of the Standard Specifications, the details provided in the plans, including all concrete, reinforcing steel, access frames and lids, steps, pipe connections, seal coat of concrete, and other miscellaneous structural details as shown on the plans. All shall be completed to the satisfaction of the Engineer.

Method of Measurement. This work will be measured per each for the structure specified.

Basis of Payment. This work will be paid for at the contract price per Lump Sum for JUNCTION BOX specified, complete in place and accepted by the Engineer.

Work shall include all excavation, disposal, dewatering, shoring and earth retention, formwork, materials, labor and equipment, backfill and cleanup as needed to install the structures and make connections to the culverts or storm sewers, to the satisfaction of the Engineer.

## **REMOVE INLET BOX**

This work shall consist of the removal of existing elongated drainage structures which receive ditch drainage flows and function to discharge the flows to a pipe culvert or storm sewer.

The work shall be done where defined on the plans in accordance with Section 605 of the Standard Specifications. The timing of the work shall be done in a manner that assures that drainage flows to the structure are maintained without presenting a hazard to traffic. The hole formed by the removal of the structure shall then be backfilled with sand and compacted.

The inlet box removal work shall be paid for at the contract unit price per Each for REMOVE INLET BOX.

## **PIPE UNDERDRAIN REMOVAL**

This work shall consist of removing and disposing of existing pipe underdrains located beneath the I-74 or I-155 mainline and ramp pavements. This work shall include removal and disposal of pipe underdrain outlets and concrete headwalls for pipe underdrains. Any excavation made by the Contractor for the removal shall be replaced. The excavated space shall be filled with material satisfactory to the Engineer and placed according to Section 205 of the Standard Specifications by and at the expense of the Contractor. Materials resulting from the removal of the existing underdrain and headwalls shall be disposed of in accordance with Article 202.03 of the Standard Specifications. The upstream end of existing pipe underdrains that are to remain shall be plugged. This work will not be paid for separately, but shall be considered as included in the contract unit price bid for Earth Excavation.

## **STEEL PLATE BEAM GUARDRAIL (SHORT RADIUS)**

Description: This work shall consist of furnishing and installing a Short Radius Guardrail System for *NCHRP Report 350* Test Level 2, at the location shown on the plans in accordance with the applicable portions of sections 630 and 631 of the Standard Specifications and the applicable Highway Standards.

A short radius guardrail system detail that satisfies NCHRP Report 350 TL-2 is presented in Figure 12 with a variation to the design presented in Figure 13.

Method of Measurement: This work will be measured for payment in feet along the top edge if the rail elements, continuously through laps and splices, from the bridge barrier to the end of the curved section at post 5 as depicted in Figures 12 and 13. The secondary road W-beam and terminal are not included in STEEL PLATE BEAM GUARDRAIL (SHORT RADIUS), and shall be measured for payment separately.

Basis of Payment: This work will be paid for at the contract unit price per Foot for STEEL PLATE BEAM GUARDRAIL (SHORT RADIUS).

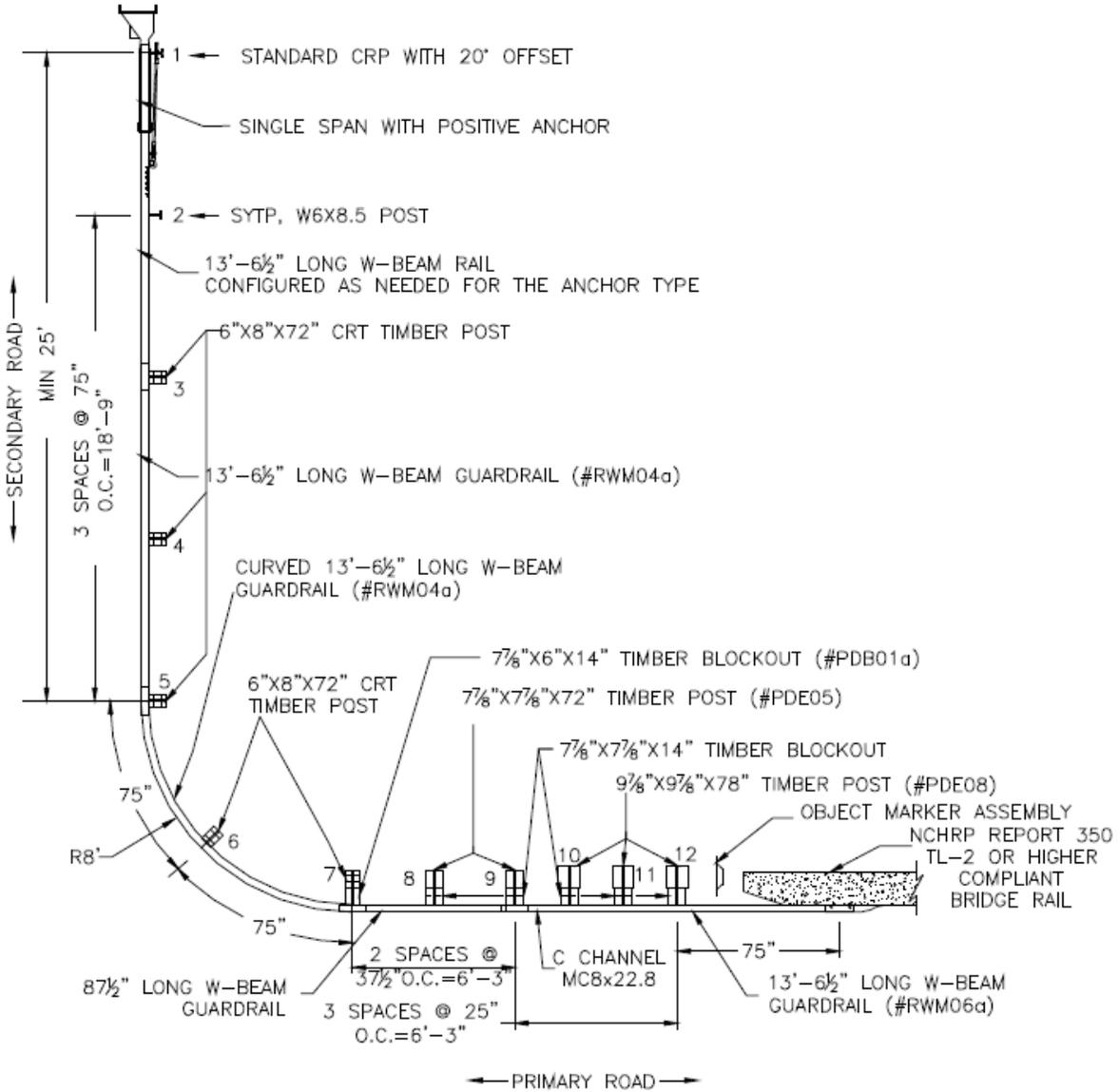


Figure 12 Recommended short radius guardrail system

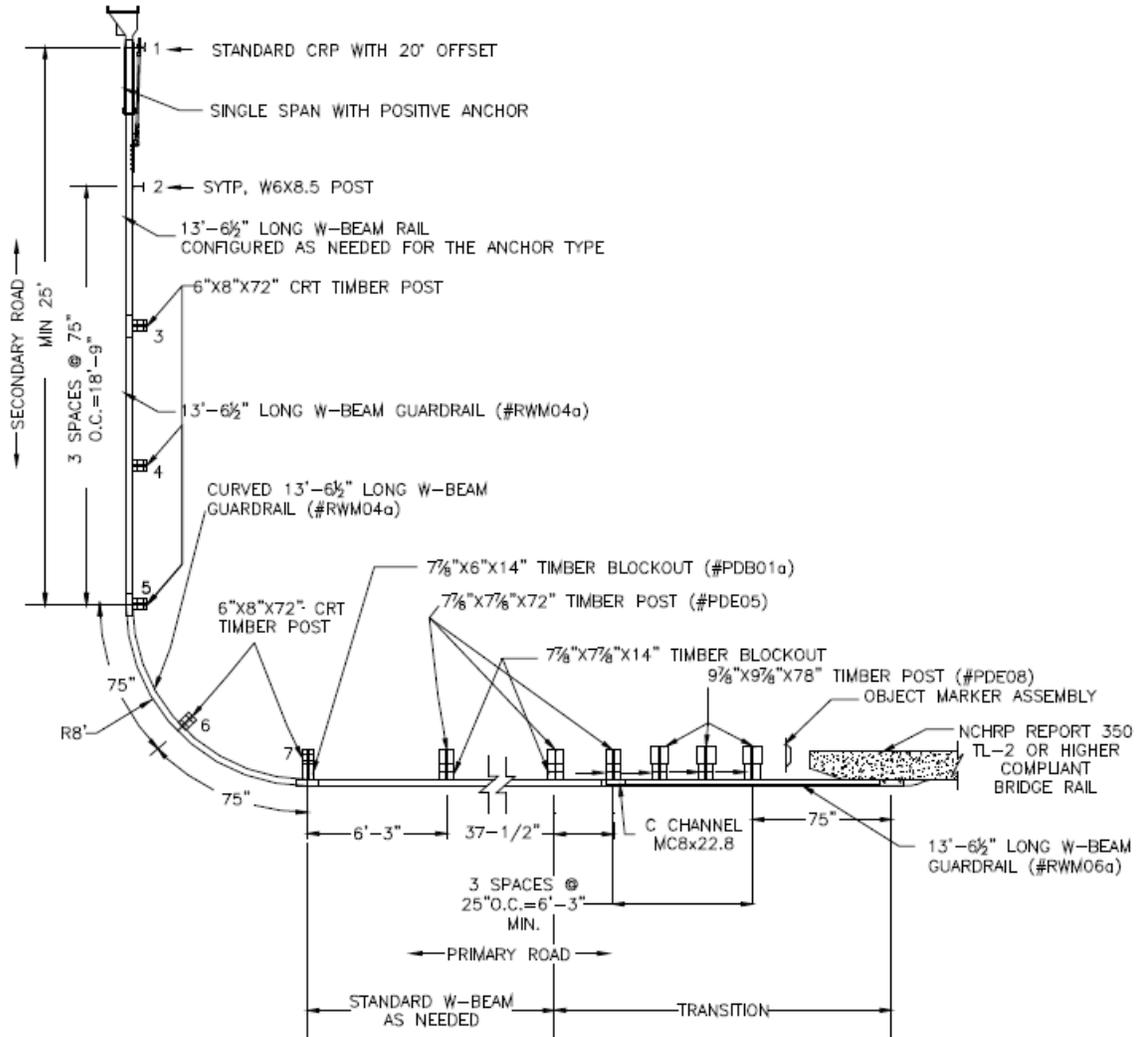


Figure 13 Acceptable variation of the recommended short radius guardrail system

## **DELINEATOR REMOVAL**

This work shall consist of removing existing delineator posts and reflectors. Removal shall be performed in accordance with Article 635.05 of the Standard Specifications.

Any such delineators that are determined by the Engineer to be essential to the safe and orderly flow of traffic during construction staging shall be re-installed by the Contractor when directed by the Engineer at temporary locations approved by the Engineer pursuant to Article 107.25 of the Standard Specifications. The reinstallation shall be in accordance with Article 635.04 of the Standard Specifications.

This work will be measured for payment in place in units of each delineator that is initially removed. Subsequent removals of delineators following temporary reinstallations will not be separately measured.

The work of removing existing delineator posts and reflectors will be paid for at the contract unit price per Each for DELINEATOR REMOVAL. Subsequent reinstallation and removal of delineator posts and reflectors shall be included in the initial delineator removal price and be administered in accordance with Article 107.25 of the Standard Specifications.

## **DRAINAGE CONTROL STRUCTURE**

Description. This work consists of constructing a reinforced concrete Drainage Control Structure as part of the drainage system for the project. The structure shall be constructed in accordance with applicable portions of Sections 502, 503 and 508 of the Standard Specifications, the details provided in the plans, including all concrete, reinforcing steel, access frames and lids, steps, pipe connections, seal coat of concrete, and other miscellaneous structural details as needed. All shall be completed to the satisfaction of the Engineer.

Method of Measurement. This work will be measured per each for the structure specified.

Basis of Payment. This work will be paid for at the contract price per each for DRAINAGE CONTROL STRUCTURE specified, complete in place and accepted by the Engineer. Work shall include all excavation, disposal, dewatering, shoring and earth retention, formwork, materials, labor and equipment, backfill and cleanup as needed to install the structures and make connections to the culverts or storm sewers, to the satisfaction of the Engineer.

## **PRECAST REINFORCED CONCRETE FLARED DROP BOX END SECTION**

Description. This work shall consist of constructing precast reinforced concrete flared end sections in accordance with the applicable portions of Section 542 of the Standard Specifications, with District Standard 542301-D4 (Precast Reinforced Concrete Flared Drop Box End Section), and shall include all excavation, pipe connection and backfill as needed. All shall be completed to the satisfaction of the Engineer.

Method of Measurement. This work will be measured per each for the structure specified. Work shall include all excavation, disposal, dewatering, materials, labor and equipment, backfill and cleanup as needed to install the structures, to the satisfaction of the Engineer.

Basis of Payment. This work will be paid for at the contract price per Each for PRECAST REINFORCED CONCRETE FLARED DROP BOX END SECTION of the diameter specified, complete in place and accepted by the Engineer.

## **CONNECTION TO EXISTING CULVERT**

Description: This work shall consist of providing a proposed storm sewer connection to an existing concrete culvert at the locations shown on the plans.

Construction Requirements: Cleanly cut new opening of adequate size in the existing culvert to accept the proposed storm sewer. Carefully install the new storm sewer in the existing culvert. The connection of the storm sewer shall extend through the inside wall of the culvert a sufficient distance to allow for the connection and the masonry shall be carefully constructed around them so as to prevent leakage along the outer surface. The proposed storm sewer shall be cut on the inside of the existing culvert to minimize or eliminate any protrusion into the culvert. All work shall be completed in accordance with applicable portions of Section 550 of the Standard Specifications.

After the connection is completed, the culvert shall be cleaned of any accumulation of debris or other foreign matter and shall be free from accumulations at the time of final inspection.

Basis of Payment: This work will be paid for at the contract unit price per Each for CONNECTION TO EXISTING CULVERT.

## **REMOVAL OF FLARED END SECTIONS**

This work shall consist of the removal of flared end sections from the ends of existing pipe culverts and storm sewers.

The work shall be performed in accordance with Article 551 of the Standard Specifications. The work shall be included with the related removal and salvaging of the existing storm sewer or pipe culvert to which the end section is attached or in preparation for the extension of the existing storm sewer or pipe culvert.

This work shall be measured for payment as an element of the storm sewer or pipe culvert being removed. The measurement shall extend to the outer edge of the end section.

This work shall be paid for at the contract unit price per Foot for STORM SEWER REMOVAL or PIPE CULVERT REMOVAL of the diameter specified.

### **SLOTTED DRAIN 12" WITH 2½" SLOT**

Description. This work shall consist of installing a slotted drain in accordance with the applicable portions of Section 601 of the Standard Specifications and District Standard 601701-D4 (Slotted Vane Drain), including connection to a new drainage structure and other miscellaneous work and details as needed to complete the work. All shall be completed to the satisfaction of the Engineer.

Method of Measurement. This work will be measured per lineal foot of slotted drain installed.

Basis of Payment. This work will be paid for at the contract price per foot for SLOTTED DRAIN 12" WITH 2½" SLOT, complete in place and accepted by the Engineer. Work shall include all excavation, disposal, materials, labor and equipment, pipe connection, backfill and cleanup as needed to install the slotted drain, to the satisfaction of the Engineer.

### **VIDEO INSPECTION OF STORM SEWER**

Description. This work shall consist of videotaping the existing culverts 36" and smaller which are being re-used in the project. Each culvert will be videotaped for its entire length. A report will be provided by the Contractor with sufficient detail, including a copy of the video, to the Engineer for evaluation of the condition of the culverts.

All existing culverts and storm sewers to have video inspection shall be cleaned in accordance with Article 602.15 of the Standard Specifications.

Method of Measurement. This work will be measured for payment per foot of storm sewer videotaped. The length measured once from manhole to manhole will be the length for payment. Both manholes and the storm sewer are included in the measured length.

Basis of Payment. This work will be paid for at the contract unit price per Foot for VIDEO INSPECTION OF STORM SEWER. Work shall include all labor and equipment needed to videotape the culverts or storm sewers, including a report to provide information regarding the condition of the storm sewer, to the satisfaction of the Engineer

### **MANHOLES, TYPE A, 5' – DIAMETER, WITH SPECIAL FRAME AND GRATE MANHOLES, TYPE A, 7' – DIAMETER, WITH SPECIAL FRAME AND GRATE MANHOLES, TYPE A, 8' – DIAMETER, WITH SPECIAL FRAME AND GRATE**

Description. This work shall consist of furnishing all excavation, disposal, shoring and earth retention, labor, equipment, and materials for the construction of Manholes and Grates in accordance with Sections 602, 604 and 606 of the Standard Specifications, and the details in the plans. The Special Frame and Grate shall be supplied in accordance with District Standard 604301-D4 (Type 37 Grate). Highway Standards shall be used for all other items specified in the plans.

Basis of Payment. Payment for this work will be paid for at the contract unit price Each for MANHOLE TYPE A, 7' DIAMETER w/SPECIAL FRAME AND GRATE; or MANHOLE TYPE A, 8' DIAMETER w/SPECIAL FRAME AND GRATE.

## **DRAINAGE STRUCTURES TO BE RECONSTRUCTED**

Description. This work shall consist of reconstructing drainage structures that have been installed in a previous stage of the project. The Type 4 structure and rims shall be reconstructed to the final grades indicated in the Drainage Plans for the project. The structures shall reuse the Type 20 Frames and Grates that were used in the initial installation. The work shall comply with applicable portions of Sections 502, 503, 508 and 602 of the Standard Specifications, Highway Standard 602106-01 (Drainage Structures Types 4, 5 & 6) and the details provided in the plans, including all concrete, reinforcing steel, steps, pipe connections, and other miscellaneous work as required. All shall be completed to the satisfaction of the Engineer.

Method of Measurement. This work will be measured per each for the structure specified.

Basis of Payment. This work will be paid for at the contract price per each for DRAINAGE STRUCTURES TO BE RECONSTRUCTED, complete in place and accepted by the Engineer. Work shall include all excavation, demolition, disposal, dewatering, shoring and earth retention, formwork, materials, labor and equipment, backfill and cleanup as needed to install the structures and make connections to the culverts or storm sewers, to the satisfaction of the Engineer.

## **STORM SEWER PROTECTED**

Description. This work shall consist of installing drain tile connections at the right-of-way line, in accordance with District Standard 611001-D4 (Storm Sewer Protected), including installation of an inspection well, connection to a new drainage structure or ditch, and other miscellaneous work and details as required. All work shall be completed to the satisfaction of the Engineer.

Exploratory trench excavation to locate and determine size and depth of existing drain tile will be paid for separately.

In the case where the depth of the existing tile(s) prevents connection to a new drainage structure or ditch, information shall be provided by the Contractor to the Engineer detailing exact locations, elevations and sizes of the drain tile where it enters and exits the right-of-way. Installation of new storm sewer to replace existing drain tile within the project limits, as determined by the Engineer, will be paid for separately.

Method of Measurement. This work will be measured per foot at every location where drain tile enters and exits the right-of-way.

Basis of Payment. This work will be paid for at the contract price per Foot for STORM SEWER, PROTECTED of the size noted in the plans, complete in place and accepted by the Engineer. Work shall include all excavation, Contractor's determination of the size, elevation and location, disposal, materials, labor and equipment, pipe connection, backfill and cleanup as needed to install the necessary items at the right-of-way line, to the satisfaction of the Engineer.

## **TEMPORARY STORM SEWER**

This work shall consist of the construction of temporary storm sewer as indicated on the plans or as directed by the Engineer.

Temporary storm sewer shall be constructed to provide a fully functional storm sewer system throughout the projects staged construction. Upon completion of the permanent sewers and at the direction of the Engineer, the temporary storm sewer shall be removed and disposed of. All work shall comply with the applicable portions of Section 550, 551 and Section 605 of the Standard Specifications.

Materials shall meet the requirements of Article 550.02 of the Standard Specifications.

Temporary Storm Sewers of different class, types and diameters will be measured for payment in place in feet.

This work will be paid for at the contract unit price per Foot for TEMPORARY STORM SEWER of the class, type and diameters specified. The unit price shall include all materials, labor, equipment and all miscellaneous work necessary to complete the installation, remove and dispose of the items.

## **TEMPORARY INLETS AND MANHOLES**

This work shall consist of construction of temporary drainage structures that provide inlets into the temporary storm sewer as indicated on the plans or as directed by the Engineer.

Temporary drainage structures shall be constructed to provide a fully functional storm sewer system throughout the projects staged construction. Upon completion of the permanent sewers and at the direction of the Engineer the temporary drainage structures shall be removed and disposed of. All work shall comply with the applicable portions of Section 550, 551 and Section 605 of the Standard Specifications. Materials shall meet the requirements of Article 550.02 of the Standard Specifications.

Temporary Manholes and Inlets of different types and diameters, with frames and grates or closed lids of different types will be measured per each for payment in place.

This work will be paid for at the contract unit price per Each for TEMPORARY INLETS or TEMPORARY MANHOLES of the class, type and diameters specified. The unit price shall include all materials, labor, equipment and all miscellaneous work necessary to complete the installation, removal and disposal of the items.

## **EROSION CONTROL CURB**

Description. This work shall consist of constructing concrete curb at bridge approach inlets. The curb shall be constructed in accordance with Section 606 of the Standard Specifications, and the detail shown in the plans, including all concrete reinforcing steel, seal coat of concrete, and other miscellaneous structural details as needed. All shall be completed to the satisfaction of the Engineer.

Method of Measurement. This work will be measured per linear foot of curb installed.

Basis of Payment. This work will be paid for at the contract price per Foot of EROSION CONTROL CURB, complete in place and accepted by the Engineer. Work shall include all excavation, disposal, form work, materials, labor and equipment, backfill and clean up as needed to install the curb, to the satisfaction of the Engineer.

## **ENGINEER'S FIELD OFFICE, TYPE A (SPECIAL)**

This item shall consist of furnishing and maintaining an Engineer's Field Office as specified in Article 670.01 of the Standard Specifications and herein.

The field office shall have a ceiling height of not less than 2m (7 ft) and a floor space of not less than 185 sq m (2000 sq.ft.). The office shall be provided with sufficient heat, natural or artificial light and air conditioning. Doors and windows shall be equipped with locks approved by the Engineer.

1. Adequate all weather parking space shall be available to accommodate a minimum of twenty vehicles.
2. Sanitary facilities shall include hot and cold potable running water, lavatory and toilet as an integral part of the office.
3. Solid waste disposal consisting of ten waste baskets and an outside trash container of sufficient size to accommodate a weekly provided pick-up service. Weekly garbage pick-up service shall be provided.
4. The Contractor shall provide the following equipment and furniture meeting the approval of the Engineer.
  - a. Eight desks with minimum working surface 1.8m x 1.2m (72 in. x 48 in.) each.
  - b. Two desks with minimum working surface 1.1 m x 750 mm (42 in. x 30 in.) with height adjustment of 585 to 750 mm (23 in. to 30 in.) for computer use.
  - c. Ten non-folding office chairs on wheels with upholstered seats, arm rests and backs.
  - d. Two 4-post drafting tables with minimum top size of 950mm x 1.2m (37- ½ in. x 48 in.). The top shall be basswood or equivalent and capable of being tilted through an angle of 50 degrees. Three adjustable height drafting stools with upholstered seats and backs shall also be provided.

- e. Three freestanding file cabinets with locks, legal size, four drawers, with an Underwriter's Laboratories insulated file device 350 degrees one hour rating.
- f. Fifteen folding chairs or stackable chairs.
- g. One equipment cabinet with lock of minimum dimension of 1100mm (44 in.) x 600mm (24in.) x 750mm (30 in.) deep. The walls shall be of steel with a 2mm minimum thickness with concealed hinges and enclosed lock constructed in such a manner as to prevent entry by force. The cabinet assembly shall be permanently attached to a structural element of the office in a manner to prevent theft of the entire cabinet.
- h. One office-style refrigerator with a minimum size of 0.4 cubic meters (16 cu ft) with a freezer unit.
- i. Four electric desk type tape printing calculators and four pocket scientific notation calculators with a 1000 hour battery life.
- j. Five telephones, including at least two cordless phones, and three telephone answering machines (or voice mail feature on 3 phone lines). One telephone shall have speaker phone capability. Six telephone lines shall be provided including one for the fax machine and two for modems. Additional features on the three voice lines shall include caller ID and 3-way calling.
- k. One photocopy machine (including maintenance and operating supplies) capable of copying field books. Supply paper and trays for 215mm x 280mm (8-1/2 in. x 11 in.); 215mm x 355mm (8-1/2 in. x 14 in.); and 280mm x 430mm (11 in. x 17 in.) sizes. The copier shall be complete with automatic feed and sorter. The machine shall be capable of scanning, copying and printing in color. The machine shall also be capable of being connected to multiple computers in the office.
- l. One telecommunication fax machine, including maintenance and operating supplies. The fax machine shall use plain paper. One table for the fax machine.
- m. One electric water cooler dispenser.
- n. One first-aid cabinet, fully equipped.
- o. Two dry-erase marker boards minimum size 700 mm x 1.0 m (28 in. x 40 in.) with markers and erasers.
- p. Four bulletin boards minimum size 700 mm x 1.0 m (28 in. x 40 in.)
- q. One microwave oven.
- r. One conference table or group of tables which can be arranged together to create a table that will seat at least 15 people.
- s. One storage cabinet minimum size 450 mm (18 in.) wide x 300 mm deep (12 in.) x 1500 mm (60 in.) with four adjustable shelves.

- t. Bookshelves - A minimum of 300mm (12 in.) deep and a minimum total available length of 30 m (100 ft).
  - u. 3-6 foot folding tables.
5. The office space shall be maintained and kept in a clean condition, and free of insects and rodents, at all times. The Contractor shall provide janitorial and/or cleaning service a minimum of once a week. Windows should be cleaned as directed by the Engineer. Maintenance shall include, but not be limited to, paper towels, soap, toilet paper, and other necessary supplies. No additional compensation will be allowed for providing this service, but it shall be included in the item ENGINEER'S FIELD OFFICE, TYPE A (SPECIAL).
  6. An electronic security system that will respond to any breach of exterior doors and windows with an on-site alarm shall be provided. The Contractor shall be responsible for security of the field office building and is liable for damages incurred as a result of vandalism, theft, and other criminal activities. Broken windows shall be replaced at no additional cost.
  7. The Contractor will be responsible for systems maintenance and repairs, which shall include the heating, cooling, sanitary, and water distribution systems and light bulb replacements.
  8. Fire extinguishers meeting the local municipalities' requirements shall be provided.
  9. Window Shades or blinds shall be provided for all windows, as directed by the Engineer.
  10. The Contractor shall be responsible for snow removal from parking areas and sidewalks surrounding the building.
  11. The Contractor shall pay the cost of any building or equipment inspections by the local municipality. The Contractor shall also pay all costs to comply with the maintenance type inspection findings.
  12. The Contractor shall provide a high speed internet service connection telephone DSL, cable broadband or CDMA wireless technology. Additionally, a wireless router capable of supplying adequate signal to the field office shall be provided.

Basis of Payment. The building, fully equipped as specified herein and accepted by the Engineer, will be paid for on a monthly basis until the building is released by the Engineer. The Contractor will be paid the contract bid price Each Month, provided the building is maintained, equipped, and utilities furnished. The building, fully equipped and maintained as specified herein, will be paid for at the contract unit price per Calendar Month or fraction thereof for ENGINEER'S FIELD OFFICE, TYPE A, (SPECIAL). This price shall include all utility costs and shall reflect the salvage value of the building, equipment and furniture which becomes the property of the Contractor after release by the Engineer, except that the Department will pay that portion of each monthly long distance telephone bill in excess of \$50.

### **ENGINEER'S FIELD LABORATORY (SPECIAL)**

This item shall consist of furnishing and maintaining an Engineer's Field Laboratory as specified in Article 670.01 of the Standard Specifications and herein.

The field laboratory shall have a ceiling height of not less than 2 m (7 ft) and a floor space of not less than 35 sq m (380 sq.ft.). The laboratory shall be provided with sufficient heat, natural and artificial light and air conditioning. Sanitary facilities shall include hot and cold potable running water, lavatory and toilet as an integral part of the office. Doors and windows shall be equipped with locks approved by the Engineer.

The Engineer's Field Laboratory shall be equipped with an electronic security system that will respond to any breach of exterior doors and windows with an on-site alarm will be provided. The Contractor shall be responsible for the security of the field office building and is liable for damages incurred as a result of vandalism, theft, and other criminal activities. Broken windows shall be replaced at no additional cost.

The Contractor will be responsible for systems maintenance and repairs, which shall include the heating, cooling, sanitary, and water distribution systems and light bulb replacements.

Windows shall be equipped with exterior screens to allow adequate ventilation. Window shades or blinds shall be provided for all windows, as directed by the Engineer. Fire extinguishers meeting the local municipalities' requirements shall be provided.

The Contractor shall be responsible for snow removal from parking areas and sidewalks surrounding the building.

The Contractor shall pay the cost of any building or equipment inspections by the local municipality. The Contractor shall also pay all costs to comply with the maintenance type inspection findings.

The lab space shall be maintained and kept in a clean condition, and free of insects and rodents, at all times. The Contractor shall provide janitorial and/or cleaning service a minimum of once a week. Windows should be cleaned as directed by the Engineer. Maintenance shall include, but not be limited to, paper towels, soap, toilet paper, and other necessary supplies. No additional compensation will be allowed for providing this service, but it shall be included in the item ENGINEER'S FIELD LABORATORY (SPECIAL).

In addition, the following equipment and furniture meeting the approval of the Engineer shall be furnished:

- (a) Four desks with minimum working surface 1.8 m x 1.2 m (72 in. x 48 in.) each and five non-folding chairs with upholstered seats, arm rests and backs
- (b) One microwave oven
- (c) One microwaveable tray

- (d) One free standing four drawer legal size file cabinet with lock and an underwriters' laboratories insulated file device 350 degrees one hour rating
- (e) Two pocket scientific notation calculators with a 1000 hour battery life
- (f) One first-aid cabinet fully equipped
- (g) One service sink and water supply for testing purposes
- (h) One work bench 900 mm x 3 m x 900 mm (3 ft x 10 ft x 36 in.) high with drawers and cabinets below and three 110 volt, 20 amp outlets above the bench
- (i) A digital scale of at least 11.5 kg (25 lbs) capacity sensitive to 0.1 g (0.003 oz)
- (j) Cleaning supplies as necessary
- (k) A uniform, rigid foundation, such as provided by a cube of concrete weighing not less than 90 kg (200 lbs), for use when performing soil proctor tests
- (l) One photocopy machine with automatic feed capable of reproducing prints up to legal size [ 215 mm x 355 mm (8 1/2 in. x 14 in.)], including maintenance and reproduction paper
- (m) One electric water cooler dispenser
- (n) Bookshelves a minimum of 300mm (12 in.) deep and a minimum total available length of 10m (30 ft)
- (o) One equipment cabinet of minimum inside dimension of 1500 mm (60 in.) high x 900 mm (36 in.) wide x 750 mm (30 in.) deep
- (p) One office-style refrigerator with a minimum size of 0.4 cubic meters (16 cu ft) with a freezer unit
- (q) One dry-erase marker board minimum size 700 mm x 1.0 m (28 in. x 40 in.) with markers and erasers
- (r) One bulletin board minimum size 700 mm x 1.0 m (28 in. x 40 in.)
- (s) A cabinet or vault shall be provided for the nuclear density equipment which shall have a suitable barrier system of concrete, steel, lead, or other radiation barrier material and shall remain at the job site. It shall have a dimension capable of holding two nuclear gauges being stored at the job site and shall have a lock for security to prevent intruders from gaining access to the equipment. All walls and doors of the unit shall be sufficient thickness to prevent any radiation leakage from the equipment should a malfunction occur which would allow this leakage.

Basis of Payment. The building, fully equipped as specified herein and accepted by the Engineer, will be paid for on a monthly basis until the building is released by the Engineer. The Contractor will be paid the contract bid price Each Month, provided the building is maintained, equipped, and utilities furnished. The building, fully equipped and maintained as specified herein, will be paid for at the contract unit price per Calendar Month or fraction thereof for ENGINEER'S FIELD LABORATORY (SPECIAL). This price shall include all utility costs and shall reflect the salvage value of the building, equipment and furniture which becomes the property of the Contractor after release by the Engineer, except that the Department will pay that portion of each monthly long distance telephone bill in excess of \$50.

The Contractor shall be responsible for the repair and maintenance of the field lab. No extra payment will be made for systems maintenance, repairs or for damages incurred as a result of.

### **CHANGEABLE MESSAGE SIGN**

Description. This work shall consist of furnishing, placing, maintaining, operating and removal of temporary portable Changeable Message Signs at locations shown on the plans. This work shall be performed and the signs shall meet the requirements of the applicable portions of Section 701 of the Standard Specifications, applicable highway standards, details as shown in the plans or as directed by the Engineer. Changeable Message Signs shall be used per the physical display and operational requirements described for Portable Changeable Message Signs in the Manual of Uniform Traffic Control Devices (MUTCD) manual.

The location of all Changeable Message Sign associated with maintenance of traffic for each construction stage is scheduled within the plans per construction stage. Some of the Changeable Message signs are included within the traffic control and protection standards for which each is required per standard. Other locations where Changeable Message Sign are shown on the staging plans are also scheduled per construction stage and listed as follows:

| STAGE          | STATION | MAINLINE | DIRECTION | RT/LT | MONTHS        |
|----------------|---------|----------|-----------|-------|---------------|
|                |         |          |           |       | <b>Approx</b> |
| PRE STAGE<br>A | 307+70  | I-474    | EB        | RT    | 0.5           |
|                | 411+00  | I-74     | EB        | RT    | 0.5           |
| PRE STAGE<br>B | 411+00  | I-74     | EB        | RT    | 0.5           |
|                | 757+00  | I-74     | WB        | RT    | 0.5           |
| PRE STAGE<br>C | 411+00  | I-74     | EB        | RT    | 0.25          |
| STAGE 1        | 377+00  | I-474    | EB        | RT    | 1.25          |
|                | 362+11  | I-74     | EB        | RT    | 1.25          |
|                | 739+00  | I-74     | WB        | RT    | 1.25          |
|                | 177+00  | I-155    | NB        | RT    | 1.25          |
|                | 14+15   | Morton   | NB        | RT    | 1.25          |
| STAGE 1B       | 377+00  | I-474    | EB        | RT    | 0.25          |
|                | 362+11  | I-74     | EB        | RT    | 0.25          |
|                | 739+00  | I-74     | WB        | RT    | 0.25          |
|                | 177+00  | I-155    | NB        | RT    | 0.25          |
| STAGE 2A       | 247+50  | I-474    | EB        | RT    | 1.50          |
|                | 247+50  | I-74     | EB        | RT    | 1.50          |
|                | 739+00  | I-74     | WB        | RT    | 1.50          |
|                | 151+50  | I-155    | NB        | RT    | 1.50          |
| STAGE 2B       | 247+50  | I-474    | EB        | RT    | 0.5           |
|                | 247+50  | I-74     | EB        | RT    | 0.5           |
|                | 739+00  | I-74     | WB        | RT    | 0.5           |
|                | 177+00  | I-155    | NB        | RT    | 0.5           |
| STAGE 3A       | 298+50  | I-474    | EB        | RT    | 1.25          |
|                | 298+50  | I-74     | EB        | RT    | 1.25          |
|                | 739+00  | I-74     | WB        | RT    | 1.25          |
|                | 151+50  | I-155    | NB        | RT    | 1.25          |

| STAGE          | STATION  | MAINLINE | DIRECTION | RT/LT | MONTHS<br>Approx |
|----------------|----------|----------|-----------|-------|------------------|
| STAGE 3B       | 308+50   | I-474    | EB        | RT    | 1.0              |
|                | 308+50   | I-74     | EB        | RT    | 1.0              |
|                | 730+00   | I-74     | WB        | RT    | 1.0              |
|                | 151+50   | I-155    | NB        | RT    | 1.0              |
| STAGE 4        | 308+50   | I-474    | EB        | RT    | 1.25             |
|                | 308+50   | I-74     | EB        | RT    | 1.25             |
|                | 730+00   | I-74     | WB        | RT    | 1.25             |
|                | 151+50   | I-155    | NB        | RT    | 1.25             |
| STAGE 4B       | 308+50   | I-474    | EB        | RT    | 0.25             |
|                | 308+50   | I-74     | EB        | RT    | 0.25             |
|                | 730+00   | I-74     | WB        | RT    | 0.25             |
|                | 151+50   | I-155    | NB        | RT    | 0.25             |
| WINTER<br>2013 | 177+00   | I-155    | NB        | RT    | 4.25             |
| STAGE 5        | 308+50   | I-474    | EB        | RT    | 1.0              |
|                | 308+50   | I-74     | EB        | RT    | 1.0              |
|                | 556+77   | I-74     | WB        | RT    | 1.0              |
|                | 700+00   | I-74     | WB        | RT    | 1.0              |
|                | 773+50   | I-74     | WB        | RT    | 1.0              |
|                | 56+20    | Morton   | SB        | RT    | 1.0              |
|                | 20+75    | Morton   | NB        | RT    | 1.0              |
| STAGE 6        | 308+50   | I-474    | EB        | RT    | 0.5              |
|                | 308+50   | I-74     | EB        | RT    | 0.5              |
|                | 556+77   | I-74     | WB        | RT    | 0.5              |
|                | 700+00   | I-74     | WB        | RT    | 0.5              |
|                | 773+50   | I-74     | WB        | RT    | 0.5              |
|                | 56+20    | Morton   | SB        | RT    | 0.5              |
|                | 20+75    | Morton   | NB        | RT    | 0.5              |
|                | STAGE 7A | 308+50   | I-474     | EB    | RT               |
| 308+50         |          | I-74     | EB        | RT    | 1.0              |
| 556+75         |          | I-74     | WB        | RT    | 1.0              |
| 773+50         |          | I-74     | WB        | RT    | 1.0              |
| 39+00          |          | I-155    | NB        | RT    | 1.0              |
| 56+20          |          | Morton   | SB        | RT    | 1.0              |

| STAGE | STATION | MAINLINE | DIRECTION | RT/LT | MONTHS        |
|-------|---------|----------|-----------|-------|---------------|
|       | 20+75   | Morton   | NB        | RT    | Approx<br>1.0 |

|          |        |        |    |    |      |
|----------|--------|--------|----|----|------|
| STAGE 7B | 308+50 | I-474  | EB | RT | 0.25 |
|          | 308+50 | I-74   | EB | RT | 0.25 |
|          | 561+25 | I-74   | WB | RT | 0.25 |
|          | 700+00 | I-74   | WB | RT | 0.25 |
|          | 773+50 | I-74   | WB | RT | 0.25 |
|          | 39+00  | I-155  | NB | RT | 0.25 |
|          | 56+20  | Morton | SB | RT | 0.25 |
|          | 20+75  | Morton | NB | RT | 0.25 |

|         |        |        |    |    |     |
|---------|--------|--------|----|----|-----|
| STAGE 8 | 308+50 | I-474  | EB | RT | 1.0 |
|         | 308+50 | I-74   | EB | RT | 1.0 |
|         | 561+25 | I-74   | WB | RT | 1.0 |
|         | 700+00 | I-74   | WB | RT | 1.0 |
|         | 773+50 | I-74   | WB | RT | 1.0 |
|         | 39+00  | I-155  | NB | RT | 1.0 |
|         | 56+20  | Morton | SB | RT | 1.0 |
|         | 20+75  | Morton | NB | RT | 1.0 |

|         |        |        |    |    |     |
|---------|--------|--------|----|----|-----|
| STAGE 9 | 308+50 | I-474  | EB | RT | 1.0 |
|         | 308+50 | I-74   | EB | RT | 1.0 |
|         | 556+75 | I-74   | WB | RT | 1.0 |
|         | 561+25 | I-74   | WB | RT | 1.0 |
|         | 700+00 | I-74   | WB | RT | 1.0 |
|         | 773+50 | I-74   | WB | RT | 1.0 |
|         | 39+00  | I-155  | NB | RT | 1.0 |
|         | 56+20  | Morton | SB | RT | 1.0 |
|         | 20+75  | Morton | NB | RT | 1.0 |

|          |        |       |    |    |      |
|----------|--------|-------|----|----|------|
| STAGE 10 | 308+50 | I-474 | EB | RT | 0.75 |
|          | 308+50 | I-74  | EB | RT | 0.75 |
|          | 556+75 | I-74  | WB | RT | 0.75 |
|          | 561+25 | I-74  | WB | RT | 0.75 |
|          | 700+00 | I-74  | WB | RT | 0.75 |
|          | 773+50 | I-74  | WB | RT | 0.75 |
|          | 39+00  | I-155 | NB | RT | 0.75 |

FAI Routes 74 & 155 (I-74 & I-155)  
 Project ACIM-ACBRI-000S(907)  
 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620

| STAGE | STATION | MAINLINE | DIRECTION | RT/LT | MONTHS |
|-------|---------|----------|-----------|-------|--------|
|       | 56+20   | Morton   | SB        | RT    | 0.75   |
|       | 20+75   | Morton   | NB        | RT    | 0.75   |

|          |        |        |    |    |      |
|----------|--------|--------|----|----|------|
| STAGE 11 | 308+50 | I-474  | EB | RT | 1.25 |
|          | 308+50 | I-74   | EB | RT | 1.25 |
|          | 561+25 | I-74   | WB | RT | 1.25 |
|          | 700+00 | I-74   | WB | RT | 1.25 |
|          | 773+50 | I-74   | WB | RT | 1.25 |
|          | 17+50  | I-155  | NB | RT | 1.25 |
|          | 39+00  | I-155  | NB | RT | 1.25 |
|          | 56+20  | Morton | SB | RT | 1.25 |
|          | 20+75  | Morton | NB | RT | 1.25 |

|          |        |        |    |    |     |
|----------|--------|--------|----|----|-----|
| STAGE 12 | 308+50 | I-474  | EB | RT | 1.5 |
|          | 308+50 | I-74   | EB | RT | 1.5 |
|          | 561+25 | I-74   | WB | RT | 1.5 |
|          | 700+00 | I-74   | WB | RT | 1.5 |
|          | 773+50 | I-74   | WB | RT | 1.5 |
|          | 17+50  | I-155  | NB | RT | 1.5 |
|          | 39+00  | I-155  | NB | RT | 1.5 |
|          | 56+20  | Morton | SB | RT | 1.5 |
|          | 20+75  | Morton | NB | RT | 1.5 |

|                |        |       |    |    |     |
|----------------|--------|-------|----|----|-----|
| WINTER<br>2014 | 138+00 | I-155 | NB | RT | 4.5 |
|----------------|--------|-------|----|----|-----|

|           |        |       |    |    |      |
|-----------|--------|-------|----|----|------|
| STAGE 13A | ADV    | I-74  | WB | RT | 1.75 |
|           | 704+00 | I-74  | WB | RT | 1.75 |
|           | 138+00 | I-155 | NB | RT | 1.75 |

|           |        |       |    |    |     |
|-----------|--------|-------|----|----|-----|
| STAGE 13B | 704+00 | I-74  | WB | RT | 0.5 |
|           | 138+00 | I-155 | NB | RT | 0.5 |

|          |        |       |    |    |      |
|----------|--------|-------|----|----|------|
| STAGE 14 | 138+00 | I-155 | NB | RT | 2.25 |
|----------|--------|-------|----|----|------|

|           |        |       |    |    |      |
|-----------|--------|-------|----|----|------|
| STAGE 14B | 138+00 | I-155 | NB | RT | 0.25 |
|-----------|--------|-------|----|----|------|

|           |        |       |    |    |      |
|-----------|--------|-------|----|----|------|
| STAGE 14C | 138+00 | I-155 | NB | RT | 0.25 |
|-----------|--------|-------|----|----|------|

In addition, Changeable Message Signs will be required to be in operation a minimum of one week prior to the beginning of initial construction activity and will serve to facilitate incident management. They will remain in place for the 27 month duration of the contract. These Changeable Message Signs are listed as follows:

- Eastbound I-74, 1.0 mile west of the Pinecrest Drive exit.
- Eastbound I-474, 1.0 mile west of the westbound I-74 exit (left) ramp.
- Westbound I-74, 1.0 mile east of the Eureka Street (IL 117) exit.
- Westbound I-74, 1.0 mile east of the Morton Avenue exit (Morton Avenue Ramp B).
- Northbound Morton Avenue, 50 feet north of Jackson Street.
- Southbound Morton Avenue, 50 feet south of Courtland Street.
- Northbound I-155, 1.0 mile south of the Broadway Road exit.
- Northbound I-155, 1.0 mile south of the Birchwood Street (IL 98) exit.
- Eastbound Birchwood Street, 150 feet east of Erie Avenue.
- Westbound Birchwood Street, 100 feet west of Detroit Avenue.

Method of Measurement. Individual Changeable Message Signs as listed above or as amended by direction of the Engineer shall be measured in place beginning with the date of scheduled operation and extending for the calendar duration of use at that recorded location rounded to the nearest 0.25 month.

Basis of Payment. This work will be paid for at the contract unit price per Calendar Month as determined separately for Each Sign as CHANGEABLE MESSAGE SIGN.

When portable Changeable Message Signs are shown on the Traffic Control and Protection Standards referenced in the plans and within the Traffic Control Plan special provision, this work will not be paid for separately, but shall be included in the Special Provision for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

### **TEMPORARY SIGN PANEL OVERLAY**

This work shall consist of furnishing, fabricating, and installing temporary sign panel overlays by attaching them onto an existing sign face which will not be used as a permanent sign at the conclusion of the construction project.

This work shall also include maintaining the sign installation through the duration of the contract.

This work shall also include removal when removal of the temporary sign panel overlay is indicated in the plans.

The sign sizes shown on the plans shall be verified in the field by the Contractor. The Department assumes no responsibility for the accuracy of the dimensions shown on the plans.

Sign Panels. The reflective sheeting be mounted on sheet aluminum, 2 mm. (0.08 in) thick, meeting Article 1090.02 of Standard Specifications.

Sign Face. The sign face material shall be in accordance with Article 1091 of the Standard Specifications.

Installation. The installation of the Temporary Sign Panel Overlay shall be in accordance with Article 721.03 of the Standard Specifications except the existing sign shall not be stripped of its existing legend prior to attachment of the Temporary Sign Panel Overlay. Durable clamps which meet the approval of the Engineer may also be used to secure the Temporary Sign Panel Overlay to the existing sign panel in lieu of rivets if at least three common edges are present and the clamps do not obscure the new message.

Method of Measurement. Temporary Sign Panel Overlay will be measured for payment in Square Feet. The area used for measurement shall be the actual area of the Temporary Sign Panel Overlay.

Removal of the Temporary Sign Panel Overlay, when necessary, shall be included in the cost of the Temporary Sign Panel Overlay.

Basis of Payment. This work will be paid for at the contract unit price per Square Feet for TEMPORARY SIGN PANEL OVERLAY.

## **REMOVE EXISTING RIPRAP**

Description. This work shall consist of removing existing riprap at the locations as shown in the plans or as directed by the Engineer in accordance with the applicable portions of Section 501 of the Standard Specifications unless modified herein. The concrete existing riprap and associated appurtenance are to be disposed of in accordance with Article 202.03 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price square yard for REMOVE EXISTING RIPRAP, which price shall include all labor, equipment, materials and all work necessary to complete this work.

Excavation required or necessary fill, removal of filter fabric and aggregate bedding will not be paid for separately but shall be considered as included in the contract unit price bid for remove existing riprap and no further compensation will be allowed.

## **SAW CUTTING**

This work shall consist of sawing a full depth, perpendicular, straight joint at the ends and all edges of portions of pavements or appurtenances to be removed. Saw cutting of existing or temporary pavements shall be timely performed during the staged construction of the project to ensure that all proposed pavement joints are properly located as defined in the project documents.

Any damage done to the existing or temporary pavement or appurtenances that are to remain in place shall be repaired or removed and replaced as directed by the Engineer.

Saw cutting shall not be separately measured for payment. The work shall be included in the cost of the various pavement removal items within the contract.

## **TEMPORARY PAVEMENT REMOVAL**

Description. This item shall include all materials, labor, and equipment necessary to remove temporary pavement in accordance with applicable portions of Section 440 of the Standard Specifications and the details in the plans except as herein specified.

When portions of existing previously placed temporary pavement are to remain in place, provisions shall be made for satisfactory transitions between replacements and the portions remaining in place. A full depth, perpendicular, straight joint shall be sawn at the ends of all edges of portions to be removed. Any damage done to the temporary pavement that is to temporarily remain in place shall be repaired or removed and replaced as directed by the Engineer.

Materials resulting from the removal of temporary pavement shall be disposed of according to Article 202.03.

Method of Measurement. Temporary pavement removal shall be measured for payment in place in Square Yards. Saw cutting of temporary pavement shall not be separately measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per Square Yard for TEMPORARY PAVEMENT REMOVAL which price shall be payment in full for all materials, labor and equipment necessary to perform the work as herein specified.

## **AGGREGATE SHOULDER REMOVAL**

This item shall consist of the removal of temporary aggregate shoulders that are placed adjacent to temporary pavements as part of the Maintenance of Traffic and Construction Staging for the project.

The work shall be performed in accordance with Section 440 of the Standard Specifications. Disposal of the aggregate shoulder materials shall be according to Section 202.03 of the Standard Specification.

This work shall be measured on the basis of the length, width and depth of aggregate shoulder as measured in place for pay item Aggregate Shoulders, Type B 6" and as converted to units of Cubic Yards.

Existing aggregate shoulders that may be in placed along existing pavements, shoulders, or in conjunction with existing guardrails shall not be measured separately for payment. Such aggregate materials shall be removed only when necessary as earth excavation according to Section 202 of the Standard Specifications.

This work shall be paid for at the contract unit price per Cubic Yard for AGGREGATE SHOULDER REMOVAL.

## **FENCE REMOVAL**

Description. This work shall consist of all labor, equipment and material for the complete removal and proper disposal of existing fences at the locations shown in the plans. The Contractor shall completely remove the fencing, including posts, and dispose of the material in accordance with Article 202.03 of the Standard Specifications. A terminal post shall be set in accordance with Section 665 of the Standard Specifications, and Highway Standard 665001, at the locations where the removal begins or ends, and there is existing fence to remain. The existing fence to remain shall be connected to the terminal post with a stretcher bar and bands as detailed in Highway Standard 665001. All postholes shall be backfilled and compacted to the satisfaction of the Engineer.

Method of Measurement. Fence to be removed shall be measured in place in feet for payment prior to removal. The line posts and terminal posts shall not be measured for payment separately.

Basis of Payment. This work shall be paid for at the contract unit price per Foot for FENCE REMOVAL, which price shall include all labor, equipment and material to complete the work and no additional compensation will be allowed.

## **FILLING EXISTING CULVERTS**

This work shall consist of filling existing pipe culverts with controlled Low Strength Material meeting the requirements of Sections 593 of the Standard Specifications. The culverts to be filled are as follows:

Morton Avenue Station 34+51 -- Existing 36" RCP, Truncated length = 205 feet

The culverts shall be plugged on both ends with a plug material meeting the approval of the Engineer. The plug shall be adequate to withstand the hydrostatic load created during the filling operation. If the plugs fail during the filling operation, the Contractor shall be responsible for the cost of repairing the plugs and filling the remainder of the culvert.

This work shall be paid for at the contract unit price Each for FILLING EXISTING CULVERTS which price shall include all labor equipment and material required to plug the pipe ends and fill each pipe. Each culvert location filled will be paid for separately.

## **TEMPORARY CONCRETE BARRIER REFLECTORS**

Installation of reflectors shall be in accordance with the Traffic Control Standards, plan details, and specifications. Installation shall be according to Section 782 of the standard specifications. Reflectors shall be installed facing approaching traffic on all temporary concrete barriers that separate traffic from the work zone or which provide clear-zone slope protection. Reflectors may need to be removed and reinstalled on some temporary concrete barriers when they are relocated.

Reflectors mounted on temporary concrete barrier will not be measured for payment and shall be included in the cost of pay items associated with temporary concrete barrier.

## **TEMPORARY PAVEMENT**

This item shall include all materials, labor and equipment necessary to construct temporary pavement in accordance with applicable sections of the Standard Specifications except as herein specified.

The Contractor shall have the option of constructing temporary pavement made of either Hot-Mix Asphalt 10 3/4" or 9 1/2" PCC Base Course, with the exception herein:

Temporary pavement at the temporary I-74 Runaround pavement, temporary I-155 Ramp F pavement and the temporary pavement placed between Morton Avenue and Morton Avenue Ramp E shall be either 9 1/2" PCC Base Course or Hot Mix asphalt pavement consisting of 2" HMA Surface with 8 3/4" HMA Base Course.

Hot-Mix Asphalt base course shall be placed in accordance with applicable portions of Section 406. Material for Hot-Mix Asphalt shall be Hot-Mix Asphalt Binder Course IL-19.0 in accordance with Sections 406. PCC base course shall be in accordance with Section 353.

This work will be paid for at the contract unit price per Square Yard for TEMPORARY PAVEMENT which price shall be payment in full for all materials, labor and equipment including bituminous and aggregate prime coat necessary to perform the work as herein specified.

Removal of Temporary Pavement will be paid for separately in accordance with the specification for Temporary Pavement Removal and Section 440 of the Standard Specifications.

## **TRAFFIC CONTROL SURVEILLANCE (SPECIAL)**

The Contractor shall provide a traffic control supervisor for each day lane closures are used on the project, in accordance with contract provisions and as directed by the Engineer.

The traffic control supervisor shall be certified as a Traffic Control Supervisor by the American Traffic Safety Services Association (ATSSA), or the National Safety Council (NSC). A copy of the traffic control supervisor's certification shall be provided to the Engineer at the project pre-construction conference.

The Contractor shall, at the pre-construction conference, designate a traffic control supervisor who shall be responsible for and perform the traffic control management. The traffic control supervisor shall either be an employee of the Contractor other than the superintendent, or an employee of a firm which has a subcontract for overall traffic control management of the project. The traffic control supervisor shall be responsible for the management of the traffic control operations of the project, including those of the Contractor, subcontractor and suppliers. The primary responsibility of the traffic control supervisor shall be the traffic control management of this project.

The traffic control supervisor shall have the authority needed to effectively require modifications and maintenance of traffic controls. This includes having the authority necessary to obtain and use all labor, equipment, and materials needed to provide and maintain traffic control in routine and emergency situations.

Traffic control management by the traffic control supervisor includes, but is not limited to:

1. Ensuring that traffic control devices are functioning as required. This includes the repair or replacement of all signs, barricades and other traffic devices that become damaged, moved, or destroyed, or lights that cease to function properly, and barricade weights that are damaged or otherwise fail to stabilize barricades.
2. Providing sufficient surveillance of signs, barricades and other traffic control devices on a 24-hour a day basis. Making sure traffic control devices are inspected every calendar day that traffic control devices are in use. Routine surveillance inspections are required on a four hour interval and recorded on the form furnished by the Engineer on a daily basis. The complete form shall be submitted to the Engineer on the first working day after the inspection.
3. The traffic control supervisor will be on the project full time every working day, "on call" at all times, and available within 45 minutes of notification, at other than normal working hours. The Contractor shall give to the Engineer the names, addresses and telephone numbers of at least three individuals (one of which is the traffic control supervisor) responsible to provide and ensure immediate attention to the traffic control management.
4. Preparing, revising, and submitting the changes to the traffic control plan as required.
5. Directing and supervising all project flaggers.
6. Coordinating all traffic control operations, including those of subcontractors and suppliers.
7. Coordinating project activities which require lane closures
8. Coordinating project activities with appropriate police and fire control agencies.
9. Maintaining a project traffic control diary, which shall become a part of the Department's project records.
10. Overseeing all requirements covered by the plans and specifications which contribute to the convenience, safety, and orderly movement of traffic.

11. Contact the Resident Engineer for the purpose of notifying the Departments Public Relations Manager about beginning road work, traffic staging changes, new lane closures, or other work operations for the purpose of timely communicating information to the Departments Public Relations Manager. Establishing communication with the Resident Engineer and the Departments Traffic Control Supervisor so that any accidents will be reviewed daily to determine if changes in traffic control are necessary.
12. Providing sufficient surveillance of all changeable message boards (CMB) to ensure the following:
  - a) Correct and current information is always provided
  - b) Proper placement of CMB's
  - c) CMB's are turned off when messages are no longer necessary.
13. Ensuring that work zone speed limits are properly installed.
14. Maintaining constant communication with the Resident Engineer, the Departments Traffic Control Supervisor, and the District Communications Center. As part of this requirement, the traffic control supervisor will be required to have a work vehicle and cellular telephone.

Basis of Payment. This work shall be paid for at the contract unit price per Calendar Day for TRAFFIC CONTROL SURVEILLANCE (SPECIAL), which price shall include all work, equipment and material required to complete this item.

### **ELECTRIC CABLE IN CONDUIT, COMMUNICATION, #20, 3/C**

This work shall be in accordance with Sections 873, 1076 of the Standard Specifications except as modified herein.

The cable will be used to install the emergency vehicle preemption equipment. The cable shall meet or exceed the following minimum specifications:

Approved Cable: Tomar Model M913 Strobecom Detector Cable or Approved Equal Conductors:

- Quantity - 3
- Gauge - AWG #20 (7 x 28) stranding
- Conductor Material - Individually tinned copper strands
- Insulation - PVC, 80C, 600V, 25 mil minimum average thickness

Shield:

- Aluminized polyester film or approved equal, applied with a nominal 20% overlap to provide 100% shield coverage

Drain Wire:

- Gauge - AWG #20 (7 x 28) stranding
- Material - Individually tinned copper strands
- Uninsulated and in contact with the shield conductive surface

Electrical Characteristics:

- Drain and conductor DC resistance shall not exceed 11.0 ohms per thousand feet
- Capacitance from 1 conductor to the other 2 conductors and shield shall not exceed 48 pf/ft at 1000Hz

Jacket:

- Minimum average wall thickness - .045"
- Temperature rating - 80C
- Voltage Rating - 600V
- Material - PVC, Black

Basis of Payment: This work will be paid for at the contract unit price per Foot for ELECTRIC CABLE IN CONDUIT, COMMUNICATION, #20, 3/C which shall be payment in full for all labor, equipment, and materials required to provide and install the cable described above, complete.

**LIGHT DETECTOR  
LIGHT DETECTOR AMPLIFIER**

This work shall be in accordance with Sections 887 and 1072 of the Standard Specifications except as modified herein.

The emergency vehicle preemption system shall be compatible with the existing 3M Opticom system that is installed at multiple intersections in the city of Morton.

The emergency vehicle preemption system shall include a two direction detector, a two channel amplifier, and all necessary components for a complete and fully functional system. The system shall be fully tested by the Contractor at the time of installation.

Basis of Payment: This work will be paid for at the contract unit price Each for LIGHT DETECTOR or LIGHT DETECTOR AMPLIFIER and shall be payment in full for all labor, materials, and equipment required to provide, test, and install the equipment described above, complete.

**SIGN PANEL – TYPE 1**

This work shall be in accordance with Sections 720 and 1090, 1091, and 1092 of the Standard Specifications except as modified herein.

The Contractor shall furnish "Left Turn Yield on Flashing Arrow" signs as shown on the plan sheet detail and install them on the mast arms (to the right of the flashing yellow arrow signal head) at the locations indicated on the plan sheets.

The Contractor shall supply all materials required to install the sign (stainless steel banding, brackets, hardware, etc.) as a part of this pay item.

Basis of Payment: This work shall be paid for at the contract unit price per Square Foot for SIGN PANEL – TYPE 1 which price shall be payment in full for all labor, equipment, and materials required to supply and install the sign panel described above, complete.

#### **UTILITY COMPANY CHARGES FOR PROVIDING ELECTRIC SERVICE**

Charges incurred by the Department for establishing electric services at each dynamic message board location shall be paid for in accordance with Article 109.05 of the Standard Specifications.

The Contractor shall pay all charges directly to the utility companies and shall be reimbursed in accordance with Article 109.05.

The Contractor shall receive as administrative costs an amount equal to five percent of the first \$10,000 and one percent of any amount over \$10,000 of the total actual amount paid per bill with the minimum payment being \$100.

The Contractor shall coordinate with the utility companies and their contractors to install electric services at each location.

This work will not be paid for separately, but shall be included in the contract bid price for ELECTRIC SERVICE INSTALLATION.

#### **HANDHOLE, PORTLAND CEMENT CONCRETE**

This work shall consist of furnishing the materials and constructing a handhole in accordance with the applicable Articles of Section 814 and 1088 of the Standard Specifications with the following modifications:

The lift ring for the cover shall consist of a solid closed ring of stainless steel at least 3/8 inch in diameter. The lift ring shall be attached to the cover by a loop of stainless steel at least 3/8 inch in diameter. The lift ring and loop shall be recessed in the cover.

The Contractor shall install heavy-duty, fully-galvanized hooks, with a minimum diameter of 1/2" in the proposed handhole. The Contractor shall submit this material to the Engineer prior to construction of the handholes.

The lid shall be marked with the legend "Traffic Signals".

Pre-cast handholes are not allowed.

All unsuitable materials shall be disposed of by the Contractor outside the job limits.

Basis of Payment: This work will be paid for at the contract unit price Each for HANDHOLE, PORTLAND CEMENT CONCRETE, which price shall be payment in full for all labor, materials, and equipment required to provide the handhole described above as well as any necessary excavating, backfilling, disposal of unsuitable materials, and furnishing all materials within the limits of the handhole.

## **DOUBLE HANDHOLE, PORTLAND CEMENT CONCRETE**

This work shall consist of furnishing the materials and constructing a double handhole in accordance with the applicable Articles of Section 814 and 1088 of the Standard Specifications with the following modifications:

The lift ring for the cover shall consist of a solid closed ring of stainless steel at least 3/8 inch in diameter. The lift ring shall be attached to the cover by a loop of stainless steel at least 3/8 inch in diameter. The lift ring and loop shall be recessed in the cover.

The Contractor shall install heavy-duty, fully-galvanized hooks, with a minimum diameter of 1/2" in the proposed handhole. The Contractor shall submit this material to the Engineer prior to construction of the handholes.

The lid shall be marked with the legend "Traffic Signals".

Pre-cast handholes are not allowed.

All unsuitable materials shall be disposed of by the Contractor outside the job limits.

Basis of Payment: This work will be paid for at the contract unit price Each for DOUBLE HANDHOLE, PORTLAND CEMENT CONCRETE, which price shall be payment in full for all labor, materials, and equipment required to provide the handhole described above as well as any necessary excavating, backfilling, disposal of unsuitable materials, and furnishing all materials within the limits of the handhole.

## **TEMPORARY TRAFFIC SIGNAL INSTALLATION**

The Contractor shall make all necessary adjustments to the temporary traffic signal heads in order to place the heads over the center of the respective lanes. The adjustments shall be done in accordance with the proposed construction staging and shall be approved by the Engineer.

This work shall be included in the cost of the TEMPORARY TRAFFIC SIGNAL INSTALLATION pay items and will not be paid for separately.

## **RELOCATE EXISTING TRAFFIC SIGNAL EQUIPMENT**

This work shall be in accordance with Section 895 of the Standard Specifications except as modified herein.

The Contractor shall remove the existing master controller, telemetry panel and fiber optic modems, and shelf mounted Intuicom Communicator II master radio interconnect system located at the intersection of US 150 (Jackson St.) & N. Morton Ave. and install it inside the existing traffic signal controller cabinet located at the intersection of Morton Ave. & Bond St.

The Contractor shall remove the existing rack mounted Intuicom Communicator II local radio interconnect system located at the intersection of N. Morton Ave. & Bond St. and install it in the existing traffic signal cabinet located at the intersection of US 150 (Jackson St.) & N. Morton Ave.

The Contractor shall perform the following work:

- Remove the existing master controller (including power supplies, controller cables, etc.), telemetry panel and fiber optic modems, master interconnect radio, and omni directional antenna from the intersection of US 150 (Jackson St.) & N. Morton Ave.
- Remove the local interconnect radio (including power supplies, controller cables, etc.) and yagi antenna from the intersection of N. Morton Ave. & Bond St.
- Install the existing master controller (including power supplies, controller cables, etc.), master interconnect radio, telemetry panel, fiber optic modems, and omni directional antenna at the intersection of US 150 (N. Morton Ave.) & Bond St. The existing controller cabinet is a TS-2 cabinet equipped with an ASC/3 controller and detector rack.
- Install the local interconnect radio (including power supplies, controller cables, etc.) and yagi antenna at the intersection of US 150 (Jackson St.) & N. Morton Ave. The existing cabinet is a TS-2 cabinet equipped with an ASC/3 controller and detector rack.
- The existing antenna cables, brackets, hardware, and other existing components may be re-used in the proposed installation, however, the Contractor shall furnish and install all items required for the master controller and radio installation and the integration of both intersections into the proposed fiber optic closed loop traffic signal system.
- After the temporary traffic signals have been removed from the intersection of N. Morton Ave. & I-74 WB Ramps, the Contractor shall install one of the video detection cameras and processor (that were previously used in the temporary traffic signal installation) for use with the proposed traffic signals at the intersection of N. Morton Ave. & I-74 WB Ramps. The video detection camera shall be installed on the mast arm for southbound Morton Ave. The Contractor shall install the video processor (along with all related components) in the proposed traffic signal cabinet at the intersection. The Contractor shall furnish and install new coax and power cables for the camera as well as all other items required to provide a complete and fully functional video detection system. The Contractor shall aim and set up the video detection system to provide detection for the southbound left turn from Morton Ave onto the I-74 EB Ramp D.

Basis of Payment: This work will be paid for at the contract unit price Each for RELOCATE EXISTING TRAFFIC SIGNAL EQUIPMENT and shall be payment in full for all labor, materials, and equipment required to furnish, install, integrate, and test the equipment described above, complete.

**FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL  
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 cabinet and controller shall be compatible with the existing Econolite closed loop system and Aries remote monitoring software.

The traffic signal cabinet shall have a NEMA TS-2 back panel. The cabinet shall include a malfunction management unit to allow enhanced fault monitoring capabilities. The malfunction management unit shall support flashing yellow arrow operation and be a Reno A&E model MMU-1600G equipped with a graphical display and Ethernet port.

The controller shall be an Econolite ASC/3-2100 NEMA TS-2 Type 2 controller equipped with a FSK telemetry module.

The cabinet, controller, and malfunction management unit shall be configured by the manufacturer for flashing yellow arrow operation.

The malfunction management unit shall be equipped with the latest software and firmware revisions. The cabinet shall be equipped with a plexi-glass shield that covers the power panel which houses the mercury bus relay, line filter, circuit breakers, and other electrical components.

The cabinet shall be equipped with a plexi-glass shield that covers the thermostat and a fluorescent lighting assembly that turns on when the door is opened. The fluorescent lighting assembly shall be equipped with a cold weather ballast and mounted in a location that will not interfere with cabinet maintenance.

The traffic signal cabinet shall be equipped with a sixteen load switch back panel to accommodate future expansion.

The cabinet shall be furnished with a compact heater strip to be used for moisture reduction during cold weather. The heater shall be thermostatically controlled, operate at 120 volts, have a minimum wattage of 150 watts, a maximum wattage of 250 watts, have a shield to protect service personnel and equipment from damaging heat, be separately fused, and be mounted where it does not interfere with a person working in the cabinet.

The cabinet shall be equipped with a twenty-four fiber wall-mountable interconnect center and two six-fiber bulkheads. The cabinet shall also be equipped with any and all other components necessary to provide for a complete and functional fiber optic telemetry.

The cabinet shall be equipped with toggle switch guards for all switches located on the door to prevent accidental switching. The cabinet shall include a high quality deluxe pleated filter.

The cabinet shall be equipped with additional surge protection for the controller, malfunction management unit, and detector amplifiers, and/or video detection system. The surge protector shall be a Transtector model ACP100BWN3 and shall be included in addition to an EDCO SHA-1250 IRS protector. The EDCO SHA-1250 IRS surge protector is to be provided in accordance with Section 1085.47 A(4a) and shall be wired to provide surge protection for the controller, malfunction management unit, and detector amplifiers. The Transtector surge suppressor may be wired to the equipment protected power terminals of the EDCO SHA-1250 IRS unit provided that the controller, MMU, and detection system are protected.

The Contractor shall set up each cabinet in his or her shop for inspection by the Engineer. All phases that are utilized shall be hooked up to a light board to provide observation for each signal indication. The Engineer shall be notified when the setup is complete so that all pertinent timings may be entered into the each traffic signal controller. The facility shall be subject to a seven day burn-in period before installation will be allowed.

After installing the cabinet in the field, prior to resuming normal signal operation, the Contractor shall test the cabinet by connecting a jumper to the cabinet field terminals to ensure that all conflicting signals will place the cabinet into conflict flash and to verify that the cabinet, controller, and malfunction management unit are operating correctly. The Contractor shall make arrangements with the local police agency to provide traffic control during the conflict test.

Basis of Payment: This work will be paid for at the contract unit price Each for FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL or FULL-ACTUATED CONTROLLER AND TYPE V CABINET, SPECIAL and shall be payment in full for all labor, materials, and equipment required to provide, test, and install the equipment described above, complete.

#### **TRAFFIC SIGNAL POST, GALVANIZED STEEL, 15 FT.**

This work shall be in accordance with Sections 878 and 1077 of the Standard Specifications except as modified herein.

The traffic signal post shall be attached to the foundation with four  $\frac{3}{4}$ " x 18" galvanized anchor bolts. The post base shall be secured to the foundation using galvanized nuts and galvanized steel flat washers that have a minimum thickness of  $\frac{1}{4}$ " and are trapezoidal in shape. The washers shall be sized so as to completely capture the mounting flanges of the traffic signal base. Round washers will not be acceptable.

Basis of Payment: This work will be paid for at the contract unit price Each for TRAFFIC SIGNAL POST, GALVANIZED STEEL, 15 FT, which price shall be payment in full for all labor, material, and equipment required to provide and install the traffic signal post and base described above.

## **TRAFFIC SIGNAL LED MODULE SPECIFICATIONS**

The material requirement shall be in accordance with Sections 880 and 1078 of the Standard Specifications except as modified herein.

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 433-1210-003XL |

The LED assembly shall conform to the following minimum specifications:

Lens: 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 shall conform to the following minimum specifications:

Lens: 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: Five-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 shall conform to the following minimum specifications:

Lens: 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: Five-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

#### 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 shall conform to the following minimum specifications:

Lens: 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): 56-58

Product Warranty: Five-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 - STS Part 3.

#### 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 431-3334-001XOD |

The LED assembly shall conform to the following minimum specifications:

Lens: 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: Five-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.

#### 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 432-2374-001XOD

The LED assembly shall conform to the following minimum specifications:

Lens: 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: Five-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.

#### 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 shall 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: Five-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.

## **VIDEO VEHICLE DETECTION SYSTEM, 4 CAMERA**

The video detection system shall be an Iteris Vantage Edge 2 (4 Camera System) or Econolite Autoscope Solo Terra (4 Camera System).

The video vehicle detection system shall include all necessary electric cable, electrical junction boxes, electrical and coaxial surge suppression, hardware, software, programming, and any camera brackets that are required for installation and configuration. These items should be taken into consideration and shall be included in the bid price for the video detection system.

One 12" – 15" color LCD video monitor and 4-camera video selector (if required to switch camera videos) shall be included for each installation to allow for the setup and monitoring of the video detection system.

All vehicle video detection systems shall be equipped with the latest software or firmware revisions.

The video vehicle system shall be configured and installed to NEMA TS2 Standards (use of the SDLC port and BIU). Installation conforming to NEMA TS1 standards will not be allowed.

The minimum requirements for a video vehicle detection system are listed below:

### 1.0 General

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.

### 1.1 System Hardware

The system shall consist of four video cameras and an automatic control unit (ACU). The ACU shall process all detected calls and shall be equipped with the latest firmware revisions.

## 1.2 System Software

The system shall be able to detect either approaching or receding vehicles in multiple traffic lanes. A minimum of 24 detection zones shall be user-definable per camera. The user shall be able to modify and delete previously defined detection zones. The software shall provide remote access operation and shall be the latest revision.

## 2.0 Functional Capabilities

### 2.1 Real-Time Detection

2.2 The ACU shall be capable of simultaneously processing information from up to four (4) video sources. The video shall be digitized and analyzed at a rate of 30 times per second.

2.3 The system shall be able to detect the presence of vehicles in a minimum of 96 detection zones within the combined field of view of the image sensors.

## 3.0 Vehicle Detection

### 3.1 Detection Zone Placement

The video detection system shall provide flexible detection zone placement anywhere and at any orientation within the combined field of view of the image sensors. In addition, detection zones shall have the capability of implementing logical functions including AND and OR.

### 3.2 Optimal Detection

The video detection system shall reliably detect vehicle presence when the image sensor is mounted 10m (30 ft.) or higher above the roadway, when the image sensor is adjacent to the desired coverage area, and when the length of the detection area or field of view (FOV) is not greater than ten (10) times the mounting height of the image sensor. The image sensor shall not be required to be mounted directly over the roadway. A single image sensor, placed at the proper mounting height with the proper lens, shall be able to monitor six (6) to eight (8) traffic lanes simultaneously.

### 3.3 Detection Performance

Overall performance of the video detection system shall be comparable to inductive loops. Using standard image sensor optics and in the absence of occlusion, the system shall be able to detect vehicle presence with 98% accuracy under normal conditions, (days & night) and 96% accuracy under adverse conditions (fog, rain, snow). The ACU shall output a constant call for each enabled detector output channel if a loss of video signal occurs in any camera.

The ACU shall be capable of processing a minimum of twenty detector zones placed anywhere in the field of view of the camera.

#### 4.0 ACU Hardware

##### 4.1 ACU Mounting

The ACU shall be shelf or rack mountable. Nominal outside dimensions excluding connectors shall not exceed 180mm (7.25") x 475mm (19") x 260mm (10.5") (H x W x D).

##### 4.2 ACU Environmental

The ACU shall be designed to operate reliably in the adverse environment found in the typical roadside traffic cabinet. It shall meet the environmental requirements set forth by the NEMA (National Electrical Manufacturers Association) TS1 and TS2 standards as well as the environmental requirements for Type 170 and Type 179 controllers. The minimum operating temperature range shall be from -35°C to +74°C at 0% to 95% relative humidity, non-condensing.

#### 5.0 ACU Electrical

5.1 The ACU shall be modular in design and provide processing capability equivalent to the Intel Pentium microprocessor. The bus connections used to interconnect the modules of the ACU shall be gold-plated DIN connectors.

5.2 The ACU shall be powered by 89 - 135 VAC, 60 Hz, single phase, and draw 0.25 amps, or by 190 - 270 VAC, 50 Hz, single phase and draw 0.12 amps. If a rack mountable ACU is supplied, it shall be capable of operating from 10 to 28 VDC. The power supply shall automatically adapt to the input power level. Surge ratings shall be as set forth in the NEMA TS1 and TS2 specifications.

5.3 Serial communications to a remote computer equipped with remote monitoring software shall be through an RS-232 serial port. A 9-pin "D" subminiature connector on the front of the ACU shall be used for serial communications.

5.4 The ACU shall be equipped with a NEMA TS2 RS-485 SDLC interface for communicating input and output information. Front panel LEDs shall provide status information when communications are open.

5.5 The ACU and/or camera hookup panel shall be equipped with four RS-170 (B&W)/NTSC (color) composite video inputs for coaxial camera connections or, so that signals from four image sensors can be processed in real-time.

5.6 The ACU shall be equipped with a port to provide communications to a computer running the remote access software.

5.7 The ACU and/or camera hookup panels used for a rack mountable ACU shall be equipped with a video output port.

5.8 The ACU shall be equipped with viewable front panel detection LED indications.

5.9 A video switcher that is capable of displaying all four video images on the screen simultaneously shall be provided.

## 6.0 Camera

- 6.1 The video detection system shall use medium resolution, monochrome or color, image sensors as the video source for real-time vehicle detection. As a minimum, each image sensor shall provide the following capabilities:
- a. Images shall be produced with a CCD sensing element with horizontal resolution of at least 500 lines and vertical resolution of at least 350 lines.
  - b. Useable video and resolvable features in the video image shall be produced when those features have luminance levels as low as 0.1 lux at night.
  - c. Useable video and resolvable features in the video image shall be produced when those features have luminance levels as high as 10,000 lux during the day.
  - d. Automatic gain, automatic iris, and absolute black reference controls shall be furnished.
  - e. An optical filter and appropriate electronic circuitry shall be included in the image sensor to suppress "blooming" effects at night.
- 6.2 The image sensor shall be equipped with an integrated zoom lens with zoom and focus capabilities that can be changed using either configuration computer software or hand-held controller. The machine vision processor (MVP) may be enclosed within the camera.
- 6.3 The image sensor and lens assembly shall be housed in an environmental enclosure that provides the following capabilities:
- a. The enclosure shall be waterproof and dust-tight to NEMA-4 specifications.
  - b. The enclosure shall allow the image sensor to operate satisfactorily over an ambient temperature range from -34°C to +74°C while exposed to precipitation as well as direct sunlight.
  - c. The enclosure shall allow the image sensor horizon to be rotated in the field during installation.
  - d. The enclosure shall include a provision at the rear of the enclosure for connection of power and video signal cables fabricated at the factory. Input power to the environmental enclosure shall be either 115 VAC 60 Hertz or 24 VAC/DC 60 Hertz.
  - e. A heater shall be at the front of the enclosure to prevent the formation of ice and condensation in cold weather, as well as to assure proper operation of the lens' iris mechanism. The heater shall not interfere with the operation of the image sensor electronics, and it shall not cause interference with the video signal.

- f. The enclosure shall be light-colored and shall include a sun shield to minimize solar heating. The front edge of the sunshield shall protrude beyond the front edge of the environmental enclosure and shall include provision to divert water flow to the sides of the sunshield. The amount of overhang of the sun shield shall be adjustable to prevent direct sunlight from entering the lens or hitting the faceplate.
  - g. The total weight of the image sensor in the environmental enclosure with sunshield shall be less than 2.7 kg (6 pounds).
  - h. When operating in the environmental enclosure with power and video signal cables connected, the image sensor shall meet FCC class B requirements for electromagnetic interference emissions.
- 6.3 The video output of the image sensor shall be isolated from earth ground. All video connections from the image sensor to the video interface panel shall also be isolated from earth ground.
- 6.4 The video output, communication, and power to the image sensor shall include transient protection to prevent damage to the sensor due to transient voltages occurring on the cable leading from the image sensor to other field locations.
- 6.5 A stainless steel junction box shall be available as an option with each image sensor for installation on the structure used for image sensor mounting. The junction box shall contain a terminal block for terminating power to the image sensor and connection points for cables from the image sensor and from the ACU.
- 6.6 A video interface panel shall be included for installation inside of the traffic cabinet. The panel shall provide coaxial cable / twisted pair connection points and an Edco CNX06-BNCY or approved equal transient suppressor for each image sensor. The shield side of the coaxial cable connection at the transient suppressor shall be connected to earth ground via the transient suppressor.
- If the cable used to connect the video signal from the image sensor to the ACU is to be routed through a conduit containing unbundled AC power cables, a video isolation amplifier shall be installed in addition to the video interface panel if interference is present. There will be no additional compensation for providing the video isolation amplifier if necessitated by the presence of video interference. The isolation amplifier shall buffer the video signal and provide transient suppression. The isolation amplifier shall have a minimum common mode rejection ratio at 60 Hz of 100 dB.
- 6.6 The image sensor shall be connected to the ACU such that the video signal originating from the image sensor is not attenuated more than 3 dB when measured at the ACU. When the connection between the image sensor and the ACU is coaxial cable, the coaxial cable used shall be a low loss 75 ohm precision video cable suited for outdoor installation, such as Belden 8281, West Penn P806, or approved equal.

## 7.0 Software

- 7.1 The system shall include the remote access software that is used to setup and configure the video detection system. The software shall be of the latest revision.
- 7.2 All necessary cable, adapters, and other equipment shall be included with the system.

## 8.0 Installation and Training

- 8.1 The supplier of the video detection system shall supervise the installation and testing of the video and video vehicle detection equipment. A factory certified representative from the supplier shall be on-site during installation.

## 9.0 Warranty, Maintenance, and Support

- 9.1 The video detection system shall be warranted by its supplier for a minimum of two (2) years from date of turn-on. This warranty shall cover all material defects and shall also provide all parts and labor as well as unlimited technical support.
- 9.2 Ongoing software support by the supplier shall include updates of the ACU and supervisor software. These updates shall be provided free of charge during the warranty period.
- 9.3 The supplier shall maintain a program for technical support and software updates following expiration of the warranty period. This program shall be made available to the contracting agency in the form of a separate agreement for continuing support.

Basis of Payment: This work will not be paid for separately, but shall be included in the contract unit price Each for TEMPORARY TRAFFIC SIGNALS, which price shall be payment in full for all labor, equipment, and materials required to furnish, install, and test the video vehicle detection system described above, complete.

## **SIGNAL HEAD, LED**

This work shall be in accordance with Sections 880 and 1078 of the Standard Specifications except as modified herein.

The traffic signal heads shall consist of 12" polycarbonate sections and shall be equipped with LED assemblies for all red bulb, yellow bulb, green bulb, red arrow, yellow arrow, and green arrow indications.

The traffic signal heads shall have a yellow finish with black doors and tunnel visors. The LED signal faces shall be equipped with spade connectors and connected to the traffic signal head terminal block.

The LED modules shall conform to the specifications listed under the section TRAFFIC SIGNAL LED MODULE SPECIFICATIONS.

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.

## **INDUCTIVE LOOP DETECTOR**

This work shall be in accordance with Sections 885 and 1079 of the Standard Specifications except as modified herein.

The detector amplifier shall be equipped with an LCD display that is capable of displaying the loop frequency and inductance and shall conform to the following specifications:

- Custom LCD displays complete status and function settings of the detector.
- All functions are programmable from the front panel LCD "Menu" - no removing of detector to change function settings.
- LCD displays loop frequency, loop inductance, & -L/L% values.
- LCD displays the accumulated number of loop failure incidents since the detector was last reset - helps diagnose intermittent systems.
- LCD bar graph displays loop inductance change to verify ideal sensitivity level setting.
- Selectable "Continuous-CALL" and "Channel-Off" to aid system troubleshooting.
- 8 loop frequencies and 9 levels of sensitivity.
- 2 Selectable modes of operation: Presence or Pulse.
- 255 second CALL Delay and 25.5 second Extension timers.
- 999 second Max. Presence Timer. NEMA TS 2 Status Output.
- EOG (end of green) reset synchronization for Max. Presence timer.
- Super bright LEDS indicate vehicle detection or loop failure.
- Environmentally sealed push button switches to insure trouble-free service.
- Phase Green (Delay Override) input.

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 and EDI Oracle Series 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.

## **TRAFFIC SIGNAL BATTERY BACKUP SYSTEM**

The following models of Battery Backup Systems are approved for use within District Four:

Alpha Novus XFM 1100  
Techpower Development DBL 1000MX

The Contractor shall be responsible for providing Battery Backup Systems that are sized appropriately for the intersection load. The total system load shall not exceed the manufacturer's specifications.

The battery backup systems for the existing traffic signal cabinets shall be installed as shown on the plan detail sheets and as follows:

- A separate circuit breaker shall be installed in the battery backup system cabinet (or in the existing traffic signal cabinet). The circuit breaker shall be rated equivalent to the main power circuit breaker rating in the existing traffic signal cabinet. The Contractor shall install #6 wiring from the test circuit breaker to the line voltage in the traffic signal cabinet. The circuit breaker shall be used to shut off the incoming utility power to test the battery backup system.
- The cabinet light, ventilation fans, heater strips, and service receptacle shall be wired to a separate circuit that will not be powered by the battery backup system.
- A hole of sufficient size for the cables will be drilled into the side of the cabinet to accommodate the battery backup system cables and harnesses from the BBS cabinet. The hole shall be free of sharp edges and equipped with a plastic or rubber grommet.
- The fail safe automatic by-pass switch and blue indicator light shall be installed in the battery backup cabinet (or in the existing traffic signal cabinet).

GENERAL REQUIREMENTS: The Battery Back-up System (BBS) shall include, but not be limited to the following: inverter/charger, power transfer relay, batteries, battery cabinet, a separate failsafe automatic bypass switch and all necessary hardware and interconnect wiring. The BBS shall provide reliable emergency power to a traffic signal in the event of a power failure or interruption. The transfer from utility power to battery power and vice versa shall not interfere with the normal operation of traffic controller, conflict monitor/malfunction management unit or any other peripheral devices within the traffic controller assembly.

The BBS shall provide power for full run-time operation for an "LED-only" intersection (all colors red, yellow, and green) or flashing mode operation for an intersection using Red LED's. As the battery reserve capacity reaches 50%, the intersection shall automatically be placed in all-red flash. The BBS shall allow the controller to automatically resume normal operation after the power has been restored. The BBS shall log an alarm in the controller for each time it is activated.

All Battery Backup Systems shall include four batteries.

The BBS shall be designed for outdoor applications, and shall meet the environmental requirements of, "NEMA Standards Publication No. TS 2 – Traffic Controller Assemblies," or applicable successor NEMA specifications, except as modified herein.

The BBS shall conform to the following specifications:

1.1 OPERATION

- 1.1 The BBS shall be on line and provide voltage regulation and power conditioning when utilizing utility power.
- 1.2 The BBS shall provide a minimum two (2) hours of full run-time operation and four (4) hours all-red flash operation for an "LED-only" intersection (minimum 1000W/1000VA active output capacity, with 80% minimum inverter efficiency).
- 1.3 The maximum transfer time from loss of utility power to switchover to battery backed inverter power shall be 150 milliseconds.
- 1.4 The BBS shall provide the user with 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, rated at a minimum 120V/1A, and labeled so as to identify each contact. For typical configuration, see the plan detail sheet.
- 1.5 A first set of NO and NC contact closures shall be energized whenever the unit switches to battery power. Contact shall be labeled or marked "On Batt."
- 1.6 The second set of NO and NC contact closures shall be energized whenever the battery approaches approximately 40% of remaining useful capacity. Contact shall be labeled or marked "Low Batt."
- 1.7 The third set of NO and NC contact closures shall be energized two hours after the unit switches to battery power. Contact shall be labeled or marked "Timer."
- 1.8 The fourth set of NO and NC contact closures shall be energized in the event of inverter/charger failure, battery failure or complete battery discharge. Contact shall be labeled or marked "BBS Fail or Status."
- 1.9 A surge suppression unit shall be provided for the output power if available as an option by the BBS manufacturer.
- 1.10 Operating temperature for both the inverter/power transfer relay and failsafe automatic bypass switch shall be -37°C to +74°C.
- 1.11 The Power Transfer Relay shall be rated at 240VAC/30AMPS minimum and failsafe automatic bypass switch shall be rated at 240VAC/20 amps, minimum.
- 1.12 The fail safe automatic bypass switch shall be wired to provide power to the BBS when the switch is set to bypass.
- 1.13 The BBS shall use a temperature-compensated battery charging system. The charging system shall compensate over a range of 2.5 – 4.0 mV/°C per cell.
- 1.14 The temperature sensor shall be external to the inverter/charger unit. The temperature sensor shall come with 2 meters (6'6") of wire.

- 1.15 Batteries shall not be recharged when battery temperature exceeds  $50^{\circ}\text{C} \pm 3^{\circ}\text{C}$ .
- 1.16 BBS shall bypass the utility line power whenever the utility line voltage is outside of the following voltage range: 100VAC to 130VAC ( $\pm 2\text{VAC}$ ).
- 1.17 When utilizing battery power, the BBS output voltage shall be between 110 VAC and 125 VAC, pure sine wave output,  $\pm 3\%$  THD,  $60\text{Hz} \pm 3\text{Hz}$ .
- 1.18 BBS shall be compatible with Illinois DOT's traffic controller assemblies utilizing NEMA TS 1 or NEMA TS 2 controllers and cabinet components for full time operation.
- 1.19 When the utility line power has been restored at above  $105\text{VAC} \pm 2\text{VAC}$  for more than 30 seconds, the BBS shall dropout of battery backup mode and return to utility line mode.
- 1.20 When the utility line power has been restored at below  $125\text{VAC} \pm 2\text{VAC}$  for more than 30 seconds, the BBS shall dropout of battery backup mode and return to utility line mode.
- 1.21 BBS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.
- 1.22 In the event of inverter/charger failure, battery failure or complete battery discharge, the power transfer relay shall revert to the NC state, where utility line power is reconnected to the cabinet. The BBS shall always revert back to utility line power and shall be designed to revert back to utility line power in the event of a BBS fault condition.
- 1.23 Recharge time for the battery, from "protective low-cutoff" to 80% or more of full battery charge capacity, shall not exceed twenty (20) hours.
- 1.24 When the intersection is in battery operation, the BBS shall bypass all internal cabinet lights, ventilation fans, heater strips, and service receptacles.
- 1.25 The fail safe automatic bypass switch shall be wired to provide power to the BBS when the switch is set to bypass.
- 1.26 A blue LED indicator light shall be mounted on the front of the traffic signal cabinet or on the side of the BBS cabinet facing traffic and shall turn on to indicate when the cabinet power has been disrupted and the BBS is in operation. The light shall be a minimum 1" diameter, be viewable from the driving lanes, and shall be large enough and visible enough to be seen from 200 ft. away.

- 1.27 All 36 volt and 48 volt systems shall include an external component that monitors battery charging to ensure that every battery in the string is fully charged. The device shall compensate for the effects of adding a new battery to an existing battery system by ensuring that the charge voltage is spread equally across all batteries. All cables, harnesses, cards, and other components that are required to provide the functionality described above shall be included in the unit bid price for the battery backup system. The following products are currently approved for use within District Four: Alpha Technologies: AlphaGuard with Charge Management Technology Module and Approved Equivalent.
- 1.28 The BBS shall be equipped with an integrated safety switch that will interrupt inverter output power in the event of a cabinet knockdown. The safety switch may be either internal to the inverter/charger or externally mounted inside of the BBS cabinet. The safety switch shall be designed to interrupt output power in the event that the charger/inverter is tilted more than twenty degrees on any axis. The switch shall be mechanically latching to ensure that power is not automatically restored to the BBS until the charger/inverter has been "reset". The switch shall also be resettable and reusable unless it has been physically damaged.

## 2.0 MOUNTING AND CONFIGURATION

### 2.1 GENERAL

2.2 Inverter/Charger Unit shall be rack or shelf-mounted.

2.3 (Reserved).

2.4 All interconnect wiring provided between Power Transfer Relay, Bypass Switch and Cabinet Terminal Service Block shall be no greater than two (2) meters (6'6") of #10 AWG wire.

2.5 Relay contact wiring provided for each set of NO/NC relay contact closure terminals shall be #18 AWG wire.

2.6 All necessary hardware for mounting (shelf angles, rack, etc) shall be included in the bid price of the BBS. The swing-trays shall be screwed to the Type IV or Type V NEMA cabinets using continuous stainless steel or aluminum piano hinge. All bolts/fasteners and washers shall be 1/2" diameter galvanized or stainless steel.

### 3.0 EXTERNAL BATTERY CABINET

3.1 The external cabinet shall be a rated NEMA Type 3R Cabinet.

3.2 Inverter/Charger and Power Transfer Relay shall be installed inside the external battery cabinet and the failsafe automatic bypass switch shall be installed inside the existing traffic signal cabinet or proposed battery backup cabinet.

- 3.3 Batteries shall be housed in the external cabinet which shall be NEMA Standard rated cabinet mounted to the side of the Type IV or Type V Cabinet (see plan sheets for details). This external battery cabinet shall conform to the IDOT Standard Specifications for traffic signal cabinets for the construction and finish of the cabinet.
- 3.4 The external battery cabinet shall mount to the Type IV or Type V NEMA Cabinet with a minimum of four (4) bolts to the satisfaction of the Engineer.
- 3.5 The dimensions of the external battery cabinet shall be 25" (L) x 16" (W) x 41" (H) and installed in accordance with the plan sheet cabinet detail and this specification.
- 3.6 The cabinet shall include heater mats for each battery shelf and/or battery. If the BBS charger/inverter does not have facilities to accommodate heater mat connections, thermostatically controlled heater mats shall be provided with the system. The heater mat thermostat shall be a separate thermostat (from the ventilation fan thermostat) and be adjustable from 0°F to 32°F for heater mat turn-on.
- 3.7 A warning sticker shall be placed on the outside of the cabinet indicating that there is an Uninterruptible Power Supply inside the cabinet.
- 3.8 The external battery cabinet shall be ventilated through the use of louvered vents (2), filters, and one thermostatically controlled fan according to NEMA TS 2 Specifications. The cabinet shall include a cleanable or replaceable cabinet filter.
- 3.9 External battery cabinet fan shall be AC operated from the same line output of the bypass Switch that supplies power to the Type IV or Type V Cabinet.
- 3.10 The BBS with external battery cabinet shall come with all bolts, conduits and bushings, gaskets, shelves, and hardware needed for mounting. The external battery cabinet shall have a hinged door opening to the entire cabinet. The cabinet shall include a bottom constructed from the same material as the cabinet.
- 3.11 The external cabinet shall be equipped with a power receptacle to accommodate the inverter/charger. The receptacle shall be wired to the line output of the manual bypass switch.
- 4.0 MAINTENANCE, DISPLAYS, CONTROLS AND DIAGNOSTICS
- 4.1 The BBS shall include a display and /or meter to indicate current battery charge status and conditions.
- 4.2 The BBS shall have lightning surge protection compliant with IEEE/ANSI C.62.41.
- 4.3 The BBS shall be equipped with an integral system to prevent battery from destructive discharge and overcharge.
- 4.4 The BBS and batteries shall be easily replaced with all needed hardware and shall not require any special tools for installation.
- 4.5 The BBS shall be equipped with a RS-232 port.

- 4.6 The BBS shall include a resettable front-panel event counter display to indicate the number of times the BBS was activated and a front-panel hour meter to display the total number of hours the unit has operated on battery power.
- 4.7 Manufacturer shall include two (2) sets of equipment lists, operation and maintenance manuals, and board-level schematic and wiring diagrams of the BBS, and the battery data sheets. Manufacturer shall include any software needed to monitor, diagnose, and operate the BBS. The manufacturer shall include any required cables to connect to a laptop computer.
- 4.8 The BBS shall include a data cable for the serial connection to the RS232 port and diagnostic software if it is available as an option with the unit (only two cables required for project).
- 4.9 One copy of the owner/maintenance manuals shall be provided with the BBS.
- 5.0 BATTERY SYSTEM
- 5.1 Individual batteries shall be 12V type and shall be easily replaced and commercially available off the shelf.
- 5.2 The batteries shall be premium gel type with a Five-Year Full Replacement Warranty.
- 5.3 Batteries used for BBS shall consist of a minimum of four (4) to eight (8) batteries with a cumulative minimum rated capacity of 240 amp-hours.
- 5.4 Batteries shall be deep cycle, completely sealed, silver alloy VRLA (Valve Regulated Lead Acid) requiring no maintenance with maximum run time.
- 5.5 Batteries shall be certified by the manufacturer to operate over a temperature range of – 40°C to +71°C.
- 5.6 The batteries shall be provided with appropriate interconnect wiring and corrosion-resistant mounting trays and/or brackets appropriate for the cabinet into which they will be installed.
- 5.7 Batteries shall indicate maximum recharge data and recharging cycles.
- 5.8 Battery interconnect wiring shall be via modular harness. Batteries shall be shipped with positive and negative terminals pre-wired with red and black cabling that terminates into a typical power-pole style connector. Harness shall be equipped with mating power-pole style connectors for batteries and a single, insulated plug-in style connection to inverter/charger unit. Harness shall allow batteries to be quickly and easily connected in any order and shall be keyed and wired to ensure proper polarity and circuit configuration.
- 5.9 Battery terminals shall be covered and insulated so as to prevent accidental shorting.

6.0 QUALITY ASSURANCE

- 6.1 BBS shall be manufactured in accordance with a manufacturer quality assurance (QA) program. The QA program shall include two types of quality assurance: (1) Design quality assurance and (2) Production quality assurance. The production quality assurance shall include statistically controlled routine tests to ensure minimum performance levels of BBS units built to meet this specification and a documented process of how problems are to be resolved.
- 6.2 QA process and test results documentation shall be kept on file for a minimum period of seven years.
- 6.3 Battery Backup System designs not satisfying design qualification testing and the production quality assurance testing performance requirements described below shall not be labeled, advertised, or sold as conforming to this specification.

7.0 DESIGN QUALIFICATION TESTING

- 7.1 The manufacturer, or an independent testing lab hired by the manufacturer, shall perform design Qualification Testing on new BBS designs, and when a major design change has been implemented on an existing design. A major design change is defined as a design change (electrical or physical) which changes any of the performance characteristics of the system, or results in a different circuit configuration.
- 7.2 Burn In. The sample systems shall be energized for a minimum of 5 hours, with full load of 700 watts, at temperatures of +74°C and -37°C., excluding batteries, before performing any design qualification testing.
- 7.3 Any failure of the BBS, which renders the unit non-compliant with the specification after burn-in, shall be cause for rejection.
- 7.4 For Operational Testing, all specifications may be measured including, but not limited to:
- 7.5 Run time while in battery backup mode, at full load.
- 7.6 Proper operation of all relay contact closures ("On-Batt", "Low-Batt", "Timer" and "BBS-Fail").
- 7.7 Inverter output voltage, frequency, harmonic distortion, and efficiency, when in battery backup mode.
- 7.8 All utility mode – battery backup mode transfer voltage levels. See Section 1 Operation.
- 7.9 Power transfer time from loss of utility power to switchover to battery backed inverter power.
- 7.10 Backfeed voltage to utility when in battery backup mode.
- 7.11 IEEE/ANSI C.62.41 compliance.
- 7.12 Battery charging time.

7.13 Event counter and runtime meter accuracy.

8.0 PRODUCTION QUALITY CONTROL TESTING

8.1 Production Quality Control tests shall consist of all of the above listed tests and shall be performed on each new system prior to shipment. Failure to meet requirements of any of these tests shall be cause for rejection. The manufacturer shall retain test results for seven (7) years.

8.2 Each BBS shall be given a minimum 100-hour burn-in period to catch any premature failures.

8.3 Each system shall be visually inspected for any exterior physical damage or assembly anomalies. Any defects shall be cause for rejection.

9.0 WARRANTY

9.1 Manufacturers shall provide a minimum two (2) year factory-repair warranty for parts and labor on the BBS from date of acceptance by the State. Batteries shall be warranted for full replacement for five (5) years from date of purchase. The warranty shall be included in the total bid price of the BBS.

9.2 The Contractor shall furnish a warranty certificate for each Battery Backup System that includes the equipment description and details, serial numbers, effective dates, and the details of the warranty regarding materials and labor. The warranty period shall begin on the date of installation and the warranty certificate shall reflect this date.

Basis of Payment: The above work will be paid for at the contract unit price Each for TRAFFIC SIGNAL BATTERY BACKUP SYSTEM shall be payment in full for all labor, materials, and equipment required to provide, install, and test the battery backup system described above, complete.

**LUMINAIRE , SODIUM VAPOR, HORIZONTAL MOUNT, 400 WATT**

Section 821 of the IDOT Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 shall be modified as follows.

STATE OF ILLINOIS  
 IDOT DISTRICT 4  
 PHOTOMETRY PERFORMANCE TABLE  
 (400-WATT LUMINAIRE)

| <b>GIVEN CONDITIONS</b> |  |                      |
|-------------------------|--|----------------------|
| ROADWAY DATA            | Pavement Width                           | 36 Feet              |
|                         | Number of Lanes                          | 3                    |
|                         | Median Width                             | 27 Feet              |
|                         | I.E.S. Surface Classification            | R3                   |
|                         | Q-Zero Value                             | .07                  |
| LIGHT POLE DATA         | Mounting Height                          | 52.5 Feet            |
|                         | Mast Arm Length                          | 12 Feet back-to-back |
|                         | Pole Set-Back From Edge of Pavement      | 13.5 Feet            |
| LUMINAIRE DATA          | Lamp Type                                | HPS                  |
|                         | Lamp Lumens                              | 50,000               |
|                         | I.E.S. Vertical Distribution             | Medium               |
|                         | I.E.S. Control of Distribution           | Full cut-off         |
|                         | I.E.S. Lateral Distribution              | III                  |
|                         | Total Light Loss Factor                  | 0.684                |
| LAYOUT DATA             | Spacing (same side of the roadway)       | 270 Feet             |
|                         | Configuration                            | Median back-to-back  |
|                         | Luminaire Overhang over edge of pavement | 0 Feet               |

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.

**Performance Requirements**

NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

|              |   |                       |
|--------------|---|-----------------------|
| ILLUMINATION | Average Horizontal Illumination, $E_{AVE}$  | 0.9 F.C.              |
|              | Uniformity Ratio, $E_{AVE}/E_{MIN}$         | 3.0:1                 |
| LUMINANCE    | Average Luminance, $L_{AVE}$                | 0.6 Cd/M <sup>2</sup> |
|              | Uniformity Ratio, $L_{AVE}/L_{MIN}$         | 3.5:1                 |
|              | Uniformity Ratio, $L_{MAX}/L_{MIN}$         | 5:1                   |
|              | Max. Veiling Luminance Ratio, $L_V/L_{AVE}$ | 0.3:1                 |

## **LUMINAIRE TESTING**

Description. This work shall consist of independent laboratory testing to verify Roadway Luminaires are manufactured and furnished to IDOT according to Section 821 of the Standard Specifications and as modified herein. The luminaire testing requirements do not apply for the temporary lighting luminaires.

Testing. Luminaires shall be tested at a properly accredited and fully certified laboratory approved for each of the required tests. All costs associated with luminaire testing shall be included in the bid price of the luminaire.

Each luminaire type used on the project shall be tested, unless noted otherwise. In addition, each luminaire wattage and distribution within a given luminaire type shall be tested. Only one luminaire for each type, wattage, and distribution shall be tested except, one additional luminaire shall be tested for each quantity of 50 luminaires supplied to the project.

The Contractor shall propose, for approval by the Engineer, testing at either the luminaire manufacturer's test laboratory or an independent test laboratory. The qualifications of the laboratory to perform each of the required tests must be furnished to the Engineer at the time the request is made to select a lab.

In addition, the Contractor shall propose a qualified independent witness, for approval by the Engineer, familiar with the luminaire requirements and test procedures, to witness the required tests. The Contractor shall provide all travel costs for the independent witness to and from the test location for all required testing. The Contractor shall supply documentation to the Engineer of the independent witness' qualifications at the time of request for selection approval.

No luminaires shall be shipped for testing until the Engineer's written approval is received for the approved lab and witness. The Contractor is responsible to find a suitable independent witness and provide advanced notice for travel and testing. No extension of time will be allowed for delays incurred as a result of luminaire testing.

The independent witness shall select from the project luminaires at the manufacturer's facility or at the Contractor's storage facility, 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.

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 plane and maximum 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.

Electrical testing shall conform to NEMA and ANSI standards and as a minimum, shall yield a complete check of wiring connections, a ballast dielectric test, total ballast losses in watts and percent of input, a lamp volt-watt trace, regulation data, a starter test, lamp current crest factor, power factor (minimum over the design range of input voltage at nominal lamp voltage) and, a table of ballast characteristics showing input amperes, watts and power factor, output volts, amperes, watts and lamp crest factor as well as ballast losses over the range of values required to produce the lamp volt-watt trace.

The summary report and the test results shall be certified by the independent test laboratory or the independent witness, as applicable, and shall be sent by certified mail directly to the Engineer. A copy of this material shall be sent to the Contractor at the same time.

Electrical and photometric test reports shall be sent to the Engineer as part of the shop drawing approval process.

Should any of the tested luminaires of a given type, distribution, and wattage fail to satisfy the specifications and perform according to approved submittal information, the luminaire of that type, distribution, and wattage shall be unacceptable and shall be replaced. Replacement luminaires must meet the specifications and therefore, the submittal and testing process shall be repeated in its entirety.

Upon approval by the Engineer, luminaires which fail, may have corrections made instead of being replaced. In the case of corrections, the Contractor shall advise the Engineer of the corrections to be made 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. The number of luminaires to be tested shall be the same quantity as originally tested. Luminaires which are not modified or corrected shall not be retested without prior approval from the Engineer.

The process of retesting (testing modified or replacement luminaires) shall be repeated until luminaires are approved for the project. Retesting, should it become necessary, shall not be grounds for additional compensation or extension of time.

Basis of Payment. This work will be paid for as part of the contract unit price Each for the specific luminaire pay item to which it is associated. No separate payment will be made for luminaire testing.

**LUMINAIRE , SODIUM VAPOR, HORIZONTAL MOUNT, 250 WATT**

Section 821 of the IDOT Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 shall be modified as follows.

STATE OF ILLINOIS  
 IDOT DISTRICT 4  
 PHOTOMETRY PERFORMANCE TABLE  
 (250-WATT LUMINAIRE)

| <b>GIVEN CONDITIONS</b> |  |                      |
|-------------------------|--|----------------------|
| ROADWAY DATA            | Pavement Width                           | 24 Feet              |
|                         | Number of Lanes                          | 2                    |
|                         | Median Width                             | -                    |
|                         | I.E.S. Surface Classification            | R3                   |
|                         | Q-Zero Value                             | .07                  |
| LIGHT POLE DATA         | Mounting Height                          | 40 Feet              |
|                         | Mast Arm Length                          | 15 Feet back-to-back |
|                         | Pole Set-Back From Edge of Pavement      | 15 Feet              |
| LUMINAIRE DATA          | Lamp Type                                | HPS                  |
|                         | Lamp Lumens                              | 30,000               |
|                         | I.E.S. Vertical Distribution             | Medium               |
|                         | I.E.S. Control of Distribution           | Full cut-off         |
|                         | I.E.S. Lateral Distribution              | III                  |
|                         | Total Light Loss Factor                  | 0.684                |
| LAYOUT DATA             | Spacing (same side of the roadway)       | 200 Feet             |
|                         | Configuration                            | Single Sided         |
|                         | Luminaire Overhang over edge of pavement | 0 Feet               |

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.

**Performance Requirements**

NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

|              |   |                       |
|--------------|---|-----------------------|
| ILLUMINATION | Average Horizontal Illumination, $E_{AVE}$  | 0.9 F.C.              |
|              | Uniformity Ratio, $E_{AVE}/E_{MIN}$         | 3.0:1                 |
| LUMINANCE    | Average Luminance, $L_{AVE}$                | 0.6 Cd/M <sup>2</sup> |
|              | Uniformity Ratio, $L_{AVE}/L_{MIN}$         | 3.5:1                 |
|              | Uniformity Ratio, $L_{MAX}/L_{MIN}$         | 5:1                   |
|              | Max. Veiling Luminance Ratio, $L_V/L_{AVE}$ | 0.3:1                 |

**UNDERPASS LUMINAIRE , 100 WATT, HIGH PRESSURE SODIUM**

**Description.** This work shall consist of furnishing and installing an underpass luminaire.

**Materials.** Materials shall be according to the following Articles of Section 1000 of the Standard Specifications - Materials, except as modified below:

| <u>Item</u>  | <u>Article/Section</u> |
|--|------------------------|
| (a) Luminaire .....  | 1067.01                |
| 1067.04(a) shall read: Housing shall be made of stainless steel. |                        |
| (b) Wire in the Pole .....                                       | 1066.09                |
| (c) Fuseholder & Fuses.....                                      | 1065.01                |
| (d) Lamps .....  | 1067.02                |
| (e) Fasteners and Hardware .....                                 | 1088.03                |
| (f) Lightning Protection – Lighting .....                        | 1065.02                |

STATE OF ILLINOIS  
 IDOT DISTRICT 4  
 PHOTOMETRY PERFORMANCE TABLE  
 (100-WATT UNDERPASS LUMINAIRE)

| <b>GIVEN CONDITIONS</b> |  |                                 |
|-------------------------|--|---------------------------------|
| ROADWAY DATA            | Pavement Width                           | 36 Feet                         |
|                         | Number of Lanes                          | 3                               |
|                         | Median Width                             | 27                              |
|                         | I.E.S. Surface Classification            | R3                              |
|                         | Q-Zero Value                             | .07                             |
| LIGHT POLE DATA         | Mounting Height                          | 16.5 Feet                       |
|                         | Mast Arm Length                          | N/A                             |
|                         | Pole Set-Back From Edge of Pavement      | N/A                             |
| LUMINAIRE DATA          | Lamp Type                                | HPS                             |
|                         | Lamp Lumens                              | 9500                            |
|                         | I.E.S. Vertical Distribution             | Medium                          |
|                         | I.E.S. Control of Distribution           | Full cut-off                    |
|                         | I.E.S. Lateral Distribution              | II                              |
|                         | Total Light Loss Factor                  | 0.684                           |
| LAYOUT DATA             | Spacing (same side of the roadway)       | 45 Feet                         |
|                         | Configuration                            | 4 rows staggered<br>with median |
|                         | Luminaire Overhang over edge of pavement | -7 Feet                         |

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> |
|---------------------------------|

NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

|                       |   |   |                       |       |     |        |
|-----------------------|---|---|-----------------------|-------|-----|--------|
| ILLUMINATION          | Average Horizontal Illumination, $E_{AVE}$<br>Uniformity Ratio, $E_{AVE}/E_{MIN}$   | <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr><td style="border-top: 1px solid black; border-bottom: 1px solid black;">2.0 F.C.</td></tr> <tr><td style="border-bottom: 1px solid black;">2.5:1</td></tr> </table>  | 2.0 F.C.              | 2.5:1 |     |        |
| 2.0 F.C.              |   |   |                       |       |     |        |
| 2.5:1                 |   |   |                       |       |     |        |
| LUMINANCE             | Average Luminance, $L_{AVE}$<br>Uniformity Ratio, $L_{AVE}/L_{MIN}$<br>Uniformity Ratio, $L_{MAX}/L_{MIN}$<br>Max. Veiling Luminance Ratio, $L_V/L_{AVE}$ | <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr><td style="border-top: 1px solid black; border-bottom: 1px solid black;">0.9 Cd/M<sup>2</sup></td></tr> <tr><td style="border-bottom: 1px solid black;">3.5:1</td></tr> <tr><td style="border-bottom: 1px solid black;">5:1</td></tr> <tr><td style="border-bottom: 1px solid black;">0.35:1</td></tr> </table> | 0.9 Cd/M <sup>2</sup> | 3.5:1 | 5:1 | 0.35:1 |
| 0.9 Cd/M <sup>2</sup> |   |   |                       |       |     |        |
| 3.5:1                 |   |   |                       |       |     |        |
| 5:1                   |   |   |                       |       |     |        |
| 0.35:1                |   |   |                       |       |     |        |

**Construction Requirements.** Installation shall be in accordance with Section 821.06.

**Basis of Payment.** This work will be paid for at the contract unit price each for UNDERPASS LUMINAIRE, 100 WATT, HIGH PRESSURE SODIUM.

**LIGHT POLE, GALVANIZED STEEL, 50 FT. M.H., 12 FT. MAST ARM, TWIN**

Shall be according to Article of 830 of the Standard Specifications.

**JUNCTION BOX EMBEDDED IN STRUCTURE 8" X 24" X 10"**

Description. This work shall consist of furnishing and installing a composite concrete junction box embedded in the median barrier as detailed in the plans.

Materials. Materials shall be according to the following Section 1088.05 of the Standard Specifications.

Installation. The embedded junction box shall be set flush with the adjoining surface and shall be properly supported during concrete placement. Concrete cover shall not be less than 3 in. all around the embedded junction box.

Field cut conduit openings shall be uniform and smooth. All burrs and rough edges shall be filed smooth prior to the installation of conduit(s) into the junction box. Field cut conduit openings shall be fitted with appropriate conduit fittings and accessories.

Basis of Payment. This work will be paid for at the contract unit price Each for JUNCTION BOX EMBEDDED IN STRUCTURE 8" X 24" X 10".

## LIGHT POLE FOUNDATION, SPECIAL

Section 836 of the IDOT Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 shall be modified as follows.

Add the following paragraphs to Article 836.03:

- (c) Median Barrier Wall Foundations. The top portion of the foundation shall be integrated with a portion of the median barrier wall, as one monolithic structure, as shown on the Standard Drawings and as directed by the Engineer. This portion of the foundation shall be of the same shape as the wall and shall be constructed according to the applicable portions of Articles 503.06 and 503.07. Any required sheeting, cribbing or other associated work required to complete the foundation work shall be included. The length of the wall included shall be as shown on the plans.

The drilled shaft portion of the foundation shall be constructed in accordance of the requirements of Article 836.03(a).

A ground rod and connecting wire shall be installed in conjunction with each foundation as shown on the Standard Drawings.

As detailed in the plans, expansion couplings shall be used at the expansion joints at either end of the foundation.

- (1) Finishing. The surface of the concrete barrier shall be finished according to Article 606.11.

- (2) Protective Coat. The protective coat shall be constructed according to Article 420.18.

Replace Article 836.04 with the following:

836.04 Method of Measurement. LIGHT POLE FOUNDATION, SPECIAL will be measured for payment in Feet-in-Place, for the drilled shaft portion as indicated on the plan detail. The length measured will be limited to that shown on the plans or authorized by the Engineer.

Relocation of a foundation due to an obstruction and any shaft excavation to that point will not be measured for payment.

Median wall integral to the foundation shall be included in the length of the concrete foundation.

Excavation in rock will be measured for payment according to Article 502.12.

Replace Article 836.05 with the following:

836.05 Basis of Payment. Median concrete foundations will be paid for at the contract unit price per Foot for LIGHT POLE FOUNDATION, SPECIAL.

### **LIGHT POLE FOUNDATION, 30" DIAMETER, SPECIAL**

Section 836 of the IDOT Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 shall be modified as follows.

Add the following paragraphs to Article 836.03:

- (c) Single Face Barrier Wall Foundations. The top portion of the foundation shall be integrated with a portion of the median barrier wall, as one monolithic structure, as shown on the Detail Drawings and as directed by the Engineer. This portion of the foundation shall be of the same shape as the wall and shall be constructed according to the applicable portions of Articles 503.06 and 503.07. Any required sheeting, cribbing or other associated work required to complete the foundation work shall be included. The length of the wall included shall be as shown on the plans.

The drilled shaft portion of the foundation shall be constructed in accordance of the requirements of Article 836.03(a).

A ground rod and connecting wire shall be installed in conjunction with each foundation as shown on the Standard Drawings.

As detailed in the plans, expansion couplings shall be used at the expansion joints at either end of the foundation.

- (1) Finishing. The surface of the concrete barrier shall be finished according to Article 606.11.

- (2) Protective Coat. The protective coat shall be constructed according to Article 420.18.

Replace Article 836.04 with the following:

836.04 Method of Measurement. LIGHT POLE FOUNDATION, 30" DIAMETER, SPECIAL will be measured for payment in feet in place, for the drilled shaft portion as indicated on the plan detail. The length measured will be limited to that shown on the plans or authorized by the Engineer.

Relocation of a foundation due to an obstruction and any shaft excavation to that point will not be measured for payment.

Single face barrier wall integral to the foundation shall be included in the length of the concrete foundation.

Excavation in rock will be measured for payment according to Article 502.12.

Replace Article 836.05 with the following:

836.05 Basis of Payment. Median concrete foundations will be paid for at the contract unit price per Foot for LIGHT POLE FOUNDATION, 30" DIAMETER SPECIAL.

**CONDUIT ATTACHED TO STRUCTURE, STAINLESS STEEL**

Description. This work shall consist of furnishing and installing stainless steel conduit of the diameter specified as shown on the plans.

Materials. The conduit, after fabrication, shall be thoroughly cleaned. Couplings and fittings shall meet ANSI Standard C 80.1. Elbows and nipples shall be according to the specifications for conduit. All fittings and couplings for rigid conduit shall be of the threaded type.

The conduit shall be stainless steel type 304 and manufactured according to UL Standard 6A and shall meet ANSI Standard C 80.1.

Installation. Installation of conduit shall be in accordance with Section 811.03(a) of the Standard Specifications.

Method of Measurement. Shall be in accordance with Section 811.04 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price per Foot for CONDUIT ATTACHED TO STRUCTURE, STAINLESS STEEL of the diameter specified.

**TEMPORARY LIGHTING SYSTEM**

**Description.** This work shall consist of furnishing, installing, and removing a complete temporary lighting system for the limits of the project as shown on the plans.

**Materials.** Materials shall be according to the following.

| ITEM  | Article/Section |
|---|-----------------|
| (a) Wood Pole.....                                  | 1069.04         |
| (b) Mast Arm.....                                   | 1069.03(a)(1)   |
| (c) Aerial Cable Conductors.....                    | 1066.02         |
| (d) Aerial Cable Insulation.....                    | 1066.03 (a)(3)  |
| (e) Aerial Cable Assembly.....                      | 1066.04         |
| (f) Splicing and Termination of Electric Cable..... | 1066.06         |
| (g) Luminaire.....                                  | 1067            |
| (h) Grounding.....                                  | 1087.01         |

**Construction Requirements.** The temporary lighting system shall be constructed as follows.

Installation. Previously used poles and appurtenances will be acceptable under this item, upon physical inspection by the Engineer. Poles shall be in good condition as according to the applicable ANSI requirements for sweep, crook, defects, and mechanical damage. Poles deemed unacceptable by the Engineer shall be removed from the jobsite.

Upon written request of the Contractor, the Engineer may permit temporary portions of the work to be wired with previously-installed aerial cable of ampacity equivalent to the specified cable and of a type and condition approved by the Engineer. The cable shall be left in place for the duration of the need for temporary wiring.

In addition to the wiring of temporary equipment as indicated, the Contractor shall furnish and install electric feeders and make necessary equipment modifications to connect the existing systems to the temporary systems.

Upon written request of the Contractor, the Engineer may permit the use of previously-installed luminaires of a type and condition approved by the Engineer. All temporary luminaires, new and/or used, shall have documentation provided to the Engineer assuring the photometrics of said luminaire meet the photometric requirements provided under the Special Provision for "LUMINAIRE, SODIUM VAPOR, HORIZONTAL MOUNT, 400 WATT."

The luminaire connections to the aerial cable shall be made with listed parallel tap insulation piercing connectors. The connector shall be rated for 600V.

Maintenance. The Contractor shall maintain existing lighting systems (temporary and permanent) and proposed lighting systems. Effective the day the Contractor starts work, the Contractor shall maintain the existing lighting equipment located within the project limits as it then exists.

The scope of work shall include the assumption of responsibility for the continuing operation of existing, temporary or other lighting systems affected by the work as may be specified elsewhere herein. Existing lighting systems, when depicted on the plans, are intended only to indicate the general nature of the systems and shall not be construed as an exact representation of the field conditions. It remains the Contractor's responsibility to visit the site to confirm and ascertain the exact nature of systems to be maintained.

The Contractor shall take over maintenance of all the equipment supplied with electric power from the power centers, regardless of location including service connections and control cabinets within the limits of the project.

The Contractor shall not be responsible for any utility charges for establishing a point of service from the power company at the location(s) shown on the plans. The Contractor shall be responsible for all costs associated with removal of the temporary electric service when the project is complete. The Contractor shall pay the energy costs until such time as the project is final inspected and accepted by IDOT. Any energy charges which the Contractor would like to present to the Department for reimbursement shall be properly metered, billed, and prorated by the Contractor at no cost to the Department. The Contractor shall be reimbursed for repair of accident damage according to Articles 105.13 and 107.30 of the Standard Specifications.

Removal. The removal of the temporary lighting system shall be in accordance with Article 841.02 of the Standard Specifications.

**Method of Measurement.** All temporary lighting units, including the associated luminaire and aerial cable, shown on the plans shall be included for payment.

Removal of the temporary lighting units by the Contractor, or any relocations required for the operation of the lighting system shall not be measured separately, but shall be measured as part of this item.

**Basis of Payment.** The installation and removal of the temporary lighting system will be paid for at the lump sum price for TEMPORARY LIGHTING SYSTEM, which shall be payment in full for the work described herein. Payment shall constitute full compensation for furnishing, installing, relocating, and removing poles of the required height, mast arms, luminaires, connecting wires, ground rods, aerial cable, and for furnishing all labor, equipment, tools and incidentals to complete the work as specified.

## **SYSTEM IMPLEMENTATION, EQUIPMENT INTEGRATION AND SUPPORT**

The Contractor shall install the dynamic message signs, CCTV cameras and microwave traffic counters at the locations indicated on the plans.

All furnished components shall be subject to a 90-day burn-in period. During the "burn-in" period, all components shall perform continuously, without any interruption of operation, for a period of ninety 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.

The Department will program the dynamic message signs, cameras and microwave traffic counters and integrate them into the existing ITS system.

The Contractor shall be responsible for installing the proposed CCTV cameras and microwave traffic counters on the proposed camera and microwave detector poles in accordance with the plans, specifications, and manufacturers recommended practices.

This work will not be paid for separately, but shall be included in the contract bid price.

## **CONTRACT GUARANTEE**

The Contractor shall guarantee all electrical equipment, apparatus, materials, and workmanship provided under the contract for a period of six (6) months after the date of final inspection according to Article 801.14.

All instruction sheets required to be furnished by the manufacturer for materials and supplies and for operations shall be delivered to the Engineer prior to the acceptance of the project, with the following warranties and guarantees:

1. The manufacturer's standard written warranty for each piece of electrical equipment or apparatus furnished under the contract.
2. The Contractor's written guarantee that, for a period of six (6) months after the date of final inspection of the project, all necessary repairs to or replacement of said warranted equipment, or apparatus shall be made by the Contractor at no cost to the Department.
3. The Contractor's written guarantee for satisfactory operation of all electrical systems furnished and constructed under the contract for a period of 6 months after final inspection of the project.

## **POT-HOLING FOR LOCATION OF EXISTING UNDERGROUND UTILITIES**

Potholing to locate existing underground utilities shall be included in the contract bid price for the conduit pay items (pushed or trenched).

Removal and replacement of existing sidewalk, pavement, and islands only for utility locating purposes will not be paid for separately, but shall be included in the contract bid price for the conduit pay items.

## **SEEDING MINOR AREAS**

Effective July 1, 1990

Revised January 1, 2007

Seeding, fertilizing, and mulching shall be done in accordance with Article 250 of the Standard Specifications except for the following revisions:

All areas disturbed by the work performed shall be seeded, fertilized, and mulched in accordance with Article 251.03(a). The materials may be purchased locally and placed as directed by the Engineer.

The estimated area is approximately 0.10 acre. The seed mixture shall be applied at 100 pounds/acre (110 kg/ha). The mixture shall be one that contains a high percentage of Kentucky Blue Grass. All seeds shall meet the purity and noxious weed requirements of Article 1081.04 of the Standard Specifications, and be approved by the Engineer.

The fertilizer nutrients shall be applied at a rate of 270 lbs. (300 kg) of actual nutrients per acre (hectare). The fertilizer furnished shall be ready mixed material having a ratio of (1-1-1).

The Contractor shall provide the Engineer with the test results from the seed container and the chemical analysis of the fertilizer nutrients.

The seed, fertilizer, and mulch will not be measured for payment but shall be included in the contract bid price for the pay items for UNDERGROUND CONDUIT of the size and type specified.

## **FIBER OPTIC CABLE 48 FIBERS, SINGLE MODE**

This work shall be in accordance with Sections 801, 864, 871, and 1076 of the Standard Specifications except as modified herein.

Each cable shall be clearly labeled in each cabinet utilizing a durable computer generated label. The label shall contain information in regards to the location where the cable is going to or coming from.

The fibers shall be spliced and terminated as shown on the fiber termination diagram on the plan sheets. All terminated fibers shall be clearly labeled.

Fibers not being used shall be labeled "spare", and fibers not attached to a distribution enclosure shall be capped and sealed.

All ancillary components, required to complete the fiber optic cable plant, including but not limited to, moisture and water sealants, cable caps, fan-out kits, weather-proof splice kits, boots, cable trays, splice enclosures, etc., shall be supplied under this pay item and will not be paid for separately. These items shall be submitted to the Department for approval.

Fiber enclosures are included in the cabinet pay items.

The fiber optic cable shall be clearly marked in each handhole and cabinet with a brightly colored (orange or yellow) weather resistant label securely attached to the cable.

The Contractor shall provide and install a 12 Ga., stranded (EPR-TYPE RHW or THHN), insulated tracer cable in 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.

Materials. The single-mode, fiber optic cable shall incorporate a loose, buffer-tube design. The cable shall conform to the requirements of RUS 7 CFR1755.900 (PE-90) for a single sheathed, non-armored cable, and shall be new, unused and of current design and manufacture. The number of fibers in each cable shall be as specified on the plans.

#### 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 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 and equipment 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 for approval by the Engineer.

#### Installation in Conduit.

During cable pulling operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and pulling operations. 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.

The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. Fuse links and breaks can be used to ensure that the cable tensile strength is not exceeded. 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 upon request.

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" or "Chinese-finger 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.

#### 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. The Contractor shall submit a splicing plan to the Department for approval.

#### Operation and Maintenance Documentation:

After the fiber optic cable plant has been installed, two (2) 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 terminal connector.
- Complete parts list including names of vendors.

Testing Requirements:

Testing shall be in accordance with Article 801.13

The Contractor shall submit detailed test procedures for approval by the Engineer. All continuous fiber runs shall be tested bi-directionally at both 1310 nm and 1550 nm with a power meter and 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.

The Contractor shall provide the date, time and location of any tests required by this specification to the Engineer at least five (5) days before performing the test. Upon completion of the cable installation, splicing, and termination, the Contractor shall test all fibers in each link for continuity and attenuation. The test procedure shall be as follows:

A Certified Technician utilizing an Optical Source/Power Meter shall conduct the testing. 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.

At the completion of the test, the Contractor shall provide two copies of documentation of the test results to the Engineer. The test documentation shall be bound and shall include the following:

Cable & Fiber Identification:

Cable ID  
Cable Location - beginning and end point  
Fiber ID, including tube and fiber color  
Operator Name  
Date & Time  
Setup Parameters  
Wavelength  
Pulse width (OTDR)  
Refractory index (OTDR)  
Range (OTDR)  
Scale (OTDR)  
Setup Option chosen to pass OTDR "dead zone"

Test Results:

Optical Source/Power Meter

Total Attenuation  
Attenuation (dB/km)

These results shall be provided in tabular form. 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 proposed fiber and/or fusion splice and connector including that event point.

The total dB loss of the cable, 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 that cable run at the Contractor's expense, both labor and materials. Elevated attenuation due to exceeding the pulling tension during installation shall require the replacement of the cable run at the Contractor's expense, including labor and materials.

The Contractor shall label the destination of each trunk cable onto the cable in each handhole and termination panel.

#### Slack Storage of Fiber Optic Cables.

A part of this pay 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 and in the traffic controller cabinets.

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

| <u>Location</u>        | <u>Length of Slack Cable (Ft.)</u> |
|------------------------|------------------------------------|
| Communications Vault   | 30.0                               |
| Double Handhole        | 30.0                               |
| Handhole               | 10.0                               |
| CCTV or Signal Cabinet | 10.0                               |
| Junction Box           | 10.0                               |
| Equipment Cabinet      | 3.0                                |

Basis of Payment: This work will be paid for at the contract unit price per Foot for FIBER OPTIC CABLE 48 FIBERS, SINGLE MODE and shall be payment in full for all labor, equipment, and materials required to provide, install, terminate, splice, and test the fiber optic cable described above, complete.

#### **FUSION SPLICING OF FIBER OPTIC CABLES**

Description. The Contractor will 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 particular location.

Two types of splices are identified. A mainline splice includes selected fibers from each cable run as shown in the plan sheets. In a lateral splice, the buffer tubes in the mainline cable are dressed out and those fibers identified on the plans are accessed in and spliced to lateral cables.

### 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 Requirements:

The closures 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 1.5 in. (38 mm).

#### Factory Testing of Splice Closures:

**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 a temperature of 0°F and 100°F (-18°C and 38°C). 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 0°F and 100°F (-18°C and 38°C). 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 20 lb (9 kg) cylindrical steel impacting head with a 2 in (5 cm) spherical radius at the point where it contacts the closure. It shall be dropped from a height of 12 in (30 cm). 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 @ 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 I. 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 10 ft (3 m) 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 to 10 ft (3 m) 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. For all splices, the cables shall be fusion spliced.

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.

Using a fusion splicer, the Contractor shall optimize the alignment of the fibers and fuse them together. The Contractor shall recoat the fused fibers and install mechanical protection over them.

Upon completing all splicing operations for a cable span, the Contractor shall measure the mean bi-directional loss at each splice using an Optical Time Domain Reflectometer. This loss shall not exceed 0.1 dB.

The Contractor shall measure the end-to-end attenuation of each fiber optic link, from connector to connector, using an optical power meter and source. This loss shall be measured from both directions and shall not exceed 0.5 dB per installed kilometer of single mode cable. Measurements shall be made at both 1,300 and 1,550 nm for single mode cable. For multimode cable, power meter measurements shall be made at 850 and 1,300 nm. The end-to-end attenuation shall not exceed 3.8 dB/installed kilometers at 850nm or 1.8 dB per installed kilometer at 1300nm for multimode fibers.

As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice not satisfying the required objectives.

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 handhole or traffic signal cabinet. No cables or enclosures will be permitted to lie 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.

Basis of Payment. This work will not be paid for separately, but shall be included in the bid price for the fiber optic cable pay items.

### **TERMINATION OF FIBER OPTIC CABLES WITH FUSION SPLICED ST CONNECTORS**

Description. The Contractor shall terminate a single mode fiber by fusion splicing a factory-formed ST connector (from a pre-formed fiber optic patch cable) onto a field fiber at the locations shown on the Plans. Multimode cables may be terminated with fusion spliced or approved mechanical ST connectors.

Materials. The Contractor shall be responsible for ensuring that the pre-formed ST connector fiber is compatible with the field fiber that it will be fusion splice to.

The splice shall be protected with a protection sleeve/enclosure that will secure both cables and prevent cable movement.

The fiber optic patch cords shall meet or exceed the following specifications:

- High-quality 125um fiber optics
- 900um tight buffer construction
- Aramid yarn individually protected
- Duplex construction
- Stress relief boots color coded (Tx/Rx)
- ST connectors with high-grade zirconia ferrule
- Insertion Loss < 0.2 dB @ 1310 / 1550 nm
- Return Loss < -58 dB @ 1310 / 1550 nm
- Compliant with ANSI/TIA/EIA 568-B.3
- TIA/EIA-604, FOCIS-2

The Contractor shall submit a shop drawing of all proposed components to the Engineer for approval prior to commencing construction.

#### Construction Requirements.

The Contractor shall prepare the cables and fibers in accordance with the cable manufacturers' installation practices. A copy of these practices shall be provided to the Engineer 21 days prior to splicing operations.

Using a fusion splicer, the Contractor shall optimize the alignment of the fibers and fuse them together. The Contractor shall recoat the fused fibers and install mechanical protection over them.

Upon completing all splicing operations for a cable span, the Contractor shall measure the mean bi-directional loss at each connector using an Optical Time Domain Reflectometer. This loss shall not exceed the loss of the fusion splice (0.1 dB) plus the loss of the connector (typically 0.75 dB).

As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice and/or connector not satisfying the required objectives.

Basis of Payment: This work will not be paid for separately, but shall be included in the bid price for the fiber optic cable pay items.

### **FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, 12MM 12SM**

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

The fiber optic cable shall have 12 multi-mode fibers and 12 single mode fibers.

All multi-mode fibers shall be terminated in each traffic signal and ITS cabinet. All terminated fibers shall be clearly labeled. Multimode fibers may be terminated using approved mechanical connectors. Any necessary fiber optic cables, connectors, and hardware shall be included in this pay item.

The Contractor shall provide and install a 12 Ga., stranded (EPR-TYPE RHW or THHN), insulated tracer cable in all PVC conduits that contain only fiber optic cable (only one locating tracer cable per conduit). 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:

| <u>Location</u>      | <u>Length of Slack Cable (Ft.)</u> |
|----------------------|------------------------------------|
| Communications Vault | 30.0                               |
| Junction Box         | 10.0                               |
| Equipment Cabinet    | 5.0                                |

The fiber optic cable shall be clearly marked in each handhole and cabinet with a brightly colored (orange or yellow) weather resistant marker securely attached to the cable.

Basis of Payment: This work will be paid for at the contract unit price per Foot for FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F SM12F and shall be payment in full for all labor, equipment, and materials required to provide, install, and test the fiber optic cable described above, complete.

## **GROUNDING OF ITS STRUCTURES**

This work shall be in accordance with the applicable articles of Sections 807, 817 and 1066 of the Standard Specifications with the following modifications:

This work shall consist of furnishing and installing a grounding wire to connect all proposed ITS cabinets and camera poles in accordance with NEC requirements.

The proposed ground wire shall be an insulated #6 XLP green copper conductor. This wire shall be bonded to all items and their associated ground rods utilizing mechanical lugs and bolts. This wire may be made continuous by splicing in the adjacent handholes with compression lugs. Split bolts will not be allowed.

The grounding wire shall be bonded to the grounded conductor at the service disconnect per the NEC.

All clamps, hardware, and other materials required shall be included.

Basis of Payment: This work will not be paid for separately, but shall be included in the unit bid prices for their associated items.

## **CAMERA POLE, 55 FT.**

The camera pole shall be galvanized steel and designed in accordance with the plan sheet detail.

Valmont Drawing Number IL122179P1 (Revision A) is approved for use.

Basis of Payment: This item shall be paid at the contract unit price Each for CAMERA POLE, 55 FT. which price shall include all equipment, labor, and materials required to furnish and install the camera pole described above and as shown in the plan detail.

## **CLOSED-CIRCUIT TELEVISION DOME CAMERA, IP BASED**

Description. This work shall consist of furnishing and installing an integrated Closed-Circuit Television (CCTV) Dome Camera Assembly, camera brackets, and all other items required for installation and operation. This assembly shall contain all components identified in the Materials Section and shall be configured as indicated on the plan sheets.

### Materials.

The CCTV camera shall be an Axis Model Q6032-E Dome Camera Assembly for integration into the existing ITS system.

The Contractor shall provide all materials required to install the proposed camera on the proposed combination mast arm assembly as shown on the plan sheets.

The Contractor shall submit catalog cut sheets to the Department for all items (mounting brackets, hardware, etc.) that will be utilized for review prior to commencing work.

The Department will program the cameras.

The camera shall meet or exceed the following specifications:

#### CAMERA

|                       |  |
|-----------------------|--|
| VIDEO:                | 60 Hz (NTSC), 50 Hz (PAL)  |
| IMAGE SENSOR:         | ¼" ExView HAD Progressive Scan CCD   |
| LENS:                 | 3.4 – 119 mm, F1.4 – 4.2, autofocus, automatic day/night, horizontal angle of view: 1.7° - 55.8°   |
| MINIMUM ILLUMINATION: | Color: 0.5 lux at 30 IRE, B/W: 0.008 lux at 30 IRE   |
| SHUTTER TIME:NTSC:    | 1/30 000 s – 0.5 s, PAL: 1/30 000 s – 1.5 s  |
| PAN/TILT/ZOOM:        | E-flip, 100 preset positions<br>Pan: 360° endless, 0.05 – 450°/s<br>Tilt: 220°, 0.05 – 450°/s<br>Zoom: 35x optical zoom and 12x digital zoom, total 420x zoom<br>Guard tour<br>Control queue |

#### VIDEO

|                      |   |
|----------------------|---|
| VIDEO COMPRESSION:   | H.264 (MPEG-4 Part 10/AVC), Motion JPEG   |
| RESOLUTIONS:         | NTSC: 704x480 to 176x120, PAL: 704x576 to 176x144   |
| FRAME RATE (H.264):  | Up to 30/25 (NTSC/PAL) fps in all resolutions   |
| FRAME RATE (M-JPEG): | Up to 30/25 (NTSC/PAL) fps in all resolutions   |
| VIDEO STREAMING:     | Multi-stream H.264 and Motion JPEG: 3 simultaneous, individually configured streams in max. resolution at 30/25 (NTSC/PAL) fps; more streams if identical or limited in frame rate/resolution; Controllable frame rate and bandwidth; VBR/CBR H.264 |
| IMAGE SETTING:       | Wide Dynamic Range (WDR), Electronic Image Stabilization (EIS), manual shutter time, compression, color, brightness, contrast, sharpness, rotation, aspect ratio correction, Text and image overlay, privacy mask, image freeze on PTZ              |

## NETWORK

SECURITY: Password protection, IP address filtering, HTTPS\* encryption, IEEE 802.1X\* network access control, digest authentication, user access log

PROTOCOLS: IPv4/v6, HTTP, HTTPS\*, QoS Layer 3 DiffServ, FTP, SMTP, Bonjour, UPnP, SNMPv1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS

## SYSTEM INTEGRATION

APPLICATION PROG INTERFACE: Open API for software integration, including VAPIX® from Axis Communications available at [www.axis.com](http://www.axis.com)

INTELLIGENT VIDEO: Video motion detection, auto-tracking

ALARM TRIGGERS: Intelligent video, PTZ position

ALARM EVENTS: File upload via FTP, HTTP and email, Notification via email, HTTP and TCP PTZ position, Local storage

VIDEO BUFFER: 56 MB pre- and post-alarm

## GENERAL

CASING: IP66-rated, metal casing (aluminum), acrylic (PMMA) clear dome cover pre-mounted to casing, sunshield (polycarbonate)

PROCESSORS AND MEMORY: ARTPEC-3, 128 MB RAM, 128 MB Flash

POWER CAMERA: High Power over Ethernet, max. 50 W, Midspan (included): AXIS T8124 High Power over Ethernet, Midspan 1-port 100-240 V AC, max. 60 W

CONNECTORS: RJ-45 for 10BASE-T/100BASE-TX, IP66-rated RJ-45 connector kit included

LOCAL STORAGE: SD/SDHC memory card slot (Card is not included)

OPERATING CONDITIONS : Camera unit: -40 °C to 50 °C (-40 °F to 122 °F), Arctic Temperature Control enables camera start-up at temperatures as low as -40 °C (-40 °F)

APPROVALS: EN 55022 Class B, EN 55024, EN 61000-3-2, EN 61000-3-3, EN61000-6-1, EN 61000-6-2, FCC Part 15 Subpart B Class B, VCCI Class B, C-tick AS/NZS CISPR22, ICES-003 Class B, EN 60950-1, Midspan: EN 60950-1, GS, UL, cUL, CE

WEIGHT 3.5 kg (7.7 lb.)

INCLUDED ACCESSORIES: AXIS T8124 High PoEMidspan 1-port, IP66-rated RJ-45 connector kit, clear and smoked dome cover, sunshield, Installation Guide, CD with User's Manual, recording software, installation and management tools, Windows decoder 1-user license

#### Environmental Enclosure/Housing

The environmental enclosure shall be designed to physically protect the integrated camera from the outdoor environment and moisture via a sealed enclosure. If the option exists in the standard product line of the manufacturer, the assembly shall be supplied with an integral sun shield. The enclosure shall be fully water and weather resistant with a NEMA 4 rating or better.

The camera dome shall be constructed of distortion free acrylic or equivalent material that must not degrade from environmental conditions. The environmental housing shall include a camera-mounting bracket. In addition, the environmental housing shall include a heater, blower, and power surge protector. An integral fitting compatible with a standard 1½" in. (38.1 mm) NPT pipe, suitable for outdoor pendant mounting shall also be provided.

The enclosure shall be equipped with a heater controlled by a thermostat. The heater shall turn on when the temperature within the enclosure falls below 40° F (4.4°C). The heater shall turn off when the temperature exceeds 60°F (15.6°C). The heater will minimize internal fogging of the dome faceplate when the assembly is operated in cold weather.

In addition, a fan shall be provided as part of the enclosure. The fan will provide airflow to ensure effective heating and to minimize condensation.

The enclosure shall be equipped with a hermetically sealed, weatherproof connector, located near the top for external interface with power, video, and control feeds.

#### CCTV Dome Camera Mounting Supports

The Contractor shall furnish and install an Axis Pole Mount Bracket T91A67 (Part Number 5017-671) for camera installation on traffic signal mast arms and CCTV camera poles and stainless steel banding as required.

Mounting supports shall be configured as shown on the camera support detail plans and as approved by the Engineer. Mount shall be of aluminum construction with enamel or polyester powder coat finish. Braces, supports, and hardware shall be stainless steel. Wind load rating shall be designed for sustained gusts up to 90 mph (145 km/hr), with a 30% gust factor. Load rating shall be designed to support up to 75 lbs (334 N). For roof or structural post/light pole mounting, mount shall have the ability to swivel inward for servicing. The mounting flange shall use standard 1½" inch (38.1 mm) NPT pipe thread.

#### Connecting Cables

The Contractor shall provide outdoor rated, gel-filled CAT 5E cable. The cable shall be terminated using the IP66 rated RJ-45 connector on the camera end and a standard RJ-45 connector in the cabinet. The Contractor shall test the cable prior after termination.

Construction Requirements.

General

The Contractor shall prepare a shop drawing detailing the complete CCTV Dome Camera Assembly and installation of all components to be supplied for approval of the Engineer. Particular emphasis shall be given to the cabling and the interconnection of all of the components.

The Contractor shall install the CCTV dome camera assembly at the locations indicated in the Plans. The CCTV Dome Camera Assembly shall be mounted on a pole, wall, or other structure.

Testing

The Contractor shall test each installed CCTV Dome Camera Assembly. The test shall be conducted from the field cabinet using the standard communication protocol and a laptop computer. The Contractor shall verify that the camera can be fully exercised and moved through the entire limits of Pan, Tilt, Zoom, Focus and Iris adjustments, using both the manual control and presets. The Contractor shall maintain a log of all testing and the results. A representative of the Contractor and a representative of the Engineer shall sign the log as witnessing the results. Records of all tests shall be submitted to the Engineer prior to accepting the installation.

Method of Measurement. The closed circuit television dome camera pay item will be measured for payment by the actual number of CCTV dome camera assemblies furnished, installed, tested, and accepted.

Basis of Payment. Payment will be made at the contract unit price for each CLOSED CIRCUIT TELEVISION DOME CAMERA, IP BASED including all equipment, material, testing, documentation, and labor detailed in the contract documents for this pay item.

**CLOSED CIRCUIT TELEVISION DOME CAMERA, IP BASED (MATERIAL ONLY)**

The Contractor shall furnish one complete CCTV camera assembly with housing, mounting bracket kit, and accessories (power supplies, etc) and deliver it to the Department.

The camera shall conform to the specifications listed under the pay item for CLOSED CIRCUIT TELEVISION DOME CAMERA, IP BASED.

Basis of Payment: This work will be paid for at the contract unit price per Each for CLOSED CIRCUIT TELEVISION DOME CAMERA, IP BASED (MATERIAL ONLY) which price shall be payment in full for all labor, materials, and equipment required to provide the equipment specified above and deliver it to the Department.

**FIBER OPTIC ETHERNET DROP AND REPEAT SWITCH**

The Contractor shall furnish a fiber optic drop and repeat switch (material only) complete with the accessories specified below and deliver it to the Department.

The fiber optic drop and repeat switch shall meet or exceed the following minimum specifications:

Approved Models: Aaxeon Technologies Model LNX-1802G-SFP-T (18-Port (16-port 10/100T + 2 10/100/1000T SFP ports Industrial Ethernet Switch, Wide Operating Temperature) or approved equal.

- Features:
- 16-Port 10/100TX + 2-Port 10/100/1000T/Mini-GBIC Combo
  - Store-and-Forward Switching Architecture
  - 7.2Gbps Back-Plane (Switching Fabric)
  - 1 Mbits Memory Buffer
  - 8K MAC Address Table
  - Wide-Range Redundant Power Design
  - Power Polarity Reserve Protect
  - Provides EFT Protection 3000 VDC for Power Line
  - Supports 6000 VDC Ethernet ESD Protection
  - IP30 Rugged Aluminum Case Design
  - 5-Year Warranty
- Standard:
- IEEE 802.3 10BaseT Ethernet
  - IEEE 802.3u 100BaseTX Fast Ethernet
  - IEEE 802.ab 1000BaseT
  - IEEE 802.z Gigabit Fiber
  - IEEE 802.3x Flow Control and Back-Pressure
- Protocol:
- CSMA/CD
- Switch Architecture:
- Back-Plane (Switching Fabric): 7.2Gbps
  - Packet Throughput Ability (Full-Duplex): 10.7Mpps @ 64bytes
- Transfer Rate:
- 14,880pps for Ethernet Port
  - 148,800pps for Fast Ethernet Port
  - 1,488,000pps for Gigabit Fiber Ethernet Port
- MAC Address:
- 8K MAC Address Table
- Jumbo Frame:
- 9 Kbytes
- Memory Buffer:
- 136 Kbits

- LED:
- Unit: Power 1, Power 2, Fault
  - 10/100 TX: Link/Activity, Full Duplex/Collision
  - Gigabit Copper: Link/Activity, Speed
  - SFP: Link/Activity
- Connector:
- 10/100T: 16 x RJ-45
  - 10/100/1000T Mini-GBIC Combo: 2 x RJ-45 + 2 x 100/1000 SFP Sockets
- Network Cable:
- 10BaseT: 2-pair UTP/STP Cat. 3, 4, 5 cable EIA/TIA-568 100-ohm (100m)
  - 100BaseTX: 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m)
- Power Supply:
- DC 12 ~ 48V, Redundant Power with Polarity Reverse Protect Function and Removable Terminal Block
- Power Consumption:
- 9 Watts
- Reverse Polarity Protection:
- Present
- Overload Current Protection:
- Present
- Mechanical:
- Casing: IP30 Metal Case
  - Dimension (W x H x D): 72 x 152 x 105 mm (2.83 x 4.13 x 5.98 in.)
  - Installation: DIN-Rail/Wall Mountable
- Weight:
- Unit Weight: 2.2 lbs.
  - Shipping Weight: 3.3 lbs.
- Operation Temperature:
- Wide Operating Temperature: -40° C to 80° C (-40° F to 176° F)
- Operation Humidity:
- 5% to 95% (Non-condensing)
- Storage Temperature:
- -40° C to 85° C
- EMI:
- FCC Class A
  - CE EN6100-4-2/EN6100-4-3/EN6100-4-4/EN6100-4-5/EN6100-4-6
  - /EN6100-4-8/EN6100-4-11/EN6100-4-12/EN6100-6-2/EN6100-6-4

- Safety:
- UL, cUL, CE EN60950-1
- Stability Testing:
- Shock: IEC60068-2-27
  - Free Fall: IEC60068-2-32
  - Vibration: IEC60068-2-6
- Warranty:
- 5-Year Warranty

The following items shall also be included with each switch:

- Power Supply – Qty. 1 (Aaxeon Model DR-45, 45 Watt, 12 Volt DC, Industrial Din-Rail Power Supply or Approved Equal)
- SFP Fiber Optic Module – Qty. 1 (Aaxeon SFP-S10-T, 1.25Gbps Ethernet SFP Transceiver, Single Mode 10KM / LC / 1310nm, -40°C~85°C)
- DIN Rail, 2 ft. section
- Fiber Optic Patch Cables – Qty. 1 (single mode fiber, 2 meter length, duplex, LC/ST connectors)

Basis of Payment: This work will be paid for at the contract unit price per Each for FIBER OPTIC ETHERNET DROP AND REPEAT SWITCH which price shall be payment in full for all labor, materials, and equipment required to provide the fiber optic Ethernet drop and repeat switch and associated equipment and deliver it to the Department.

## **CAT 5 ETHERNET CABLE**

This work shall be in accordance with Sections 873, 1076, and 1088 of the Standard Specifications except as modified herein.

This work shall consist of furnishing and installing an outdoor rated CAT5E cable in conduits, handholes, and poles.

The cable shall be rated for outdoor use and conform to the following specifications:

- Outdoor CMX Rated Jacket (climate/oil resistant jacket)
- UV Resistant Outer Jacket Material (PVC-UV, UV Stabilized)
- Outer Jacket Ripcord
- Designed For Outdoor Above- Ground or Conduit Duct applications
- Cat5E rated to 350MHz (great for 10/100 or even 1000mbps Gigabit Ethernet)
- Meets TIA/EIA 568b.2 Standard
- Unshielded Twist Pair
- 4 Pairs, 8 Conductors
- 24AWG, Solid Core Copper
- UL 444 ANSI TIA/EIA-568.2 ISO/IEC 11801
- RoHS Compliant
- Gel filled

Basis of Payment: This work will be paid for at the contract unit price per Foot for CAT 5 ETHERNET CABLE, which shall be payment in full for all labor, equipment, and materials required to provide and install the cable described above, complete.

## **COMMUNICATIONS VAULT**

This work shall be in accordance with Sections 814 and 1088 of the Standard Specifications except as modified herein.

This work shall consist of furnishing and installing a communications vault constructed of polymer concrete.

The following items are approved for use in District 4: Hubbel, Quazite, Part Numbers: PG2436HA00 (Cover) and PG2436BA30 (Box) or approved equal:

The communications vault and lid shall conform to the following specifications:

### Cover:

Material: Polymer Concrete  
Nominal Dimensions: 24" W x 36 L"  
Gasketed, Heavy Duty Lid with 2 Bolts  
Design/Test Load: 15,000/22,500 lb  
ANSI Tier: 15

### Box:

Material: Polymer Concrete  
Nominal Dimensions: 24" W x 36" L x 30" D  
Open Bottom  
Design/Test Load: 22,500/33,750 lb  
ANSI Tier: 22

The location of the handhole shall be excavated so that the top of the handhole is set flush with the sidewalk or paved surface. When installed in earth shoulder away from the pavement edge, the top surface of the handhole shall be 1" in. (25 mm) above the finished grade. The excavation shall be deep enough to accommodate the depth of the box and French drain.

The french drain shall be constructed underneath the proposed handhole according to Article 601.06 and in accordance with Highway Standard 814001.

The conduits shall enter the vault at 24" and the Contractor shall install six inches of CA 5 or CA 7" in. the bottom of the vault.

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

## **POLE MOUNTED EQUIPMENT CABINET TYPE B**

Description. This work consists of furnishing and installing a pole mounted equipment cabinet and peripheral equipment at locations indicated in the Plans. These cabinets will be utilized to house critical electrical, optical, and communications equipment as defined in other contract pay items.

Materials. Materials shall be in accordance to the following specifications.

General. The equipment cabinet shall conform to the details shown on the plan sheet. Equipment cabinets shall be mounted and anchored on the poles and structures at locations indicated in the Plans. In addition, all mounting hardware and brackets required to install the equipment cabinet on the pole shall be stainless steel and provided. The mounting heights and pole diameters shall be as specified by the Engineer.

The Type B cabinet shall be a NEMA 3R Single Door Enclosure, constructed from .125" thick aluminum, with minimum outside dimensions of 41" (H) x 20" (W) x 14" (D). The cabinet shall have a natural finish.

The cabinet shall be furnished with one adjustable height shelf, a three point latching mechanism, three position door stop (90, 120, 180 degrees), neoprene door gasket, door louvers, overhang vent slots, continuous stainless steel door hinge, interior stiffeners for pole mounting, and all stainless steel hardware. The cabinet shall also have a Corbin #2 dead bolt lock or equal. The key shall be removable in the lock position only. Two keys shall be supplied for each lock, and all equipment cabinet locks shall be keyed the same. The cabinet shall be equipped with a thermostatically controlled ventilation fan.

The cabinet shall be equipped with one 24 fiber enclosure equipped with 24 multimode ST ferrules.

All cables shall be labeled utilizing marking tags.

The cabinet shall be equipped with a main power panel as shown on the cabinet plan detail sheet. The power panel shall include one 30A main breaker, one 15A equipment breaker, neutral bus bar, ground bus bar, 15A GFI receptacle, two terminal blocks, one surge protector, and one six outlet power strip with integral surge protection. The power panel shall include a plexi-glass safety shield that covers the power panel.

### Surge Protectors

The cabinet equipment surge protector shall be an ECO SHA-1210IRS or approved equal.

A surge protector shall protect each leg of the primary power feed. This surge protector shall be installed as a precautionary measure against possible damage resulting from voltage surges on all incoming power lines. The 120V AC single-phase surge protector shall incorporate a series choke and shall have a maximum clamp voltage of 340 V at 20 kA with a 5 ns response.

In addition, the surge protector shall have the capability of removing high-energy surges and shall block high-speed transients. The surge protector shall comply with the following specifications:

|                            |                                    |
|----------------------------|------------------------------------|
| Peak Current:              | 20,000 amps (8 X 20 us wave shape) |
| Occurrences:               | 20 times at peak current           |
| Minimum Series Inductance: | 200 microHenrys                    |
| Continuous Series Current: | 50A                                |
| Temperature Range:         | -40°F to 185°F (-40°C to +85°C)    |

### Power Strip

The cabinet power strip shall have a minimum of six outlets and integral surge suppression that meets or exceeds the following minimum specifications:

- Let Through Voltage: <85 Volts
- Operating Voltage: 120VAC, 50/60H
- UL Suppressed Voltage Rating: 330V
- Energy Rating: 320J
- Peak Current NM/CM: 13k Amps NM, 13k Amps CM
- EMI/RFI Noise Filtration: >25-60dB

The power strip shall be wired directly to the protected power terminals on the cabinet surge arrester.

### Construction Requirements.

The Contractor shall prepare and submit shop drawings that detail all of the components to be supplied, along with associated mounting hardware for the pole mounted equipment cabinet. The shop drawings must be approved by the Engineer prior installation of the completed cabinet in the field.

The Engineer reserves the right to inspect and/or factory test any completed cabinet assemblies prior to shipment of the material to the project site. Any deviations from these specifications that are identified during such testing shall be corrected prior to delivery of the assembly to the project site.

The AC power service to be run to the equipment cabinet shall be terminated. In addition, the cabinet shall be connected to an adequate ground following the Standard Specifications.

The Contractor shall terminate any inbound and outbound fiber optic, telephone, or wireless antenna leads in the equipment cabinet as shown in the Plans. The Contractor shall terminate any twisted pair communication cable on the termination panel in the equipment cabinet as shown in the Plans. Lugs shall be installed at the end of each conductor suitable for connection to the barrier terminal blocks.

The Contractor shall install DIN rail and associated equipment inside the cabinet to the satisfaction of the Engineer.

Method of Measurement. This item shall be measured for payment by each pole mounted equipment cabinet type B in-place.

Basis of Payment. This work shall be paid for at the contract unit price Each for POLE MOUNTED EQUIPMENT CABINET TYPE B, and shall include all equipment, material and labor detailed in the specifications and as shown on the Plans.

## **CONCRETE FOUNDATION, TYPE-D**

Description: This item shall consists of constructing a Type-D foundation for the installation of a Type-III ground cabinet housing continuous traffic count equipment, anchor bolts and ground rod 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 and in applicable portions of **Section 878** of the Standard Specifications.

Materials: The materials shall conform to the specifications for Class SI concrete Reinforcement Bars in the Standard Specifications. The conduit and fittings within the limits of the foundation shall conform to the same requirements as specified for the conduit outside these limits. Anchor bolts shall meet the requirements of **Section 505** and **Article 1006.09** of the Standard Specifications.

A ground rod shall be installed in each foundation and shall conform to **Article 1087.01**. Unless otherwise indicated, ground rods shall be one piece copper-clad steel rods  $\frac{3}{4}$ " x 10 feet. After installation, and before acceptance of the ATR, the earth ground shall be tested in the presence of the Engineer utilizing an appropriate earth-ground test set.

### Construction Requirements

The Class SI Type-D foundations shall be at the locations specified in the plans. The top of the foundations shall be finished level. Shimming will not be permitted. All edges along the top of the foundation shall have a 1 inch bevel. A form extending a minimum of 9 inches below the top surface of the foundation is required. The form shall be set level and means shall be provided for holding same rigidly in place while the concrete is being deposited. If the excavation is irregular, a form shall be used to provide the proper dimensions of the entire foundation below the grade surface. Where a concrete foundation is contiguous to a sidewalk, preformed joint filler of 1 inch thickness shall be placed between the foundation and the sidewalk.

All conduit in the foundation shall be installed rigidly in place before concrete is deposited in the form. Insulated bushings shall be provided at the ends of conduit.

Anchor bolts shall be set in place before the concrete is deposited by means of a template constructed to place the anchor bolts in accordance with the pattern of the bolt holes in the base. After installation of cables, all conduit openings in the foundations shall be sealed with an approved mastic. The required number and size of galvanized steel conduit shall be installed in every concrete foundation as shown in the plans. An excess of galvanized steel conduit shall be installed in every concrete foundation. These excess stubs shall be 2" inches in length. Placement and Quantity shall be determined by the Engineer and the ends of the stubs shall be capped.

Included in the cost of each Type-D foundation, the Contractor shall construct a 5" inch PCC sidewalk of rectangular area 3' foot x 4' foot immediately adjacent to the cabinet door, with the 4' foot dimension of the rectangle parallel to the cabinet door when closed. The only situation where this is not applicable is when the foundation is immediately adjacent to or within a paved sidewalk or shoulder area where no further surfacing area is required. The Engineer shall be the sole judge of proper action if this situation should arise.

Basis for Payment: This work shall be paid for at the contract unit price per Foot of depth of CONCRETE FOUNDATION, TYPE D, which price shall be payment in full for all necessary excavating, backfilling, disposal of surplus material, form work, and furnishing all materials, anchor bolts, stubs, and ground rods within the limits of the foundation.

### **CONCRETE FOUNDATION (SPECIAL)**

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 836.02 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 the 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. 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 conduit 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 appurtenance 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 CONCRETE FOUNDATION (SPECIAL), of the diameter and length indicated. The price shall include payment in full for furnishing, installing, and testing all materials (entering conduits, bolts, anchor rods, grounding, etc.) within the limits of the foundation and any topsoil, fertilizing, seeding, and mulching of the distributed areas as well as all associated labor is to be included in this price.

## **TRAFFIC COUNTER**

This work shall consist of furnishing and installing a microwave traffic counter on a proposed galvanized steel pole at the locations shown on the plan sheets.

The traffic counter shall be either a WavetronixSmartsensor or an Image Sensing Solutions RTMS G4 for integration into the IDOT District 4 ITS and Advanced Traffic Management Software.

The Contractor shall perform the following:

- Furnish and install the power supply and lightning arrestor in the proposed Type 334 equipment cabinet.
- Furnish and install the traffic counter on the proposed camera pole in accordance with the manufacturer's recommendations.
- Adjust the rotation, elevation, and azimuth of sensor as directed by the Engineer (IDOT will be on-site during sensor installation to program sensor and verify sensor operation).
- Furnish and install power and data cables.
- Furnish and install all items required for installation and operation including, but not limited to, communication cables, brackets, banding, hardware, etc.

The Department will program the traffic counters and integrate them into the IDOT District 4 ITS and Advanced Traffic Management Software and will be responsible for all labor and materials required for integration.

Description: This work shall consist of furnishing and installing a complete and operational microwave detector with all necessary hardware and software components. The microwave detector shall be a true presence detector that senses vehicles in several lanes and collects location-specific traffic flow data including lane volumes, occupancy, and speed. The detector shall be mounted in a side-fire configuration, at the side of and well above the traveled way.

The microwave detector includes the following components: a detector assembly, power to the unit, and appurtenant mounting hardware, conduits, and cables. These items shall be installed as shown on the Plans and in accordance with the applicable requirements identified in these Special Provisions.

Materials:

General

All required components including tools, equipment, cables, materials, supplies, and manufactured articles required to successfully install the components of the microwave detector as shown on the Plans and as specified herein.

All equipment and component parts furnished shall be new, be of the latest design and manufacture, and be in an operable condition at the time of delivery and installation. All parts shall be of high quality workmanship, and no part or attachment shall be substituted or applied contrary to the manufacturer's recommendations and standard practices.

The design shall be such as to prevent reversed assembly or improper installation of connectors, fasteners, etc. Each item of equipment shall be designed to protect personnel from exposure to high voltage during equipment operation, adjustments, and maintenance.

Microwave Detector Assembly:

Microwave detector assembly includes a microwave detector, mounting brackets or plates, cabling, wiring harnesses, and manufacturer specific setup software connected through a communications cable to a terminal block and a power supply placed in the proposed Type 334 cabinet, to provide a fully functioning vehicle detector installation. All mounting hardware, conduit bushings, conduit straps, cables, wires, connectors, weather heads, etc. necessary to complete the microwave detector special as shown on the Plans and specified herein shall be supplied and installed as recommended by the manufacturer and as approved by the Engineer.

The Contractor shall provide each microwave detector consisting of primarily a detector, mounting bracket, sufficient power and communication cables to go from the detector assembly to a local equipment cabinet that provides power and communications services, and a power supply and terminal block inside the equipment cabinet.

Microwave Detector:

The microwave vehicle detector shall meet or exceed the following requirements:

- Above-pavement installation. The subsystem shall not be embedded in or beneath the traveled way.
- Easy to install, adjust and remove.
- Fully programmable to support a variety of applications.
- Designed for roadside installation in a "side-fire" configuration, with each detector capable of detecting vehicles in several lanes of traffic.
- Resistant to degradation by weather or normal changes in other environmental conditions.

- Outputs processed data including speed, volume, occupancy and detector errors for up to 8 detection zones from each field device. This information shall be available via a serial communications port in the cabinet.
- Transmitter power, if required, shall not exceed 10 milliwatts.
- The microwave detector's vehicle detection range shall be from  $\leq 5$  ft (1.5 m) to  $\geq 197$  ft (60 m) with an elevation beam width of 45 degrees and an azimuth beam width of 15 degrees.
- The maximum number of detection zones defined shall be no fewer than eight (8). The range limits of each zone shall be user defined in steps of 7 ft.
- The detector shall identify vehicle presence within each detection zone with a 95 percent accuracy or greater, independent of the vehicle's direction of travel through the detection zone.
- Measurement error percentage shall be less than or equal to values in the following table:

| <u>Measurement</u>                 | <u>% Error</u> | <u>Range</u> |
|------------------------------------|----------------|--------------|
| Per lane Occupancy (Side-fire)     | <5%            | 0-100 %      |
| Per lane Volume (Side-fire)        | <5%            | 0-255        |
| Per lane Average Speed (Side-fire) | <10%           | 0-100mph     |

- The maximum permissible error shall be 10 percent in the case of side-fire speed measurement.
- The designed Mean Time Between Failures (MTBF) of the microwave detector, operating continuously in this application, shall be 10 years or longer.
- The detector shall be enclosed in a rugged watertight NEMA Type 3R enclosure or 4X polycarbonate box.
- The overall dimensions of the detector unit, including fittings, shall not exceed 8" in. (21 cm) X 10 in (27 cm) X 6 in (16 cm).
- The total weight of the detector shall not exceed 15 lbs.
- The detector unit shall be operable from either 12 - 24 VAC/DC @ 6W, or from 95 - 135 VAC @ 60 Hz.
- Power supply shall be obtained from the power distribution assembly within the equipment cabinet.

#### Communication Cable Requirements

Provide a weatherproof, UV-resistant cable of six or more twisted pairs of insulated, stranded AWG #20 or #22 wires with a common shield rated at 300 volts with a temperature rating of > 222 degrees F (105 degrees C) between each detector and the equipment and terminal block in the equipment cabinet for data communications and power. Each conducting pair shall be separately shielded, and all shields shall have a common drain connection. The Contractor shall submit a catalog cut sheet to the Department for approval.

#### Environmental Requirements

Equipment shall be enclosed in a rugged weatherproof box and sealed to protect the equipment inside from wind, dust and airborne particles, and exposure to moisture.

Equipment within the box shall meet all its specified requirements during and after being subjected to any combination of the following:

- Ambient temperature range of -35° to +165° F (-31° to 74° C)
- Relative humidity from 5 to 95 percent, non-condensing
- Sustained wind speed of  $\leq$  90 mph (1454 kph), with a 30 percent gust factor

The design shall be inherently temperature compensated to prevent abnormal operation. Circuit design shall include such compensation as is necessary to overcome adverse effects in the specified environmental range.

No item, component, or subassembly shall emit a noise level exceeding the peak level of 55 DBA when measured at a distance 3.3 feet (1 meter) away from its surface.

If the microwave detector emits radio frequency (RF), each detector shall transmit on a frequency band of 10.525 GHz +/- 25 MHz or another approved spectral band. The detector shall comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules or the appropriate Spectrum Management Authority.

The microwave detector shall be resistant to vibration in accordance with IEC 68-2-30 (test Fc), NEMA TS-1 (Section 2.1.12), or approved equivalent.

The microwave detector shall be resistant to shock in accordance with IEC 68-2-27 (test Ea), NEMA TS-1 (Section 2.1.13), or approved equivalent.

### Power Supply

Provide a power supply in the local equipment cabinet that shall provide appropriate electrical power to the microwave detector. No modular DC power supplies with integral AC plugs shall be used. The device shall protect the microwave detector against damage from power line transients and surges. The device shall include surge protection in accordance with IEC 1000-4-5/EN 61000-4-5.

### System Interface

The microwave detector system interface shall consist of a single MS connector, which provides:

- Power to the microwave detector unit.
- A minimum 12-connector terminal block in the cabinet that terminates the communications cable from the microwave detector.
- Output contact closure wire pairs for each of the required detection zones rated at 200 V AC/DC 100 mA.
- A serial communications port for programming, testing or modem interface to the microwave detector at 9.6 Kbps or faster.

### Mounting Bracket

- A mounting bracket for each detector shall be provided.
- Provide painted steel, stainless steel or all aluminum construction brackets capable of supporting a load of 22 lbs (10 kg) for approval by the Engineer.
- Incorporate a ball joint or other approved mechanism that can be tilted in both axes and locked into place in order to provide the optimum area of coverage.
- Bands fastening the detector-mounting bracket to the support pole shall be made of minimum  $\frac{3}{4}$ " in (19 mm) wide, 0.025 in (0.635 mm) thick stainless steel.
- Bolts that are to fasten the detector-mounting bracket to a concrete wall/bridge shall be stainless steel expansion bolts of sufficient length and diameter to support 100 lb (45 kg).

### Software

The microwave detector shall include manufacturer specific software that provides capabilities satisfying the functional detector requirements listed above. In addition, the software shall:

- Allow a maintenance person to set up to eight (8) detection lanes of varying width.
- Allow parameters to be set manually and/or automatically when calibrating speeds in individual lanes.

### Construction Requirements

#### Microwave Detector Assembly

The microwave detector shall be mounted in a side-fire configuration on poles or sign structures at the specified locations, using the manufactured supplied mounting brackets as shown in the Plans and specified herein. The Contractor shall install the microwave detector unit on a pole at the height specified above the road surface as shown in the Plans so that the masking of vehicles is minimized and that all detection zones are contained within the specified elevation angle as suggested by the manufacturer and approved by the Engineer.

Where the Plans show one microwave detector unit at one site, it shall be configured to obtain traffic data from all the lanes Northbound or Southbound or all the lanes Eastbound or Westbound.

Prepare the power and communications cable according to the detector manufacturer's instructions and as approved by the Engineer. Inside the equipment cabinet, terminate cable pairs used for detector power on the communications interface terminal block, and make the appropriate connections to a power supply or power distribution assembly.

#### Power and Communications System Interface

Install all necessary electrical and interface cables in the equipment cabinet, as shown in the Plans and in accordance with the details as indicated. The MS connector pins must be crimped to the cable conductors and assembled and tested prior to the installation and pulling of cable on site. The Department will test the cable and microwave detector prior to installation.

On the back of the microwave detector unit, terminate the power and communication cable to provide power and serial communications. Inside the cabinet, terminate cable pairs used for power on interface panel terminal blocks, and make the necessary connections to the power supply and/or the power distribution assembly.

#### Miscellaneous

The microwave detector special includes installation of the following components: a detector assembly, power to the unit, and appurtenant mounting hardware, conduits, and power and communications cables. All the earthwork preparation and grading necessary for the installation of the side-fire microwave detector station shall be included in the bid price of this item, including repairing disturbed portions of the construction area.

Install cable tags for all controller and internal wiring harnesses, jumper cables, and microwave detector cables. Include the cable function, origin, destination, equipment location, and other information to facilitate testing, operation, and maintenance as required and approved by the Engineer.

Comply with the requirements of associations, societies, codes, and regulations as applicable. Provide certifications as required by law.

#### Warranty

The Contractor shall warranty all materials and workmanship including labor for a period of two years after the completion and acceptance of the installation, unless other warranty requirements prevail. The warranty period shall begin when the Contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. This warranty shall include repair and/or replacement of all failed components via a factory authorized depot repair service. All items sent to the depot for repair shall be returned within two weeks of the date of receipt at the facility. The depot location shall be in the United States. Repairs shall not require more than two weeks from date of receipt and the provider of the warranty shall be responsible for all return shipping costs. The depot maintainer designated for each component shall be authorized by the original manufacturer to supply this service. A warranty certificate shall be supplied for each component from the designated depot repair site indicating the start and end dates of the warranty. The certificate shall be supplied at the conclusion of the system acceptance test and shall be for a minimum of two years after that point. The certificate shall name the Department as the recipient of the service. The Department shall have the right to transfer this service to other private parties who may be contracted to perform overall maintenance of the facility.

Method of Measurement: The microwave detector special will be measured for payment by the actual number of sites furnished, installed, tested, and accepted including all necessary hardware and software components.

Basis of Payment: This work will be paid for at the contract unit price of Each for TRAFFIC COUNTER, which shall be payment in full for all labor, equipment, and materials required to provide and install the traffic counter described above, complete.

### CONTROLLER CABINET TYPE III

Description: This item shall consist of furnishing and installing Type-3 ground-mounted cabinets of the size specified in place including anchor bolts, bases, cable harnesses, ground rods, terminal boards, shelves, mounting hardware, and all miscellaneous items at locations as directed by the Engineer.

Materials: Cabinets shall be of fabricated aluminum supplied in the sizes with minimum inside dimensions as listed below.

| Type     | Height  | Width | Depth | Thicknes | Opening         |
|----------|---------|-------|-------|----------|-----------------|
| E.S.P. 3 | 49.5 In | 30 In | 17 In | .185 In  | 38 In X 27.5 In |

A heavy-duty gasket shall be installed around the cabinet door opening to provide a weather-tight seal for the protection of the enclosed equipment.

The Type-3 ground mounted cabinet shall be caulked along the entire perimeter of the base with a waterproof, non hardening compound prior to setting the cabinet on the foundation to ensure a water, dust and insect-proof seal.

The cabinet shall be provided with a screened vent under the roof overhang, but a thermostatically controlled fan is not required. No louvers or filtered air intake in the door shall be required.

The cabinet exterior surface shall be smooth, free of marks and scratches and provide an unpainted brushed aluminum finish.

The cabinet door shall be capable of being opened to various angles by a stop and catch mechanism.

The cabinet door shall be equipped with Type-2 Corbin brass locks.

The cabinet shall not be equipped with a police door.

The cabinet shall have two (2) shelves for setting counter/classifiers and other equipment. The shelves' vertical position shall be adjustable.

Materials shall conform to applicable portions of controller cabinets as listed in the Standard Specifications Section 1074.03

#### Installation Details

Installation shall conform to applicable portions of **Section 863** of the Standard Specifications.

The detector loop leads and telephone line shall be equipped with lightning protection. Any lightning protection for the axle sensors shall be as recommended by the manufacturer. Lightning arrestors for the detector loop leads shall be EDCO SRA6LCBLL, manufactured by EDCO Inc. of Belleview, FL. or equivalent. The type of high quality lightning arrestors for the axle sensor lead-in and telephone line shall be as recommended by the equipment manufacturers. The terminal board wiring and all other wiring and connections shall be as indicated in the wiring diagram. Open-end spade connectors shall be used and shall be of sufficient length to allow moving the I.R.D. Automatic Traffic Recorder or equal counter/classifier at least 380 mm outside the cabinet door opening without disconnecting any cables.

No holes shall be drilled through the cabinet exterior for internal equipment mounting.

Each wire entering a cabinet shall be trained in a workmanlike manner and lugged at each terminal strip. If more than one wire has a common terminal on a terminal strip, the adjacent strip shall be used and an appropriate jumped connection shall be made.

All cables and wiring entering a cabinet shall be dressed, harnessed, tied, laced, and clamped to produce a workmanlike wiring installation.

All cables, loop wires, power, phone shall be labeled with a Panduit type cable tag. The tag will identify the type of cable and the cable destination.

The Piezo Electric Axle Sensor Transmission Cable shall be terminated in the cabinet with a male BNC connector of a commercial grade or better and a colored strain-relief sleeve. Assembly shall be performed using proper methods and tooling. Twist-on connectors shall not be used.

The Piezo Electric Axle Sensor Transmission Cable color code shall be as follows:

|          |        |
|----------|--------|
| LANE #1  | RED    |
| LANE #2  | WHITE  |
| LANE #3  | GREEN  |
| LANE #4  | BLUE   |
| LANE #5  | ORANGE |
| LANE # 6 | VIOLET |

A copper grounding bus shall be mounted on the rear wall of the cabinets connecting all components to earth ground. Each cabinet shall contain a wiring diagram of the installation in addition to the diagrams which are to be submitted to the Engineer.

The cabinet shall be wired in accordance with the plans provided. Any deviation from the plans shall be submitted and approved in advance.

The Contractor shall furnish three (3) diagrams of the internal and external connections of the equipment in each cabinet. He shall also furnish the operating and maintenance instructions for all equipment supplied. One copy of the wiring diagrams for each cabinet shall be retained in each field cabinet. Wiring diagram shall be contained in a plastic pouch that shall be permanently mounted to the door of each cabinet. Contractor shall permanently mark the cabinet for each terminal connection as to function and destination.

Included in the cost of each cabinet, the Contractor shall construct a 5"-inch PCC sidewalk of a rectangular area 3' feet by 4' feet immediately adjacent to the cabinet foundation on the same side of the foundation as the cabinet door, with the 4'-foot dimension of the rectangle parallel to the cabinet door when closed. If the width of the required cabinet foundation is greater than the 3'-foot width of the standard Type D concrete foundation, the 4'-foot dimension of the sidewalk area shall be increased to equal the width of the foundation plus 1'-foot, the area to extend 6 inches beyond each side of the foundation. This paragraph shall be applicable at all cabinet locations included in this Section. The only situations where this paragraph shall not apply are as follows: When the foundation is immediately adjacent to or within a paved sidewalk or shoulder area and no further surfacing is required. The Engineer shall be the sole judge as to the applicability of this paragraph in all questions arising there from.

**No conduit shall be allowed to enter cabinet through the sides, top or back walls.**

Terminal blocks provided in field cabinets shall be the heavy duty barrier type. The terminal block shall be a minimum of 2" inches wide and 1.2" inches deep. Center to center of the terminal screws or studs shall be a minimum of 0.63 inch with barriers in-between. Terminal blocks shall be rated at 45 amps 600 volts breakdown RMS line to line 11,000 V. and breakdown RMS line to ground 13,800 V. A marking strip shall be provided with each terminal block.

Method of Measurement: Each cabinet installed complete and in place on a Type D concrete foundation will be counted as a single unit.

Basis for Payment: This work will be paid for at the contract unit price Each for CONTROLLER CABINET, TYPE-III which price shall be paid in full for furnishing, wiring and installing the new cabinet, anchor bolts and terminal facilities complete.

**CABINET, MODEL 334**

Description: Work under this item shall consist of furnishing and installing a Model 334 cabinet for field equipment including fiber optic communications, inductive loop detector stations, changeable message signs, and CCTV dome camera, as shown on the Plans and as hereinafter provided.

Materials:

General

Cabinet, Model 334 shall be an aluminum durable, weatherproof enclosure, with nominal outside dimensions of 66" in. (1.7 m) high X 24" in. (600 mm) wide X 30" in. (762 mm) deep. Cabinet, Model 334 shall consist of the following components: double door each equipped with a lock for front and rear cabinet entry, housing, mounting cage, service panel, thermostatically controlled fan, and all necessary mounting hardware and wiring, and other equipment, as shown on the Plans and specified in these special provisions.

All bolts, nuts, washers, screws, hinges, and hinge pins that are subject to corrosion shall be stainless steel unless otherwise specified. All equipment under this item shall be in accordance with Section 1074.03 of the Standard Specifications except as modified herein.

### Cabinet Components.

The housing and the mounting cage assembly shall conform to those of the Model 334 cabinet provisions of the "Traffic Signal Control Equipment Specifications" (TSCES) issued by the State of California, Department of Transportation, and to all addenda thereto current at the time of project advertising. The housing shall be rainproof with the top of the enclosure crowned to prevent standing water. All exterior seams for the enclosure and doors shall be continuously welded and shall be smooth. The housing shall have no provisions for a police panel or door.

The cabinet shall have single front and rear doors, each equipped with a lock. The enclosure door frames shall be double flanged out on all 4 sides and shall have strikers to hold tension on and form a firm seal between the door gasketing and the frame. The front and rear doors shall be provided with catches to hold the door open at both 90 and 180 ±10°. Gasketing shall be provided on all door openings and shall be dust-tight. For horizontal support and bolt attachment, cage bottom support mounting angles shall be provided on either side, level with the bottom edge of the door.

The latching handles on the doors shall have provisions for padlocking in the closed position. When the door is closed and latched, the door shall be locked. The locks and handles shall be on the right side of the front door and the left side of the rear door. The lock and lock support shall be rigidly mounted to the door. The locks shall be Corbin #2 and two keys shall be supplied to the Department with each lock. The keys shall be removable in the locked position only.

The front and rear doors shall be provided with louvered vents. A removable and reusable air filter shall be housed behind the door vents. The filter filtration area shall cover the vent opening area, and the filter shell shall be provided that fits over the filter providing mechanical support for the filter. The shell shall be louvered to direct the incoming air downward.

The intake (including filter with shell) and exhaust areas shall pass a minimum of 60 cubic feet of air per minute for housing #1 and 26 cubic feet of air per minute for housing #2. The thermostatically controlled fan with ball or roller bearings shall be mounted within the housing and vented. The fan shall provide a capacity of at least 150 cubic feet of free air delivery per minute of ventilation. The fan shall be thermostatically controlled and activated when the temperature inside the cabinet exceeds 75°F (24°C) and shut off when the temperature is less than 64°F (18°C). In addition, the fan shall be manually adjustable for automatic turn on and off. The fan circuit shall be protected at 125 percent of the fan motor ampacity.

The housing shall also be equipped with a heating element installed in the bottom front of the cabinet and mounted along the side of the rack. The heating element shall draw 500 watts and have an output of at least 1700 BTU/hr. The heater shall have a built-in quick response thermostat with sealed contacts that has a temperature control range of 40°F to 100°F, and have a built-in thermal cut-off to automatically shut-off the heater in the event of overheating.

All subassemblies shall be mounted in removable 19 in (482 mm) EIA self-standing rack assemblies. The EIA rack portion of the cage shall consist of 2 pairs of continuous, adjustable equipment mounting angles that comply with Standard EIA RS-310-B. The cage shall be centered within the cabinet and bolted to the cabinet at 4 points.

Each cabinet shall be equipped with 2 shelves and one slide out keyboard tray. Shelves shall be the full width of the rack and 12 in (300 mm) deep. The shelves shall be designed to support a minimum of 50 pounds.

The cabinet shall be equipped with one rack mounted 96 fiber enclosure equipped with 96 single mode ST ferrules.

Each cabinet shall be equipped with one fluorescent lighting fixture mounted to the inside top front portion of the cabinet. The fixture shall have an F-15-T-8 cool white lamp; operated from a normal power factor, UL listed cold weather ballast. A door-activated switch shall be installed to turn the cabinet light on when the front door is opened. The door switch shall be on a separate circuit by itself and used only to turn on the cabinet light.

Each cabinet shall be supplied with a heavy-duty plastic envelope to store plans, wiring diagrams, schematics, etc. This envelope shall have metal grommets so that it hangs from the door hooks. The envelope shall have minimum dimensions of 10" in. (250 mm) x 15" in. (381 mm).

Foundations shall conform to those shown on the plan sheets. The foundation is paid for separately.

#### Construction Requirements

The Contractor shall deliver the Cabinet Model 334 mounted on a plywood-shipping pallet that is bolted to the cabinet base. The cabinet shall be enclosed in a slipcover cardboard packaging shell. The housing doors shall be blocked to prevent movement during transportation to the site.

The Contractor shall securely fasten the Cabinet Model 334 on the new concrete foundation at the locations shown on the Plans. The Contractor shall confirm the orientation of the Cabinet Model 334 installation and its front door side with the Engineer prior to installation. Stainless steel bolted connections shall be provided with lock-washers, locking nuts, or other approved means to prevent the connection nuts from backing off. Dissimilar materials shall be isolated from one another by stainless steel fittings.

The Contractor shall make all power connections to the cabinet in accordance with the Plans and as required. The neutral bus shall be isolated from the cabinet and equipment ground. It shall terminate at the neutral lug ultimately attached to the meter pedestal. All conductors used in cabinet wiring shall terminate with properly sized non-insulated (if used, for DC logic only) or clear insulated spring-spade type terminals except when soldered to a through-panel solder lug on the rear side of the terminal block or as specified otherwise. All conductors, except those, which can be readily traced, shall be labeled. Labels attached to each end of the conductor shall identify the destination of the other end of the conductor. Cabling shall be routed to prevent conductors from being in contact with metal edges. Cabling shall be arranged so that any removable assembly may be removed without disturbing conductors not associated with that assembly.

### Tests.

Cabinet Acceptance Test - In addition to the environmental and design approval tests specified in the FHWA Type 170 Traffic Signal Control System Hardware Specification, the following water spray test shall be performed for each type of cabinet:

Spray water from a point directly overhead at an angle of 60° from the vertical axis of the cabinet. Repeat for each of eight equally spaced positions around the cabinet for a period of five minutes in each position. The water shall be sprayed using a domestic type-sprinkling nozzle at a rate of not less than 10 gal/min minute per square foot of surface area. The cabinet shall then be inspected for leakage. Evidence of water leakage shall be cause for rejection.

### Documentation

Shop drawings and wiring showing the proposed layout of each type of cabinet shall be submitted to the Engineer for approval prior to the start of fabrication. Wiring lists for the internal manufacturer cut sheets for all electrical equipment included in each type of cabinet shall be included in the submission.

Four copies of drawings showing the wiring for each cabinet shall be provided. One copy shall be placed in the clear plastic envelope furnished as part of the cabinet. The other three copies shall be delivered to the Engineer.

Method of Measurement: Cabinet, model 334 will be measured as a unit, completely installed and operational.

Basis of Payment: CABINET, MODEL 334, measured as provided above, will be paid for at the contract unit price Each, which price shall be payment in full for furnishing and installing the cabinet and all connections; testing, and for all labor, tools, equipment, transportation, and incidentals necessary to complete this item of work.

## **DETECTOR LOOP, TYPE I**

Description: This item shall consist of furnishing, installing and testing 6' X 8' rectangular detector loops at the locations shown on the plans. The detector loops shall be installed in accordance with all details shown on the plans and applicable portions of Section 886 of the Standard Specifications. All sawcutting, detector loop installation, joint sealing, lead-ins, and testing necessary to complete the installation shall conform to the following requirements:

Materials: The cable used for detector loop shall be #14-7 strand XHHW XLP-600V, encased in orange Detecta-duct tubing as manufactured by Kris-Tech Wire Company, Inc or equivalent. All loop wire shall be UL listed. Lead-ins shall be Conoga-30003 cable or equivalent from the handhole to the cabinet. The jacket shall be made of high-density polyethylene.

At ambient air temperatures above 50 degrees F, joint sealer having a minimum tensile strength of 100 P.I.E. when tested by ASTM Method D638-58T shall be used. The sealer shall have sufficient strength and resiliency to withstand stresses caused by vibrations, and pavement expansion and contraction due to temperature changes. Adhesion of the sealer to Portland cement concrete shall be at least equal to the tensile strength of the concrete. The joint sealer shall have a maximum cure time of 30 minutes. Curing shall be defined as the capability of withstanding normal traffic loads without degradation. The sealer shall meet or exceed the specifications of OZ GEDNEY DOZSeal 230 filling compound.

If the ambient air temperature is below 50°F, a hard asphalt-base filling and insulating compound having a high softening point and a high pouring temperature shall be used. The filling compound shall have a softening point of not less than 235°F, a summer pouring temperature of 375°F, and a winter pouring temperature of 425°F.

### Installation Details

The Engineer shall be contacted regarding proposed changes in loop locations necessitated by badly deteriorated pavement. The Engineer may relocate such loops. Detector loops may not be installed before permanent striping is completed on a newly resurfaced section of road.

Slots in the pavement shall be cut with a concrete sawing machine in accordance with the applicable portions of Section 420.05 of the Standard Specifications. 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. Loops shall not be dry cut. Loops shall not be installed at an outside temperature below 50° F unless directed by Engineer.

All excess joint sealer shall be removed so that the level of the sealer in the sawcut is at the same level as the adjoining pavement.

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.

Detector loops shall be centered in all 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. Lane #1 shall be the southbound (westernmost) or westbound (northernmost) outside lane. Subsequent lanes are to be coded sequentially towards the opposite outside shoulder. A chart which shows the coding for each installation shall be included in each cabinet. Core holes will not be allowed at corners of loops. Sawcuts for all detector loops and lead-ins shall not be greater than 2 3/4 inches in depth.

All detector loops shall contain four (4) turns of #14 wire. Detector loops shall not be connected in series with other loops. Each detector loop shall have its own lead-in cable to the cabinet when said detector loop is over 150 feet from the cabinet. The loop lead-in shall be a Canoga 30003 cable or equivalent. Loop and lead-in wires shall be free from kinks or any insulation abrasions. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-in cable shall be brought into a cabinet or handhole at the time the detector loop is placed in the pavement.

Where lead-in runs are less than 150' feet, the loop wire shall be utilized as lead-in to the point of termination without splices, being twisted 5 turns per foot. The loop wire will be paid for as lead-in from the handhole to the point of termination in the cabinet.

Loop lead-ins placed in handholes shall be coiled, taped and secured to the upper portion of the handhole to protect against water damage. The excess coiled wire should not exceed 6' in. length. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged at each angled drilled hole, handhole, and junction box through which it passes and at the termination point in the cabinet.

An angled hole shall be drilled at least 12" inches in from the edge of pavement through which the 1¼" inches of PVC conduit containing the loop lead-in cable shall be installed (see plan detail).

The loop shall be spliced to the lead-in wire with a barrel sleeve, crimped and soldered. Adhesive-lined heat shrink tubing shall be used to provide waterproof protection for the splice. The soldered connection shall be made with a soldering iron or soldering gun. No other method will be acceptable, i.e. the use of a torch to solder will not be acceptable. The heat shrink tubing shall be shrunk with a heat gun. No other method will be acceptable, i.e. the use of a torch will not be acceptable. No burrs shall be left on the wire when soldering is finished. Cold solder joints will not be acceptable.

The Traffic Count Detector Loop color code shall be as follows:

|         |        |
|---------|--------|
| LOOP #1 | GRAY   |
| LOOP #2 | ORANGE |
| LOOP #3 | PURPLE |
| LOOP #4 | BLUE   |
| LOOP #5 | GREEN  |
| LOOP #6 | YELLOW |
| LOOP #7 | BROWN  |
| LOOP #8 | WHITE  |

At locations where there are more than eight loops , loops number nine through number sixteen shall repeat the same color code, but all loops shall additionally be marked to identify the lane.

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.

#### Protection of Work

Electrical work, equipment and appurtenances shall be protected from damage during construction until final acceptance. Electrical duct openings shall be capped or sealed to prevent the entrance of water and dirt. Wiring shall be protected from mechanical injury.

### Standards of Installation

Electrical work shall be completed in a neat and workmanlike manner in accordance with the best practices of the trade. Unless otherwise indicated, materials and equipment shall be new and installed in accordance with the manufacturer's recommendations.

Except as specified elsewhere herein, materials and equipment shall be in conformance with the requirements of Section 106 of the Standard Specifications.

### Testing

Detector loops shall be tested immediately upon installation at each automated traffic recording station and again at the time of Final Acceptance Inspection in the presence of the Engineer. Items which fail to test satisfactorily shall be repaired or replaced before final acceptance.

An electronic test instrument capable of measuring large values of electrical resistance, such as a megger, shall be used to measure the resistance of the detector loop and its lead-in. The resistance of the loop and its lead-in shall be a minimum of 100 megohms above ground under any conditions of weather or moisture. The resistance tests and all electronic tests shall be performed in the presence of the Engineer any number of times as specified by the Engineer. The loop and loop lead-in shall have an inductance between 100 microhenries and 350 microhenries. The continuity test of the loop and loop lead-in shall not indicate a resistance greater than two (2) ohms. The Contractor shall conduct all testing in the presence of the Engineer and all readings will be recorded by the Engineer. Testing shall be done with an approved loop tester.

Method of Measurement: The detector loop measurement shall be the length of sawcut in the pavement which contains loop wire. The actual length of wire used in the sawcut shall not be considered in any measurement.

Basis of Payment: This item will be paid at the contract unit price per lineal foot for DETECTOR LOOP, TYPE I.

### **DETECTOR LOOP LEAD-IN CABLE IN CONDUIT, CONOGA-30003**

Description: This work consists of furnishing and installing loop detector lead-in cables or interconnect cables of the number of pairs specified in the conduit in accordance with the requirements of the Standard Specifications, Section 886 and the following exceptions or additions.

Materials: The Traffic Count Detector Loop Lead-in Cable shall be Canoga 30003 or equivalent.

Installation: Each end of the cable shall be identified with wire markers as directed by the Engineer.

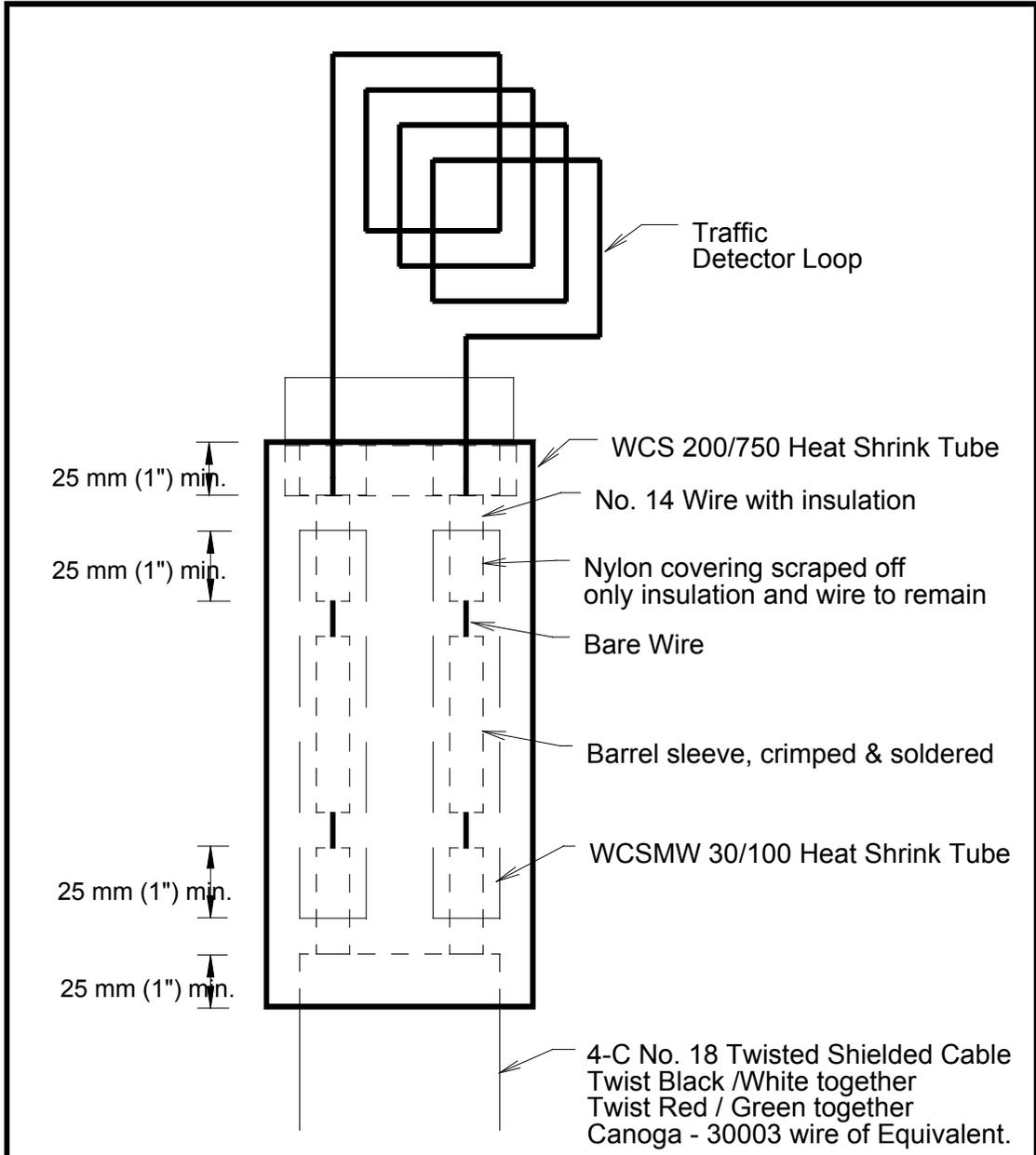
The drain wire of each pair shall be grounded to chassis ground in the cabinet only for interference suppression.

FAI Routes 74 & 155 (I-74 & I-155)  
Project ACIM-ACBRI-000S(907)  
Section 90-[14R;(14HB-4,14,14HVB)BR]  
Tazewell County  
Contract No. 68620

The electrical values of the cable shall be metered by the Contractor, in the presence of the Engineer, after they are spliced to the detector loop. Acceptance of the cable as metered shall be determined by the Engineer.

Basis for Payment: This work shall be paid for at the contract unit price per lineal foot for ELECTRIC CABLE IN CONDUIT, CONOGA-30003.

**LOOP SPLICING REQUIREMENTS**



Minimum 25 mm (1") Heat Shrink Tube overlap on wire.  
 PVC & Shielded cable to form water tight seal. Note/Not to Scale

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| <b>Illinois Department of Transportation</b><br>Office of Planning and Programming |             |          |       |
| Drawn By:  | Checked By: | Date     | Scale |
| R.   | R. Taylor   | 01/20/00 | NON   |

## **HEAVY-DUTY HANDHOLE**

Description: This item shall consist of constructing a heavy-duty handhold cast in place, complete with 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 handholds shall be installed in accordance with Section 814 of the Standard Specifications.

Materials: All materials shall conform to Article 1085.59, and all handholds shall be constructed of Class SI concrete conforming to Article 1020 of the Standard Specifications.

### Construction Details:

Heavy-duty handholds 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 Section. 503 of the Standard Specifications.

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 1 inch above the finished surface of the ground.

Backfilling: Any backfilling necessary under a pavement, shoulder, and sidewalk or within 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 handhold wall, and across all trenches leading into the handhold excavation. The ends of conduits leading into the handhold 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.

French Drain: A French drain conforming to the dimensions shown on the plans shall be constructed in the bottom of the handhold excavation.

Steel Hooks: Each handhold shall be provided with four galvanized steel hooks of appropriate size, one on each wall of the handhold.

Frame and Cover: The outside of the cover shall contain a recessed ring (Type-G) for lifting and a legend "IDOT OPP" cast-in.

Cleaning: The handhold 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 for at the contract unit price Each for HEAVY DUTY HANDHOLE 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.

## **PIEZO AXLE SENSORS, CLASS-II**

Description: This item consists of installing one Class II Piezo Axle Sensor (AMP Model No. 0-1004673-0 BLC Sensor Class II or equivalent), in each lane indicated on the plans.

The use of Global Resin Epoxy or equivalent is necessary for proper bonding. A minimum of thirty (30) days cure time for new asphalt is required before the epoxy is used for bonding. To accelerate cure time of the epoxy at temperatures below 50°F an epoxy heater will be furnished by IDOT. The Contractor shall provide a 240V generator capable of providing at least 3,600 watts of power.

Piezo axle sensors may not be installed before permanent striping is completed on a newly resurfaced section of road. Installation of an automated traffic recorder must be completed no later than sixty (60) days after installation is begun.

Material: The Class II axle sensors, necessary RG58C/U transmission cable and Global Epoxy or equivalent for encapsulating sensors shall be furnished by the Contractor. ROADTRAX BLC Traffic Sensors manufactured by AMP Incorporated or equivalent shall be installed at this location. The axle sensor shall be flexible along its longitudinal axis to allow the sensor to easily conform to the profile of the lane in which it is being installed. Class II axle sensors shall be manufactured with suitable lengths of RG58C/U transmission cable for continuous run from axle sensor through the handhole to the cabinet. Splicing of transmission cable to axle sensor shall not be permitted unless approved in advance and supervised by Mr. Ramon Taylor of the Illinois Department of Transportation.

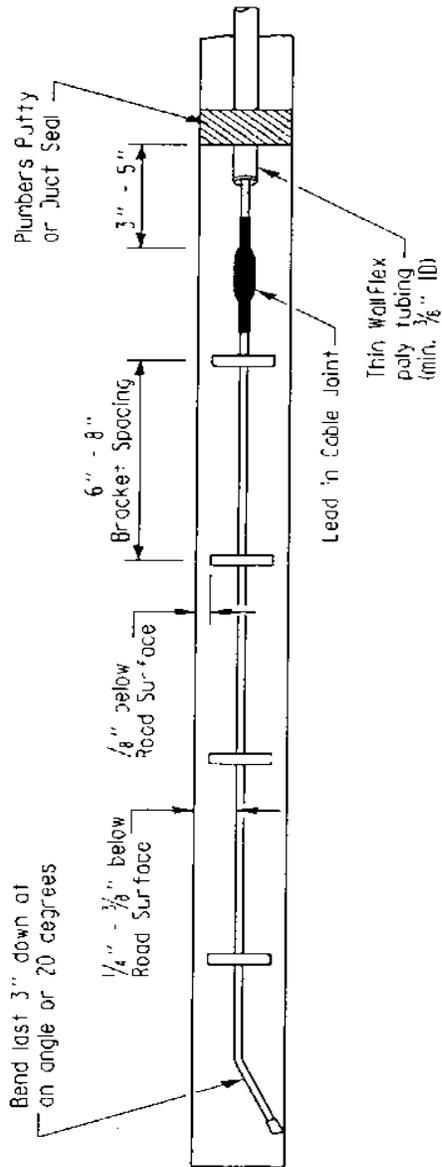
Installation: Installation shall be in accordance with the attached instructions. The Engineer should be advised at least three days prior to installation. Mr. Ramon Taylor of the Illinois Department of Transportation, telephone (217) 782-2065, must be present to supervise installation of the axle sensors.

Heated loop sealers shall not be used to seal the RG58C/U transmission cable in the pavement sawcut. Sealex or equivalent loop sealant shall be used.

Testing: Piezo axle sensors shall be tested immediately upon installation and again at the time of Final Acceptance Inspection in the presence of the Engineer. The tests shall be performed utilizing an oscilloscope to ensure acceptable, clean signals of proper amplitude and polarity. Sensors that fail to test satisfactorily shall be repaired or replaced before final acceptance.

Basis for Payment: This work shall be paid for at the contract unit price per linear foot for PIEZO AXLE SENSOR, CLASS II, measured along the sawcut in the pavement containing the axle sensor. The lead-in measured from the end of the axle sensor to the dive hole shall be paid for at the contract unit price per linear foot for detector loop type I. The lead-in from the dive hole to the cabinet shall be considered incidental since it is provided with the sensor.

PIEZO DETAIL



**POSSIBLE SOURCES FOR SPECIFIED ITEMS**

| Material   | Possible Source                  | Contact        | Telephone Number | Location         |
|--|----------------------------------|----------------|------------------|------------------|
| Loop Detector wire encased in Orange Detecta-Duct Tubing | Kris-Tech Wire Company           | Sales          | (315) 339-5288   | Rome, NY         |
| Conoga 2-pair shielded wire suitable for direct burial   | 3M Traffic Products Division     | Sales          | (612) 733-1110   | Minneapolis, MI  |
| RL-200 Polyurethane resin                                | International Road Dynamics Inc. | Scott Sherwood | (815) 675-1430   | Spring Grove, IL |
| SX320J Solar Panel                                       | B.P. Solar                       | Sales          | 1-800-521-7652   | Frederick, MD    |
| Class-II Peizo Sensor                                    | Measurement Specialties Inc.     | Don Halverson  | (610) 650-1580   | Valley Forge, PA |
| Class-II Peizo Sensor                                    | International Road Dynamics      | Scott Sherwood | (815) 675-1430   | Spring Grove, IL |
| LifeLine Battery Part # GPL-24T                          | Concord Battery Corp.            | Sales          | (626) 813-1234   | West Covina, CA  |
| Solsum 6.6 solar charger                                 | Sunwise Technology               | Sales          | 1-800-817-6527   | Kingston, NY     |
| Precast Composite Concrete Handhole                      | Handhole.com                     | Sales          | 1-800-332-8114   | Cedar Rapids, IA |
|  |                                  |                |                  |                  |
|  |                                  |                |                  |                  |
|  |                                  |                |                  |                  |
|  |                                  |                |                  |                  |

## **SOLAR POWER SYSTEM**

Description: The solar power system shall consist of the solar panel (collector) all necessary mounting hardware, post, Solsum 5.0C voltage regulator, and Lifeline battery Model No. GPL-24T or equivalent with bolt terminals. This battery shall be a 12 volt, 80 ampere hour absorbed electrolyte type battery. It shall have a completely sealed, valve regulated construction. The battery shall be provided with an attached handle for carrying. The systems must be of the following capacity: All continuous vehicle ATRs shall be equipped with 18-20 watt solar panels. The system's capacity should enable it to operate the equipment for thirty (30) consecutive days of heavily overcast weather without the power level of the battery dropping to a point at which it would no longer power or operate the equipment.

Material: The solar panel and all necessary mounting hardware shall be constructed of maintenance free materials which will not require painting. The solar panel surface shall be mounted at an angle of 65° referenced to the south horizon for maximum efficiency in this geographic region. Mounting height shall be a minimum of 9' feet above ground on a pressure-treated 4" inch x 6" inch post. Mounting in any other fashion will be as specified by the Engineer. A pullbox shall be installed in the conduit on the wood post approximately 3' feet above grade level to facilitate splicing the power wires to the solar panel.

Basis for Payment. This work will be paid for at the contract unit price Each for SOLAR EQUIPMENT mounted on a new post which shall be payment in full for furnishing the post, the charge controller, the battery and the conduit with electric cable attached to the post.

## **TRAFFIC COUNTER POST, GALVANIZED STEEL**

Description. This work shall consist of furnishing and installing a pole, base plate, transformer breakaway base, anchor bolts, and all miscellaneous hardware required to complete the installation in accordance with the Standard Specifications, as shown on the Plans, and as hereinafter provided. Each non-intrusive detector pole will support a traffic counter (microwave detector).

The following pole is approved for use: Valmont, Drawing Number IL4894404.

Materials. The non-intrusive detector pole shall be galvanized steel and furnished and delivered conforming to the details as shown on the Plans. The poles shall be designed and constructed in accordance with the requirements and recommendations of the latest addition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals". The pole shall be designed to support a traffic counter load of up to 25 lbs (11 kg), and 5.3 square feet (0.50 square meters) of area exposed to the wind. Maximum fully loaded deflection at the top of the pole with the Microwave Detector Special and microwave dish mounted shall not exceed 1.5 percent of the pole height based upon a wind velocity of 90 mph (144 km/hr) with a 1.3 gust factor, or 0.5 percent of the pole height based upon a wind velocity of 40 mph (64 km/hr) with a 1.3 gust factor.

The pole height, including breakaway base assembly, shall be 30' feet.

**Pole Components:** The pole shall be constructed of materials having sufficient rigidity using normal pole shaft ranking techniques so that with all material completely installed and in-place as shown on the Plans, the centerline of the shaft shall appear straight and vertical. Upon the completion of the manufacturing process, the pole shafts shall be round and constructed per the specified length. All pole shafts shall have a J-hook at the top of each pole to provide strain relief for the cables and grommets shall also be provided to prevent cable damage. In addition, any and all fasteners and other attachment hardware used on the pole shaft shall be stainless steel unless otherwise approved by the Engineer.

After welding and before galvanizing the exterior surfaces of each steel pole, the pole shall be thoroughly cleaned and free of all loose rust and mill scale, dirt, oil, or grease and any other foreign substances. Galvanizing of the non-intrusive detector pole shall be in accordance with Standard Specifications and shall be tight, free from rough areas or slag, and shall present a uniform appearance.

A base plate shall be provided with a bolt circle for the specified pole height. The base plate and bolt center dimensions shall be adjusted per the result of manufacturer calculations. The base plate casting to be attached to the pole shaft shall be clean, smooth, and with all details well defined and true to pattern. Base plates shall be firmly attached to the pole shaft by welding or another approved method at the discretion of the Engineer. Four base plate anchor bolts shall be installed with each pole as shown on the Plans and is included with each pole.

A cast iron frangible transformer-type base shall be provided with a base plate and bolt circle for the specified pole height. The transformer base and bolt center dimensions shall be adjusted per the result of manufacturer calculations. The transformer bases shall be robotic welded, breakaway approved, and fatigue tested. The transformer base shall be installed with each pole as shown on the Plans and is included with each pole.

A raceway hole as well as reinforced hand holes no less than 3" in. (76 mm) by 5" in. (127 mm) shall also be provided. The hand holes shall include an access cover that is mounted to the pole by two ¼" in. (6.35 mm) stainless steel bolts. The bolts shall have hex heads with 20 threads per inch (mm) and be ¾" in. (19.05 mm) long to secure the door to the pole. In addition, a grounding lug (bolt – hex head), complete with mounting hardware (nut and washer) shall be provided inside the pole. This grounding lug shall be accessible from the hand hole and mounted by welding, directly opposite the hand hole on the inside of the wall of the pole.

The non-intrusive detector pole shall be designed to be free of harmful harmonic motion and vibrations and the Certificate of Compliance shall specifically address this requirement.

**Surface Finish:** Galvanized steel poles shall be galvanized including the handhole, handhole door, base plate, mounting plate and all other elements welded to the shaft according to AASHTO M 111.

**Identification:** The pole shall be identified and labeled with external markings as specified in Article 1069.02 of the Standard Specifications and as shown on the Plans. The wall thickness of each pole shaft, alloy number, the shaft length, the manufacturer, and the date, shall all be indicated on a manufacturer's plate attached to each pole shaft near the base.

Construction Requirements. The Contractor shall furnish a Certificate of Compliance to the Engineer for approval showing structural calculations covering the poles and including compliance with the details shown on the Plans, the specifications in these Special Provisions, and the foregoing AASHTO performance requirements. The Certificate of Compliance shall be complete and submitted with the materials list, and shall include information relative to all specified requirements suitable for verification of compliance. The pole furnished shall match the general appearance illustrated in the Plans.

The non-intrusive detector poles and hardware shall be packaged during shipment to protect all surfaces from being scratched, marred, chipped, or damaged in any way. The packaging of the poles by bundle by the Contractor is acceptable. However, each bundle shall contain a maximum of four poles. Prior to installation, the Engineer will inspect the poles and all its components and any parts found to be damaged or defective shall be replaced at no additional cost.

The Contractor shall assemble pole components at the site before erection. The poles shall be without defect. Poles deemed unacceptable by the Engineer shall be removed from the jobsite and replaced at no additional cost. Components shall be made electrically continuous from the top of the pole to the base and grounding rod. The Contractor shall install the non-intrusive detector pole on a new concrete foundation provided under a separate pay item and as shown on the Plans. The pole shall be set plumb with the use of leveling nuts. The pole shall be set with proper orientation of the access handhole. The Contractor shall avoid contact of dissimilar metals in erecting the pole. Any concern of trapped moisture or potential corrosion cell shall be resolved to the satisfaction of the Engineer.

The Contractor shall furnish and install all required items, such as anchor bolts, screws, wire nuts, grommets, tape connectors, electrical nuts, etc., in order to make the proposed nonintrusive detector pole system complete from the bottom to the top of the pole. Rust, corrosion, and anti-seize protection shall be provided at all threaded assemblies by coating the mating surfaces with an approved compound.

The Contractor shall be responsible for furnishing pole mounting equipment and hardware that is of adequate strength and compatible for the pole it supports. This shall include but not limited to the foundation, anchor rods, anchor bolts, and miscellaneous hardware. The non-intrusive detector pole shall be located away from the traveled way at a certain distance as shown in the Plans or as directed by the Engineer.

Basis of Payment. TRAFFIC COUNTER POST, GALVANIZED STEEL will be paid for at the contract unit price Each, which shall be payment in full for furnishing and installing each pole and all materials including poles, fittings, identification plaque, and all hardware necessary to completely install the non-intrusive detector pole, and for all labor, tools, equipment, transportation, and required items necessary to complete this work.

## **DMS SIGN SOFTWARE AND MAINTENANCE TRAINING**

As part of the contract, the Contractor shall provide on-site training for technicians and operators of the DMS software and associated equipment. This training will address normal operations of the system, routine system maintenance, provisioning and system setup, and fault diagnosis and system repair.

The Contractor shall provide the following training:

- Two (2) 4-hour software operations training sessions with capacity for twelve (12) participants for IDOT District Four DMS software operators to be held at the IDOT District 4 headquarters located in Peoria.
- Two (2) 4-hour maintenance training sessions with capacity for ten (10) participants for IDOT District Four maintenance personnel to be held at the IDOT District 4 headquarters located in Peoria.

The training shall include, but not be limited to, the following:

1. "Hands-on" operation of all sign control hardware and software
2. Explanation of all system commands, their function and usage
3. Insertion of data
4. Required preventative maintenance procedures
5. Servicing procedures
6. System "troubleshooting" or problem identification procedures

Training shall be hands-on with ample time for questions. The Contractor shall submit an agenda for the training and one complete set of training material (manual and schematic) along with the qualification of proposed instructors) to the Department for approval at least 30 calendar days before the training is to begin. The Department will review material and approve or request changes.

The DMS Manufacturer shall record the entire training on DVD and shall provide five copies of the DVD's to the Department for later use.

The Contractor shall furnish training manuals that contain a course outline, ATMS software operation information, hands-on training exercises, and any other pertinent items for each participant.

This work will not be paid for separately, but shall be included in the contract bid price for TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN.

### **TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN**

Description: This work consists of providing a truss mounted dynamic message sign (TMDMS) at the locations shown on the Plans and as directed by the Engineer. Truss mounted dynamic message sign assembly includes the TMDMS enclosure, communication cables, conduits, and associated mounting hardware and software as described in these Special Provisions and as shown on the contract Plans. It also includes operational TMDMS software that remotely provides access to the functionality and performance specified herein.

TMDMS Manufacturer Qualifications: The TMDMS Manufacturer shall submit references as specified below. Reference data shall include current name and address of organization, and the current name and telephone number of an individual from the organization who can be contacted to verify system operation, as well as date of system installation.

Experience Requirements: The TMDMS Manufacturer shall submit at least two references, preferably from other state departments of transportation, that are successfully operating a highway LED full matrix TMDMS system, supplied by this manufacturer under the current corporate name, which otherwise meets this specification, for a period of no less than two years. The LED TMDMS systems submitted shall be full-matrix and able to display at least three (3) lines of 18 characters per line, 18" characters and have walk-in access housings.

References: The TMDMS Manufacturer shall submit three references, preferably from other state departments of transportation, that are successfully operating a multi-unit, multi-lane state or interstate highway, permanently-mounted, overhead dynamic message sign system supplied by this manufacturer under the current corporate name, for a period of no less than five years.

Materials:

General: The TMDMS shall be a full matrix amber LED display in a walk-in weatherproof cabinet. The TMDMS shall provide approaching motorists with a clear readable message in all normally encountered weather and lighting conditions. The TMDMS shall be capable of displaying messages with three lines, eighteen characters per line, at an eighteen inch character height.

The sign shall be designed for a minimum life of 20 years.

All materials furnished, assembled, fabricated or installed under this item shall be new, corrosion resistant and in strict accordance with the details shown in the plans and as detailed in this specification. All details and functionality listed in this specification will be thoroughly inspected and tested by the Department. Failure to meet all details and functionality detailed in this specification shall be grounds for rejection of the equipment.

The equipment design and construction shall utilize the latest available techniques with a minimum number of different parts, subassemblies, circuits, cards and modules to maximize standardization and commonality. The equipment shall be designed for ease of maintenance. All component parts shall be readily accessible for inspection and maintenance. Test points shall be provided for checking essential voltages.

The sign shall be designed and constructed so as to present a clean and neat appearance.

All cables shall be securely clamped/tied in the sign housing. No adhesive attachments will be allowed.

The performance of the sign shall not be impaired due to continuous vibration caused by wind, traffic or other factors. This includes the visibility and legibility of the display.

The TMDMS hardware, along with the sign controller hardware, software and firmware, shall support all TMDMS functionality described throughout the remaining specification sections.

The TMDMS assembly shall be listed by an accredited 3<sup>rd</sup> party testing organization for conformance to Underwriters Laboratories (UL) standards 48 (Standard for Electric Signs) and 1433 (Control Centers for Changing Message Signs). Proof of this conformance shall be provided with submittal materials.

### Environmental Requirements

The TMDMS shall withstand the following environmental conditions for 24 hours or more with no functional or performance degradation, permanent deformation or other damages:

|              |   |
|--------------|---|
| Temperature: | -40°F to +140°F (-40°C to 60°C)                 |
| Humidity:    | 0 to 100 %                                      |
| Wind:        | To at least 90 mph with a 30% gust factor       |
| Ice:         | Front face ice load of 4 pounds per square foot |

All field equipment enclosures shall be designed to withstand the effects of sand, dust, and hose-directed water. All connections shall be watertight.

### Functional Requirements

The TMDMS shall be capable of accepting commands, displaying messages and returning status as required by the current version (v2) National Transportation Communications for ITS Protocol (NTCIP) Specifications applicable for TMDMS and as specified in these special provisions. The TMDMS shall communicate without error for all of the applicable National Transportation for Intelligent Transportation System Protocol (NTCIP) standards and be compliant with all applicable NTCIP standards for TMDMS. The TMDMS shall support all mandatory objects of all mandatory conformance groups of NTCIP for TMDMS.

The TMDMS shall enable the display of text, consisting of a string of alphanumeric and other characters. Each character shall be formed by a matrix of luminous pixels. The matrix of a standard character shall consist of 35 pixels over 5 columns and 7 rows. Each TMDMS shall be minimum 27 pixel high x 125 pixel wide, full matrix and capable of displaying three lines of text using a standard 5 wide x 7 high font size. All display elements and modules shall be solid state. No mechanical or electromechanical elements or shutters shall be used.

All characters, symbols, and digits shall be 18" nominal character size and shall be clearly visible and legible at a distance of 1100' within a minimum 30 degree cone of vision centered around the optical axis of the pixel.

The signs shall be capable of displaying the following:

- A static message
- A flashing message
- Alternating messages, either flashing or static

The changing from one message to another shall be instantaneous.

For message creation, the TMDMS field controller, and TMDMS control software shall support the storage and use of a minimum of three (3) alphanumeric character font files comprising the ASCII character set and including eight (8) directional arrows. Software shall provide the ability to create and maintain message libraries containing up to 255 messages.

## Software

The Contractor shall supply fifteen licenses of remote control and sensing software used to control and interrogate the signs. This software shall provide interoperability with all other signs supplied under this contract and shall be designed to run on a workstation under Windows XP, Windows 7 and Windows Server 2008, either remotely, using the communications link connected to the TMDMS; or locally, from a laptop computer connected to the sign controller communications port. The software shall display the message to be downloaded to operators exactly as it will appear on the destination TMDMS and shall provide verification back to the operators that the actual message has been visibly displayed on the destination TMDMS on an individual pixel basis.

The software shall include functionality for message scheduling (based on date and time), message priority queuing and DMS diagnostics.

The software shall be capable of sending multiple messages to multiple signs based on a user programmable time schedule. Communications shall be by cellular wireless service. The cellular modem and service will be paid for under a separate pay item.

TMDMS control software shall support the creation of user ID's and passwords for up to 25 potential system users. User creation, as well as individual user access rights, shall be assignable only by a "System Administrator".

Before a system operator can use the TMDMS control software, the software shall request a "user name" and user "password". If the correct user name and password are not provided, access to the software shall be declined.

An 8-bit identification code shall be assignable to each controller, via switches located inside the controller enclosure. The software shall control a network of at least 250 variable message signs.

The software shall have the following functionality:

|                  |   |
|------------------|---|
| Display Control: | <ul style="list-style-type: none"> <li>• View, group, and monitor DMS in real time</li> <li>• Controls any NTCIP-compliant DMS (Any DMS configuration, Portable NTCIP message displays)</li> <li>• Powerful list view or map view</li> <li>• Pre-schedule event scenarios</li> <li>• Scheduled status polling of DMS</li> </ul> |
| Messaging:       | <ul style="list-style-type: none"> <li>• Full suite of message and graphic tools</li> <li>• Message changing depending time and date</li> <li>• Adjust message duration and priority</li> <li>• Time based scheduled DMS polling</li> </ul>   |
| Communications:  | <ul style="list-style-type: none"> <li>• Run nearly unlimited signs at once from traffic management centers with client-server architecture</li> <li>• Supports Ethernet and serial (COM Port) connections</li> <li>• Supports modem pools</li> </ul>   |
| Diagnostics:     | <ul style="list-style-type: none"> <li>• Log events and alert TMC staff via email</li> <li>• Locate pixel failures instantly with an in-software visual representation test</li> <li>• View status, errors, and problem codes of all DMS subsystems</li> <li>• Verify and troubleshoot at the pixel level</li> </ul>            |
| Security:        | <ul style="list-style-type: none"> <li>• Real-time verification of "on" pixels</li> <li>• Username/password restricted access to functional areas</li> <li>• Built-in security levels for easy setup</li> <li>• Prohibited words list</li> </ul>  |

In the event that the software is not capable of operating on a laptop that is connected directly to the DMS sign, the Contractor shall provide ten additional licenses of software that can be used in the field to manage the DMS and perform sign diagnostics.

The vendor shall furnish updated copies of all software during the warranty period at no charge to the Department.

Software Documentation

Full documentation for all software and associated protocols shall be supplied to the Department on a CD-ROM. The Department reserves the right to provide this documentation to other parties who may be contracted with in order to provide overall integration or maintenance of this item.

### Performance Requirements

TMDMS messages shall be clearly visible and legible from in-vehicle viewing distances between 150 and 1100 feet. While using an 18 in character height, the TMDMS shall be capable of simultaneously displaying up to 18 characters in each of three lines with spaces between characters, using 5 horizontal X 7 vertical (or larger) pixel matrices.

The TMDMS controller shall be capable of storing a minimum of 32 three-line full width messages. The controller shall be capable of downloading a minimum of 8 additional messages and commands from the communications interface.

The sign shall provide a, RS-232 communications interface in the sign control cabinet suitable for wireless, PSTN, cellular, and fiber optic communications with the sign controller. Additionally, an RS-232 serial port and Ethernet port shall be provided in the control cabinet for full sign operation by means of a laptop computer. Each serial port shall support data rates of 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, and 1200 bps.

### Optical Requirements

All mandatory NTCIP sign functions shall be available and message effects shall be visible from the ground-mounted sign control cabinet.

The viewing angle of each discrete LED-formed pixel shall be a minimum cone of 30 degrees around a line normal to the TMDMS viewing surface. The intensity of each pixel shall not decrease more than 30 percent over the twenty-year life of the sign.

If pulse-width modulation is used for intensity control, the sign drive electronics shall use a refresh or repetition rate of 100 Hz or greater.

The TMDMS walk-in cabinet shall mount three or more light sensors, one angled in a northerly direction away from nearby lighting, scaled for 100 lux, and two normal to the sign face, pointing in opposite directions, scaled for 100,000 lux. Each sensor shall have an adjustable aiming angle. The TMDMS shall be capable of automatic dimming.

### Characters Displayed

The sign shall be capable of displaying ASCII characters 32 through 126 and the following characters at any location in the message line:

“A” thru “Z”- All upper case letters.

“0” thru “9”- All decimal digits.

Space (i.e., ASCII code 0x20).

Punctuation marks shown in brackets [ . , ! ? - ‘ ’ “ ” / ( ) ]

Special characters shown in brackets [# & \* +<>]

3 pixel wide dash

The display modules shall be rectangular, and shall have an identical vertical and horizontal pitch between pixels. The pitch shall be no greater than 2¾".

The separation between the last column of one display module and the first column of the next shall be equal to the horizontal distance between the columns of a single display module.

The characters shall be legible under all light conditions at a distance of 1,100' within a 30° degree cone of vision centered around the optical axis of the pixel.

The sign shall be the proper brightness in all lighting conditions for optimum legibility. It shall be bright enough to have a good target value, but not to the point where the pixels bloom, especially in low ambient light level conditions.

The brightness and color of each pixel shall be uniform over the entire face of the sign within the fifteen degree cone of vision from 1,100' to 200' in all lighting conditions. Non-uniformity of brightness or color over the face of the sign under these conditions shall be cause for rejection of the sign.

### Electronic Materials and Components

All electronic components, except printed circuit boards, shall be commercially available, easily accessible, replaceable and individually removable using conventional electronics repair methods. All electronic assemblies shall meet or exceed IPC 610A workmanship standards.

Each pixel shall have a device attached to the printed circuit board (PCB) to hold and protect the LEDs. These devices shall:

1. Hold the LEDs perpendicular to the display modules within 0.5 degree,
2. Prevent the LEDs from being crushed or bent during handling,
3. Protect the LEDs from damage when the display module is laid on the front surface (the side that the LED lamps are located),
4. Not put any stress on the LEDs due to differentials of expansion and contraction between the device and the LEDs over the herein specified temperature range,
5. Not become loose or fall off during handling or due to vibrations,
6. Not block airflow over the leads of the LEDs,
7. Securely hold each LED while allowing a gap between the device and a minimum of 95% of the body of each LED for airflow,
8. Not block the light output of the LEDs at the required viewing angle,
9. Be black in color to maximize contrast.

The LEDs shall be protected from the outside environmental conditions, including moisture, snow, ice, wind, dust, dirt and UV rays.

Printed Circuit Board (PCB) design shall be such that components may be removed and replaced without damage to boards, traces or tracks.

Only FR-4 0.062 inch minimum thickness material shall be used. Inter component wiring shall be copper clad track having a minimum weight of 2 ounces per square foot with adequate cross section for current to be carried. Jumper wires will not be permitted, except from plated-through holes to component. The maximum number of jumper wires allowed per circuit board is two.

All printed circuit boards (PCBs), except for the power supply PCBs, UPS PCBs, modem PCBs and sign controller PCBs, shall be completely conformal coated with a silicone resin conformal coat.

All PCBs shall be finished with a solder mask and a component identifier silk screen.

### Capacitors

The DC and AC voltage ratings as well as the dissipation factor of a capacitor shall exceed the worst case design parameters of the circuitry by 50 percent.

A capacitor which can be damaged by shock or vibration shall be supported mechanically by a clamp or fastener.

Capacitor encasements shall be resistant to cracking, peeling and discoloration.

### Resistors

Any resistor shall not be operated in excess of 50 percent of its power rating.

### Semiconductor Devices

All transistors, integrated circuits, and diodes shall be a standard type listed by EIA and clearly identifiable.

### Connectors

All PCB edge connectors and cable connectors, except for those found in the power supply, UPS, modem and sign controller, shall be base plated with nickel and finished with 30 micro-inches of gold.

### Mechanical Components

All external screws, nuts, and locking washers shall be stainless steel. No self-tapping external screws shall be used. All parts shall be made of corrosion resistant materials, such as plastic, stainless steel or aluminum. All materials used in construction shall be resistant to fungus growth and moisture deterioration. Dissimilar metals shall be separated by an inert dielectric material.

### Main Power Supply and Energy Distribution

The sign and its controller shall be designed for use on the following:

Power line Voltage - 120/240 VAC Nominal, single-phase power, 40 amperes per leg - the system shall operate within a voltage range of 95VAC to 135VAC.

Frequency – 60Hz +/- 3Hz

Under normal operation, the drop in voltage between no load and full load of the sign and its controller shall not exceed 10 percent of the nominal voltage. The system shall be protected by transient suppression devices including, MOVs, RIS and spark gap arrestor.

The system shall report any power failures to the main controller when system power returns.

Power protection shall be provided by a thermal magnetic circuit breaker associated with a 5 mA ground fault circuit interruption (GFI) device. A GFI device shall protect all service outlets.

The sign shall have a 40 A two-pole (common trip) main, 120/240 VAC, single phase, four wire load center with 20 circuit capability. Each circuit in the sign shall be powered from a separate circuit breaker. The power cables shall be as required by the NEC for acceptable voltage drop to supply AC power to the sign. The power required for sign operation shall not exceed 7000 watts for the sign housing to include fans, heaters, sign controller, communication equipment and all pixels illuminated at 100 percent brightness.

Two conduits shall connect the controller cabinet with the walk-in sign display; one for power and one for communications, unless communications between the two is by optical fiber.

The TMDMS manufacturer shall provide two earth ground lugs that are electrically bonded to the TMDMS housing. Lugs shall be installed near the lower left and lower right corners of the TMDMS housing's rear wall. The TMDMS installation Contractor shall provide the balance of materials and services needed to properly earth ground the TMDMS to all four ground rods at each site.

The sign and shall be equipped with surge suppression circuitry for AC power conductors and external RS-232 data lines to protect them from electrical spikes and transients. The presence of power transients or electromagnetic fields, including those created by any components of the system, shall have no deleterious effect on the performance of the system.

The system shall not conduct or radiate signals which will adversely affect other electrical or electronic equipment including, but not limited to, other control systems, data processing equipment, audio, radio and industrial equipment.

#### Surge Protection

The system power shall be protected by two (2) stages of transient voltage suppression devices including MOVs and spark gap arrestor. Tripping of each stage (or both if tripped simultaneously) of the surge protection shall cause the sign controller to report the error condition to the DMS remote monitoring software.

#### DMS Power Supplies

TMDMS shall be provided with redundant DC power supplies. These shall be rated for a minimum of 50 percent spare capacity over that required to light every pixel on a line to full intensity, and shall automatically pick up the load if one unit fails, while sending an error indication to the TMDMS controller. All electrical components operating on more than 24 V shall be UL listed.

The power supplies shall be continuously monitored for proper operation by the sign controller. If the voltage drops below its nominal operating value, an error message shall be generated and transmitted to the DMS Client software, or laptop computer on site at local control box location automatically.

### Display Modules

Display modules consisting of nominal 18" high characters shall be assembled to form the specified full matrix message configuration. These circuit boards shall be designed and constructed to allow a single service technician to troubleshoot, isolate, remove, and replace these boards with minimal impact to the overall operation of the sign.

All LED boards shall be fully interchangeable and not require any address switches or adjustment when interchanged or placed in service. Module addressing, where required, shall be accomplished in the connector. The DMS Manufacturer shall document all LED testing for color so that replacement LED boards shall match existing amber color.

Pixel status and diagnostics shall include string failure, pixel failure and failed pixel location (line, module, row and column numbers). Replacement of a complete display module shall be possible using only simple hand tools. Interconnection of modules shall be through connectors only. All connectors shall be keyed to preclude improper hookups.

The display modules shall be approximately 3/4" behind the lens panel assembly.

### LED and Pixel Characteristics

Each pixel shall be a maximum of 1-3/8" in diameter. The LEDs in each pixel shall be clustered to maximize long range visibility. The average light intensity of the LEDs in each pixel shall be 3 candela minimum. All pixels in the sign shall have equal color and on-axis intensity. All pixels shall have a minimum on-axis intensity of 40 candela @ 20 mA forward current, with an overbright capability of 60 cd.

All pixels in all signs in this project, including the spare parts, shall have equal color and on-axis intensity. The pixel strings shall be powered from a regulated DC power source and the LED current shall be maintained at the LED manufacturer's specified nominal operating current to maximize life of the pixel. The failure of an LED in one string within a pixel shall not affect the operation of any other string or pixel. Pixel power drawn from the DC supplies shall not exceed 1.5 W per pixel, including the driving circuitry.

The LEDs shall be individually mounted directly to a printed circuit board and shall be easily replaceable and individually removable using conventional electronics repair methods.

The LEDs shall be protected from the outside environmental conditions, including, but not limited to, moisture, snow, ice, wind, dust, dirt, and UV rays.

TMDMS pixels shall be constructed with discrete LEDs manufactured by the Toshiba Corporation or Agilent Technologies (formerly known as Hewlett-Packard). Substitutes will not be accepted. Discrete LEDs shall conform to the following specifications:

- LED's shall be non-tinted, non-diffused, high-intensity, solid-state lamps that utilize AlInGaP semiconductor technology.
- LED lenses shall be fabricated from UV light resistant epoxy.
- The LED lens diameter shall be 0.2 inches (5 mm).

- LEDs shall emit amber (yellow-orange) light that has a peak wavelength of  $590 \pm 4$  nm.
- LEDs shall be obtained from a one-bin luminous intensity sort.
- LEDs shall have a minimum half-power viewing angle of  $15^\circ$ .
- LED package style shall be through-hole flush-mount; LED's with standoffs and surface mount LED's will not be accepted.
- All LED's used in all TMDMS provided for this contract shall be from the same manufacturer and have the same part number.

The sign shall have a minimum intensity of 9,200 cd/m<sup>2</sup>.

All LED display modules, as well as the LED pixel boards and driver circuit boards, shall be identical and interchangeable throughout the TMDMS. LED arrays shall not share a circuit board with the display drive electronics but shall be easily connected and disconnected from the driver board using plugs, sockets, and simple hand tools while excluding soldering operations.

The state of the LEDs (full on, or off) in each pixel of the sign shall be read by the sign controller when it is polled or when a message is downloaded from the DMS Client software, existing ATMS software, or laptop computer on site at local control box location, and shall allow the DMS Client software or laptop computer on site at local control box location show the actual message that is visibly displayed on the sign in a WYSIWYG format, including any full-out or fully stuck on pixels.

All printed circuit boards, except the LED circuit board, shall be conformal coated. The LED board shall be conformal coated except at the pixels. All printed circuit boards, including the LED circuit board, shall have a solder mask and a component identifier silk screen. The display modules shall be assembled in a full matrix configuration.

LED intensity shall be automatically adjusted to match ambient lighting conditions. This automatic control shall be provided with an override operated through the TMDMS controller communications channel.

Front face panels shall provide a high-contrast background for the TMDMS display matrix. The aluminum portion of each panel shall be painted black and shall contain a circular or square opening for each LED pixel. Openings shall be large enough to not block any portion of the LED-viewing angle.

The front panel shall be heated to prevent fogging and condensation. A minimum eight watt-per-foot, self-regulating, heat tape shall be provided along the bottom of the message area, between the glazing and the display modules. The TMDMS controller shall control the heat tape. All heat tape terminal blocks shall be covered for safety.

### Structural Requirements

Walk-in TMDMS Display Cabinet: The TMDMS display cabinet shall allow replacement of any display component from the walkway within the sign, excluding the sign display cover. The removal of any display module shall not reduce the structural integrity of the walk-in cabinet.

The maximum weight of the TMDMS display and walk-in enclosure shall not exceed 4,000 lbs and shall conform to the structural loading capabilities of the sign structure. Dimensions of the TMDMS walk-in enclosure shall not exceed thirty one feet long by nine feet high by three feet wide (nominal dimensions).

The walk-in housing dimensions and total weight shall be as shown in this specification or in the plans. The walk-in housing shall protect all internal components from rain, ice, dust, and corrosion in accordance with NEMA enclosure Type 3R standards as described in NEMA Standards Publication 2501997, Enclosures for Electrical Equipment (1000 Volts Maximum).

The sign housing shall be engineered and P.E. certified to 2001 AASHTO and NCHRP Report 411 specifications for AASHTO basic wind speeds. The sign housing shall also be engineered and P.E. certified to withstand group loading combinations as outlined in 2001 AASHTO including: sign weight, repair personnel and equipment, ice and wind loads, and shall also meet strength requirements for truck-induced gusts as specified in NCHRP Report 412. The sign housing shall be engineered to withstand snow loading (40 PSF) for applicable geographical regions.

The internal structural members shall be extruded aluminum and shall accommodate both display module mounting and air distribution. They shall retain the display modules in a manner to facilitate easy and rapid removal of each display module without disturbing adjacent display modules.

The external fascia panels shall be extruded aluminum and shall be designed to keep heat conduction to a minimum between the exterior surfaces and the interior components. They shall incorporate provisions for retaining and sealing the modular lens panels and have a closed cell resilient gasket. They shall be finished with a matte black, KYNAR 500, or approved equal, and be removable from within the main sign housing. The external fascia perimeter panels shall be a minimum of 12" wide. The external fascia panels shall be thermally isolated from the rest of the sign housing. There shall be a minimum amount of metal contact between the external fascia panels and the rest of the sign housing.

The lens panel assembly shall be modular in design, interchangeable without misalignment of the lens panel and the LED pixels and removable from within the main sign housing.

The lens panel aluminum mask shall be 0.040" minimum thickness and panel interiors contain 0.236-inch-polycarbonate sheeting. It shall be perforated to provide an aperture for each pixel on the display modules. Each aperture shall be as small as possible, without blocking the LED light output at the required viewing angle.

The lens panel clear glazing shall be 90 percent UV opaque, non-breakable, polycarbonate GE LEXAN XL, ¼" minimum thickness and clear in color shall be laminated to the inside surface of the lens panel aluminum mask using an acrylic foam tape joining system, 3M Scotch VHB, or approved equal, to form the lens panel assembly.

The face shall be finished with a matte black, factory applied PVDF resin. All other exterior and all interior surfaces shall be a natural aluminum mill finish. No painted surfaces will be allowed.

Inside the sign housing, all 120 VAC service lines shall be independently protected by a thermal magnetic circuit breaker at the housing entry point. All 120 VAC wiring shall be located in conduit, pull boxes, raceways or control cabinets. No 120 VAC wiring shall be exposed to the inside or outside of the sign housing. The sign housing shall not be considered as a raceway or control cabinet.

The bottom panel of the housing shall have a minimum of four drain holes, with replaceable drain filter plug inserts.

A three-point lockable aluminum access door shall be provided at the end of the housing as shown in the plans to enable easy access to the walk-in housing. This access door shall be 6'-8" X 2'-0" minimum. The door shall have a handle-operated locking mechanism, closed cell neoprene gasket and a stainless steel hinge. The locking mechanism shall be a heavy-duty, industrial-strength, three-point, dead bolt, center-case lock with a zinc finish. There shall be a handle on both the inside and the outside of the door. Handles shall be heavy-duty, industrial-strength with a zinc finish on the inside handle and a chrome plated finish on the outside handle. The outside handle shall be pad-lockable. Included in the door assembly shall be a device to hold the door open at 90 degrees.

For moving and installation purposes, multiple steel lifting eyebolts shall be attached to the top of the TMDMS housing. Eyebolts shall attach directly to the TMDMS housing structural frame and shall be installed at the TMDMS factory. All eyebolt-mounting points shall be sealed to prevent water from entering the TMDMS housing. Lifting eyebolts, as well as the housing frame, shall be designed so that the TMDMS can be shipped and handled without damage or undue stress being applied to the housing prior to or during TMDMS installation on its support structure.

The sign housing shall have a continuous 18"-inch wide walkway extending the full length of the sign. The walkway shall be made of 1/8"-inch, diamond tread, 6061-T6 or 3003-H22 aluminum. All edges of the walkway grating shall be finished to eliminate sharp edges or protrusions. The walkway shall be capable of supporting a total load of 1000 lb. within any 10'-ft section of the walkway.

The sign housing shall be a minimum of 30 inches wide to allow adequate room inside the sign housing for maintenance personnel. There shall be 18" inches of clear area between all equipment along the entire length of the sign housing from the 18"-inch walkway, and upwards 6' feet.

The sign shall be designed and constructed so as to present a clean and neat appearance. Poor quality work shall be cause for rejection of the sign. The equipment within the sign housing shall be protected from moisture, dust, dirt and corrosion. The sign shall be constructed of aluminum alloy 3003-H14, 5052-H32, or an approved equal, which shall not be less than 1/8" inch thick. Framing structural members shall be made of aluminum alloy 6061-T6, 6063-T5, or approved equal.

All welding shall be by an inert gas process in accordance with the American Welding Society (AWS) Standards, ANSI/AWS D1.2-97. The LED TMDMS manufacturer's welders and welding procedures shall be certified by an ANSI/AWS Certified Welding Inspector to the 1997 ANSI/AWS D1.2-97 Structural Welding Code for Aluminum.

The sign enclosures shall be capable of withstanding wind loadings of 120 mph without permanent deformation.

The performance of the signs shall not be impaired due to continuous vibration caused by wind, traffic or other factors. This includes the visibility and legibility of the display.

The ventilation system shall be a positive-pressure, filtered, forced-air system which cools both the display modules and the sign housing interior. The sign housing shall have at least two exhaust ports. Each exhaust port shall be filtered and protected by an aluminum hood assembly.

The ventilation system shall have a minimum of two fans. Air shall be drawn into the sign housing through hoods near the top of the housing, and then filtered before reaching the fan units. There shall be one aluminum hood assembly and one inlet filter for each fan.

The filters shall be 1" thick, permanent, reusable, filters. These filters shall be easily removable from within the sign housing without the use of tools. Each sign shall include a complete set of replacement filters.

All duct work that impedes access to any sign components shall be easily removable, without tools, for servicing of these components. Ductwork shall be 0.040" in. minimum thickness aluminum and shall be designed for minimal pressure drops throughout the system.

Multiple temperature sensors shall activate the ventilation system. There shall be a minimum of one sensor located near the middle of the sign, at the top of the display area. There shall be an additional temperature sensor located to accurately measure the ambient temperature outside the sign housing. The temperature sensors shall have an accuracy of +/- 3°F. or better and a range from -40°F to +155°F or greater.

The temperatures from the sensors shall be continuously measured and monitored by the sign controller. A temperature reading greater than a user selectable critical temperature shall cause the sign to go to blank and the TMDMS controller shall report this error message to the central controller.

The ventilation system shall be equipped with a manual override timer to provide ventilation for service personnel. The timer will have a maximum on time of 1 hour.

The LED modules and electronic equipment shall be protected by a fail-safe, back-up fan control system in the event of an electronic fan control failure or shutdown of the sign controller.

The sign housing shall be furnished with a minimum of four florescent lights equipped with cold weather ballasts. The lamps shall be spaced evenly above the walkway and shall be fitted with protective guards. The light switch shall be located near the door and shall include a timer to turn off the lights after a specified time period.

The sign housing shall be equipped with two 15 amp 120V ( $\pm 10\%$ ) grounded GFCI protected duplex electrical receptacles to accommodate inspection and maintenance requirements. One of these receptacles shall be located at each end of the sign housing. Additionally, the sign housing shall be equipped with sufficient and readily available power source in order to accommodate a fiber optic modem and all other necessary communications equipment required to transmit data from the sign to nearest controller cabinet with fiber optic communications for the backbone. The sign housing and display panel shall be designed to minimize any visible internal light from the outside of the DMS when the internal DMS lighting is on during nighttime maintenance activities.

An effective, field-proven defogging and anti-condensation system shall be incorporated into the overall functionality of the sign. The face shall be heated to prevent fogging, frost and condensation.

A humidity sensor shall be provided and monitored by the sign controller from zero percent to 100 percent relative humidity in 1 percent or fewer increments. The sensor shall operate and survive from 0 percent to 100 percent relative humidity. The sensor shall have an accuracy that is better than  $\pm$  five percent relative humidity.

The sign controller shall read the internal temperature sensors, external ambient temperature sensor and the humidity sensor. The sign controller shall use these readings in an algorithm that turns on the heater and/or the fans at the appropriate times to reduce both frost on the face of the sign and condensation on the display modules and other electronic circuitry.

Baseboard heaters shall be included in the sign housing. These heaters shall be capable of remote start up in anticipation of winter field service.

The interior of the sign shall include a fold-down shelf for a laptop computer.

Sign Controller: The sign controller shall include a minimum of two (2) serial communications I/O ports; one (1) RS-232, one (1) RS-485 and one (1) Ethernet port.

The sign controller shall be programmed to receive NTCIP-compliant sign control commands from the central controller (DMS client software) or laptop computer, transmit NTCIP-compliant responses as requested to the central controller (DMS client software or existing ATMS) or laptop computer, monitor sign and message status and control sign operation and message displays.

The controller will have power-up and auto-restart capabilities with a programmable default message (including a blank message) when recovering from a power off condition.

The sign controller shall be programmed to receive sign control commands from the master controller, transmit responses as requested to the master controller and control sign operation and message displays.

The sign controller shall be able to receive and send messages and data via IEEE 802.3 (Ethernet), fiber optic modem, and cellular CDPD, CDMA or GSM/GPRS. Transmission speed shall be a minimum of 9.6 kbps. A test pattern shall be provided in the DMS controller.

The sign controller shall be designed for fail-safe prevention of improper information display in the case of a system malfunction. Failure of any sign shall not affect operation of any other sign in the system. The sign controller shall consist, but not be limited to, the following:

Local control panel status indicators, including:

1. Power on/off
2. Communication status with the electronics in the walk-in housing
3. Sign display power supply status
4. Controller address
5. Power supply module
6. Central processor module
7. Input/output circuits

The sign controller shall have power-up and auto-restart capabilities with automatic sign blanking when recovering from a power-off condition. A watch-dog circuit shall be utilized to provide automatic shut down of the sign in the event of power or sign controller failure.

Connections from the controller shall be accomplished via industry standard, keyed type connectors with a retaining mechanism.

The sign controller shall communicate with the display modules via the system interface circuit consisting of data bus drivers and line address decoders. Communication and control lines between the sign controller and the system interface circuits shall be surge protected.

The sign controller shall be controlled from the DMS client software, existing ATMS software or the laptop computer, which shall specify the appropriate display. The sign controller and its software shall perform the following functions:

1. Display a message, including:
  2. Static messages
  3. Flashing messages
  4. Alternating messages
  5. Double brush stroke messages for maximum legibility
  6. Full-Matrix type displays

It shall be possible to separately vary the flashing and alternating frequency. The flashing frequency shall vary between one-half and five seconds in one tenth second increments. The alternating frequency shall vary between one-half and five seconds in one-tenth second increments.

It shall be possible to flash any character or set of characters in a static or alternating message. In the case of alternating message, the flashing period shall be a sub-multiple of the alternating on time it is associated with.

The sign controller shall report errors and failures, including, but not limited to:

Data transmission error  
Receipt of invalid data  
Communications failure recovery  
AC power failure  
Power recovery  
Pixel status  
Fan status  
Temperature status  
Power Supply status

The sign controller shall issue an SNMP trap under the following conditions:

Power Supply Failure – when the AC power supply at a DMS has failed.

Power Restoration - whenever it detects restoration of AC power at the sign controller.

Temperature Limit – Whenever internal DMS temperature initially exceeds a programmed safety limit. A new trap will not be issued until the temperature once again falls below the safety limit and then exceeds it.

Door Open – Whenever the door of the DMS housing or the door of the controller cabinet is opened.

Message and status monitoring:

The sign controller shall transmit a return message to the DMS client software and existing ATMS software whenever it receives a valid request for status. The return message shall contain the following:

Address of the sign controller  
Actual message that is visibly displayed on the sign on an individual pixel basis  
Current sign illumination level  
Error and failure reports  
Temperature readings  
Power supply operational status  
Origin of display message transmission (laptop, manual, central, etc)  
Beacon status (for possible future enhancement)  
Uninterruptible power supply status

The sign controller shall blank any message displayed in the event of power or sign controller failure.

The sign shall normally display single stroke (5 X 7) characters, compressed (4 X 7), expanded (6 X 7) or double-stroke (7 X 7) character fonts. Each font shall be fully customizable, and modifications to a font may be downloaded to the sign controller from the DMS client software and existing ATMS software or laptop computer at any time without any software or hardware modifications. The sign shall be capable of displaying a different font and character spacing on each line.

The sign controller shall monitor the photocell circuits in the sign and convert the measured light intensity into the desired pixel brightness. The photo circuit readings shall be correlated with a brightness table in the sign controller. The brightness table shall have a minimum of 255 brightness levels. Automatic adjustment of the LED driving waveform duty cycle shall occur in small enough increments so that brightness of the sign changes smoothly, with no perceivable brightness change between adjacent levels. The brightness levels shall be adjustable from the DMS client software.

The operational status of each pixel in the sign shall be automatically tested once a day and tested when a pixel test is requested from the DMS client software and existing ATMS software or laptop computer. A list of defective pixels shall then be transmitted to the DMS client software and existing ATMS software or laptop computer and logged into the log file, listing pixel status, module number, column number and pixel number. This pixel status test shall distinguish the difference between full out and fully stuck on pixels. This test shall not affect the displayed message for more than 0.5 seconds.

When the sign controller is polled and when a message is downloaded from the DMS client software and existing ATMS software or laptop computer, each pixel in the sign shall be read and its current state for the current displayed message, and shall be returned to the DMS client software and existing ATMS software to show either on a laptop computer or the controller itself, the actual message that is visibly displayed on the sign on an individual pixel basis in a WYSIWYG format.

The operational status of the fans shall have the ability to be automatically tested once a day and tested on command from the DMS client software and existing ATMS software or laptop computer. Any failure shall cause an error message to be sent to the DMS client software, existing ATMS software or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software or laptop computer.

Temperature sensors shall be continuously measured and monitored by the sign controller. A temperature greater than a user selectable critical temperature shall cause the sign message to go to blank and an error message shall be sent to the DMS client software and existing ATMS software or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software or laptop computer. This user selectable critical temperature shall be capable of being changed by the DMS client software, existing ATMS software (if available) or laptop computer. The DMS client software and existing ATMS software (if available) and laptop computers shall have the ability to read all temperature measurements from the sign controller. When the sign reaches an internal temperature of 130°F, it shall cut the LED intensity to half of its normal brightness to keep the sign from reaching the critical temperature and shutting down.

When the display time of a message has expired, the controller shall set the sign to neutral. A sign is considered to be neutral when the sign is blank.

In the event of a communications failure with the DMS client software or existing ATMS software, the sign controller shall set the sign to neutral after a user-defined number of minutes (1 to 60) unless communications have been restored within this period. This function shall apply only when the sign controller is in the Master Control mode.

All LED module power supplies shall be continuously monitored by the sign controller. A low voltage reading shall cause an error message to be sent to the DMS client software, existing ATMS software or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software or laptop computer.

There shall be no perceivable flicker or ghosting of the pixels during sign erasure and writing periods.

Message additions, deletions and changes in the sign controller shall be made from either the DMS client software, existing ATMS software or the laptop computer.

In the event of an AC power loss, all non-volatile memory shall be retained for a minimum of 30 days. AC power failure shall cause the sign controller to notify the DMS client software and existing ATMS software and display an error message on the DMS client software and existing ATMS software CRT. For cellular operation, the sign controller shall immediately access the modem to notify the DMS client software and existing ATMS of the AC power failure.

Failure of any sign shall not affect the operation of any other sign in the system.

The sign controller internal time clock shall ensure that a message is taken down at the correct time, even in the event of communications loss.

The sign controller shall maintain its internal clock during power outages of less than 4 hours and display the proper message when power is restored.

The sign controller shall be able to put a self-updating time, temperature and/or date display on the sign.

Flashing Beacons: The TMDMS shall be equipped with two 12" diameter yellow flashing beacons that can be programmed to operate through the sign controller and remote access software. The beacons shall be located at the top of the sign on each end and shall flash alternately. The beacons shall be equipped with tunnel visors to maximize visibility.

Construction Requirements: Sign construction and installation shall be coordinated with the Engineer. TMDMS shall be transported and erected in a manner recommended by the manufacturer, providing a minimum clearance of 17.5' ft. above the pavement and a horizontal appearance to motorists once fully installed as shown on the Plans.

#### Technical Assistance

The DMS manufacturer's technical representative shall provide on-site technical assistance in following areas:

1. Sign to structure installation
2. Controller cabinet installation
3. Sign housing to ground control cabinet cable termination
4. Initial sign turn on and stand alone test

The initial powering up of the sign(s) shall not be executed without the permission of the DMS manufacturer's technical representative.

Any special or proprietary cables shall be provided by the DMS Manufacturer to the installation Contractor.

Testing: The Contractor shall certify in writing to the Engineer that each TMDMS installation is fully compliant with the NTCIP standards named in the Materials section of this Special Provision. All mandatory objects and the optional objects mentioned above under Materials shall be certified for each sign and provided to the Department. In addition, following installation, the Contractor shall perform a site test of each sign, demonstrating the functionality and performance required in the Materials section of this Special Provision to the Engineer. The Contractor shall give the Engineer a minimum of two weeks notice before performing the site test.

Testing Requirements: The Department has the right to require performance testing of materials and equipment not previously tested and approved. If technical data are not considered adequate for approval, samples may be requested for testing.

The DMS Manufacturer shall provide five (5) copies of all factory acceptance tests, stand-alone, system test and 90 day test procedures and data forms for the Department's approval at least 60 calendar days prior to the day the tests are to begin. The test procedures shall include the sequence in which the tests will be conducted. The test procedures shall have the Department's approval prior to submission of equipment for tests.

The DMS Manufacturer shall perform the factory acceptance tests, stand-alone and system test. The DMS Manufacturer shall furnish data forms containing all of the data taken, as well as quantitative results for all tests. The data forms shall be signed by an authorized representative (company official) of the equipment manufacturer. At least one (1) copy of the data forms shall be sent to the Department within 14 days of the test's conclusion.

The Department reserves the right to have a representative to witness all tests. The results of each test shall be compared with the requirements specified herein. Failure to conform to the requirements of any test shall be counted as a defect, and the equipment shall be subject to rejection by the Department. Rejected equipment may be offered again for a retest, provided that all non-compliances have been corrected and retested by the DMS Manufacturer and evidence thereof submitted to the Department.

Each of the tests on all or one type of equipment must be completed within five (5) working days of each other. Any delays in performing all these tests may result in the DMS Manufacturer paying the additional costs of providing the Department's representatives for the additional testing time.

Final inspection and acceptance of equipment shall be made after installation at the designated location as shown on the installation plans.

The DMS Manufacturer shall be responsible for providing the test fixtures and test instruments for all the tests.

The Stand-Alone and System Tests are separate tests, however, they may be performed by the DMS Manufacturer during the same visit.

Consequences of Test Failures: If any unit fails to pass its test, the unit shall be corrected or another unit substituted in its place and the test successfully repeated.

If a unit has been modified as a result of a test failure, a report shall be prepared and delivered to the Department prior to shipment of the unit. The report shall describe the nature of the failure and the corrective action taken.

If a failure pattern develops, the Department may direct that design and construction modifications be made to all units at no additional cost or extension of the contract period.

#### Factory Acceptance Tests

The TMDMS Manufacturer shall be responsible for conducting demonstration tests on all units at a TMDMS's Manufacturer's facility. These tests shall be performed on each unit supplied. The Department shall be notified a minimum of 30 calendar days before the start of tests. At a minimum, all equipment shall have passed the following individual tests:

- Examination of Product: Each TMDMS unit shall be examined carefully to verify that the materials, design, construction, markings and quality of work comply with the requirements of these project specifications.
- Continuity Tests: The wiring shall be checked to determine conformance with the requirements of the appropriate paragraphs in these project specifications.
- Operational Test: Each TMDMS unit shall be operated long enough to permit equipment temperature stabilization, and to check and record an adequate number of performance characteristics to ensure compliance with the requirements of these project specifications.
- NTCIP Test: A NTCIP test shall be performed at the TMDMS Manufacturer's facility. The Department may elect to perform and/or witness this test. The specifics of this factory acceptance test shall be proposed by the TMDMS Manufacturer to the Department for approval.
- Stand-Alone Tests: The TMDMS Manufacturer shall conduct an approved stand-alone test of the equipment installation at the field site. The test shall, as a minimum, exercise all stand-alone (non-network) functional operations of the field equipment with all of the equipment installed according to the contract documents.

Approved data forms shall be completed and turned over to the Department as the basis for review and rejection or acceptance. At least 30 working days notice shall be given prior to all tests to permit the Department to observe each test.

System Tests: After the installation of the TMDMS system is completed and the successful completion of the System Test, the TMDMS system shall be subjected to one continuous 72-hour full operating test prior to a 90 day test period. The test shall consist primarily of exercising all control, monitor and communications functions of the field equipment by the central management software.

The 90 days test period shall commence on the first day after the successful completion of the approved 72-hour continuous full operating test period.

During the 90 days test period, downtime, due to mechanical, electrical and/or other malfunctions, shall not exceed five (5) working days. The Engineer may extend the 90 days test period by a number of days equal to the downtime in excess of five (5) working days.

The Engineer will furnish the TMDMS vendor with a letter of approval stating the first day of the 90 days test period.

Maintenance Services: The installation Contractor shall provide complete maintenance services for the entire TMDMS assembly until the final acceptance. All labor, travel, replacement parts and associated costs necessary to maintain the TMDMS assembly shall be included in the contract at no additional cost to the Department.

The installation Contractor shall correct all failures in the TMDMS assembly within 48 hours of notification from the Department until final acceptance. A failure of a sign installation shall be defined as the inability of the sign to function as per these specifications. A failure shall also be defined as the sign becoming unreadable or illegible as determined by the Department.

Final System Acceptance: Final system acceptance will be defined as when all work and materials provided have been furnished and completely installed by the TMDMS Manufacturer, and all parts of the work have been approved and accepted by the Department and the Dynamic Message Sign System has been operated continuously and successfully for 90 calendar days with no more than five (5) calendar days downtime due to mechanical, electrical and/or other malfunctions, as specified herein.

The warranty period, as specified in herein, will begin upon final acceptance.

#### Operator's Manuals

A manual containing a general description and detailed operating and installation instructions shall be provided for each different type or model of equipment. One (1) copy of the manual shall be provided and kept in the sign cabinet. An additional ten (10) copies of the manual shall be submitted to the Department for each model of equipment. An additional copy of the manual shall be submitted to the Department on CD for each model of equipment. The manual shall include the following information:

1. A general description of the equipment including all information necessary to describe the basic use or function of the system components. This shall include a general block diagram presentation of the equipment. Where auxiliary equipment is required, tabular charts shall be included, listing such equipment. These charts shall include the nomenclature physical and electrical characteristics and functions of the auxiliary equipment unless such information is contained elsewhere in an associated manual. In the latter case, a reference shall be made to the location of the information pertaining to the auxiliary equipment.

2. The theory of operation of the system components in a clear, concise manner supported by simplified schematics, logic, data flow diagrams, one-function diagrams, etc. Timing and waveform diagrams and voltage levels shall be shown as required. A logical development shall be used starting with a system block level and proceeding to a circuit analysis. Circuit analysis shall be detailed whenever circuits are not normally found in standard textbooks. The application of new theoretical concepts shall be fully described. Where the design allows operation in a number of different modes, an operational description of each mode shall be included.
3. In simple, clear language, the routine of operation, from necessary preparations for placing the equipment into operation, to securing the equipment after operation. This section shall contain appropriate illustrations, with the sequence of operations presented in tabular form wherever feasible. This section shall also contain a list of applicable test instruments, aids and tools required in the performance of necessary measurements and technique of each system component. In addition, set-up test, and calibration procedures shall be described.
4. Schematic diagrams shall be complete and accurate as required to supplement the text material and to allow the books to be a self-contained technical information source. Maximum size of these diagrams should be limited to allow their use in close proximity of the equipment, in the classroom, etc., part reference symbols, test voltages, waveforms, and other aids to understanding of the circuit's function shall be included on the diagrams. Test voltages, waveforms, and other aids to understanding of the circuit's function may be shown on both the simplified schematics and other drawings (as required in the above sections) on theory of operation, or maintenance or on the schematic diagrams required for this section. The overall scope of information shall not be less, however, than that stated for the schematic diagrams.

### Software Manuals

The TMDMS Manufacturer shall provide manuals and data for the computer software system and components thereof. One (1) copy of the manual shall be provided and kept in the sign cabinet. Ten (10) additional copies of the manual shall be submitted to the Department for each version of software. One (1) copy of the manual shall be provided on CD. As software is upgraded, updated versions of the manual shall be provided. This submittal shall include the following:

1. Software user's manuals shall be supplied. Include instructions for performing a backup of all software and message libraries.
2. Two (2) copies of source programs, for master and sign controller software, shall be provided on CD-ROM. The Department shall have the right to duplicate the sign controller software as needed for use in controlling signs under its' jurisdiction.
3. The TMDMS Manufacturer's NTCIP MIB (Management Information Base) shall be provided to the Department.
4. Warranty information.
5. Preventive maintenance and maintenance information.

Maintenance Manuals. A manual containing a general description and detailed maintenance instructions shall be provided for each different type or model of equipment. One (1) copy of the manual shall be provided and kept in the sign cabinet. An additional ten (10) copies of the manual shall be submitted to the Department for each model of equipment. One (1) copy of the manual shall be provided on CD. The manual shall include the following information:

1. The manufacturer's recommended procedures and checks necessary for preventive maintenance. This shall be specified for pre-operation, weekly, monthly, quarterly, semi-annual, annual, and "as required" checks as necessary to assure reliable equipment operation. Specifications, including tolerances, for all electrical, mechanical, and other applicable measurement, adjustments, or both, shall be listed. The TMDMS Manufacturer shall provide the Department with a sample preventive maintenance schedule.
2. Data necessary for isolation and repair of failures or malfunctions, assuming the maintenance technicians to be capable of analytical reasoning using the information provided above. Accuracies, limits, and tolerances for all electrical, physical or other applicable measurements shall be described. General instructions shall be included for disassembly, overhaul, and reassembly, including shop specifications or performance requirements.
3. Detailed instructions shall be given only where failure to follow special procedures would result in damage to the equipment, improper operation, or danger to operating or maintenance personnel.
4. The parts list shall contain all information required to describe the characteristics of the individual parts, as required for identification. It shall include a list of all equipment within a group and list of all assemblies, subassemblies, and replacement parts of units. The tabular arrangement shall be in alphanumerical order of the schematic reference symbols and shall give the associated description, manufacturer's name, and part number. A table of contents or some other convenient means, e.g., appropriate grouping, shall be provided for the purpose of identifying major components, assemblies, etc.

As-Built Documentation. The TMDMS Manufacturer shall provide to the Department the following documentation of the complete installed equipment prior to final payment. Sufficient documentation shall be provided to reflect "as-built" conditions and to facilitate operation, maintenance, modification, and expansion of the system or any of its individual components. Manufacturer supplied documentation which covers the intent of this requirement may be used, subject to the approval of the Department:

The TMDMS Manufacturer shall prepare and submit the following detailed drawings for each sign:

- TMDMS character set as detailed herein,
- All non-catalog or custom-made components,
- Sign housing assembly details, including the component location details and a layout of all the display elements, complete with dimensions,
- Sign housing structural details, including member details, support mechanism details required for installation of the TMDMS onto the sign truss, welding details, and miscellaneous hardware details; complete with dimensions and sizes,
- Sign mounting bracket structural details, including miscellaneous members and hardware required to attach the TMDMS to the sign truss; complete with dimensions and sizes, and
- Wiring schematics.

Final documentation shall reflect all field changes and software modifications and shall be provided before final payment is made.

The TMDMS Manufacturer shall coordinate and take the lead on this effort with the installation Contractor.

This documentation shall include drawings of conduit layouts, cable diagrams, wiring lists, cabinet layouts, wiring diagrams and schematics for all elements of the communications system. This shall also include detailed drawings identifying by cable type, color code and function, the routing of all conductors (pairs) in the communications system.

Four (4) copies of each As-Built installation shall be delivered to the Department with one complete copy to be placed in the equipment cabinet at each TMDMS location. Drawings left in the TMDMS shall be attached to the door with stainless steel fasteners and protected from weather with a waterproof enclosure.

Warranty: The Contractor shall warranty all materials and workmanship including labor for a period of two years after the completion and acceptance of the installation, unless other warranty requirements prevail. Any parts or equipment found to be defective and/or determined to be a failure in design, materials and workmanship during the warranty period shall be replaced free of charge. The warranty period shall begin when the Contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. This warranty shall include repair and/or replacement of all failed components via a factory authorized depot repair service. All items sent to the depot for repair shall be returned within two weeks of the date of receipt at the facility. The depot location shall be in the United States. Repairs shall not require more than two weeks from date of receipt and the provider of the warranty shall be responsible for all return shipping costs. The depot maintainer designated for each component shall be authorized by the original manufacturer to supply this service. A warranty certificate shall be supplied for each component from the designated depot repair site indicating the start and end dates of the warranty. The certificate shall be supplied at the conclusion of the system acceptance test and shall be for a minimum of two years after that point. The certificate shall name the Department as the recipient of the service. Company contact information and warranty dates should be clearly shown on the warranty certificate. The Department shall have the right to transfer this service to other private parties who may be contracted to perform overall maintenance of the facility.

Method of Measurement. Truss mounted changeable message sign shall be measured for payment Each per TMTDMS complete, in place, tested to assure all functionality and performance required above, and accepted by the Engineer.

Basis of Payment. Payment will be made at the unit price for Each TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN which shall include all equipment, material, documentation, testing and labor detailed in the contract documents for this pay item.

### **FLEXIBLE LIQUID TIGHT STAINLESS STEEL CONDUIT, 1" DIAMETER, 6 FOOT LENGTH**

Description. This work shall consist of furnishing and installing flexible liquid tight stainless steel conduit of the diameter and length specified.

Materials. The conduit shall be comprised of a spirally wound flexible stainless steel core over which a plastic jacket is extruded around and into the helical grooves of the core with true locking action.

Liquidtight flexible metal conduit shall be manufactured to the requirements of UL Standard 360 and shall be UL listed and labeled.

Fittings for liquidtight flexible metal conduit terminal fittings shall be listed by Underwriter's Laboratory as approved for this purpose.

Basis of Payment. This work will be paid for at the contract unit price per Each for FLEXIBLE LIQUID TIGHT STAINLESS STEEL CONDUIT, 1" DIAMETER, 6 FOOT LENGTH of the diameter and length specified.

### **SUPPORT EQUIPMENT AND MAINTENANCE**

The Contractor shall furnish the following equipment (MATERIAL ONLY) and deliver it to the Department:

There are no support requirements associated with this pay item.

- Dynamic Message Sign Controller - Qty. 1
- Dynamic Message Sign LED Modules with Driver Cards (7x5, 4 LEDS per pixel, 30 Degree) – Qty. 6
- Dynamic Message Sign External Power Supplies – Qty. 5
- Dynamic Message Sign Surge Arrestors – Qty 5
- Fiber Optic Fusion Splicer – Qty. 1

The fusion splicer be Fitel S178A or equivalent and shall meet or exceed the following specifications:

- Features
- Rugged and compact handheld design endures harsh environmental conditions
  - Fast splicing (7 seconds) at super low loss and fast heating (25 seconds)
  - Simplified maintenance –electrode replacement/mirror-free alignment system
  - Software upgrade via the Internet
  - Easily exchanged fiber holder systems (tight holder/fiber holder/SOC holder)
  - PC interface software to allow user management of splicing recipes and results
  - Auto-start shrink sleeve oven feature
  - Large memory for storage of splice data (2,000) and images (100)
  - RoHS compliant

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|--|--|
| <u>Fiber Alignment</u>                                 | Core Alignment   |
| <u>Applicable Fibers</u>                               | SMF, MMF, DSF, NZDSF, BIF/UBIF (bend-optimized fiber)                          |
| <u>Fiber Cleave Length</u>                             | 5 – 16 mm for 250 µm fiber, 10 -16 mm for 900 µm tight buffer                  |
| <u>Cladding Diameter</u>                               | 80 – 150 µm  |
| <u>Coating Diameter</u>                                | 160 – 900 µm   |
| <u>Typical Insertion Loss (Similar Fiber Splicing)</u> | 0.02 dB for SMF, 0.01 dB for MMF, 0.03 dB for NZDSF, 0.04 dB for EZ-Bend Fiber |
| <u>Splice Programs</u>                                 | Up to 150  |
| <u>Automatic Splicing Selection</u>                    | SM: SMF, DSF, NZDSF, BIF/UBIF (bend-optimized fiber)<br>MM: MMF                |
| <u>Heat Program</u>                                    | Up to 18   |
| <u>Auto Heating Start</u>                              | Available  |
| <u>Fiber Holding</u>                                   | Tight holder (loose tube applicable) or fiber holder system                    |
| <u>Splice Time</u>                                     | 7 seconds (semi-auto mode), 9 seconds (regular mode)                           |
| <u>Batteries</u>                                       | Equipped with two battery packs  |

|   |  |
|---|--|
| <u>Applicable Sleeves</u>                   | 40/60 mm   |
| <u>Heating Time</u>                         | 25 seconds for 40 mm and 60 mm sleeves (pre-heating mode); 31 seconds for 40 mm and 60 mm sleeves (regular mode)   |
| <u>Return Loss</u>                          | > 60 dB  |
| <u>Tension Test</u>                         | 1.96 N   |
| <u>Magnification</u>                        | 101x, 304x or 608x   |
| <u>Monitor</u>                              | 3.5" color LCD monitor   |
| <u>Video Output/Data Interface</u>          | USB 2.0  |
| <u>Splice Memory</u>                        | Maximum 2000 splices   |
| <u>Image Capture Capacity</u>               | Last 100 images to be automatically captured + up to 24 images to be stored permanently  |
| <u>Display User Interface</u>               | Graphical user interface (GUI)   |
| <u>Battery Capacity</u>                     | 80 splice/heat cycles with single battery; 200 splice/heat cycle with dual batteries   |
| <u>Displaying Language</u>                  | 20 languages (e.g. English, Spanish, Japanese, Chinese)  |
| <u>Operating Temperature</u>                | -10° C to +50° C (without excessive humidity)  |
| <u>Storage Temperature</u>                  | -40° C to +60° C (without excessive humidity)  |
| <u>Power Source</u>                         | AC 100 to 240V (50/60 Hz), DC input 11 to 17 V   |
| <u>Drop Resistance</u>                      | Equipped with shock absorber to provide drop resistance ( 76 cm drops from 5 different angles)   |
| <u>Environmental Ratings and Resistance</u> | Water resistance – IPX2 rating drip proof (exposed to 3 mm/min drip for 10 mins with 15° tilt), Dust resistance – IP5X rating dust proof (exposed to dust particles with a diameter of 0.1 to 25 µm for 8 hours) |
| <u>Included Accessories</u>                 | Hard Carrying Case, Spare Electrodes (1 Pair), AC Adapter, AC Cord, Electrode Sharpener, V-Groove Cleaning Brush, Electrode Cleaning Disk, Battery Charger, User Manual  |

The fiber optic fusion splicer shall also include the following accessories:

|  |        |
|--|--------|
| <u>Spare Battery Pack</u>                              | Qty. 1 |
| <u>10mm Cleave Length Tight Fiber Holder</u>           | Qty. 1 |
| <u>250 <math>\mu</math>m Fiber Holders</u>             | Qty. 1 |
| <u>900 <math>\mu</math>m Fiber Holders</u>             | Qty. 1 |
| <u>One-step hand held high precision fiber cleaver</u> | Qty. 1 |

The fiber cleaver shall be a Fitel S325A or equivalent that meets or exceeds the following specifications:

- Suitable for all fiber types
- One-step action
- Easy fiber loading
- 0.125 mm clad diameter
- 0.25mm and 0.9 mm coating diameter for single fiber
- Cleave Length: Single Fiber: Fixed Length – 10 & 16 mm, Variable Length – 3 to 20 mm
- High Capacity Fiber Waste Collection Bin
- Durable
- Easy maintenance

Fiber Prep Fluid (3 oz. pump) High-purity, environmentally safe solvent that delivers consistent cleaning of fiber after stripping and before fusion splicing Qty. 4

Fiber Wipes (90 sheets) Qty. 4

Fiber Stripper Qty. 1

Fiber Splice Protection Sleeves (Single Fiber 0.25-0.9 mm coating, Stainless Steel Strength Member, 60mm length) Qty. 250

Portable Work Table with Folding Chair

The portable work table shall be a Napco CT-53 table or equivalent that meets or exceeds the following specifications:

- Designed for and ideal for splicing and terminating fiber optic cable.
- Matte black work top
- High strength
- Light weight steel tube construction
- Rounded corner design
- High quality "powder coat" finish
- Set up or take down in seconds in the field
- Durable design for years of service.
- 29"-36" work height
- 22" x 44" table surface
- Includes accessory kit with lamp, magnifier, universal clamp and fabric carrying case
- Includes folding chair suitable for use with table (275 lb maximum weight capacity)

Basis of Payment: This work will be paid for at the contract unit price per Lump Sum for SUPPORT EQUIPMENT AND MAINTENANCE which price shall be payment in full for all labor, materials, and equipment required to provide the equipment specified above and deliver it to the Department.

**WIRELESS ETHERNET RADIO**

Description: The Contractor shall furnish and install a licensed wireless Ethernet 1 GB point to point radio link consisting of two microwave transceivers.

Materials: The Contractor shall furnish all required tools, equipment, cables, materials, and consumable supplies, required to install and integrate the components of the microwave link.

The microwave link shall consist of two linked transceivers. The transceivers consist of two primary components: the indoor unit (IDU) and the outdoor unit (ODU). The outdoor unit includes the antenna, radio frequency amplifiers, and converters.

The radio shall be a Proxim Tsunami GX800 (18 Ghz) or equivalent that meets or exceeds the following specifications:

RADIO & TRANSMISSION

FREQUENCY BANDS

| Frequency Band (GHz) | Frequency Range (GHz) | T/R Spacing (MHz)                 |
|----------------------|-----------------------|-----------------------------------|
| 6U/L                 | 5.925 - 7.110         | 160, 170, 252.04, 300, 340, 350   |
| 7                    | 7.125 - 7.725         | 154, 160, 161, 168, 196, 245      |
| 8                    | 7.9 - 8.5             | 119, 126, 208, 266, 311.32        |
| 10/11                | 10.7 - 11.7           | 350, 490, 500, 530                |
| 13                   | 12.75 - 13.25         | 266                               |
| 15                   | 14.4 - 15.4           | 315, 420, 475, 490, 640, 644, 728 |
| 18                   | 17.7 - 19.7           | 1008, 1092.5, 1010, 1560          |
| 23                   | 21.2 - 23.6           | 1008, 1200, 1232                  |

CHANNEL BANDWIDTH

Wideband support, Configurable from 7 - 56MHz, CEPT/ETSI: 7, 14, 28, 56MHz, ANSI/FCC: 10, 20, 30, 40, 50MHz

MAX TX POWER

27 dBm

TX POWER CONTROL

1 dBm Steps and Supports ATPC

MAX RX SENSITIVITY

-90 dBm

MODULATION

QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM

ERROR CORRECTION

FEC, Predistortion, Equalization, Internal BER

FREQUENCY STABILITY

±5 ppm

EMISSION DESIGNATOR

30M0D1D (ANSI), 28M0D1D (ETSI)

BRIDGING & DATA INTERFACES

TRAFFIC INTERFACES

Gigabit Ethernet 1000Mbps Base T (RJ45) + One 100Mbps FastEthernetHSI Module Interface Options: nxE1, nxT1, nxE3, nxT3

THROUGHPUT CAPACITY

622Mbps

LATENCY

100 µs – 400 µs

VLAN, QOS

IEEE 802.1Q, 802.1p QoS

MANAGEMENT

|                       |   |
|-----------------------|---|
| CHANNEL               | Inband and out-of-band  |
| SNMP                  | SNMP v1/v2c, Manageable via Proxim Vision ES  |
| TELNET                | IP Based via dedicated NMS port   |
| SERIAL                | Craft/RS232 Port  |
| HTTP                  | Web based GUI   |
| USB                   | 2 USB Ports. USB port A can be used for connecting USB flash card for configuration store/restore, firmware upgrade and to download log files from device. USB port B is used for device debug Management by Proxim |
| Out-of-band interface | 10 / 100 Base T Fast Ethernet Port (RJ-45)  |

#### PHYSICAL

|            |   |
|------------|---|
| DIMENSIONS | IDU : 10.0 x 1.73 x 7.9 in (Std 19" Half rack mount & 1U height); ODU : 10.9 x 9.4 x 3.6 in |
| WEIGHT     | IDU : 2.6 lbs, ODU : ≤ 9.5 lbs  |

#### POWER

|                       |                        |
|-----------------------|------------------------|
| POWER INPUT           | -48 VDC (EN 300 132-2) |
| MAX POWER CONSUMPTION | 60W Max. (IDU + ODU)   |

#### ENVIRONMENTAL

|                       |   |
|-----------------------|---|
| OPERATING TEMPERATURE | IDU: ETS 300 019 Class 3.2 (-5 to +45°C)<br>ODU: ETS 300 019-2-4 Class 4M5 (-45 to +55°C) |
| RELATIVE HUMIDITY     | up to 95% (non-condensing)  |

#### REGULATORY

ETSI/FCC Compliant, CE Mark Certification, 50 Year Recyclable Compliant, ROHS-Compliant

#### MTBF

200,000 hours

## WARRANTY

3 year parts and labor with next business day advanced replacement

ODU-IDU Communications Cable: The Contractor shall furnish and install a communications cable between the indoor and the outdoor microwave transceiver unit. The communications cables shall be in accordance with manufacturer's recommendations, be suitable for outdoor installation, and consist of low loss coaxial cable (LMR 400), outdoor rated CAT 5E cables, etc.

Microwave Directional Antenna: The microwave antenna shall provide enough directional gain to allow each wireless link shown on the Plans to be specified at a BER at or below  $10^{-6}$ . The DS3 Microwave Directional Antenna shall be rapid and easy to install and focus, requiring no more than one technician to adjust and service.

Construction Requirements: The Contractor shall furnish all required tools, equipment, cables, materials, and consumable supplies, required to install and integrate the components of the microwave link.

All furnished equipment and component parts shall be new, and of the latest design and manufacture. They shall comply with all specifications at the time of installation. All parts shall be of high quality workmanship, and no part or attachment shall be substituted or applied contrary to the manufacturer's recommendations and standard practices.

The equipment shall be designed to protect personnel from exposure to high voltages and shall be UL certified.

An authorized factory representative shall be present during installation, programming, testing, and commissioning of the wireless radio link.

Path Engineering: The Contractor is responsible for the engineering and design of all microwave paths to assure that the proposed links will operate at the reliability standards stated in the following sections. The design shall use industry-accepted techniques in order to evaluate the viability of each link.

In addition, the Contractor shall provide size, height, and azimuth of all antennas at all locations. For antennas greater than 1.5' ft in diameter, the Contractor shall submit to the Engineer, stamped calculations that demonstrate the structural soundness of the proposed antenna installations, including waveguides, coaxial and control cables, and ancillary equipment.

The Contractor shall verify that all microwave paths will meet the expected reliability requirements and that all calculations are correct. If any path is found to be, the Contractor shall advise the Engineer prior to ordering the equipment.

### Reliability Requirements

The one-way propagation reliability objective of the link shall meet or exceed 99.99% (3600 SES/yr.)

## Fresnel Zone Clearances

All paths shall be designed so that the Fresnel zones clear the earth's curvature and all obstructions. This shall include the appropriate earth's curvature for the assigned point along the path. Paths shall be designed for a frequency of 23 GHz. Clearance shall be in accordance with the following criteria:

For earth's curvature = 1.333, the clearance shall be 1.0 x first Fresnel zone  
For earth's curvature = 0.667, the clearance shall be 0.3 x first Fresnel zone

Obstructions: Any obstructions along the path shall be estimated to within 10 feet of the actual obstruction height and verified in the field. This includes buildings, shrubs, trees, etc., that lie within 200 feet of the stated Fresnel zones. In no case shall trees be estimated at a height of less than 65 feet.

Preliminary Path Profiles: The Contractor shall provide preliminary path profiles for all microwave paths. These path profiles should include computer-generated plots using USGS three second or 30 meter data. They shall include line of sight, Fresnel Zone clearance, and earth curvature data as identified previously.

Reliability Analysis: The Contractor shall include a reliability analysis for all links. This analysis shall include a complete description of the link power budget with all anticipated gains and losses. Using the transmitter power, antenna gains, and receiver sensitivity for the equipment being supplied, the Contractor shall calculate the excess power budget or fade margin.

Reflection Analysis: Using the path profile, the Contractor shall propose an optimum height for the antennas. These proposed heights shall be approved by the Engineer prior to installing any equipment.

Installation: The Contractor shall install equipment at locations as indicated in the Plans.

The Contractor shall align all antennas for maximum performance. (Note: if multipath interference is encountered, maximum performance may not be synonymous with maximum receiver signal level (RSL).)

The Contractor shall interface the IDU to the transport multiplex. The system shall be tested end-to-end from both the ports on the transceiver, and the "low-speed" ports of the Transport Multiplex.

The Contractor shall provide to the Engineer the results of a frequency search for the 18 GHz frequency range; the Contractor shall be responsible for all FCC frequency coordination and prepare and submit all paperwork to obtain an FCC license for the proposed links.

All equipment shall be grounded in accordance with Section 807 of the Standards Specifications.

Install cable tags for all internal wiring harnesses, jumper cables, etc. Include the cable function, origin, destination, equipment location and other information to facilitate testing, operating, and maintenance required and approved by the Engineer.

Programming: The Contractor shall program the radio link to provide a 1 GB Ethernet bridge between end points.

Warranty: The Contractor shall warranty all materials and workmanship including labor for a period of three years after the completion and acceptance of the installation.

The radio link shall have next business day advanced replacement for all components covered under warranty.

The warranty period shall begin when the Contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. This warranty shall include repair and/or replacement of all failed components via a factory authorized depot repair service. All items sent to the depot for repair shall be returned within two weeks of the date of receipt at the facility. The depot location shall be in the United States. Repairs shall not require more than two weeks from date of receipt of defective equipment, and the provider of the warranty shall be responsible for all return shipping costs. The depot maintainer designated for each component shall be authorized by the original manufacturer to supply this service. A warranty certificate shall be supplied for each component from the designated depot repair site indicating the start and end dates of the warranty. The certificate shall be supplied at the conclusion of the system acceptance test and shall continue a minimum of two years after that point. The certificate shall name the Department as the recipient of the service. The Department shall have the right to transfer this service to other private parties who may be contracted to perform overall maintenance of the facility.

Documentation and Training: The Contractor shall prepare and submit to the Engineer documentation of as-installed changes to the plans, results of all testing, and manuals to operate and maintain the equipment. Three manuals for the equipment shall be provided to the Engineer prior to ordering any equipment. These manuals will be reviewed for adequacy and compliance with the specifications. Based upon a successful evaluation, the Contractor will be given the approval to purchase the equipment. Two additional manuals shall be supplied with each Microwave Link.

The Contractor shall prepare a system test and acceptance plan, identifying all test procedures and the acceptable parameter values. The results of these tests shall be documented, identifying the measured values. These values shall include the BER and RSL.

The Contractor shall provide a minimum of four hours of formal classroom training on the equipment. This training shall be provided to a nominal class size of 4 engineers and technicians. The training shall include the theory of operation of the equipment and all necessary procedures to operate and maintain the equipment.

Method of Measurement: Wireless Ethernet Radio Link will be measured for payment by the actual number of sites furnished, installed, tested, and accepted. Acceptance shall be predicated on a successful demonstration of end-to-end performance and a 30-day operational test.

Basis of Payment: This work will be paid for at the contract unit price per Each for WIRELESS ETHERNET RADIO which price shall be payment in full for all labor, materials, and equipment required to furnish, install, and program the radio link as described above.

## **CELLULAR MODEM**

The Contractor shall furnish an industrial cellular router with three years of cellular service, industrial power supply, and externally mounted cellular antenna.

The cellular router shall include three years of pre-paid wireless cellular service (5 GB data plan) from Verizon Wireless. The service period shall not begin until the dynamic message boards and CCTV cameras are installed and operational. The Contractor shall transfer the service and account to the Department at the end of the three year period.

The Contractor shall install the cellular router and industrial power supply inside the proposed ITS equipment cabinet using DIN rail mounting. The Contractor shall furnish and install all wiring and hardware required to install the cellular router, power supply, and external antenna.

The Department will assist with providing programming parameters for the cellular modem. The Contractor shall coordinate with the dynamic message board supplier to get the modem configured for reliable operation with the message board. The sixty day burn-in period will not commence until communications are fully operational.

The cellular router shall be a Sixnet SN-6621-VZ Cellular Modem CDMA EVDO Rev A or approved equal that meets or exceeds the following minimum specifications:

### FEATURES & BENEFITS

- |                                |  |
|--------------------------------|--|
| Cellular Connectivity:         | <ul style="list-style-type: none"><li>• 2G/2.5G (GSM GPRS/EDGE and CDMA 1XRTT)</li><li>• 3G (GSM WCDMA/HSDPA/HSUPA or EVDO Rev A)</li></ul>  |
| Built-In Security & Routing:   | <ul style="list-style-type: none"><li>• Secure modbus data using IPSec VPN tunnels</li><li>• VPN tunnel: IP SEC, SSL</li><li>• Port forwarding</li><li>• Stateful Firewall</li><li>• Packet Filtering</li><li>• Access Control List (ACL)</li></ul>                                  |
| Powerful Web-Based Management: | <ul style="list-style-type: none"><li>• Provides remote monitoring and control</li><li>• Mass activation and device upgrades</li><li>• Remote diagnostics and troubleshooting</li><li>• Reporting of key metrics</li></ul>   |
| Rugged, Compact Design:        | <ul style="list-style-type: none"><li>• -40 to +85°C operating temperature</li><li>• DIN-rail mounting</li></ul>   |
| Features:                      | <ul style="list-style-type: none"><li>• Connect multiple devices to single WAN link</li><li>• Remote TCP/IP based capabilities</li><li>• Integrated switching/routing capabilities</li><li>• Serial to IP conversion</li><li>• Access IP and serial devices simultaneously</li></ul> |

## SPECIFICATIONS

- Wireless Interface:
- Dual-band CDMA2000 EVDO Rev. A (backward compatible with 1xRTT)
  - GSM HSPA (backward compatible with EDGE)
  - EDGE/GPRS
- Ethernet Interface:
- 5x RJ45 Ethernet 10/100 auto-sensing
- Serial Interface:
- 1x RS-232 Serial DB9 115200bps
- USB Interface:
- 1x USB2.0 mini
- LED Status Indicators:
- Power, WAN, Signal, RS232, Ethernet Link and Activity
- Dimensions:
- Steel 120 x 96 x 51 mm (4.7" x 3.77" x 2.0"), 500g (1.1 lbs)
- Power Input:
- 8 - 30 Vdc (12Vdc nominal)
- Environmental:
- Operating Temp: -40 to +85°C
  - Shock: IEC60068-2-27,
  - Vibration: IEC60068-2-6
  - Humidity: 5 to 95% non-condensing
- Certification:
- EMC:FCC, part 15 and Industry Canada, ICES-003
  - Hazardous Locations: Class I, Div. 2, Groups A,B,C,D, UL1604
  - Electrical Safety: UL508/CSA22.2/14 (CUL)
- Routing Protocols:
- OSPF, BGP, RIP
- Encapsulation Protocols:
- GRE and IPinIP
- Tunneling:
- VPN: IPsec and SSL
- Clustering:
- VRRP
- IP:
- NAT, Port Forwarding, Dynamic DNS, DHCP
  - Stateful Inspection Firewall, IP Transparency
- Warranty:
- 3 years on design and manufacturing defects

The Contractor shall furnish an Aaxeon Model DR-4512 45 watt industrial DIN rail power supply or approved equal that meets or exceeds the following specifications:

#### OUTPUT

- DC Voltage: • 12V
- Rated Current: • 3.5A
- Current Range: • 0-3.5A
- Rated Power: • 42W
- Ripple & Noise (Max.): • 200mVp-p
- Voltage Adjustment Range: • 10.8 – 13.2V
- Voltage Tolerance: • +/- 1.0%
- Line Regulation: • +/- 1.0%
- Load Regulation: • +/- 1.0%
- Setup, Rise Time: • 800ms, 60ms/230VAC at full load
- Hold Time (Typ.) • 100ms/230VAC at full load

#### INPUT

- Voltage Range: • 85 – 265 VAC, 120 – 370 VDC
- Frequency Range: • 47 – 63 Hz
- Efficiency (Typ.): • 77%
- AC Current (Typ.): • 1.5A/115VAC, 0.75A/230VAC
- Inrush Current (Typ.): • Cold Start 28A/115VAC, 56A/230VAC
- Leakage Current: • <1mA/240VAC

#### PROTECTION

- Over Load: • 105 – 150% rated output power (Protection Type: Constant current limiting, recovers automatically after fault condition is removed)

- Over Voltage: • 13.8 – 16.2V (Protection Type: Shut down o/p voltage, re-power on to recover)
- Over Temperature: • 135 degrees C (Protection Type: Shut down o/p voltage, recovers automatically after temperature goes down)

#### ENVIRONMENT

- Working Temperature: • -10 to 50 degrees C
- Working Humidity: • 20 – 90% Non-condensing
- Storage Temperature • -20 to 85 degrees C
- Storage Humidity: • 10 to 95% Relative Humidity

#### SAFETY

- Safety Standards: • UL 508
- Withstand Voltage: • I/P-O/P:3KVAC, I/P-FG:1.5KVAC, O/P-FG:0.5KVAC
- Isolation Resistance: • I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC
- Harmonic Current: • Compliance to EN61000-3-2,-3
- EMI Conduction and Radiation: • Compliance to EN55011, EN55022

#### OTHER

- Mounting • DIN Rail

The Contractor shall furnish and install a NEMA 15-R power cable (3' ft. length) and install the power supply in the proposed equipment cabinet and connect the cellular modem to it.

The cellular modem shall be equipped with an external antenna that shall be attached to the sign structure support and aimed at the nearest Verizon cellular tower.

The cellular antenna shall be a Wilson Electronics 14 dBi Gain 1900 MHz Yagi Antenna (Product Number 301124) or approved equal that meets or exceeds the following specifications:

- |                     |  |
|---------------------|--|
| Features:           | <ul style="list-style-type: none"><li>• Supports 1900MHz PCS Frequency band, Compatible with all PCS providers, Built-in ground plane</li></ul>              |
| Antenna Type:       | <ul style="list-style-type: none"><li>• Directional</li></ul>  |
| Number of Elements: | <ul style="list-style-type: none"><li>• 9</li></ul>  |
| Material:           | <ul style="list-style-type: none"><li>• Aluminum</li></ul>   |
| Frequency Range:    | <ul style="list-style-type: none"><li>• 1850-1990 MHz</li></ul>  |
| Impedance:          | <ul style="list-style-type: none"><li>• 50 Ohms</li></ul>  |
| Antenna Gain:       | <ul style="list-style-type: none"><li>• 14 dBi (1710-1880 MHz and 1850-1990 MHz)</li></ul>   |
| Beam Width:         | <ul style="list-style-type: none"><li>• H 31 Degrees, V 31 Degrees</li></ul>   |
| Polarization:       | <ul style="list-style-type: none"><li>• Vertical</li></ul>   |
| Maximum Power:      | <ul style="list-style-type: none"><li>• 25 Watts</li></ul>   |
| Radiation:          | <ul style="list-style-type: none"><li>• Directional</li></ul>  |
| Connector:          | <ul style="list-style-type: none"><li>• N Female</li></ul>   |
| Dimensions:         | <ul style="list-style-type: none"><li>• Pole with U-Bolts</li></ul>  |
| Mounting:           | <ul style="list-style-type: none"><li>• U-Bolts, Mounts on pipe with 0.5 inch to 1.5 inch diameter</li></ul>   |
| Accessories:        | <ul style="list-style-type: none"><li>• RG-58 coax extension equipped with factory installed connectors for Yagi and cellular modem, 20 Ft. Length</li></ul> |

The Contractor shall furnish and install all cables, brackets, pole mast and hardware required to install the antenna onto the sign structure. The Contractor shall not drill any holes into the top of the proposed equipment cabinet to mount the antenna.

Basis of Payment: This work will be paid for at the contract unit price per Each for CELLULAR MODEM which price shall be payment in full for all labor, materials, and equipment required to provide the cellular modem complete with three years prepaid cellular data service and all accessories described above, configure the modem for operation with the TMDMS and camera, and install it in the proposed equipment cabinet.

## DATA NETWORK PORT ADAPTER

The Contractor shall furnish a data network port adapter complete with the accessories specified below and deliver it to the Department.

The data network port adapter shall meet or exceed the following minimum specifications:

Approved Models: MOXA Model N-Port 5210-T (2 Port RS-232 Serial Device Server Extended Operating Temperature) or approved equal.

- LAN:
- Ethernet: 10/100 Mbps, RJ45, IEEE 802.3
  - Protection: Built-in 1.5 KV magnetic isolation
  - Number of Ports 1
  - Connector(s) 8-pin RJ45
- Serial Interface:
- Interface: RS-232
  - Number of Ports: 2
  - Port Type: 8-Pin RJ45
  - Signals: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
  - Serial Line Protection: 15 KV ESD for all signals
  - Power Line Protection: 4 KV Burst (EFT), 2 KV Surge (Power)
- Serial Communication Parameters:
- Parity: None, Even, Odd, Space, Mark
  - Data Bits: 5, 6, 7, 8
  - Stop Bit: 1, 1.5, 2
  - Flow Control: RTS/CTS, XON/XOFF, DTR/DSR
  - Transmission Speed: 110 bps to 230.4 Kbps (Bi-Directional Data Transmission)
- Software Features:
- Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP, HTTP, SMTP, SNTF
  - Real COM/TTY Drivers: Windows 95/98/ME/NT/2000/XP/2003 Real COM drivers
  - Configuration: Web Browser, Serial/Telnet Console, or Windows Utility
  - The data network port adaptor shall include software that can be installed on a workstation to provide access to all adapters through the use of software selectable and assignable virtual communication ports (minimum of 128 ports) on the host computer.

- Electrical:
- 120 VAC (internal or external power supply) and self-setting over-current protection shall be included
  - Input Voltage 12 to 48 VDC
  - Power Consumption 305 mA @ 12 V max.
  - Power Line Protection 1 KV burst (EN61000-4-4: EFT/B), 0.5 KV surge (EN61000-4-5)
- Physical Characteristics:
- Enclosure Aluminum (1 mm), providing IP30 protection
  - Weight 320 g
  - Dimensions Without ears: 67 x 100.4 x 22 mm (2.64 x 3.95 x 0.87 in)
  - With ears: 90 x 100.4 x 22 mm (3.54 x 3.95 x 0.87 in)
- Environmental:
- Operating Temperature: -40 to 167 degrees F
  - Operating Humidity 5 to 95% RH
  - Storage Temperature -20 to 85°C (-40 to 185°F)
- Other:
- Both local and remote configuration and software upgrade capability
  - Password protection for security

Basis of Payment: This work will be paid for at the contract unit price Each for DATA NETWORK PORT ADAPTER, which shall be payment in full for all labor, materials, and equipment required to furnish the equipment described above and deliver it to the Department.

### **RELOCATE OVERHEAD SIGN STRUCTURE – SPAN, SPECIAL**

This work shall be in accordance with Sections 734, 735, and 737 of the Standard Specifications except as modified herein.

The existing sign structure and truss mounted dynamic message sign located along I-74 approximately ¼-mile east of the Muller Rd. overpass shall be removed and relocated in its entirety to the proposed location along I-74 near the Washington Blacktop overpass.

The Contractor shall perform the following work:

- The Contractor shall remove the existing LedStar DMS from the sign structure in accordance with the manufacturer's recommendations. The existing electrical service feed for the DMS shall be disconnected and all cables and related items that are no longer needed shall be removed. Upon removal, the Department will inspect the sign in the presence of the Contractor and note any existing damage. In the event that the DMS sign cannot be immediately reinstalled on the relocated sign structure, the Contractor shall be responsible for transporting the DMS and all related components to a secure site for storage until the existing sign structure and crash attenuators have been installed at the new location. The Contractor shall store all DMS components in a neat and orderly fashion in a location where they will not be susceptible to damage from third parties and damage arising from improper storage. The Contractor shall be responsible for damage resulting from improper storage, third parties, and acts of nature.
- The Contractor shall relocate the existing sign structure in accordance with Section 735. The Contractor shall furnish new bolts, nuts, washers, and other structural hardware that is not suitable for reuse, due to condition, compatibility, or elongation. All hardware shall be approved for use by the manufacturer of the sign structure and the Department prior to installation. The Contractor shall re-install the existing sign supports, truss span, walkway, and all other related items.
- The Contractor shall construct concrete foundations for the relocated sign structure in accordance with Section 734. The Contractor shall be responsible for construction layout and perform all site preparation required to install the sign structure and DMS. The proposed concrete foundations shall be constructed to provide adequate overhead clearance for the sign structure and the DMS sign. The Contractor shall notify the Department for location approval prior to commencing work.
- The Contractor shall install the DMS on the relocated sign structure. The Contractor shall furnish and install all hardware, brackets, conduit attached to structure, electric cables, and all other items required to install the truss mounted DMS on the relocated sign structure. The Contractor shall furnish and install new cables for DMS electric power and sign communications from the overhead sign to the proposed Type 334 cabinet that houses DMS controller. The Contractor shall remove the existing rack mounted sign controller and related DMS components from the Type 334 cabinet located along I-74 near Muller Rd. and install them in the proposed Type 334 cabinet. The Contractor shall test the DMS in accordance with the manufacturer's recommendations to ensure that it is operating correctly. An authorized representative from LedStar shall be on-site during DMS installation and conduct post installation operational and acceptance testing. The relocated DMS will be subject to a thirty day burn-in period to ensure that all items have been completed and that the sign is operating correctly. The burn-in period will begin after the sign has been inspected and accepted by the Department.

- The Contractor shall perform maintenance on the DMS sign. The Contractor shall inspect and test the ventilation system, clean dirt and debris from all ventilation fans and air intakes, replace all air filters with deluxe pleated air filters, clean the LED sign panels on the inside and outside, replace the surge arrestors in the sign and Type 334 cabinet, and inspect all electrical connectors. All maintenance work shall be performed in accordance with the manufacturer's recommendations and all components shall conform to manufacturer's requirements..
- The Contractor shall furnish and install a mast on the existing sign structure. The mast shall provide an additional fifteen feet of height for camera mounting. The camera mast shall be installed level and plumb. The Contractor shall furnish and install hardware, brackets, and all other items required for the camera mast. The Contractor shall be responsible for verifying that the proposed camera mast components fit correctly and are compatible with the existing sign structure. The Contractor shall submit catalog cut sheets and drawings for all materials to the Department for review prior to ordering material.

Basis of Payment: This work will be paid for at the contract unit price per Each for RELOCATE OVERHEAD SIGN STRUCTURE – SPAN, SPECIAL which price shall be payment in full for all labor, materials, and equipment required to relocate the existing sign structure and DMS as described above and deliver it to the Department.

### **SERVICE INSTALLATION, TYPE B**

This work shall be in accordance with Section 805 and 1086 of the Standard Specifications except as modified herein.

The service installation shall include furnishing and installing a 6" x 6" x 10' treated wood post, disconnect switches, and all associated appurtenances including a meter base if required by the utility company. The service disconnects shall be mounted on the wood post.

The Contractor shall furnish and install a nameplate on the service disconnect switch that designates which intersection the disconnect switch is for. The nameplates shall be engraved plastic or stamped steel.

Galvanized steel conduit shall be used for the service riser. The use of PVC conduit will not be allowed.

A rain tight hub assembly (Myers type) shall be used when conduit enters the switch from the top of the disconnect.

The service disconnect switch shall be a stainless steel, weatherproof NEMA 4X enclosure that meets the following specifications:

60-Ampere (250 V) Minimum Fused Disconnect Switch: Unless indicated otherwise on the plan sheets, the fused disconnect switch shall be single-throw, three-wire (two poles, two fuses, and solid neutral). The switch shall provide for locking the blades in either the "On" or "Off" position with one or two padlocks and for locking the cover in the closed position. The disconnect switch and fuse rating shall be rated at the voltage and amperage required to comply with utility company and equipment requirements. All fuses shall be provided with the disconnect installation.

The service disconnect shall be installed at a maximum height of 42".

The Department will furnish all padlocks.

Basis of Payment: This work shall be paid for at the contract unit price Each for SERVICE INSTALLATION, TYPE B which price shall be payment in full for all labor, equipment, and materials required to provide and install the electrical service installation described above, complete.

**RAILROAD PROTECTIVE LIABILITY INSURANCE (BDE)**

Effective: December 1, 1986

Revised: January 1, 2006

Description. Railroad Protective Liability and Property Damage Liability Insurance shall be carried according to Article 107.11 of the Standard Specifications. A separate policy is required for each railroad unless otherwise noted.

| NAMED INSURED & ADDRESS  | NUMBER & SPEED OF PASSENGER TRAINS             | NUMBER & SPEED OF FREIGHT TRAINS                       |
|--|--|--|
| Toledo, Peoria & Western Railway Corporation<br>1990 East Washington Street<br>East Peoria, IL 61611   | 0  | 0/day @ 0 mph  |
| DOT/AAR No.: 004909R<br>RR Division: Illinois  | RR Mile Post: 46.44<br>RR Sub-Division: Peoria |  |
| For Freight/Passenger Information Contact: Steve Lee<br>For Insurance Information Contact: Mark Koenig |  | Phone: (309) 698-2000 ext 240<br>Phone: (904) 538-6154 |

Approval of Insurance. The original and one certified copy of each required policy shall be submitted to the following address for approval:

Illinois Department of Transportation  
 Bureau of Design and Environment  
 2300 South Dirksen Parkway, Room 326  
 Springfield, Illinois 62764

The Contractor will be advised when the Department has received approval of the insurance from the railroad(s). Before any work begins on railroad right-of-way, the Contractor shall submit to the Engineer evidence that the required insurance has been approved by the railroad(s). The Contractor shall also provide the Engineer with the expiration date of each required policy.

Basis of Payment. Providing Railroad Protective Liability and Property Damage Liability Insurance will be paid for at the contract unit price per Lump Sum for RAILROAD PROTECTIVE LIABILITY INSURANCE.

## **CONSTRUCTION LAYOUT EQUIPMENT**

### General

The Contractor shall furnish articles of survey equipment to be used by the Department for independent monitoring and verification of construction layout stakes, reference points, and any other horizontal and vertical control set by the Contractor. All equipment will be for the exclusive use of the Department throughout the duration of the contract and will be returned to the contractor at the end of the contract.

### Equipment

The equipment to be furnished by the Contractor shall consist of one precision GNSS rover and a secondary GPS handheld controller. The precision GNSS rover shall be a "Trimble SPS985 Precision Rover and TSC3", or their equivalent. The secondary GPS handheld controller shall be a "Trimble TCA 1 with Trimble SCS700 Software" or its equivalent. The equipment provided shall include all software, data and any additional equipment (base station, repeaters, etc.) necessary to find any point on the project in station, offset and elevation with precision. The project data included in the equipment will be consistent with the data used by the contractor for layout and grading. Any data revisions or software updates to the contractor's equipment will also be applied to the Department's equipment by the contractor.

The contractor will be responsible for providing training for three members of the Department's staff on use of the equipment and software.

### Basis of Payment

This work will not be measured separately, but shall be included in the contract lump sum price for CONSTRUCTION LAYOUT.

## HIGH LOAD MULTI-ROTATIONAL BEARINGS

Effective: October 13, 1988

Revised: October 15, 2011

Description. This work shall consist of furnishing and installing High Load Multi-Rotational type bearing assemblies at the locations shown on the plans.

High Load Multi-Rotational (HLMR) bearings shall be one of the following at the Contractors option unless otherwise restricted on the plans:

- a) Pot Bearings. These bearings shall be manufactured so that the rotational capability is provided by an assembly having a rubber disc of proper thickness, confined in a manner so it behaves like a fluid. The disc shall be installed, with a snug fit, into a steel cylinder and confined by a tight fitting piston. The outside diameter of the piston shall be no more than 0.03 in. (750 microns) less than the inside diameter of the cylinder at the interface level of the piston and rubber disc. The sides of the piston shall be beveled. PTFE sheets, or silicone grease shall be utilized to facilitate rotation of the rubber disc. Suitable brass sealing rings shall be provided to prevent any extrusion between piston and cylinder.
- b) Shear Inhibited Disc Type Bearing. The Structural Element shall be restricted from shear by the pin and ring design and need not be completely confined as with the Pot Bearing design. The disc shall be a molded monolithic Polyether Urethane compound.

These bearings shall be further subdivided into one or more of the following types:

- 1) Fixed. These allow rotation in any direction but are fixed against translation.
- 2) Guided Expansion. These allow rotation in any direction but translation only in limited directions.
- 3) Non-Guided Expansion. These allow rotation and translation in any direction.

The HLMR bearings shall be of the type specified and designed for the loads shown on the plans. The design of the top and bottom bearing plates are based on detail assumptions which are not applicable to all suppliers and may require modifications depending on the supplier chosen by the Contractor. The overall depth dimension for the HLMR bearings shall be as specified on the plans. The horizontal dimensions shall be limited to the available bearing seat area. Any modifications required to accommodate the bearings chosen shall be submitted to the Engineer for approval prior to ordering materials. Modifications required shall be made at no additional cost to the State. Inverted pot bearing configurations will not be permitted.

The Contractor shall comply with all manufacturers' material, fabrication and installation requirements specified.

All bearings shall be supplied by prequalified manufacturers. The Department will maintain a list of prequalified manufacturers.

Submittals. Shop drawings shall be submitted to the Engineer for approval according to Article 105.04 of the Standard Specifications. In addition the Contractor shall furnish certified copies of the bearing manufacturer's test reports on the physical properties of the component materials for the bearings to be furnished and a certification by the bearing manufacturer stating the bearing assemblies furnished conform to all the requirements shown on the plans and as herein specified. Submittals with insufficient test data and supporting certifications will be rejected.

**Materials.** The materials for the HLMR bearing assemblies shall be according to the following:

- (a) Elastomeric Materials. The rubber disc for Pot bearings shall be according to Article 1083.02(a) of the Standard Specifications.
- (b) Polytetrafluoroethylene (PTFE) Material. The PTFE material shall be according to Article 1083.02(b) of the Standard Specifications.
- (c) Stainless Steel Sheets: The stainless steel sheets shall be of the thickness specified and shall be according to ASTM A 240 (A 240M), Type 302 or 304. The sliding surface shall be polished to a bright mirror finish less than 20 micro-in. (510 nm ) root mean square.
- (d) Structural Steel. All structural steel used in the bearing assemblies shall be according to AASHTO M 270, Grade 50 (M 270M Grade 345), unless otherwise specified.
- (e) Threaded studs. The threaded stud, when required, shall conform to the requirements of Article 1083.02(d)(4) of the Standard Specifications.
- (f) Polyether Urethane for Disc bearings shall be according to all of the following requirements:

| PHYSICAL PROPERTY  | ASTM TEST METHOD | REQUIREMENTS             |                          |
|--|------------------|--------------------------|--------------------------|
| Hardness, Type D durometer                                   | D 2240           | 45 Min                   | 65 Max                   |
| Tensile Stress, psi (kPa)<br>At 100% elongation, min         | D 412            | 1500 psi<br>(10,350 kPa) | 2300 psi<br>(15,900 kPa) |
| Tensile Stress, psi (kPa)<br>At 200% elongation, min         | D 412            | 2800 psi<br>(19,300 kPa) | 4000 psi<br>(27,600 kPa) |
| Tensile Strength, psi (kPa), min                             | D 412            | 4000 psi<br>(27,600 kPa) | 6000 psi<br>(41,400 kPa) |
| Ultimate Elongation, %, min                                  | D 412            | 350                      | 220                      |
| Compression Set 22 hr. at 158 °F<br>(70 °C), Method B %, max | D 395            | 40                       | 40                       |

The physical properties for a durometer hardness between the minimum and maximum values shown above shall be determined by straight line interpolation.

**Design.** The fabricator shall design the HLMR bearings according to the appropriate AASHTO Design Specifications noted on the bridge plans.

**Fabrication.** The bearings shall be complete factory-produced assemblies. They shall provide for rotation in all directions and for sliding, when specified, in directions as indicated on the plans. All bearings shall be furnished as a complete unit from one manufacturing source. All material used in the manufacture shall be new and unused with no reclaimed material incorporated into the finished assembly.

The translation capability for both guided and non-guided expansion bearings shall be provided by means of a polished stainless steel sliding plate that bears on a PTFE sheet bonded and recessed to the top surface of the piston or disc. The sliding element of expansion bearings shall be restrained against movement in the fixed direction by exterior guide bars capable of resisting the horizontal forces or 20 percent of the vertical design load on the bearing applied in any direction, whichever is greater. The sliding surfaces of the guide bar shall be of PTFE sheet and stainless steel. Guiding off of the fixed base, or any extension of the base, will not be permitted.

Structural steel bearing plates shall be fabricated according to Article 505.04(l) of the Standard Specifications. Prior to shipment the exposed edges and other exposed portions of the structural steel bearing plates shall be cleaned and painted according to Articles 506.03 and 506.04 of the Standard Specifications. Painting shall be with the paint specified for shop painting of structural steel. During cleaning and painting the stainless steel, PTFE sheet and neoprene shall be protected from abrasion and paint.

PTFE sheets shall be bonded to steel under factory controlled conditions using heat and pressure for the time required to set the epoxy adhesive used. The PTFE sheet shall be free from bubbles and the sliding surface shall be burnished to an absolutely smooth surface.

The steel piston and the steel cylinder for pot bearings shall each be machined from a solid piece of steel. The steel base cylinder shall be either integrally machined, recessed into with a snug fit, or continuously welded to its bottom steel bearing plate.

Packaging. Each HLMR bearing assembly shall be fully assembled at the manufacturing plant and delivered to the construction site as complete units. The assemblies shall be packaged, crated or wrapped so the assemblies will not be damaged during handling, transporting and shipping. The bearings shall be held together with removable restraints so sliding surfaces are not damaged.

Centerlines shall be marked on both top and base plates for alignment in the field. The bearings shall be shipped in moisture-proof and dust-proof covers.

Performance Testing. The following performance tests are required. All tests shall be performed by the manufacturer prior to shipment. Where lot testing is permitted, a lot size shall be the number of bearings per type on the project but not to exceed 25 bearings per type.

Dimension Check. Each bearing shall be checked dimensionally to verify all bearing components are within tolerances. Failure to satisfy any dimensional tolerance shall be grounds for rejecting the bearing component or the entire bearing assembly.

Clearance Test. This test shall be performed on one bearing per lot. The bearing selected for this test shall be the one with the least amount of clearance based on the dimension check. The bearing assembly shall be loaded to its service limit state rated capacity at its full design rotation but not less than 0.02 radians to verify the required clearances exist. This test shall be performed twice for each bearing with the rotation oriented longitudinally with the bridge once in each direction. Any visual signs of rubbing or binding shall be grounds for rejection of the lot.

Proof Load Test. This test shall be performed on one bearing per lot. The bearing assembly shall be load tested to 150 percent of the service limit state rated capacity at a rotation of 0.02 radians. The load shall be maintained for 5 minutes, removed then reapplied for 5 minutes. If the load drops below the required value during either application, the test shall be restarted from the beginning. This test shall be performed twice for each bearing with the rotation oriented longitudinally with the bridge once in each direction.

The bearing shall be visually examined both during the test and upon disassembly after the test. Any resultant visual defects include, but are not limited to:

1. Extruded or deformed elastomer, polyether urethane, or PTFE.
2. Insufficient clearances such as evidence of metal to metal contact between the pot wall and the top plate.
3. Damaged components such as cracked steel, damaged seal rings, or damaged limiting rings.
4. Bond failure.

If any of the above items are found it shall be grounds for rejection of the lot.

**Sliding Friction Test.** For expansion bearings, this test shall be performed on one bearing per lot. The sliding surfaces shall be thoroughly cleaned with a degreasing solvent. No lubrication other than that specified for the bearing shall be used. The bearing shall be loaded to its service limit state rated capacity for 1 hour prior to and throughout the duration of the sliding test. At least 12 cycles of plus and minus sliding with an amplitude equaling the smaller of the design displacement and 1 inch (25 mm) shall then be applied. The average sliding speed shall be between 0.1 inch and 1.0 inches (2.5 mm and 25 mm) per minute. The sliding friction coefficient shall be computed for each direction of each cycle and its mean and standard deviation shall be computed for the sixth through twelfth cycles. The friction coefficient for the first movement and the mean plus two standard deviations for the sixth through twelfth cycles shall not exceed the design value used. In addition, the mean value for the sixth through twelfth cycles shall not exceed 2/3 of the design value used. Failure of either of these shall result in rejection of the lot.

The bearing shall also be visually examined both during and after the testing, any resultant defects, such as bond failure, physical destruction, or cold flow of the PTFE shall also be cause for rejection of the lot.

The Contractor shall furnish to the Department a notarized certification from the bearing manufacturer stating the HLMR bearings have been performance tested as specified. The Contractor shall also furnish to the Engineer of Tests at the Bureau of Materials and Physical Research (126 East Ash Springfield, IL 62704) a purchase order prior to fabrication. The purchase order shall contain, as a minimum, the quantity and size of each type of bearing furnished. The Department reserves the right to perform any of the specified tests on one or more of the furnished bearings. If the tested bearing shows failure it shall be replaced and the remaining bearings shall be similarly tested for acceptance at the Contractor's expense.

When directed by the Engineer, the manufacturer shall furnish an additional bearing assembly and/or random samples of component materials used in the bearings, for testing by the Department, according to Article 1083.04 of the Standard Specifications.

Installation. The HLMR bearings shall be erected according to Article 521.05 of the Standard Specifications.

Exposed edges and other exposed portions of the structural steel plates shall be field painted as specified for Structural Steel.

Basis of Payment. This work will be paid for at the contract unit price each for HIGH LOAD MULTI-ROTATIONAL BEARINGS, FIXED; HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION; or HIGH LOAD MULTI-ROTATIONAL BEARINGS, NON-GUIDED EXPANSION of the load rating specified.

When the fabrication and erection of HLMR bearings is accomplished under separate contracts, the applicable requirements of Article 505.09 shall apply.

Fabricated HLMR bearings and other materials complying with the requirements of this item, furnished and accepted, will be paid for at the contract unit price each for FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, FIXED, FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION or FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, NON-GUIDED EXPANSION of the load rating specified.

Storage and care of fabricated HLMR bearings and other materials complying with the requirements of this item by the Fabrication Contractor beyond the specified storage period, will be paid for at the contract unit price per calendar day for STORAGE OF HIGH LOAD MULTI-ROTATIONAL BEARINGS if a pay item is provided for in the contract, or will be paid for according to Article 109.04 if a pay item is not provided in the contract.

HLMR bearings and other materials fabricated under this item erected according to the requirements of the specifications, and accepted, will be paid for at the contract unit price each for ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, FIXED, ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION or ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, NON-GUIDED EXPANSION of the load rating specified.

#### **TEMPORARY SHEET PILING**

Effective: September 2, 1994

Revised: January 31, 2012

Description. This work shall consist of furnishing, driving, adjusting for stage construction when required and subsequent removal of the sheet piling according to the dimensions and details shown on the plans and according to the applicable portions of Section 512 of the Standard Specifications.

This work shall also include furnishing, installing and subsequent removal of all miscellaneous steel shapes, plates and connecting hardware when required to attach the sheeting to an existing substructure unit and/or to facilitate stage construction.

General. The Contractor may propose other means of supporting the sides of the excavation provided they are done so at no extra cost to the department. If the Contractor elects to vary from the design requirements shown on the plans, the revised design calculations and details shall be submitted to the Engineer for approval. The calculations shall be prepared and sealed by an Illinois Licensed Structural Engineer. This approval will not relieve the Contractor of responsibility for the safety of the excavation. Approval shall be contingent upon acceptance by all involved utilities and/or railroads.

Material. The sheet piling shall be made of steel and may be new or used material, at the option of the Contractor. The sheet piling shall have a minimum section modulus as shown on the plans or in the approved Contractor's alternate design. The sheeting shall have a minimum yield strength of 38.5 ksi (265 MPa) unless otherwise specified. The sheeting, used by the Contractor, shall be identifiable and in good condition free of bends and other structural defects. The Contractor shall furnish a copy of the published sheet pile section properties to the Engineer for verification purposes. The Engineer's approval will be required prior to driving any sheeting. All driven sheeting not approved by the Engineer shall be removed at the Contractor's expense.

Construction. The Contractor shall verify locations of all underground utilities before driving any sheet piling. Any disturbance or damage to existing structures, utilities or other property, caused by the Contractor's operation, shall be repaired by the Contractor in a manner satisfactory to the Engineer at no additional cost to the Department. The Contractor shall be responsible for determining the appropriate equipment necessary to drive the sheeting to the tip elevation(s) specified on the plans or according to the Contractor's approved design. The sheet piling shall be driven, as a minimum, to the tip elevation(s) specified, prior to commencing any related excavation. If unable to reach the minimum tip elevation, the adequacy of the sheet piling design will require re-evaluation by the Department prior to allowing excavation adjacent to the sheet piling in question. The Contractor shall not excavate below the maximum excavation line shown on the plans without the prior permission of the Engineer. The sheet piling shall remain in place until the Engineer determines it is no longer required.

The sheet piling shall be removed and disposed of by the Contractor when directed by the Engineer. When allowed, the Contractor may elect to cut off a portion of the sheet piling leaving the remainder in place. The remaining sheet piling shall be a minimum of 12 in. (300 mm) below the finished grade or as directed by the Engineer. Removed sheet piling shall become the property of the Contractor.

When an obstruction is encountered, the Contractor shall notify the Engineer and upon concurrence of the Engineer, the Contractor shall begin working to break up, push aside, or remove the obstruction. An obstruction shall be defined as any object (such as but not limited to, boulders, logs, old foundations etc.) where it's presence was not obvious or specifically noted on the plans prior to bidding, that cannot be driven through or around with normal driving procedures, but requires additional excavation or other procedures to remove or miss the obstruction.

Method of Measurement. The temporary sheet piling will be measured for payment in place in square feet (square meter). Any temporary sheet piling cut off, left in place, or driven to dimensions other than those shown on the contract plans without the written permission of the Engineer, shall not be measured for payment but shall be done at the contractor's expense.

If the Contractor is unable to drive the sheeting to the specified tip elevation(s) and can demonstrate that any further effort to drive it would only result in damaging the sheeting, then the Contractor shall be paid based on the plan quantity of temporary sheeting involved. However, no additional payment will be made for any walers, bracing, or other supplement to the temporary sheet piling, which may be required as a result of the re-evaluation in order to insure the original design intent was met. Portions of the temporary sheet piling left in place for reuse in later stages of construction shall only be measured for payment once.

Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for TEMPORARY SHEET PILING.

Payment for any excavation performed in conjunction with this work will not be included in this item but shall be paid for as specified elsewhere in this contract.

Obstruction mitigation shall be paid for according to Article 109.04 of the Standard Specifications.

## **TEMPORARY SOIL RETENTION SYSTEM**

Effective: December 30, 2002

Revised : May 11, 2009

Description. This work shall consist of designing, furnishing, installing, adjusting for stage construction when required and subsequent removal of the temporary soil retention system according to the dimensions and details shown on the plans and in the approved design submittal.

General. The temporary soil retention system shall be designed by the Contractor as a minimum, to retain the exposed surface area specified in the plans or as directed by the Engineer.

The design calculations and details for the temporary soil retention system proposed by the Contractor shall be submitted to the Engineer for approval. The calculations shall be prepared and sealed by an Illinois Licensed Structural Engineer. This approval will not relieve the Contractor of responsibility for the safety of the excavation. Approval shall be contingent upon acceptance by all involved utilities and/or railroads.

Construction. The Contractor shall verify locations of all underground utilities before installing any of the soil retention system components or commencing any excavation. Any disturbance or damage to existing structures, utilities or other property, caused by the Contractor's operation, shall be repaired by the Contractor in a manner satisfactory to the Engineer at no additional cost to the Department. The soil retention system shall be installed according to the Contractor's approved design, or as directed by the Engineer, prior to commencing any related excavation. If unable to install the temporary soil retention system as specified in the approved design, the Contractor shall have the adequacy of the design re-evaluated. Any reevaluation shall be submitted to the Engineer for approval prior to commencing the excavation adjacent to the area in question. The Contractor shall not excavate below the maximum excavation line shown in the approved design without the prior permission of the Engineer. The temporary soil retention system shall remain in place until the Engineer determines it is no longer required.

The temporary soil retention system shall be removed and disposed of by the Contractor when directed by the Engineer. When allowed, the Contractor may elect to cut off a portion of the temporary soil retention system leaving the remainder in place. The remaining temporary soil retention system shall be removed to a depth which will not interfere with the new construction, and as a minimum, to a depth of 12 in. (300 mm) below the finished grade, or as directed by the Engineer. Removed system components shall become the property of the Contractor.

When an obstruction is encountered, the Contractor shall notify the Engineer and upon concurrence of the Engineer, the Contractor shall begin working to break up, push aside, or remove the obstruction. An obstruction shall be defined as any object (such as but not limited to, boulders, logs, old foundations etc.) where its presence was not obvious or specifically noted on the plans prior to bidding, that cannot be driven or installed through or around, with normal driving or installation procedures, but requires additional excavation or other procedures to remove or miss the obstruction.

**Method of Measurement.** The temporary soil retention system furnished and installed according to the Contractor's approved design or as directed by the Engineer will be measured for payment in place, in square feet (square meters). The area measured shall be the vertical exposed surface area envelope of the excavation supported by temporary soil retention system. Portions of the temporary soil retention system left in place for reuse in later stages of construction shall only be measured for payment once.

Any temporary soil retention system installed beyond those dimensions shown on the contract plans or the approved contractor's design without the written permission of the Engineer, shall not be measured for payment but shall be done at the contractor's own expense.

**Basis of Payment.** This work will be paid for at the contract unit price per square foot (square meter) for TEMPORARY SOIL RETENTION SYSTEM.

Payment for any excavation, related solely to the installation and removal of the temporary soil retention system and/or its components, shall not be paid for separately but shall be included in the unit bid price for TEMPORARY SOIL RETENTION SYSTEM. Other excavation, performed in conjunction with this work, will not be included in this item but shall be paid for as specified elsewhere in this contract.

Obstruction mitigation shall be paid for according to Article 109.04 of the Standard Specifications.

## **GEOTEXTILE RETAINING WALLS**

Effective: September 19, 2003

Revised: October 9, 2009

**Description.** This work shall consist of furnishing the materials and the constructing of the geotextile retaining wall to the lines, grades and dimensions shown on the plans and as directed by the Engineer. The geotextile wall shall consist of successive layers of geotextile fabric anchored by placing select fill retained at the face by extending the fabric over a removable form brace and re-embedding the remaining fabric back into the select fill. The materials and construction methods shall comply with this Special Provision and the requirements specified by the geotextile supplier selected by the Contractor.

**Submittals.** The Contractor shall submit calculations demonstrating that the geotextile fabric they propose to use will provide an allowable tensile strength above the minimum value ( $T_{min}$ ) specified in the contract plans. No work or ordering of materials for the geotextile wall shall be done until the submittal has been approved by the Engineer.

**Materials.** The Geotextile wall shall conform to the supplier's standards and the following:

- (a) The geotextile shall satisfy the requirements of article 1080.05 and shall have both a minimum Ultraviolet (UV) Stability (percent strength retained according to ASTM D 4355) of 70 percent as well as a minimum permeability of 0.08 ft./min. (0.04 cm/sec) according to ASTM D 4491. In addition to satisfying these properties, the allowable strength of the fabric shall meet or exceed the ( $T_{min}$ ) strength specified on the plans. The geotextile allowable strength shall be determined according to the procedure covered in the Design Criteria Section of this specification.

The Contractor shall submit to the Engineer a manufacturer's certification which shall include the manufacturer's name, address, the geotextile product name, polymer type, and the products physical properties. The physical properties submitted shall include weight, grab strength, grab elongation, equivalent opening size, UV stability, permeability, and the allowable strength. The Contractor may be requested by the Engineer to submit a sample of the geotextile for testing by the department.

During shipment and storage, the geotextile shall be kept dry and wrapped in UV resistant material capable of protecting it from damage from sunlight and other elements.

(b) The select fill, defined as the material placed in the geotextile reinforced volume, shall be according to Sections 1003 and 1004 of the Standard Specifications and the following:

(1) Select Fill Gradation. Either a coarse aggregate or a fine aggregate may be used. For coarse aggregate, gradations CA 12 thru CA 16 may be used. For fine aggregate, gradations FA 1, FA 2, or FA 20 may be used.

Other aggregate gradations may be used provided the maximum aggregate size is 3/4 in. (15 mm), the maximum material passing the #40 (425  $\mu$ m) sieve is 60 percent, and the maximum material passing the #200 (75  $\mu$ m) sieve is 15 percent.

(2) Select Fill Quality. The coarse or fine aggregate shall be Class B quality or better, except that a maximum of 15 percent of the material may be finer than the #200 (75  $\mu$ m) sieve.

(3) Select Fill Internal Friction Angle. The effective internal friction angle for the coarse or fine aggregate shall be a minimum 34 degrees according to AASHTO T 236 on samples compacted to 95 percent density according to Illinois Modified AASHTO T 99. The AASHTO T 296 test with pore pressure measurement may be used in lieu of AASHTO T 236. If the vendor's design uses a friction angle higher than 34 degrees, as indicated on the approved shop drawings, this higher value shall be taken as the minimum required.

(4) Test Frequency. Prior to start of construction, the Contractor shall provide an internal friction angle test result to show the select fill material meets the specification requirement. This test result shall be no more than 12 months old. In addition, a sample of select fill material will be obtained for testing and approval by the Department. Thereafter, the minimum frequency of sampling and testing at the jobsite will be one per 20,000 cubic yards (15,500 cubic meters) of select fill material.

(c) The embankment material behind the select fill shall be according to Section 202 and/or Section 204.

**Design Criteria.** The Contractor is responsible for selecting a geotextile fabric which will provide an allowable tensile strength larger than the minimum value ( $T_{min}$ ) specified on the plans. The Contractor shall consider the project specific strength reduction due to long-term creep, chemical and biological degradation, as well as installation damage in their calculations to determine the allowable tensile strength of the geotextile selected for use. The determination of the allowable tensile strength of the fabric shall follow the AASHTO Design Specifications for Mechanically Stabilized Earth Wall Design, Allowable Stresses using geosynthetic reinforcement. The design life for this wall shall be 3 years unless otherwise indicated on the plans.

**Construction.** Prior to wall construction, the foundation soils supporting the wall shall be graded to a level uniform condition and compacted such that it is free from ruts and protruding objects such as rocks or sticks for a width equal to the length of the geotextile reinforcement. Any foundation soils found to be unsuitable shall be removed and replaced, as directed by the Engineer, and shall be paid for separately according to Section 202.

Wall construction shall begin at the lowest level of the wall and each layer shall be placed horizontally as shown in the construction sequence on the plans. The geotextile shall be stretched out in the direction perpendicular to the wall face to ensure that no slack or wrinkles exist in the geotextile prior to select fill placement. The select fill shall be placed or pushed onto the geotextile in a manner that does not distort or distress the fabric. The select fill shall not be dropped onto the fabric from a distance of more than 4.75 ft. (1.5 m) and end dumping select fill from trucks directly onto the fabric shall not be permitted. A minimum of 4 in. (100 mm) of select fill material must be present between the geotextile and any equipment tires or tracks and sudden turning of equipment on the select fill shall be not be permitted to prevent construction damage or distortion to the fabric. Any damage to the fabric shall be repaired by the Contractor as required by the Engineer at no additional cost to the Department.

As select fill material is placed against the form brace, the form brace shall be maintained in position to produce proper fabric face alignment after the form brace is removed. The removable form brace detail shown in the plans is provided as a guide, the Contractor shall be responsible for the actual form brace used to support the fabric face.

Select fill shall be compacted in 6 in. (150 mm) maximum lifts and the minimum required compaction shall be 95 percent of maximum density as determined by AASHTO T 99. Sheepsfoot rollers or other rollers with protrusions shall not be used. Compaction in a strip 3 ft. (1 m) wide adjacent to the backside of the panels shall be achieved using a minimum of 3 passes of a light weight mechanical tamper, roller or vibratory system. The embankment placement shall closely follow the erection of each lift of geotextile and select fill. The select fill material should be roughly leveled and compacted prior to placing the next level of geotextile. At the end of each day's operations, the Contractor shall shape the last level of select fill to permit runoff of rainwater away from the wall face. The Engineer will perform one density test per 5000 cu yd (3800 cu m) and not less than one test per 2 ft (0.6 m) of lift.

Where geotextile fabric splices perpendicular to the wall face are required to connect separate pieces of geotextile, the fabric shall be overlapped by at least 4 ft. (1.2 m). No splices are allowed parallel to the wall face as the geotextile must extend continuously from the rear limits of the soil reinforcement, around the face and terminate at the end of the re-embedment length.

At locations where the plans specify a change of wall alignment, the fabric shall be neatly folded over itself to create inside turns or it may be cut perpendicular to the wall face and lapped at the wall face for outside wall turns to ensure no loss of select fill. Fabric layers shown terminating against a cut slope, sheet piling, concrete walls or other structures must have at least 3 ft. (1 meter) of additional fabric extending past or placed against the surface, neatly folded back in such a manner to ensure adequate embedment and no loss of select fill.

The thickness of each geotextile reinforcement layer shall be within 3 in. (75 mm) of that shown on the plans. The offset of the wall face bulge shall be within 5 in. (125 mm) of that shown on the plans at each layer, and along the entire length of wall. Failure to meet this tolerance may cause the Engineer to require the Contractor to disassemble and re-erect the affected portions of the wall.

**Method of Measurement.** Geotextile Retaining Wall will be measured for payment in square feet (square meters) of completed wall face. The area will be calculated from the top limits of the geotextile to the bottom level of fabric reinforcement at each variation along the length of the wall.

**Basis of Payment.** This work will be paid for at the contract unit price per square foot (square meters) for GEOTEXTILE RETAINING WALL.

Embankment placed outside of the select fill volume will be measured and paid for according to Sections 202 and/or 204 as applicable.

## **PIPE UNDERDRAINS FOR STRUCTURES**

Effective: May 17, 2000

Revised: January 22, 2010

**Description.** This work shall consist of furnishing and installing a pipe underdrain system as shown on the plans, as specified herein, and as directed by the Engineer.

**Materials.** Materials shall meet the requirements as set forth below:

The perforated pipe underdrain shall be according to Article 601.02 of the Standard Specifications. Outlet pipes or pipes connecting to a separate storm sewer system shall not be perforated.

The drainage aggregate shall be a combination of one or more of the following gradations, FA1, FA2, CA5, CA7, CA8, CA11, or CA13 thru 16, according to Sections 1003 and 1004 of the Standard Specifications.

The fabric surrounding the drainage aggregate shall be Geotechnical Fabric for French Drains according to Article 1080.05 of the Standard Specifications.

**Construction Requirements.** All work shall be according to the applicable requirements of Section 601 of the Standard Specifications except as modified below.

The pipe underdrains shall consist of a perforated pipe drain situated at the bottom of an area of drainage aggregate wrapped completely in geotechnical fabric and shall be installed to the lines and gradients as shown on the plans.

Method of Measurement. Pipe Underdrains for Structures shall be measured for payment in feet (meters), in place. Measurement shall be along the centerline of the pipe underdrains. All connectors, outlet pipes, elbows, and all other miscellaneous items shall be included in the measurement. Concrete headwalls shall be included in the cost of Pipe Underdrains for Structures, but shall not be included in the measurement for payment.

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for PIPE UNDERDRAINS FOR STRUCTURES of the diameter specified. Furnishing and installation of the drainage aggregate, geotechnical fabric, forming holes in structural elements and any excavation required, will not be paid for separately, but shall be included in the cost of the pipe underdrains for structures.

#### **PERMANENT STEEL SHEET PILING (LRFD)**

Effective: January 31, 2012

Revised: August 17, 2012

Description. This work shall consist of furnishing and installing the permanent sheet piling to the limits and tolerances shown on the plans according to Section 512 of the Standard Specifications.

Material. The sheet piling shall be made of steel and shall be new material. Unless otherwise specified the sheeting shall have a minimum yield strength of 50 ksi (345 MPa) according to ASTM A 572. The sheeting shall be identifiable and free of bends and other structural defects. The Contractor shall furnish a copy of the published sheet pile section properties to the Engineer for verification purposes. The Engineer's approval will be required prior to driving any sheeting. All driven sheeting not approved by the Engineer shall be removed at the Contractor's expense.

The Contractor shall furnish a sheet pile section, to be used for each wall section, with a published section modulus equal to or larger than that specified on the plans.

The selection of the sheet pile section shall not relieve the Contractor of the responsibility to satisfy all details including minimum clearances, cover, reinforcement, shear stud locations, interlocking, and field cutting. Any modifications of the plans to accommodate the Contractor's selection shall be paid for by the Contractor and subject to the approval of the Engineer.

Construction. The Contractor shall verify locations of all underground utilities before driving any sheet piling. Any disturbance or damage to existing structures, utilities or other property, caused by the Contractor's operation, shall be repaired by the Contractor in a manner satisfactory to the Engineer at no additional cost to the Department. The Contractor shall be responsible for determining the appropriate equipment necessary to drive the sheeting to the tip elevation(s) specified on the plans or according to the Contractor's approved design. The sheet piling shall be driven, as a minimum, to the tip elevation(s) specified, prior to commencing any related construction. If unable to reach the minimum tip elevation, the adequacy of the sheet piling design will require re-evaluation by the Department prior to allowing construction adjacent to the sheet piling in question.

Obstructions. Obstructions shall be defined as any object (such as but not limited to, boulders, logs, old foundations, etc.) that cannot be driven through with normal driving procedures, but requires special equipment to remove the obstruction. When obstructions are encountered, the Contractor shall notify the Engineer and upon concurrence of the Engineer, the Contractor shall begin working to break up, push aside, or remove the obstruction.

Method of Measurement. This work will be measured in place in square feet (square meters). Sheet piling associated with other work in this contract or for permanent sheet piling that is cut off or driven beyond those dimensions shown on the plans will not be measured for payment.

Obstruction mitigation shall be paid for according to Article 109.04.

Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for PERMANENT STEEL SHEET PILING at the location shown on the plans.

## **GRANULAR BACKFILL FOR STRUCTURES**

Effective: April 19, 2012  
Revised: August 17, 2012

Revise Section 586 of the Standard Specifications to read:

### **SECTION 586. GRANULAR BACKFILL FOR STRUCTURES**

**586.01 Description.** This work shall consist of furnishing, transporting and placing granular backfill for abutment structures.

**586.02 Materials.** Materials shall be according to the following.

| Item                        | Article/Section |
|-----------------------------|-----------------|
| (a) Fine Aggregate.....     | 1003.04         |
| (b) Coarse Aggregates ..... | 1004.05         |

## CONSTRUCTION REQUIREMENTS

**586.03 General.** This work shall be done according to Article 502.10 except as modified below. The backfill volume shall be backfilled, with granular material as specified in Article

586.02, to the required elevation as shown in the contract plans. The backfill volume shall be placed in convenient lifts for the full width to be backfilled. Unless otherwise specified in the contract plans, mechanical compaction will not be required. A deposit of gravel or crushed stone placed behind drain holes shall not be required. All drains not covered by geocomposite wall drains or other devices to prevent loss of backfill material shall be covered by sufficient filter fabric material meeting the requirements of Section 1080 and Section 282 with either 6 or 8 oz/sq yd (200 or 270 g/sq m) material allowed, with free edges overlapping the drain hole by at least 12 in. (300 mm) in all directions.

The granular backfill shall be brought to the finished grade as shown in the contract plans. When concrete is to be cast on top of the granular backfill, the Contractor, subject to approval of the Engineer, may prepare the top surface of the fill to receive the concrete as he/she deems necessary for satisfactory placement at no additional cost to the Department.

**586.04 Method of Measurement.** This work will be measured for payment as follows.

(a) Contract Quantities. The requirements for the use of contract quantities shall conform to Article 202.07(a).

(b) Measured Quantities. This work will be measured for payment in place and the volume computed in cubic yards (cubic meters). The volume will be determined by the method of average end areas behind the abutment.

**586.05 Basis of Payment.** This work will be paid for at the contract unit price per cubic yard (cubic meter) for GRANULAR BACKFILL FOR STRUCTURES.

Revise the first paragraph of Article 1003.04 (c) of the Standard Specifications to read:

“(c) Gradation. The granular fine aggregate gradations for Embankment, Backfill, Bedding, Trench Backfill for Pipe Culverts and Storm Sewers shall be FA 1, FA 2, or FA 6 though FA 21.”

Revise Article 1004.05 (c) of the Standard Specifications to read:

“(c) Gradation. The coarse aggregate gradation for Blotter shall be CA 15.

The granular coarse aggregate gradations for Embankment, Backfill, Bedding, and Trench Backfill for Pipe Culverts and Storm Sewers shall be CA 6, CA 9, CA 10, CA 12, CA 17 thru CA19.

The porous granular coarse aggregate gradations for Embankment, Backfill, and French Drains shall be CA 7, CA 8, CA 11, CA 15, CA 16 and CA 18.”

## **DYNAMIC PILE MONITORING**

Effective: February 5, 2009

Revised: February 1, 2012

**General.** This work consists of accommodating the dynamic monitoring of a pile at all test pile locations, both during their initial driving process and the re-strike procedure conducted after the minimum waiting period specified herein has elapsed. All pile driving operations shall follow Section 512 of the standard specifications unless otherwise indicated in this special provision.

Dynamic monitoring will be accomplished by attaching sensors near the top of the pile which transmit data by cable or wireless connection to a Pile Driving Analyzer (PDA) unit at the site. The sensors, their attachment to the pile, the connection to PDA, and the operation of the PDA will be provided by Dr Jim Long or another PDA operator from the University of Illinois Urbana Champaign (UIUC).

Unless otherwise approved by the Engineer and agreed to by Dr. Long, the pile(s) to be monitored shall be the test pile(s).

**Submittals.** The Contractor shall submit a completed "Pile Driving Equipment Data" Form (<http://www.dot.il.gov/Forms/BBS%20136.docx>) included below to the Engineer for transmittal by email to Dr. Long at ([jhlong@uiuc.edu](mailto:jhlong@uiuc.edu)) to prepare the PDA. The Contractor shall also notify the Engineer in writing of the anticipated driving and re-strike date(s) of the pile(s) to be dynamically monitored to allow the Engineer to inform Dr. Long at (217-333-2543) of the schedule. Both the completed form and written driving and re-strike dates shall be provided to the Engineer and sent to Dr. Long a minimum of two weeks prior to driving the first dynamically monitored pile. Any changes to the proposed driving equipment or dates shall be submitted to the Engineer to determine if they can be accommodated by Dr. Long or another PDA operator.

### **Construction.**

Dynamic monitoring will be performed during the final 20 to 50 ft (6 to 15 m) of initial driving. Depending on the location of any contractor planned pile splices and the total estimated pile length, the PDA operator will determine if all pile segments or only selected pile segments will require monitoring. After lifting the section(s) of the pile to be monitored into the leads, the Contractor shall provide labor to access to either side of the H-pile web or the Metal Shell within the top 8 ft (2.4 m) while in the leads to attach the sensors which should take less than 10 minutes.

When the level of the sensors is within 1 ft (300 mm) of any obstruction endangering the survival of sensors and/or cables, driving shall be halted and the contractor shall remove the sensors and reattach them after passing the obstruction. When sensors are within 1 ft (300 mm) of the ground surface, driving shall be halted and the contractor shall remove the sensors and reattach them near the top of the next pile segment after lifting into place and splicing.

The driving will be terminated when the Nominal Driven Bearing exceeds the Nominal Required Bearing shown on the plans by no more than 10 percent as directed by the Engineer per PDA operator's analysis. Upon completion of initial driving process of each dynamically monitored pile, the Contractor shall provide the PDA operator access to remove the sensors. Other piles in the substructure and elsewhere on the project may be driven during the waiting period but the dynamically monitored piles shall not be cut off and remain accessible for the re-strike procedure.

If the sensors are located 10 ft (3 m) or more above the ground at the end of initial driving, the Contractor shall provide equipment and labor to remove the sensors as well as reattach them after the waiting period, just prior to the re-strike procedure.

Unless otherwise specified on the plans, the Contractor shall wait a minimum of 15 days prior to re-striking piles.

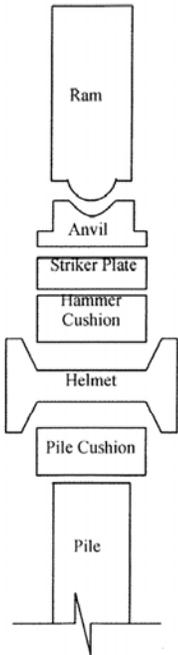
After the minimum waiting period has elapsed, the Contractor shall warm up the hammer by driving another pile a minimum of an additional 20 blows and reposition the driving equipment on the re-strike pile. Once the PDA operator has reattached the sensors and connections, the contractor shall apply at least 20 blows or drive the pile an additional 3 in (75 mm), whichever occurs first to allow the PDA to obtain the final pile setup data. The contractor shall remove and provide the sensors to the PDA operator after which the contractor may proceed with cutting the pile to length and normal construction.

**Method of Measurement and Basis of Payment.** This work will not be measured for payment but shall be included in the appropriate pay item(s) for Test Piles and Driving piles.



**Pile Driving Equipment Data**

Structure Number: \_\_\_\_\_  
 Pile Driving Contractor: \_\_\_\_\_  
 Abutment / Pier Number(s): \_\_\_\_\_ Route: \_\_\_\_\_  
 Pile Type & Size(s): \_\_\_\_\_ Section: \_\_\_\_\_  
 Nominal Required: \_\_\_\_\_ County: \_\_\_\_\_  
 Production Pile Length(s): \_\_\_\_\_ Closest Boring(s): \_\_\_\_\_ Contract: \_\_\_\_\_  
 Hammer Manufacturer: \_\_\_\_\_ Model No: \_\_\_\_\_  
 Type (diesel, air/steam hydraulic, etc.): \_\_\_\_\_ Ram Stroke Type (fixed or Variable): \_\_\_\_\_  
 Maximum Operating Energy: \_\_\_\_\_ Minimum Operating Energy: \_\_\_\_\_



Maximum Recommended Stroke: \_\_\_\_\_  
 Minimum Measurable Stroke: \_\_\_\_\_  
 Ram Weight: \_\_\_\_\_  
 Anvil Weight: \_\_\_\_\_  
 Modifications to Hammer (if any): \_\_\_\_\_  
 Striker Plate  
 Diameter: \_\_\_\_\_  
 Thickness: \_\_\_\_\_  
 Weight: \_\_\_\_\_  
 Hammer Cushion Material 1  
 Material Type: \_\_\_\_\_  
 Diameter: \_\_\_\_\_  
 Thickness per Plate: \_\_\_\_\_  
 No. of Plates: \_\_\_\_\_  
 Total Hammer Cushion Thickness: \_\_\_\_\_  
 Hammer Cushion Material 2 (if composite)  
 Material Type: \_\_\_\_\_  
 Diameter: \_\_\_\_\_  
 Thickness per Plate: \_\_\_\_\_  
 No. of Plates: \_\_\_\_\_  
 Helmet (Drive Head, Pile Cap) Weight (including bonnet insert if any): \_\_\_\_\_  
 Pile Cushion (precast concrete piles only)  
 Material: \_\_\_\_\_  
 Thickness Per Sheet: \_\_\_\_\_  
 Area: \_\_\_\_\_  
 No. of Sheets: \_\_\_\_\_  
 Thickness Total: \_\_\_\_\_

**Double Acting/Differential Acting Air or Steam**

Hammers Net Weight: \_\_\_\_\_  
 Cylinder Net Weight: \_\_\_\_\_  
 Piston Area: \_\_\_\_\_

Attach Bounce Chamber Pressure vs. Equivalent Energy Graphs (Closed-End Diesel Hammers Only): \_\_\_\_\_

Hammer Data Completed by: \_\_\_\_\_ Contact Phone Number: \_\_\_\_\_  
 Date Completed: \_\_\_\_\_

**AGREEMENT TO PLAN QUANTITY (BDE)**

Effective: January 1, 2012

Revise the second paragraph of Article 202.07(a) of the Standard Specifications to read:

“When the plans or work have been altered, or when disagreement exists between the Contractor and the Engineer as to the accuracy of the plan quantities, either party shall, before any work is started which would affect the measurement, have the right to request in writing and thereby cause the quantities involved to be measured. When plan quantities are revised by the issuance of revised plan sheets that are made part of the contract, and the Contractor and the Engineer have agreed in writing that the revised quantities are accurate, no further measurement will be required and payment will be made for the revised quantities shown.”

**AGGREGATE SUBGRADE IMPROVEMENT (BDE)**

Effective: April 1, 2012

Revised: August 1, 2012

Add the following Section to the Standard Specifications:

**“SECTION 303. AGGREGATE SUBGRADE IMPROVEMENT**

**303.01 Description.** This work shall consist of constructing an aggregate subgrade improvement.

**303.02 Materials.** Materials shall be according to the following.

| Item   | Article/Section |
|--|-----------------|
| (a) Coarse Aggregate .....                                     | 1004.06         |
| (b) Reclaimed Asphalt Pavement (RAP) (Notes 1, 2, and 3) ..... | 1031            |

Note 1. RAP shall not contain more than 10 percent steel slag or any materials considered expansive by the Department.

Note 2. Crushed RAP, from either full depth or single lift removal, may be mechanically blended with aggregate gradations CS 01, CS 02, and RR 01 but shall not exceed 40 percent of the total product. The top size of the RAP shall be less than 4 in. (100 mm) and well graded.

Note 3. RAP having 100 percent passing the 1 1/2 in. (37.5 mm) sieve and being well graded, may be used as capping aggregate in the top 3 in. (75 mm) when aggregate gradations CS 01, CS 02, or RR 01 are used in lower lifts.

**303.03 Equipment.** The vibratory machine shall be according to Article 1101.01, or as approved by the Engineer.

**303.04 Soil Preparation.** The stability of the soil shall be according to the Department's Subgrade Stability Manual for the aggregate thickness specified.

**303.05 Placing Aggregate.** The maximum nominal lift thickness of aggregate gradations CA 02, CA 06, or CA 10 shall be 12 in. (300 mm). The maximum nominal lift thickness of aggregate gradations CS 01, CS 02, and RR 01 shall be 24 in. (600 mm).

**303.06 Capping Aggregate.** The top surface of the aggregate subgrade shall consist of a minimum 3 in. (75 mm) of aggregate gradations CA 06 or CA 10. When the contract specifies that a granular subbase is to be placed on the aggregate subgrade improvement, the 3 in. (75 mm) of capping aggregate shall be the same gradation and may be placed with the underlying aggregate subgrade improvement material.

**303.07 Compaction.** All aggregate lifts shall be compacted to the satisfaction of the Engineer. If the moisture content of the material is such that compaction cannot be obtained, sufficient water shall be added so that satisfactory compaction can be obtained.

**303.08 Finishing and Maintenance of Aggregate Subgrade Improvement.** The aggregate subgrade improvement shall be finished to the lines, grades, and cross sections shown on the plans, or as directed by the Engineer. The aggregate subgrade improvement shall be maintained in a smooth and compacted condition.

**303.09 Method of Measurement.** This work will be measured for payment according to Article 311.08.

**303.10 Basis of Payment.** This work will be paid for at the contract unit price per cubic yard (cubic meter) or ton (metric ton) for AGGREGATE SUBGRADE IMPROVEMENT or at the contract unit price per square yard (square meter) for AGGREGATE SUBGRADE IMPROVEMENT, of the thickness specified.”

Add the following to Section 1004 of the Standard Specifications:

“**1004.06 Coarse Aggregate for Aggregate Subgrade Improvement.** The aggregate shall be according to Article 1004.01 and the following.

- (a) Description. The coarse aggregate shall be crushed gravel, crushed stone, or crushed concrete.
- (b) Quality. The coarse aggregate shall consist of sound durable particles reasonably free of deleterious materials.
- (c) Gradation.

- (1) The coarse aggregate gradation for total subgrade thickness less than or equal to 12 in. (300 mm) shall be CA 2, CA 6, CA 10, or CS 01.

The coarse aggregate gradation for total subgrade thickness more than 12 in. (300 mm) shall be CS 01, CS 02 or RR 01(see Article 1005.01(c)).

| COARSE AGGREGATE SUBGRADE GRADATIONS |                                |        |         |         |         |       |
|--------------------------------------|--------------------------------|--------|---------|---------|---------|-------|
| Grad No.                             | Sieve Size and Percent Passing |        |         |         |         |       |
|                                      | 8"                             | 6"     | 4"      | 2"      | #4      | #200  |
| CS 01                                | 100                            | 97 ± 3 | 90 ± 10 | 45 ± 25 | 20 ± 20 | 5 ± 5 |
| CS 02                                |                                | 100    | 80 ± 10 | 25 ± 15 |         |       |

| COARSE AGGREGATE SUBGRADE GRADATIONS (Metric) |                                |        |         |         |         |       |
|---|--------------------------------|--------|---------|---------|---------|-------|
| Grad No.                                      | Sieve Size and Percent Passing |        |         |         |         |       |
|   | 200 mm                         | 150 mm | 100 mm  | 50 mm   | 4.75 mm | 75 µm |
| CS 01   | 100                            | 97 ± 3 | 90 ± 10 | 45 ± 25 | 20 ± 20 | 5 ± 5 |
| CS 02   |                                | 100    | 80 ± 10 | 25 ± 15 |         |       |

(2) The 3 in. (75 mm) capping aggregate shall be gradation CA 6 or CA 10."

**BRIDGE RELIEF JOINT SEALER (BDE)**

Effective: January 1, 2012

Revised: August 1, 2012

Add the following to the end of the second paragraph of Article 503.19 of the Standard Specifications:

"After the surface is clean and before applying protective coat, relief joints being sealed according to Section 588 shall be covered with a masking tape to prevent protective coat from contacting the vertical faces of the joint."

Revise Section 588 of the Standard Specifications to read:

**"SECTION 588. BRIDGE RELIEF JOINT SEALER**

**588.01 Description.** This work shall consist of sealing transverse relief joints in the bridge decks.

**588.02 Materials.** Materials shall be according to the following.

| Item                             | Article/Section |
|----------------------------------|-----------------|
| (a) Hot-Poured Joint Sealer..... | 1050.02         |

**CONSTRUCTION REQUIREMENTS**

**588.03 General.** The relief joint opening shall be formed to produce a reservoir for the sealing material and shall be 1/4 in. (6 mm) wide by 3/4 in. (20 mm) deep. For concrete surfaces the relief joint shall be formed into the concrete. For HMA surfaces the relief joint shall be sawed into the surface. Immediately prior to pouring the sealer the joint opening shall be cleaned with compressed air so that it is free of all foreign and loose material and in a dry condition. The bridge deck relief joints to be sealed shall be free of cracked or spalled areas. Any cracked areas shall be chipped back to sound material before placing joint sealer.

The hot-poured joint sealer shall not be placed when the air temperature in the shade is below 40 °F (5 °C) or when foggy or rainy, unless approved by the Engineer.

Hot-poured joint sealer shall be stirred during heating to prevent localized overheating. The sealing material shall be applied to each joint opening according to the details shown on the plans or as directed by the Engineer, without spilling on the exposed deck surfaces.

All bridge relief joints shall be filled with sufficient sealer compound so that the top of the seal is flush with the top of the finished deck or wearing surface.

Any sealing compound that is not bonded to the relief joint wall or face 24 hours after placing shall be removed and the joint shall be cleaned and resealed.

**588.04 Basis of Payment.** This work will not be paid for as a separate item, but shall be considered as included in the unit price bid for the major item of construction involved.”

Revise Section 589 of the Standard Specifications to read:

**“SECTION 589. Reserved”**

#### **COARSE AGGREGATE IN BRIDGE APPROACH SLABS/FOOTINGS (BDE)**

Effective: April 1, 2012

Revise the third paragraph of Article 1004.01(b) of the Standard Specifications to read:

“Aggregates used in Class BS concrete (except when poured on subgrade), Class PS concrete, and Class PC concrete (superstructure products only) shall contain no more than two percent by weight (mass) of deleterious materials. Deleterious materials shall include substances whose disintegration is accompanied by an increase in volume which may cause spalling of the concrete.”

Revise the first sentence of the first paragraph of Article 1004.02(f) of the Standard Specifications to read:

“(f) Freeze-Thaw Rating. When coarse aggregate is used to produce portland cement concrete for base course, base course widening, pavement, driveway pavement, sidewalk, shoulders, curb, gutter, combination curb and gutter, median, paved ditch, concrete superstructures on subgrade such as bridge approach slabs, concrete structures on subgrade such as bridge approach footings, or their repair using concrete, the gradation permitted will be determined from the results of the Department’s Freeze-Thaw Test (Illinois Modified AASHTO T 161).”

#### **CONCRETE MIX DESIGN – DEPARTMENT PROVIDED (BDE)**

Effective: January 1, 2012

For the “Portland Cement Concrete (BDE)” special provision included in this project, specifically Article 1020.05(a), the Contractor has the option to request the Engineer determine mix design material proportions for Class PV, PP, RR, BS, DS, SC, and SI concrete. A single mix design for each class of concrete will be provided. Acceptance by the Contractor to use the mix design developed by the Engineer shall not relieve the Contractor from meeting specification requirements.

**CONSTRUCTION AIR QUALITY - DIESEL VEHICLE EMISSIONS CONTROL (BDE)**

Effective: April 1, 2009

Revised: January 2, 2012

Diesel Vehicle Emissions Control. The reduction of construction air emissions shall be accomplished by using cleaner burning diesel fuel. The term "equipment" refers to any and all diesel fuel powered devices rated at 50 hp and above, to be used on the project site in excess of seven calendar days over the course of the construction period on the project site (including any "rental" equipment).

All equipment on the jobsite, with engine ratings of 50 hp and above, shall be required to: use Ultra Low Sulfur Diesel fuel (ULSD) exclusively (15 ppm sulfur content or less).

Diesel powered equipment in non-compliance will not be allowed to be used on the project site, and is also subject to a notice of non-compliance as outlined below.

The Contractor shall certify that only ULSD will be used in all jobsite equipment. The certification shall be presented to the Department prior to the commencement of the work.

If any diesel powered equipment is found to be in non-compliance with any portion of this specification, the Engineer will issue the Contractor a notice of non-compliance and identify an appropriate period of time, as outlined below under environmental deficiency deduction, in which to bring the equipment into compliance or remove it from the project site.

Any costs associated with bringing any diesel powered equipment into compliance with these diesel vehicle emissions controls 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 also not be grounds for a claim.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists, he/she will notify the Contractor in writing, and direct the Contractor to correct the deficiency within a specified time period. The specified time-period, which begins upon Contractor notification, will be from 1/2 hour to 24 hours long, based on the urgency of the situation and the nature of the deficiency. The Engineer shall be the sole judge regarding the time period.

The deficiency will be based on lack of repair, maintenance and diesel vehicle emissions control.

If the Contractor fails to correct the deficiency within the specified time frame, 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.

If a Contractor or subcontractor accumulates three environmental deficiency deductions 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 contract time, waiver of penalties, or be grounds for any claim.

## **CONSTRUCTION AIR QUALITY - IDLING RESTRICTIONS (BDE)**

Effective: April 1, 2009

Idling Restrictions. The Contractor shall establish truck-staging areas for all diesel powered vehicles that are waiting to load or unload material at the jobsite. Staging areas shall be located where the diesel emissions from the equipment will have a minimum impact on adjacent sensitive receptors. The Department will review the selection of staging areas, whether within or outside the existing highway right-of-way, to avoid locations near sensitive areas or populations to the extent possible. Sensitive receptors include, but are not limited to, hospitals, schools, residences, motels, hotels, daycare facilities, elderly housing and convalescent facilities. Diesel powered engines shall also be located as far away as possible from fresh air intakes, air conditioners, and windows. The Engineer will approve staging areas before implementation.

Diesel powered vehicle operators may not cause or allow the motor vehicle, when it is not in motion, to idle for more than a total of 10 minutes within any 60 minute period, except under any of the following circumstances:

- 1) The motor vehicle has a gross vehicle weight rating of less than 8000 lb (3630 kg).
- 2) The motor vehicle idles while forced to remain motionless because of on-highway traffic, an official traffic control device or signal, or at the direction of a law enforcement official.
- 3) The motor vehicle idles when operating defrosters, heaters, air conditioners, or other equipment solely to prevent a safety or health emergency.
- 4) A police, fire, ambulance, public safety, other emergency or law enforcement motor vehicle, or any motor vehicle used in an emergency capacity, idles while in an emergency or training mode and not for the convenience of the vehicle operator.
- 5) The primary propulsion engine idles for maintenance, servicing, repairing, or diagnostic purposes if idling is necessary for such activity.
- 6) A motor vehicle idles as part of a government inspection to verify that all equipment is in good working order, provided idling is required as part of the inspection.
- 7) When idling of the motor vehicle is required to operate auxiliary equipment to accomplish the intended use of the vehicle (such as loading, unloading, mixing, or processing cargo; controlling cargo temperature; construction operations, lumbering operations; oil or gas well servicing; or farming operations), provided that this exemption does not apply when the vehicle is idling solely for cabin comfort or to operate non-essential equipment such as air conditioning, heating, microwave ovens, or televisions.
- 8) When the motor vehicle idles due to mechanical difficulties over which the operator has no control.
- 9) The outdoor temperature is less than 32 °F (0 °C) or greater than 80 °F (26 °C).

When the outdoor temperature is greater than or equal to 32 °F (0 °C) or less than or equal to 80 °F (26 °C), a person who operates a motor vehicle operating on diesel fuel shall not cause or allow the motor vehicle to idle for a period greater than 30 minutes in any 60 minute period while waiting to weigh, load, or unload cargo or freight, unless the vehicle is in a line of vehicles that regularly and periodically moves forward.

The above requirements do not prohibit the operation of an auxiliary power unit or generator set as an alternative to idling the main engine of a motor vehicle operating on diesel fuel.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists based on non-compliance with the idling restrictions, he/she will notify the Contractor, and direct the Contractor to correct the deficiency.

If the Contractor fails to correct the deficiency a monetary deduction will be imposed. The monetary deduction will be \$1,000.00 for each deficiency identified.

### **DIGITAL TERRAIN MODELING FOR EARTHWORK CALCULATIONS (BDE)**

Effective: April 1, 2007

Revise the first and second paragraphs of Article 202.07(b) of the Standard Specifications to read:

“(b) Measured Quantities. Earth and rock excavation will be measured in cubic yards (cubic meters) in their original positions. The volumes will be computed by the method of average end areas using before and after cross sections; or by the method of digital terrain modeling using before and after total station surveys. The volume of any unstable or unsuitable material removed will be measured for payment in cubic yards (cubic meters).

In rock excavation, the Contractor shall strip ledge rock of overburden so that necessary survey shots for measurement may be taken. Vertical measurements shall extend from the surface of the rock to an elevation not more than 6 in. (150 mm) below the subgrade of the proposed pavement structure, as shown on the plans, or to the bottom of the rock where that point is above the subgrade of the proposed pavement structure. Horizontal measurements shall extend not more than 6 in. (150 mm) beyond the slope lines fixed by the Engineer for the work. Boulders and rocks 1/2 cu yd (0.5 cu m) or more in volume will be measured individually and the volume computed from average dimensions taken in three directions.”

Revise the first paragraph of Article 204.07 of the Standard Specifications to read.

“**204.07 Method of Measurement.** Borrow excavation will be measured in cubic yards (cubic meters) in its original position. The volume will be computed by the method of average end areas using before and after cross sections; or by the method of digital terrain modeling using before and after total station surveys.”

Revise the embankment definition of Article 204.07(b) of the Standard Specifications to read:

“Embankment = the volume of fill in its final position computed by the method of average end areas or digital terrain modeling. Both methods will be based upon the existing ground line as shown on the plans, except as noted in (1) and (2) below;”

Revise Article 207.04 of the Standard Specifications to read:

**“207.04 Method of Measurement.** This work will be measured for payment in tons (metric tons) according to Article 311.08(b), or in cubic yards (cubic meters) compacted in place and the volume computed by the method of average end areas or digital terrain modeling by total station measurement.”

Revise the second sentence of the second paragraph of Article 211.07(b) of the Standard Specifications to read:

“The volume will be computed by the method of average end areas or digital terrain modeling by total station measurement.”

### **DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (DBE)**

Effective: September 1, 2000

Revised: August 2, 2011

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.

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 **12.00%** 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 [www.dot.il.gov](http://www.dot.il.gov).

BIDDING PROCEDURES. Compliance with this Special Provision is a material bidding requirement. The failure of the bidder to comply will render the bid not responsive.

- (a) The bidder shall submit a Disadvantaged Business Utilization Plan on Department forms SBE 2025 and 2026 with the bid.
- (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 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 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 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.

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 performance 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.
- (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.
- (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 and/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 consideration, 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 regular dealer or 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 Participation 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) TERMINATION OR REPLACEMENT. 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 the Special Provision.
- (c) 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, 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.
- (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 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 1,200 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 contractor 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.

- (f) PAYMENT RECORDS. The Contractor shall maintain a record of payments for work performed to the DBE participants. The records shall be made available to the Department for inspection upon request. 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 Regional 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 BDE 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.

### **ERRATA FOR THE 2012 STANDARD SPECIFICATIONS (BDE)**

Effective: April 1, 2012

Revised: August 1, 2012

- Page 182 Article 354.12. In the second line of the first paragraph change "Article 353.12" to "Article 353.13".
- Page 183 Article 355.10. In the second line of the first paragraph change "Article 353.12" to "Article 353.13".
- Page 185 Article 356.10. In the second line of the first paragraph change "Article 353.12" to "Article 353.13".
- Page 337 Article 505.04. Revise the subparagraph "(i) Match Making." to "(i) Match Marking.".
- Page 360 Article 506.07. In the first line of the second paragraph change "AASHTO/AWS D1.5/D1.5." to "AASHTO/AWS D1.5M/D1.5.".
- Page 361 Article 506.08. In the third line of the sixth paragraph change "506.08(a)" to "506.08(b)".
- Page 531 Article 609.07. In the first paragraph delete "TYPE B, C, or D INLET BOX STANDARD 609001 or".
- Page 601 Article 701.18(h). In the first line of the first paragraph change "Standard 701426." to "Standard 701426 and 701427.".
- Page 609 Article 703.05. In the first line of the second paragraph delete "or Type II".
- Page 989 Article 1083.02(a). In the seventh line of the first paragraph change "Table 14.7.5.2-2" to "Table 14.7.5.2-1".
- Page 1019 Article 1095.01(b)(1)e. In the table for daylight reflectance for the color yellow, change "75 % min." to "45 % min.".

**FLAGGER AT SIDE ROADS AND ENTRANCES (BDE)**

Effective: April 1, 2009

Revise the second paragraph of Article 701.13(a) of the Standard Specifications to read:

“The Engineer will determine when a side road or entrance shall be closed to traffic. A flagger will be required at each side road or entrance remaining open to traffic within the operation where two-way traffic is maintained on one lane of pavement. The flagger shall be positioned as shown on the plans or as directed by the Engineer.”

Revise the first and second paragraph of Article 701.20(i) of the Standard Specifications to read:

“Signs, barricades, or other traffic control devices required by the Engineer over and above those specified will be paid for according to Article 109.04. All flaggers required at side roads and entrances remaining open to traffic including those that are shown on the Highway Standards and/or additional barricades required by the Engineer to close side roads and entrances will be paid for according to Article 109.04.”

**FRICITION AGGREGATE (BDE)**

Effective: January 1, 2011

Revise Article 1004.01(a)(4) of the Standard Specifications to read:

“(4)Crushed Stone. Crushed stone shall be the angular fragments resulting from crushing undisturbed, consolidated deposits of rock by mechanical means. Crushed stone shall be divided into the following, when specified.

- a. Carbonate Crushed Stone. Carbonate crushed stone shall be either dolomite or limestone. Dolomite shall contain 11.0 percent or more magnesium oxide (MgO). Limestone shall contain less than 11.0 percent magnesium oxide (MgO).
- b. Crystalline Crushed Stone. Crystalline crushed stone shall be either metamorphic or igneous stone, including but is not limited to, quartzite, granite, rhyolite and diabase.”

Revise Article 1004.03(a) of the Standard Specifications to read:

“**1004.03 Coarse Aggregate for Hot-Mix Asphalt (HMA).** The aggregate shall be according to Article 1004.01 and the following.

- (a) Description. The coarse aggregate for HMA shall be according to the following table.

FAI Routes 74 & 155 (I-74 & I-155)  
 Project ACIM-ACBRI-000S(907)  
 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620

| Use                          | Mixture  | Aggregates Allowed   |                 |                |               |          |
|------------------------------|--|--|-----------------|----------------|---------------|----------|
| Class A                      | Seal or Cover  | <u>Allowed Alone or in Combination:</u><br>Gravel<br>Crushed Gravel<br>Carbonate Crushed Stone<br>Crystalline Crushed Stone<br>Crushed Sandstone<br>Crushed Slag (ACBF)<br>Crushed Steel Slag<br>Crushed Concrete  |                 |                |               |          |
| HMA<br>All Other             | Stabilized Subbase<br>or Shoulders   | <u>Allowed Alone or in Combination:</u><br>Gravel<br>Crushed Gravel<br>Carbonate Crushed Stone<br>Crystalline Crushed Stone<br>Crushed Sandstone<br>Crushed Slag (ACBF)<br>Crushed Steel Slag <sup>1/</sup><br>Crushed Concrete  |                 |                |               |          |
| HMA<br>High ESAL<br>Low ESAL | Binder<br>IL-25.0, IL-19.0,<br>or IL-19.0L<br><br>SMA Binder                                       | <u>Allowed Alone or in Combination:</u><br>Crushed Gravel<br>Carbonate Crushed Stone <sup>2/</sup><br>Crystalline Crushed Stone<br>Crushed Sandstone<br>Crushed Slag (ACBF)<br>Crushed Concrete <sup>3/</sup>  |                 |                |               |          |
| HMA<br>High ESAL<br>Low ESAL | C Surface and<br>Leveling Binder<br>IL-12.5,IL-9.5,<br>or IL-9.5L<br><br>SMA<br>Ndesign 50 Surface | <u>Allowed Alone or in Combination:</u><br>Crushed Gravel<br>Carbonate Crushed Stone <sup>2/</sup><br>Crystalline Crushed Stone<br>Crushed Sandstone<br>Crushed Slag (ACBF)<br>Crushed Steel Slag <sup>4/</sup><br>Crushed Concrete <sup>3/</sup>  |                 |                |               |          |
| HMA<br>High ESAL             | D Surface and<br>Leveling Binder<br>IL-12.5 or<br>IL-9.5<br><br>SMA<br>Ndesign 50<br>Surface       | <u>Allowed Alone or in Combination:</u><br>Crushed Gravel<br>Carbonate Crushed Stone (other than<br>Limestone) <sup>2/</sup><br>Crystalline Crushed Stone<br>Crushed Sandstone<br>Crushed Slag (ACBF) <sup>5/</sup><br>Crushed Steel Slag <sup>4/ 5/</sup><br>Crushed Concrete <sup>3/</sup> |                 |                |               |          |
|                              |  | <u>Other Combinations Allowed:</u>   |                 |                |               |          |
|                              |  | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"><i>Up to...</i></td> <td style="width: 50%;"><i>With...</i></td> </tr> <tr> <td>25% Limestone</td> <td>Dolomite</td> </tr> </table>  | <i>Up to...</i> | <i>With...</i> | 25% Limestone | Dolomite |
| <i>Up to...</i>              | <i>With...</i>   |  |                 |                |               |          |
| 25% Limestone                | Dolomite   |  |                 |                |               |          |

FAI Routes 74 & 155 (I-74 & I-155)  
 Project ACIM-ACBRI-000S(907)  
 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620

| Use              | Mixture   | Aggregates Allowed  |   |
|------------------|---|---|---|
|                  |   | 50% Limestone   | Any Mixture D aggregate other than Dolomite   |
|                  |   | 75% Limestone   | Crushed Slag (ACBF) <sup>5/</sup> or Crushed Sandstone  |
| HMA<br>High ESAL | E Surface<br>IL-12.5 or<br>IL-9.5<br><br>SMA<br>Ndesign 80<br>Surface | <u>Allowed Alone or in Combination:</u><br>Crushed Gravel<br>Crystalline Crushed Stone<br>Crushed Sandstone<br>Crushed Slag (ACBF) <sup>5/</sup><br>Crushed Steel Slag <sup>5/</sup><br>Crushed Concrete <sup>3/</sup><br><br>No Limestone. |   |
|                  |   | <u>Other Combinations Allowed:</u>  |   |
|                  |   | <i>Up to...</i>   | <i>With...</i>  |
|                  |   | 50% Dolomite <sup>2/</sup>  | Any Mixture E aggregate   |
|                  |   | 75% Dolomite <sup>2/</sup>  | Crushed Sandstone,<br>Crushed Slag (ACBF) <sup>5/</sup> ,<br>Crushed Steel Slag <sup>5/</sup> , or<br>Crystalline Crushed Stone |
|                  |   | 75% Crushed Gravel or<br>Crushed Concrete <sup>3/</sup>   | Crushed Sandstone,<br>Crystalline Crushed Stone,<br>Crushed Slag (ACBF) <sup>5/</sup> , or<br>Crushed Steel Slag <sup>5/</sup>  |
| HMA<br>High ESAL | F Surface<br>IL-12.5 or<br>IL-9.5<br><br>SMA<br>Ndesign 80<br>Surface | <u>Allowed Alone or in Combination:</u><br>Crystalline Crushed Stone<br>Crushed Sandstone<br>Crushed Slag (ACBF) <sup>5/</sup><br>Crushed Steel Slag <sup>5/</sup><br>No Limestone.   |   |
|                  |   | <u>Other Combinations Allowed:</u>  |   |
|                  |   | <i>Up to...</i>   | <i>With...</i>  |
|                  |   | 50% Crushed Gravel, Crushed Concrete <sup>3/</sup> , or Dolomite <sup>2/</sup>  | Crushed Sandstone,<br>Crushed Slag (ACBF) <sup>5/</sup> ,<br>Crushed Steel Slag <sup>5/</sup> , or<br>Crystalline Crushed Stone |
|                  |   |   |   |
|                  |   |   |   |

- 1/ Crushed steel slag allowed in shoulder surface only.
- 2/ Carbonate crushed stone shall not be used in SMA Ndesign 80. In SMA Ndesign 50, carbonate crushed stone shall not be blended with any of the other aggregates allowed alone in Ndesign 50 SMA binder or Ndesign 50 SMA surface.
- 3/ Crushed concrete will not be permitted in SMA mixes.
- 4/ Crushed steel slag shall not be used as leveling binder.
- 5/ When either slag is used, the blend percentages listed shall be by volume."

**HOT-MIX ASPHALT - DENSITY TESTING OF LONGITUDINAL JOINTS (BDE)**

Effective: January 1, 2010

Revised: April 1, 2012

Description. This work shall consist of testing the density of longitudinal joints as part of the quality control/quality assurance (QC/QA) of hot-mix asphalt (HMA). Work shall be according to Section 1030 of the Standard Specifications except as follows.

Quality Control/Quality Assurance (QC/QA). Delete the second and third sentence of the third paragraph of Article 1030.05(d)(3) of the Standard Specifications.

Add the following paragraphs to the end of Article 1030.05(d)(3) of the Standard Specifications:

“Longitudinal joint density testing shall be performed at each random density test location. Longitudinal joint testing shall be located at a distance equal to the lift thickness or a minimum of 4 in. (100 mm), from each pavement edge. (i.e. for a 5 in. (125 mm) lift the near edge of the density gauge or core barrel shall be within 5 in. (125 mm) from the edge of pavement.) Longitudinal joint density testing shall be performed using either a correlated nuclear gauge or cores.

- a. Confined Edge. Each confined edge density shall be represented by a one-minute nuclear density reading or a core density and shall be included in the average of density readings or core densities taken across the mat which represents the Individual Test.
- b. Unconfined Edge. Each unconfined edge joint density shall be represented by an average of three one-minute density readings or a single core density at the given density test location and shall meet the density requirements specified herein. The three one-minute readings shall be spaced ten feet apart longitudinally along the unconfined pavement edge and centered at the random density test location.”

Revise the Density Control Limits table in Article 1030.05(d)(4) of the Standard Specifications to read:

| “Mixture Composition       | Parameter         | Individual Test<br>(includes confined edges) | Unconfined Edge<br>Joint Density Minimum |
|----------------------------|-------------------|--|--|
| IL-4.75                    | Ndesign = 50      | 93.0 – 97.4%                                 | 91.0%                                    |
| IL-9.5, IL-12.5            | Ndesign ≥ 90      | 92.0 – 96.0%                                 | 90.0%                                    |
| IL-9.5,IL-9.5L, IL-12.5    | Ndesign < 90      | 92.5 – 97.4%                                 | 90.0%                                    |
| IL-19.0, IL-25.0           | Ndesign ≥ 90      | 93.0 – 96.0%                                 | 90.0%                                    |
| IL-19.0, IL-19.0L, IL-25.0 | Ndesign < 90      | 93.0 – 97.4%                                 | 90.0%                                    |
| SMA                        | Ndesign = 50 & 80 | 93.5 – 97.4%                                 | 91.0%                                    |
| All Other                  | Ndesign = 30      | 93.0 - 97.4%                                 | 90.0%”                                   |

**IMPACT ATTENUATORS (BDE)**

Effective: November 1, 2003

Revised: January 1, 2012

Add the following to the Standard Specifications:

**“SECTION 643. IMPACT ATTENUATORS**

**643.01 Description.** This work shall consist of furnishing and installing impact attenuators.

**643.02 Materials.** Materials shall be according to the impact attenuator manufacturer’s specifications and the following.

| Item   | Article/Section           |
|--|---------------------------|
| (a) Fine Aggregate (Note 1).....                               | 1003.01                   |
| (b) Steel Posts, Structural Shapes, and Plates .....           | 1006.04                   |
| (c) Rail Elements, End Section Plates, and Splice Plates ..... | 1006.25                   |
| (d) Bolts, Nuts, Washers and Hardware .....                    | 1006.25                   |
| (e) Hollow Structural Tubing .....                             | 1006.27(b)                |
| (f) Wood Posts and Wood Blockouts .....                        | 1007.01, 1007.02, 1007.06 |
| (g) Preservative Treatment.....                                | 1007.12                   |

Note 1. Fine aggregate shall be FA 1 or FA 2, Class A quality. The sand shall be unbagged and shall have a maximum moisture content of five percent.

**CONSTRUCTION REQUIREMENTS**

**643.03 General.** Impact attenuators shall meet the testing criteria contained in either NCHRP Report 350 or MASH and shall be on the Department’s approved list. Fully redirective and partially redirective attenuators shall be designed for bi-directional impacts.

**643.04 Installation.** Impact attenuators shall be installed according to the manufacturer’s specifications and include all necessary transitions between the impact attenuator and the item to which it is attached. Regrading of slopes or approaches for the installation shall be as shown on the plans.

The design for sand module impact attenuators (orientation and number of modules, sand weights, etc.) shall be as shown on the plans. Bases for sand module impact attenuators will be required. The bases shall be constructed of either portland cement concrete or hot-mix asphalt (HMA). Portland cement concrete bases shall be 6 in. (150 mm) thick and be according to the applicable requirements of Section 424. HMA bases shall be 8 in. (200 mm) thick and be according to the applicable requirements of Section 408. The surface of the base shall be slightly sloped or crowned to facilitate drainage. The perimeter of each module and the specified weight (mass) of sand in each module shall be painted on the surface of the base.

Bases for impact attenuators, other than sand modules, shall be installed when required by the manufacturer. The bases shall be constructed according to the manufacturer’s specifications, on a prepared subgrade. The surface of the base shall be slightly sloped or crowned to facilitate drainage.

**643.05 Method of Measurement.** This work will be measured for payment as each, where each is defined as one complete installation.

Contract quantities for sand module attenuator bases may be accepted according to Article 202.07(a). When measured, sand module attenuator bases will be measured in place and the dimensions used to calculate square yards (square meters) will not exceed those as shown on the plans.

**643.06 Basis of Payment.** This work will be paid for at the contract unit price per each for IMPACT ATTENUATORS (FULLY REDIRECTIVE, NARROW); IMPACT ATTENUATORS (FULLY REDIRECTIVE, WIDE); IMPACT ATTENUATORS (FULLY REDIRECTIVE, RESETTABLE); IMPACT ATTENUATORS (SEVERE USE, NARROW); IMPACT ATTENUATORS (SEVERE USE, WIDE); IMPACT ATTENUATORS (PARTIALLY REDIRECTIVE); or IMPACT ATTENUATORS (NON-REDIRECTIVE), of the test level specified.

Sand module impact attenuator bases will be paid for at the contract unit price per square yard (square meter) for ATTENUATOR BASE.

Regrading of slopes or approaches will be paid for according to Section 202 and/or Section 204 of the Standard Specifications.”

**IMPACT ATTENUATORS, TEMPORARY (BDE)**

Effective: November 1, 2003

Revised: January 1, 2012

Description. This work shall consist of furnishing, installing, maintaining, and removing temporary impact attenuators of the category and test level specified.

Materials. Materials shall be according to the impact attenuator manufacturer’s specifications and the following:

| Item   | Article/Section           |
|--|---------------------------|
| (a) Fine Aggregate (Note 1).....                               | 1003.01                   |
| (b) Steel Posts, Structural Shapes, and Plates .....           | 1006.04                   |
| (c) Rail Elements, End Section Plates, and Splice Plates ..... | 1006.25                   |
| (d) Bolts, Nuts, Washers and Hardware .....                    | 1006.25                   |
| (e) Hollow Structural Tubing .....                             | 1006.27(b)                |
| (f) Wood Posts and Wood Blockouts .....                        | 1007.01, 1007.02, 1007.06 |
| (g) Preservative Treatment.....                                | 1007.12                   |
| (h) Packaged Rapid Hardening Mortar .....                      | 1018.01                   |

Note 1. Fine aggregate shall be FA 1 or FA 2, Class A quality. The sand shall be unbagged and shall have a maximum moisture content of five percent.

CONSTRUCTION REQUIREMENTS

General. Impact Attenuators shall meet the testing criteria contained in either the National Cooperative Highway Research Program (NCHRP) Report 350 or MASH and shall be on the Department’s approved list.

Installation. Impact attenuators shall be installed according to the manufacturer's specifications and include all necessary transitions between the impact attenuator and the item to which it is attached. Regrading of slopes or approaches for the installation shall be as shown on the plans.

Attenuator bases, when required by the manufacturer, shall be constructed on a prepared subgrade according to the manufacturer's specifications. The surface of the base shall be slightly sloped or crowned to facilitate drainage.

When water filled attenuators are used between November 1 and April 15, they shall contain anti-freeze according to the manufacturer's recommendations.

Markings. Sand module impact attenuators shall be striped with alternating reflectorized Type AA or Type AP fluorescent orange and reflectorized white horizontal, circumferential stripes. There shall be at least two of each stripe on each module.

Other types of impact attenuators shall have a terminal marker applied to their nose and reflectors along their sides.

Maintenance. All maintenance of the impact attenuators shall be the responsibility of the Contractor until removal is directed by the Engineer.

Relocate. When relocation of temporary impact attenuators is specified, they shall be removed, relocated and reinstalled at the new location. The reinstallation requirements shall be the same as those for a new installation.

Removal. When the Engineer determines the temporary impact attenuators are no longer required, the installation shall be dismantled with all hardware becoming the property of the Contractor.

Surplus material shall be disposed of according to Article 202.03. Anti-freeze, when present, shall be disposed of/recycled according to local ordinances.

When impact attenuators have been anchored to the pavement, the anchor holes shall be repaired with rapid set mortar; only enough water to permit placement and consolidation by rodding shall be used and the material shall be struck-off flush.

Method of Measurement. This work will be measured for payment as each, where each is defined as one complete installation.

Basis of Payment. This work will be paid for at the contract unit price per each for IMPACT ATTENUATORS, TEMPORARY (FULLY REDIRECTIVE, NARROW); IMPACT ATTENUATORS, TEMPORARY (FULLY REDIRECTIVE, WIDE); IMPACT ATTENUATORS, TEMPORARY (FULLY REDIRECTIVE, RESETTABLE); IMPACT ATTENUATORS, TEMPORARY (SEVERE USE, NARROW); IMPACT ATTENUATORS, TEMPORARY (SEVERE USE, WIDE); or IMPACT ATTENUATORS, TEMPORARY (NON-REDIRECTIVE) of the test level specified.

Relocation of the devices will be paid for at the contract unit price per each for IMPACT ATTENUATORS, RELOCATE (FULLY REDIRECTIVE); IMPACT ATTENUATORS, RELOCATE (SEVERE USE); or IMPACT ATTENUATORS, RELOCATE (NON-REDIRECTIVE); of the test level specified.

Regrading of slopes or approaches will be paid for according to Section 202 and/or Section 204 of the Standard Specifications.

**METAL HARDWARE CAST INTO CONCRETE (BDE)**

Effective: April 1, 2008

Revised: January 1, 2012

Add the following to Article 503.02 of the Standard Specifications:

“(h) Metal Hardware Cast into Concrete ..... 1006.13”

Add the following to Article 504.02 of the Standard Specifications:

“(j) Metal Hardware Cast into Concrete ..... 1006.13”

Revise Article 1006.13 of the Standard Specifications to read:

“**1006.13 Metal Hardware Cast into Concrete.** Unless otherwise noted, all steel hardware cast into concrete, such as inserts, brackets, cable clamps, metal casings for formed holes, and other miscellaneous items, shall be galvanized according to AASHTO M 232 or AASHTO M 111. Aluminum inserts will not be allowed. Zinc alloy inserts shall be according to ASTM B 86, Alloys 3, 5, or 7.

When stainless steel junction boxes or other stainless steel appurtenances are specified, Type 304 stainless steel hardware shall be used when cast into concrete.

The inserts shall be UNC threaded type anchorages having the following minimum certified proof load.

| Insert Diameter | Proof Load         |
|-----------------|--------------------|
| 5/8 in. (16 mm) | 6600 lb (29.4 kN)  |
| 3/4 in. (19 mm) | 6600 lb (29.4 kN)  |
| 1 in. (25 mm)   | 9240 lb (41.1 kN)” |

**MODIFIED URETHANE PAVEMENT MARKING (BDE)**

Effective: April 1, 2012

Add the following to Article 780.02 of the Standard Specifications:

“(h) Modified Urethane Pavement Marking ..... 1095.09”

Add the following to Article 780.03 of the Standard Specifications:

“(e) Modified Urethane ..... 1105.04”

Revise Article 780.11 of the Standard Specifications to read:

“**780.11 Modified Urethane.** The pavement shall be cleaned of all dirt, grease, glaze, or any other material that would reduce the adhesion of the markings with minimum or no damage to the pavement. New PCC pavements shall be blast-cleaned to remove all curing compounds. New asphalt and seal coated shall be in place a minimum of two weeks prior to marking applications.

Markings shall be applied on the same calendar day that the pavement surface is cleaned. If this cannot be accomplished, the surface shall be re-cleaned prior to applying the markings. Existing pavement markings shall be at least 90 percent removed. No markings shall be applied until the Engineer approves the cleaning.

Widths, lengths, and shapes of the cleaned surface shall be prepared wider than the modified urethane pavement marking material to be applied, such that a prepared area is on all sides of the urethane pavement marking material after application.

The Contractor shall notify the Engineer 72 hours prior to the placement of the markings in order than an inspector can be present during the operation. At the time of this notification, the Contractor shall indicate the manufacturer and lot numbers of urethane and reflective media that will be used. The Engineer will ensure that the approved lot numbers appear on the material package.

The pavement markings shall be applied during conditions of dry weather and subsequently dry pavement surfaces at a minimum uniform wet thickness of 25 mils (0.64 mm) according to the manufacturer’s installation instructions. The application and combination of reflective media (glass beads and/or reflective elements) shall be applied at a rate specified by the manufacturer. At the time of installation the pavement surface temperature shall be 40 °F (5 °C) and rising and the ambient temperature shall be 35 °F (2 °C) and rising. The pavement surface temperature and the ambient temperatures shall be determined and documented before the start of each of marking operation. The pavement markings shall not be applied if the pavement shows any visible signs of moisture or it is anticipated that moisture, such as rain showers, may occur during the installation and curing periods.”

Revise Article 780.12 of the Standard Specifications to read:

“**780.12 Inspection.** The epoxy, thermoplastic, preformed thermoplastic, preformed plastic Type B or C, polyurea, and modified urethane pavement markings will be inspected following installation, but no later than October 15 for preformed plastic markings, November 1 for thermoplastic and preformed thermoplastic markings, and December 15 for epoxy, polyurea, and modified urethane markings. In addition, they will be inspected following a winter performance period that extends 180 days from November 1.

Within 15 calendar days after the end of the winter performance period, a final performance inspection will be made. Final acceptance requirements are as follows.

- (a) Lane lines: 90 percent intact by area of each individual dashed line segment.
- (b) Crosswalks, stop lines, arrows, and words: 90 percent intact by area of each individual line, symbol, or letter.
- (c) Center lines, edge lines, gore markings, and channelizing lines: 90 percent intact by area measured over any 10 ft (3 m) length of any individual line regardless of width.
- (d) Entire project: measured in its entirety according to (a), (b), and (c) above, the entire project shall be 95 percent intact.

Upon completion of the final performance inspection, or after satisfactory completion of any necessary correction, the Engineer will notify the Contractor, in writing, of the date of such final performance inspection and release him/her from further performance responsibility.

If this inspection discloses any work, in whole or in part, which does not meet the inspection requirements, the Contractor shall, within 30 calendar days, completely repair or replace such work to the satisfaction of the Engineer.

This performance inspection and performance acceptance of the epoxy, thermoplastic, preformed thermoplastic, preformed plastic Type B and C pavement, polyurea, and modified urethane markings shall not delay acceptance of the entire project and final payment due if the Contractor requires and receives from the subcontractor a third party "performance" bond naming the Department as obligee in the full amount of all pavement marking quantities listed in the contract, multiplied by the contract unit price. The bond shall be executed prior to acceptance and final payment of the non-pavement marking items and shall be in full force and effect until final performance inspection and performance acceptance of the epoxy, thermoplastic, preformed thermoplastic, preformed plastic, polyurea, and modified urethane pavement markings. Execution of the third party bond shall be the option of the Contractor."

Revise Article 780.13 of the Standard Specifications to read:

**"780.13 Method of Measurement.** This work will be measured for payment as follows.

- (a) Contract Quantities. The requirements for the use of contract quantities shall be according to Article 202.07(a).
- (b) Measured Quantities. Lines will be measured for payment in place in feet (meters). Double yellow lines will be measured as two separate lines.

Words and symbols shall conform to the sizes and dimensions specified in the Illinois Manual on Uniform Traffic Control Devices and Standard 780001 and will be measured based on the total areas indicated in Table 1 or as specified in the plans.

Removal of existing pavement markings will be measured for payment according to Article 783.05."

Add the following to Section 780 of the Standard Specifications:

**“780.14 Basis of Payment.** This work will be paid for at the contract unit prices per foot (meter) of applied line width, as specified, for THERMOPLASTIC PAVEMENT MARKING - LINE; PAINT PAVEMENT MARKING - LINE; EPOXY PAVEMENT MARKING - LINE; PREFORMED PLASTIC PAVEMENT MARKING - LINE - TYPE B, C, or B - INLAID; PREFORMED THERMOPLASTIC PAVEMENT MARKING - LINE; POLYUREA PAVEMENT MARKING TYPE I - LINE; POLYUREA PAVEMENT MARKING TYPE II - LINE; MODIFIED URETHANE PAVEMENT MARKING - LINE; and/or per square foot (square meter) for THERMOPLASTIC PAVEMENT MARKING - LETTERS AND SYMBOLS; PAINT PAVEMENT MARKING - LETTERS AND SYMBOLS; EPOXY PAVEMENT MARKING - LETTERS AND SYMBOLS; PREFORMED PLASTIC PAVEMENT MARKING - TYPE B, C, or B - INLAID - LETTERS AND SYMBOLS; PREFORMED THERMOPLASTIC PAVEMENT MARKING - LETTERS AND SYMBOLS; MODIFIED URETHANE PAVEMENT MARKING - LETTERS AND SYMBOLS.

When the Contractor has the option of applying Permanent Pavement Marking it shall be Thermoplastic, Preformed Plastic (Type B, C, or B - Inlaid), Epoxy, Preformed Thermoplastic, Polyurea, or Modified Urethane Pavement Markings. It will be paid for at the contract unit price per foot (meter) of applied line for PERMANENT PAVEMENT MARKING - LINE 4 (100), 5 (125), 6 (150), 8 (200), 12 (300), 16 (400), or 24 in. (600 mm) and per square foot (square meter) for PERMANENT PAVEMENT MARKING - LETTERS AND SYMBOLS.

Temporary pavement markings placed in lieu of permanent will be paid for according to Article 703.07.

Removal of existing pavement markings will be paid for according to Article 783.06.

\*TABLE 1

LETTERS  
 sq ft (sq m)

| Size            | A             | B             | C             | D             | E             | F             | G             | H             | I             |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 6 ft<br>(1.8 m) | 3.1<br>(0.28) | 4.0<br>(0.37) | 2.7<br>(0.25) | 3.4<br>(0.31) | 3.3<br>(0.31) | 2.6<br>(0.24) | 3.3<br>(0.31) | 3.4<br>(0.31) | 1.5<br>(0.14) |
| 8 ft<br>(2.4 m) | 5.5<br>(0.51) | 7.1<br>(0.66) | 4.8<br>(0.45) | 6.1<br>(0.57) | 5.9<br>(0.55) | 4.7<br>(0.44) | 5.8<br>(0.54) | 6.0<br>(0.56) | 2.6<br>(0.24) |

| Size            | J             | K             | L             | M             | N             | O             | P             | Q             | R             |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 6 ft<br>(1.8 m) | 2.1<br>(0.2)  | 3.1<br>(0.28) | 2.2<br>(0.20) | 4.2<br>(0.39) | 4.0<br>(0.37) | 3.4<br>(0.31) | 3.0<br>(0.28) | 3.6<br>(0.33) | 3.6<br>(0.33) |
| 8 ft<br>(2.4 m) | 3.7<br>(0.34) | 5.7<br>(0.53) | 3.8<br>(0.45) | 7.4<br>(0.69) | 7.1<br>(0.65) | 6.0<br>(0.56) | 5.3<br>(0.49) | 6.3<br>(0.59) | 6.3<br>(0.59) |

| Size            | S             | T             | U             | V             | W             | X             | Y             | Z             |
|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 6 ft<br>(1.8 m) | 3.2<br>(0.30) | 2.2<br>(0.20) | 3.2<br>(0.30) | 2.7<br>(0.25) | 4.2<br>(0.39) | 2.7<br>(0.25) | 2.2<br>(0.20) | 2.9<br>(0.26) |
| 8 ft<br>(2.4 m) | 5.7<br>(0.53) | 3.8<br>(0.35) | 5.6<br>(0.52) | 4.8<br>(0.45) | 7.3<br>(0.68) | 4.8<br>(0.45) | 3.9<br>(0.36) | 5.1<br>(0.47) |

NUMBERS  
 sq ft (sq m)

| Size            | 1             | 2             | 3             | 4             | 5             |
|-----------------|---------------|---------------|---------------|---------------|---------------|
| 6 ft<br>(1.8 m) | 1.5<br>(0.14) | 3.3<br>(0.31) | 3.3<br>(0.31) | 2.9<br>(0.26) | 3.5<br>(0.33) |
| 8 ft<br>(2.4 m) | 2.6<br>(0.24) | 5.8<br>(0.54) | 5.8<br>(0.54) | 5.1<br>(0.47) | 6.1<br>(0.57) |

| Size            | 6             | 7             | 8             | 9             | 0             |
|-----------------|---------------|---------------|---------------|---------------|---------------|
| 6 ft<br>(1.8 m) | 3.5<br>(0.33) | 2.2<br>(0.20) | 3.8<br>(0.35) | 3.5<br>(0.33) | 3.4<br>(0.31) |
| 8 ft<br>(2.4 m) | 6.2<br>(0.58) | 3.8<br>(0.35) | 6.7<br>(0.62) | 6.2<br>(0.58) | 6.0<br>(0.56) |

SYMBOLS

| Symbol   | Large Size<br>sq ft (sq m) | Small Size<br>sq ft (sq m) |
|--|----------------------------|----------------------------|
| Through Arrow                                      | 11.5 (1.07)                | 6.5 (0.60)                 |
| Left or Right Arrow                                | 15.6 (1.47)                | 8.8 (0.82)                 |
| 2 Arrow Combination<br>Left (or Right) and Through | 26.0 (2.42)                | 14.7 (1.37)                |
| 3 Arrow Combination<br>Left, Right, and Through    | 38.4 (3.56)                | 20.9 (1.94)                |
| Lane Drop Arrow                                    | 41.5 (3.86)                | --                         |
| Wrong Way Arrow                                    | 24.3 (2.26)                | --                         |
| Railroad "R" 6 ft (1.8 m)                          | 3.6 (0.33)                 | --                         |
| Railroad "X" 20 ft (6.1 m)                         | 54.0 (5.02)                | --                         |
| Handicapped Symbol                                 | 4.6 (0.43)                 | --                         |

\*Table applies to all types of pavement marking materials.”

Add the following Section to Section 1095 of the Standard Specifications:

**“1095.09 Modified Urethane Pavement Marking.** The modified urethane pavement marking material shall consist of a homogenous blend of modified urethane resins and pigments designed to provide a simple volumetric mixing ratio of two components (must be two volumes of Part A to one volume of Part B). No volatile solvent or fillers will be allowed.

- (a) Pigmentation. The pigment content by weight (mass) of Part A shall be determined by low temperature ashing according to ASTM D 3723. The pigment content shall not vary more than ± two percent from the pigment content of the original qualified paint.

White pigment shall be Titanium Dioxide meeting ASTM D 476 Type II, Rutile.

Yellow pigment shall be Organic Yellow containing no heavy metals.

- (b) Environmental. Upon heating to application temperature, the material shall not exude fumes which are toxic or injurious persons or property when handled according to manufacturer specifications. The modified urethane pavement marking material compositions shall not contain free isocyanate functionality.

- (c) Daylight Reflectance. The daylight directional reflectance of the cured modified urethane material (without reflective media) shall be a minimum of 80 percent (white) and 50 percent (yellow) relative to magnesium oxide when tested using a color spectrophotometer with a 45 degree circumferential / zero degrees geometry, illuminant C, and two degrees observer angle. The color instrument shall measure the visible spectrum from 380 to 720 nm with a wavelength measurement interval and spectral bandpass of 10 nm. In addition, the color of the yellow modified urethane shall visually match Color Number 33538 of Federal Standard 595a with chromaticity limits as follows:

|   |       |       |       |       |
|---|-------|-------|-------|-------|
| x | 0.490 | 0.475 | 0.485 | 0.539 |
| y | 0.470 | 0.438 | 0.425 | 0.456 |

- (d) Weathering Resistance. The modified urethane, when mixed in the proper ratio and applied at 14 to 16 mils (0.35 to 0.41 mm) wet film thickness to an aluminum alloy panel (Federal Test Std. No. 141, Method 2013) and allowed to cure for 72 hours at room temperature, shall be subjected to accelerated weathering for 75 hours. The accelerated weathering shall be completed by using the light and water exposure apparatus (fluorescent UV – condensation type) and tested according to ASTM G 53.

The cycle shall consist of four hours UV exposure at 122 °F (50 °C) and four hours of condensation at 104 °F (40 °C). UVB 313 bulbs shall be used. At the end of the exposure period, the material shall show no substantial change in color or gloss.

- (e) Drying Time. The modified urethane material, when mixed in the proper ratio and applied at 14 to 16 mils (0.35 to 0.41 mm) wet film thickness and with the proper saturation of glass beads, shall exhibit a no-tracking time of four minutes or less when tested according to ASTM D 711.
- (f) Adhesion. The catalyzed modified urethane pavement marking materials when applied to a 4 x 4 x 2 in. (100 x 100 x 50 mm) concrete block shall have a degree of adhesion which results in a 100 percent concrete failure in the performance of this test.

The concrete block shall be brushed on one side and have a minimum strength of 3,500 psi (24,100 kPa). A 2 in. (50 mm) square film of the mixed modified urethane shall be applied to the brushed surface and allowed to cure for 72 hours at room temperature. A 2 in. (50 mm) cube shall be affixed to the surface of the modified urethane by means of an epoxy glue. After the glue has cured for 24 hours, the modified urethane specimen shall be placed on a dynamic testing machine in such a fashion so that the specimen block is in a fixed position and the 2 in. (50 mm) cube (glued to the modified urethane surface) is attached to the dynamometer head. Direct upward pressure shall be slowly applied until the modified urethane system fails. The location of the break and the amount of concrete failure shall be recorded.

- (g) Hardness. The modified urethane marking materials, when tested according to ASTM D 2240, shall have a Shore D Hardness greater than 75. Films shall be cast on a rigid substrate at 14 to 16 mils (0.35 to 0.41 mm) in thickness and allowed to cure at room temperature for 72 hours before testing.
- (h) Abrasion. The abrasion resistance shall be evaluated according to ASTM D 4060 using a Taber Abrader with a 1,000 gram load and CS 17 wheels. The duration of test shall be 1,000 cycles. The loss shall be calculated by difference and be less than 80. The tests shall be run on cured samples of modified urethane material which have been applied at a film thickness of 14 to 16 mils (0.35 to 0.41) to code S-16 stainless steel plates. The films shall be allowed to cure at room temperature for at least 72 hours and not more than 96 hours before testing.
- (i) Tensile. When tested according to ASTM D 638, the modified urethane pavement marking materials shall have an average tensile strength of not less than 6000 psi (41,300 kPa). The Type IV specimens shall be pulled at a rate of 1/4 in. (6.3 mm) per minute by a suitable dynamic testing machine. The samples shall be allowed to cure at 75 °F ± 2 °F (24 °C ± 1 °C) for a minimum of 24 hours and a maximum of 72 hours prior to performing the indicated tests.

- (j) Compressive Strength. When tested according to ASTM D 695, the catalyzed modified urethane pavement marking materials shall have a compressive strength of not less than 12,000 psi (83,000 kPa). The cast sample shall be conditioned at 75 °F ± 2 °F (24 °C ± 1 °C) for a minimum of 72 hours before performing the indicated tests. The rate of compression of these samples shall be no more than 1/4 in. (6.3 mm) per minute.
- (k) Glass Beads. The glass beads shall meet the requirements of Article 1095.04(m) and Article 1095.07 for first drop and second drop glass beads.
- (l) Packaging. The material shall be shipped to the jobsite in substantial containers and shall be plainly marked with the manufacturer's name and address, the name and color of the material, date of manufacture and batch number.
- (m) Verification. Prior to approval and use of the modified urethane pavement marking materials, the manufacturer shall submit a notarized certification of an independent laboratory, together with the results of all tests, stating these materials meet the requirements as set forth herein. The certification test report shall state the lot tested, manufacturer's name, brand name of modified urethane and date of manufacture. The certification shall be accompanied by 1 pt (1/2 L) samples each of Part A and Part B. Samples shall be sent in the appropriate volumes for complete mixing of Part A and Part B.

After approval by the Department, certification by the modified urethane manufacturer shall be submitted for each batch used. New independent laboratory certified test results and samples for testing by the Department shall be submitted any time the manufacturing process or paint formulation is changed.

- (n) Acceptance samples. Acceptance samples shall consist of 1 pt (1/2 L) samples of Part A and Part B, of each lot of paint. Samples shall be sent in the appropriate volumes for complete mixing of Part A and Part B. The samples shall be submitted to the Department for testing, together with a manufacturer's certification. The certification shall state the formulation for the lot represented is essentially identical to that used for qualification testing. All, acceptance samples will be taken by a representative of the Illinois Department of Transportation. The modified urethane pavement marking materials shall not be used until tests are completed and they have met the requirements as set forth herein.
- (o) Material Retainage. The manufacturer shall retain the test sample for a minimum of 18 months."

Add the following to Section 1105 of the Standard Specifications:

**1105.04 Modified Urethane.** The modified urethane pavement marking compounds shall be applied through equipment specifically designed to precisely meter the two components in the ratio of 2:1 and approved by the manufacturer of the material. The equipment shall produce the required amount of heat at the mixing head and gun tip and maintain those temperatures within the tolerances specified. The equipment shall also have as an integral part of the gun carriage, a high pressure air spray capable of cleaning the pavement immediately prior to the marking application.

The equipment shall be capable of spraying both yellow and white modified urethane, according to the manufacturer's recommended proportions and be mounted on a truck of sufficient size and stability with an adequate power source to produce lines of uniform dimensions and prevent application failure. The truck shall have at least two urethane tanks each of 110 gal (415 L) minimum capacity and shall be equipped with hydraulic systems. It shall be capable of placing stripes on the left and right sides and placing two lines on a three-line system simultaneously with either line in a solid or intermittent pattern, in yellow or white, and applying glass beads by the double drop pressurized bead system. The system shall apply both the first drop glass beads and the second drop glass beads at a rate of 1.2 kg/L (10 lb/gal). The equipment shall be equipped with pressure gauges for each proportioning pump. All guns shall be in full view of operators at all times. The equipment shall have a metering device to register the accumulated installed quantities for each gun, each day. Each vehicle shall include at least one operator who shall be a technical expert in equipment operations and urethane application techniques. Certification of equipment shall be provided at the preconstruction conference."

#### **PAVEMENT MARKING REMOVAL (BDE)**

Effective: April 1, 2009

Add the following to the end of the first paragraph of Article 783.03(a) of the Standard Specifications:

"The use of grinders will not be allowed on new surface courses."

#### **PAVEMENT PATCHING (BDE)**

Effective: January 1, 2010

Revise the first sentence of the second paragraph of Article 701.17(e)(1) of the Standard Specifications to read:

"In addition to the traffic control and protection shown elsewhere in the contract for pavement, two devices shall be placed immediately in front of each open patch, open hole, and broken pavement where temporary concrete barriers are not used to separate traffic from the work area."

#### **PAYMENTS TO SUBCONTRACTORS (BDE)**

Effective: June 1, 2000

Revised: January 1, 2006

Federal regulations found at 49 CFR §26.29 mandate the Department to establish a contract clause to require Contractors to pay subcontractors for satisfactory performance of their subcontracts and to set the time for such payments.

State law also addresses the timing of payments to be made to subcontractors and material suppliers. Section 7 of the Prompt Payment Act, 30 ILCS 540/7, requires that when a Contractor receives any payment from the Department, the Contractor shall make corresponding, proportional payments to each subcontractor and material supplier performing work or supplying material within 15 calendar days after receipt of the Department payment. Section 7 of the Act further provides that interest in the amount of two percent per month, in addition to the payment due, shall be paid to any subcontractor or material supplier by the Contractor if the payment required by the Act is withheld or delayed without reasonable cause. The Act also provides that the time for payment required and the calculation of any interest due applies to transactions between subcontractors and lower-tier subcontractors and material suppliers throughout the contracting chain.

This Special Provision establishes the required federal contract clause, and adopts the 15 calendar day requirement of the State Prompt Payment Act for purposes of compliance with the federal regulation regarding payments to subcontractors. This contract is subject to the following payment obligations.

When progress payments are made to the Contractor according to Article 109.07 of the Standard Specifications, the Contractor shall make a corresponding payment to each subcontractor and material supplier in proportion to the work satisfactorily completed by each subcontractor and for the material supplied to perform any work of the contract. The proportionate amount of partial payment due to each subcontractor and material supplier throughout the contracting chain shall be determined by the quantities measured or otherwise determined as eligible for payment by the Department and included in the progress payment to the Contractor. Subcontractors and material suppliers shall be paid by the Contractor within 15 calendar days after the receipt of payment from the Department. The Contractor shall not hold retainage from the subcontractors. These obligations shall also apply to any payments made by subcontractors and material suppliers to their subcontractors and material suppliers; and to all payments made to lower tier subcontractors and material suppliers throughout the contracting chain. Any payment or portion of a payment subject to this provision may only be withheld from the subcontractor or material supplier to whom it is due for reasonable cause.

This Special Provision does not create any rights in favor of any subcontractor or material supplier against the State or authorize any cause of action against the State on account of any payment, nonpayment, delayed payment, or interest claimed by application of the State Prompt Payment Act. The Department will not approve any delay or postponement of the 15 day requirement except for reasonable cause shown after notice and hearing pursuant to Section 7(b) of the State Prompt Payment Act. State law creates other and additional remedies available to any subcontractor or material supplier, regardless of tier, who has not been paid for work properly performed or material furnished. These remedies are a lien against public funds set forth in Section 23(c) of the Mechanics Lien Act, 770 ILCS 60/23(c), and a recovery on the Contractor's payment bond according to the Public Construction Bond Act, 30 ILCS 550.

**PLANTING WOODY PLANTS (BDE)**

Effective: January 1, 2012

Revised: August 1, 2012

Revise the second sentence of Article 253.01 of the Standard Specifications to read:

“This work shall consist of furnishing, transporting, and planting woody plants such as trees, shrubs, evergreens, vines, and seedlings.”

Revise Article 253.02(a) of the Standard Specifications to read:

“(a) Trees, Shrubs, Evergreens, Vines and Seedlings ..... 1081.01”

Revise the first sentence of Article 253.08(a) of the Standard Specifications to read:

“(a) Excavation for Deciduous Trees and Evergreen Trees.”

Revise the first sentence of Article 253.08(b) of the Standard Specifications to read:

“(b) Excavation for Deciduous Shrubs, Evergreen Shrubs, Vines, and Seedlings.”

Revise the first sentence of Article 253.13 of the Standard Specifications to read:

“All deciduous and evergreen trees, with the exception of multi-stem or clump form specimens, over 8 ft (2.5 m) in height shall require three 6 ft (2 m) long steel posts so placed that they are equidistant from each other and adjacent to the outside of the ball.”

Revise the first sentence of the second paragraph of Article 253.14 of the Standard Specifications to read:

“This period of establishment for the plants shall not delay acceptance of the entire project and final payment due if the contractor requires and receives from the subcontractor a third party performance bond naming the Department as obligee in the full amount of the planting quantities subject to this period of establishment, multiplied by their contract unit prices.”

Revise the third sentence of Article 253.16 of the Standard Specifications to read:

“Trees, shrubs, evergreens, and vines will be measured as each individual plant.”

Revise Article 253.17 of the Standard Specifications to read:

**“253.17 Basis of Payment.** This work will be paid for at the contract unit price per each for TREES, SHRUBS, EVERGREENS, or VINES, of the species, root type, and plant size specified; and per unit for SEEDLINGS. Payment will be made according to the following schedule.

- (a) Initial Payment. Upon completion of planting, mulch covering, wrapping, and bracing, 90 percent of the pay item(s) will be paid.

- (b) Final Payment. Upon inspection and acceptance of the plant material, or upon execution of a third party bond, the remaining ten percent of the pay item(s) will be paid.”

Revise the first paragraph of Article 1081.01 of the Standard Specifications to read:

“**1081.01 Trees, Shrubs, Evergreens, Vines, and Seedlings.** Trees, shrubs, evergreens, vines, and seedlings shall be according to the current standards adopted by the ANLA.”

### **PORTLAND CEMENT CONCRETE (BDE)**

Effective: January 1, 2012

Revise Notes 1 and 2 of Article 312.24 of the Standard Specifications to read:

“Note 1. Coarse aggregate shall be gradation CA 6, CA 7, CA 9, CA 10, or CA 11, Class D quality or better. Article 1020.05(d) shall apply.

Note 2. Fine aggregate shall be FA 1 or FA 2. Article 1020.05(d) shall apply.”

Revise the first paragraph of Article 312.26 of the Standard Specifications to read:

“**312.26 Proportioning and Mix Design.** At least 60 days prior to start of placing CAM II, the Contractor shall submit samples of materials for proportioning and testing. The mixture shall contain a minimum of 200 lb (90 kg) of cement per cubic yard (cubic meter). Portland cement may be replaced with fly ash according to Article 1020.05(c)(1). Blends of coarse and fine aggregates will be permitted, provided the volume of fine aggregate does not exceed the volume of coarse aggregate. The Engineer will determine the proportions of materials for the mixture. However, the Contractor may substitute their own mix design. Article 1020.05(a) shall apply and a Level III PCC Technician shall develop the mix design.”

Revise the second paragraph of Article 503.22 of the Standard Specifications to read:

Other cast-in-place concrete for structures will be paid for at the contract unit price per cubic yard (cubic meter) for CONCRETE HANDRAIL, CONCRETE ENCASUREMENT, and SEAL COAT CONCRETE.”

Add the following to Article 1003.02 of the Standard Specifications:

(e) Alkali Reaction.

- (1) ASTM C 1260. Each 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 portland 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 0.03 percent will be assigned to limestone or dolomite fine aggregates (manufactured stone sand). However, the Department reserves the right to perform the ASTM C 1260 test.

- (2) ASTM C 1293 by Department. In some instances, such as chert natural sand or other fine aggregates, testing according to ASTM C 1260 may not provide accurate test results. In this case, the Department may only test according to ASTM C 1293.
- (3) ASTM C 1293 by Contractor. If an individual aggregate has an ASTM C 1260 expansion value that is unacceptable to the Contractor, an ASTM C 1293 test may be performed by the Contractor to evaluate the Department's ASTM C 1260 test result. The laboratory performing the ASTM C 1293 test shall be approved by the Department according to the current Bureau of Materials and Physical Research Policy Memorandum "Minimum Laboratory Requirements for Alkali-Silica Reactivity (ASR) Testing".

The ASTM C 1293 test shall be performed with Type I or II portland cement having a total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) of 0.80 percent or greater. The interior vertical wall of the ASTM C 1293 recommended container (pail) shall be half covered with a wick of absorbent material consisting of blotting paper. If the testing laboratory desires to use an alternate container, wick of absorbent material, or amount of coverage inside the container with blotting paper, ASTM C 1293 test results with an alkali-reactive aggregate of known expansion characteristics shall be provided to the Engineer for review and approval. If the expansion is less than 0.040 percent after one year, the aggregate will be assigned an ASTM C 1260 expansion value of 0.08 percent that will be valid for two years, unless the Engineer determines the aggregate has changed significantly. If the aggregate is manufactured into multiple gradation numbers, and the other gradation numbers have the same or lower ASTM C 1260 value, the ASTM C 1293 test result may apply to multiple gradation numbers.

The Engineer reserves the right to verify a Contractor's ASTM C 1293 test result. When the Contractor performs the test, a split sample shall be provided to the Engineer. The Engineer may also independently obtain a sample at any time. The aggregate will be considered reactive if the Contractor or Engineer obtains an expansion value of 0.040 percent or greater.

Revise Article 1004.02(d) of the Standard Specifications to read:

"(d)Combining Sizes. Each size shall be stored separately and care shall be taken to prevent them from being mixed until they are ready to be proportioned. Separate compartments shall be provided to proportion each size.

- (1) When Class BS concrete is to be pumped, the coarse aggregate gradation shall have a minimum of 45 percent passing the 1/2 in. (12.5 mm) sieve. The Contractor may combine two or more coarse aggregate sizes, consisting of CA 7, CA 11, CA 13, CA 14, and CA 16, provided a CA 7 or CA 11 is included in the blend.
- (2) If the coarse aggregate is furnished in separate sizes, they shall be combined in proportions to provide a uniformly graded coarse aggregate grading within the following limits.

| Class of Concrete <sup>1/</sup> | Combined Sizes | Sieve Size and Percent Passing |       |           |           |       |         |       |
|---------------------------------|----------------|--------------------------------|-------|-----------|-----------|-------|---------|-------|
|                                 |                | 2 1/2 in.                      | 2 in. | 1 3/4 in. | 1 1/2 in. | 1 in. | 1/2 in. | No. 4 |
| PV <sup>2/</sup>                | CA 5 & CA 7    | ---                            | ---   | 100       | 98±2      | 72±22 | 22±12   | 3±3   |
|                                 | CA 5 & CA 11   | ---                            | ---   | 100       | 98±2      | 72±22 | 22±12   | 3±3   |
| SI and SC <sup>2/</sup>         | CA 3 & CA 7    | 100                            | 95±5  | ---       | ---       | 55±25 | 20±10   | 3±3   |
|                                 | CA 3 & CA 11   | 100                            | 95±5  | ---       | ---       | 55±25 | 20±10   | 3±3   |
|                                 | CA 5 & CA 7    | ---                            | ---   | 100       | 98±2      | 72±22 | 22±12   | 3±3   |
|                                 | CA 5 & CA 11   | ---                            | ---   | 100       | 98±2      | 72±22 | 22±12   | 3±3   |

| Class of Concrete <sup>1/</sup> | Combined Sizes | Sieve Size (metric) and Percent Passing |       |       |         |       |         |         |
|---------------------------------|----------------|---|-------|-------|---------|-------|---------|---------|
|                                 |                | 63 mm                                   | 50 mm | 45 mm | 37.5 mm | 25 mm | 12.5 mm | 4.75 mm |
| PV <sup>2/</sup>                | CA 5 & CA 7    | ---                                     | ---   | 100   | 98±2    | 72±22 | 22±12   | 3±3     |
|                                 | CA 5 & CA 11   | ---                                     | ---   | 100   | 98±2    | 72±22 | 22±12   | 3±3     |
| SI and SC <sup>2/</sup>         | CA 3 & CA 7    | 100                                     | 95±5  | ---   | ---     | 55±25 | 20±10   | 3±3     |
|                                 | CA 3 & CA 11   | 100                                     | 95±5  | ---   | ---     | 55±25 | 20±10   | 3±3     |
|                                 | CA 5 & CA 7    | ---                                     | ---   | 100   | 98±2    | 72±22 | 22±12   | 3±3     |
|                                 | CA 5 & CA 11   | ---                                     | ---   | 100   | 98±2    | 72±22 | 22±12   | 3±3     |

1/ See Table 1 of Article 1020.04.

2/ Any of the listed combination of sizes may be used.”

Add the following to Article 1004.02 of the Standard Specifications:

(g) Alkali Reaction.

- (1) Each coarse 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 portland cement having a total equivalent alkali content (Na<sub>2</sub>O + 0.658K<sub>2</sub>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. However, the Department reserves the right to perform the ASTM C 1260 test.
- (2) ASTM C 1293 by Department. In some instances testing a coarse aggregate according to ASTM C 1260 may not provide accurate test results. In this case, the Department may only test according to ASTM C 1293.
- (3) ASTM C 1293 by Contractor. If an individual aggregate has an ASTM C 1260 expansion value that is unacceptable to the Contractor, an ASTM C 1293 test may be performed by the Contractor according to Article 1003.02(e)(3).

Revise the first paragraph of Article 1019.06 of the Standard Specifications to read:

“**1019.06 Contractor Mix Design.** A Contractor may submit their own mix design and may propose alternate fine aggregate materials, fine aggregate gradations, or material proportions. Article 1020.05(a) shall apply and a Level III PCC Technician shall develop the mix design.”

Revise Section 1020 of the Standard Specifications to read:

**“SECTION 1020. PORTLAND CEMENT CONCRETE**

**1020.01 Description.** This item shall consist of the materials, mix design, production, testing, curing, low air temperature protection, and temperature control of concrete.

**1020.02 Materials.** Materials shall be according to the following.

| Item                                | Article/Section |
|-------------------------------------|-----------------|
| (a) Cement .....                    | 1001            |
| (b) Water .....                     | 1002            |
| (c) Fine Aggregate .....            | 1003            |
| (d) Coarse Aggregate .....          | 1004            |
| (e) Concrete Admixtures .....       | 1021            |
| (f) Finely Divided Minerals .....   | 1010            |
| (g) Concrete Curing Materials ..... | 1022            |
| (h) Straw .....                     | 1081.06(a)(1)   |
| (i) Calcium Chloride .....          | 1013.01         |

**1020.03 Equipment.** Equipment shall be according to the following.

| Item  | Article/Section |
|---|-----------------|
| (a) Concrete Mixers and Trucks .....                      | 1103.01         |
| (b) Batching and Weighing Equipment .....                 | 1103.02         |
| (c) Automatic and Semi-Automatic Batching Equipment ..... | 1103.03         |
| (d) Water Supply Equipment .....                          | 1103.11         |
| (e) Membrane Curing Equipment .....                       | 1101.09         |
| (f) Mobile Portland Cement Concrete Plants .....          | 1103.04         |

**1020.04 Concrete Classes and General Mix Design Criteria.** The classes of concrete shown in Table 1 identify the various mixtures by the general uses and mix design criteria. If the class of concrete for a specific item of construction is not specified, Class SI concrete shall be used.

For the minimum cement factor in Table 1, it shall apply to portland cement, portland-pozzolan cement, and portland blast-furnace slag except when a particular cement is specified in the Table.

The Contractor shall not assume that the minimum cement factor indicated in Table 1 will produce a mixture that will meet the specified strength. In addition, the Contractor shall not assume that the maximum finely divided mineral allowed in a mix design according to Article 1020.05(c) will produce a mixture that will meet the specified strength. The Contractor shall select a cement factor within the allowable range that will obtain the specified strength. The Contractor shall take into consideration materials selected, seasonal temperatures, and other factors which may require the Contractor to submit multiple mix designs.

For a portland-pozzolan cement, portland blast-furnace slag cement, or when replacing portland cement with finely divided minerals per Articles 1020.05(c) and 1020.05(d), the portland cement content in the mixture shall be a minimum of 375 lbs/cu yd (222 kg/cu m). When the total of organic processing additions, inorganic processing additions, and limestone addition exceed 5.0 percent in the cement, the minimum portland cement content in the mixture shall be 400 lbs/cu yd (237 kg/cu m). When calculating the portland cement portion in the portland-pozzolan or portland blast-furnace slag cement, the AASHTO M 240 tolerance may be ignored.

Special classifications may be made for the purpose of including the concrete for a particular use or location as a separate pay item in the contract. The concrete used in such cases shall conform to this section.

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 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620

| TABLE 1. CLASSES OF CONCRETE AND MIX DESIGN CRITERIA |  |   |                       |                       |                               |                                     |   |               |       |                  |   |
|--|--|---|-----------------------|-----------------------|-------------------------------|-------------------------------------|---|---------------|-------|------------------|---|
| Class of Conc.                                       | Use  | Specification Section Reference               | Cement Factor         |                       | Water / Cement Ratio<br>lb/lb | S<br>l<br>u<br>m<br>p<br>in.<br>(4) | Mix Design Compressive Strength (Flexural Strength) |               |       | Air Content %    | Coarse Aggregate Gradations (14)                          |
|  |  |   | cwt/cu yd (3)         |                       |                               |                                     | psi, minimum  |               |       |                  |   |
|  |  |   | Min.                  | Max                   |                               |                                     | Days  |               |       |                  |   |
|  |  |   |                       |                       |                               | 3                                   | 14  | 28            |       |                  |   |
| PV   | Pavement<br>Base Course<br>Base Course Widening<br>Driveway Pavement<br>Shoulders<br>Shoulder Curb | 420 or 421<br>353<br>354<br>423<br>483<br>662 | 5.65 (1)<br>6.05 (2)  | 7.05                  | 0.32 - 0.42                   | 2 - 4<br>(5)                        | Ty III<br>3500<br>(650)                             | 3500<br>(650) |       | 5.0 - 8.0        | CA 5 & CA 7,<br>CA 5 & CA 11,<br>CA 7, CA 11,<br>or CA 14 |
| PP   | Pavement Patching<br>Bridge Deck Patching (10)   | 442   |                       |                       |                               |                                     | 3200<br>(600)<br>Article 701.17(e)(3)b.             |               |       |                  |   |
|  | PP-1   |   | 6.50<br>6.20 (Ty III) | 7.50<br>7.20 (Ty III) | 0.32 - 0.44                   | 2 - 4                               | at 48 hours   |               |       | 4.0 - 7.0        | CA 7, CA 11,<br>CA 13, CA 14,<br>or CA 16                 |
|  | PP-2   |   | 7.35                  | 7.35                  | 0.32 - 0.38                   | 2 - 6                               | at 24 hours   |               |       | 4.0 - 6.0        |   |
|  | PP-3   |   | 7.35 (Ty III) (8)     | 7.35 (Ty III) (8)     | 0.32 - 0.35                   | 2 - 4                               | at 16 hours   |               |       | 4.0 - 6.0        |   |
|  | PP-4   |   | 6.00 (9)              | 6.25 (9)              | 0.32 - 0.50                   | 2 - 6                               | at 8 hours  |               |       | 4.0 - 6.0        |   |
|  | PP-5   |   | 6.75 (9)              | 6.75 (9)              | 0.32 - 0.40                   | 2 - 8                               | at 4 hours  |               |       | 4.0 - 6.0        | CA 13, CA 14, or<br>CA 16                                 |
| RR   | Railroad Crossing  | 422   | 6.50<br>6.20 (Ty III) | 7.50<br>7.20 (Ty III) | 0.32 - 0.44                   | 2 - 4                               | 3500 (650)<br>at 48 hours                           |               |       | 4.0 - 7.0        | CA 7, CA 11,<br>or CA 14                                  |
| BS   | Bridge Superstructure<br>Bridge Approach Slab  | 503   | 6.05                  | 7.05                  | 0.32 - 0.44                   | 2 - 4<br>(5)                        |   | 4000<br>(675) |       | 5.0 - 8.0        | CA 7, CA 11,<br>or CA 14 (7)                              |
| PC   | Various Precast Concrete Items<br>Wet Cast<br>Dry Cast   | 1042  | 5.65<br>5.65 (TY III) | 7.05<br>7.05 (TY III) | 0.32 - 0.44<br>0.25 - 0.40    | 1 - 4<br>0 - 1                      | See Section 1042                                    |               |       | 5.0 - 8.0<br>N/A | CA7, CA11, CA 13,<br>CA 14, CA 16, or<br>CA 7 & CA 16     |
| PS   | Precast Prestressed Members  | 504   | 5.65                  | 7.05                  | 0.32 - 0.44                   | 1 - 4                               |   |               | Plans | 5.0 - 8.0        | CA 11 (11),<br>CA 13, CA 14 (11),<br>or CA 16             |
|  | Precast Prestressed Piles and Extensions   | 512   | 5.65 (TY III)         | 7.05 (TY III)         |                               |                                     |   |               | 5000  |                  |   |
|  | Precast Prestressed Sight Screen   | 639   |                       |                       |                               |                                     |   |               | 3500  |                  |   |

| TABLE 1. CLASSES OF CONCRETE AND MIX DESIGN CRITERIA |   |   |                      |      |                               |                                     |   |               |  |                      |  |
|--|---|---|----------------------|------|-------------------------------|-------------------------------------|---|---------------|--|----------------------|--|
| Class of Conc.                                       | Use   | Specification Section Reference   | Cement Factor        |      | Water / Cement Ratio<br>lb/lb | S<br>l<br>u<br>m<br>p<br>in.<br>(4) | Mix Design Compressive Strength (Flexural Strength) |               |  | Air Content %        | Coarse Aggregate Gradations (14)   |
|  |   |   | cwt/cu yd (3)        |      |                               |                                     | psi, minimum  |               |  |                      |  |
|  |   |   | Min.                 | Max  |                               |                                     | Days  |               |  |                      |  |
|  |   |   |                      |      |                               | 3                                   | 14  | 28            |  |                      |  |
| DS   | Drilled Shaft (12)<br>Metal Shell Piles (12)<br>Sign Structures<br>Drilled Shaft (12)<br>Light Tower Foundation (12)  | 516<br>512<br>734<br>837  | 6.65                 | 7.05 | 0.32 - 0.44                   | 6 - 8<br>(6)                        |   | 4000<br>(675) |  | 5.0 - 8.0            | CA 13, CA 14,<br>CA 16, or a blend<br>of these gradations.   |
| SC   | Seal Coat   | 503   | 5.65 (1)<br>6.05 (2) | 7.05 | 0.32 - 0.44                   | 3 - 5                               |   | 3500<br>(650) |  | Optional<br>6.0 max. | CA 3 & CA 7,<br>CA 3 & CA 11,<br>CA 5 & CA 7,<br>CA 7 & CA 11,<br>CA 7, or CA 11                                 |
| SI   | Structures (except Superstructure)<br>Sidewalk<br>Slope Wall<br>Encasement<br>Box Culverts<br>End Section and Collar<br>Curb, Gutter, Curb & Gutter,<br>Median, and Paved Ditch<br>Concrete Barrier<br>Sign Structures<br>Spread Footing<br>Concrete Foundation<br>Pole Foundation (12)<br>Traffic Signal Foundation<br>Drilled Shaft (12)<br>Square or Rectangular | 503<br>424<br>511<br>512<br>540<br>542<br>606<br>637<br>734<br>836<br>878 | 5.65 (1)<br>6.05 (2) | 7.05 | 0.32 - 0.44                   | 2 - 4<br>(5)                        |   | 3500<br>(650) |  | 5.0 - 8.0            | CA 3 & CA 7,<br>CA 3 & CA 11,<br>CA 5 & CA 7,<br>CA 5 & CA 11,<br>CA 7, CA 11, CA 13,<br>CA 14, or CA 16<br>(13) |

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- Notes:
- (1) Central-mixed.
  - (2) Truck-mixed or shrink-mixed. Shrink-mixed concrete will not be permitted for Class PV concrete.
  - (3) For Class SC concrete and for any other class of concrete that is to be placed underwater, except Class DS concrete, the cement factor shall be increased by ten percent.
  - (4) The maximum slump may be increased to 7 in. when a high range water-reducing admixture is used for all classes of concrete, except Class PV, SC, and PP. For Class SC, the maximum slump may be increased to 8 in. For Class PP-1, the maximum slump may be increased to 6 in. For Class PS, the 7 in. maximum slump may be increased to 8 1/2 in. if the high range water-reducing admixture is the polycarboxylate type.
  - (5) The slump range for slipform construction shall be 1/2 to 1 1/2 in.
  - (6) If concrete is placed to displace drilling fluid, or against temporary casing, the slump shall be 8 - 10 in. at the point of placement. If a water-reducing admixture is used in lieu of a high range water-reducing admixture according to Article 1020.05(b)(7), the slump shall be 2 - 4 in.
  - (7) For Class BS concrete used in bridge deck patching, the coarse aggregate gradation shall be CA 13, CA 14, or CA 16, except CA 11 may be used for full-depth patching.
  - (8) In addition to the Type III portland cement, 100 lb/cu yd of ground granulated blast-furnace slag and 50 lb/cu yd of microsilica (silica fume) shall be used. For an air temperature greater than 85 °F, the Type III portland cement may be replaced with Type I or II portland cement.
  - (9) The cement shall be a rapid hardening cement from the Department's "Approved List of Packaged, Dry, Rapid Hardening Cementitious Materials for Concrete Repairs" for PP-4 and calcium aluminate cement for PP-5.
  - (10) For Class PP concrete used in bridge deck patching, the aggregate gradation shall be CA 13, CA 14, or CA 16, except CA 11 may be used for full-depth patching. In addition, the mix design shall have 72 hours to obtain a 4,000 psi compressive or 675 psi flexural strength for all PP mix designs.
  - (11) The nominal maximum size permitted is 3/4 in. Nominal maximum size is defined as the largest sieve which retains any of the aggregate sample particles.
  - (12) The concrete mix shall be designed to remain fluid throughout the anticipated duration of the pour plus one hour. At the Engineer's discretion, the Contractor may be required to conduct a minimum 2 cu yd trial batch to verify the mix design.
  - (13) CA 3 or CA 5 may be used when the nominal maximum size does not exceed two-thirds the clear distance between parallel reinforcement bars, or between the reinforcement bar and the form. Nominal maximum size is defined in Note 11.
  - (14) Alternate combinations of gradations sizes may be used with the approval of the Engineer. Refer also to Article 1004.02(d) for additional information on combining sizes.

FAI Routes 74 & 155 (I-74 & I-155)  
 Project ACIM-ACBRI-000S(907)  
 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620

| TABLE 1. CLASSES OF CONCRETE AND MIX DESIGN CRITERIA (metric) |  |                                 |                  |                  |                               |                                     |  |               |           |   |  |
|---|--|---------------------------------|------------------|------------------|-------------------------------|-------------------------------------|--|---------------|-----------|---|--|
| Class of Conc.  | Use                                      | Specification Section Reference | Cement Factor    |                  | Water / Cement Ratio<br>kg/kg | S<br>l<br>u<br>m<br>p<br><br>mm (4) | Mix Design Compressive Strength (Flexural Strength)    |               |           | Air Content %                           | Coarse Aggregate Gradations (14)                 |
|   |  |                                 | kg/cu m (3)      |                  |                               |                                     | kPa, minimum   |               |           |   |  |
|   |  |                                 | Min.             | Max              |                               |                                     | Days   |               |           |   |  |
|   |  |                                 |                  |                  |                               |                                     | 3  | 14            | 28        |   |  |
| PV  | Pavement Base Course                     | 420 or 421                      |                  |                  |                               |                                     |  |               |           |   | CA 5 & CA 7, CA 5 & CA 11, CA 7, CA 11, or CA 14 |
|   | Base Course Widening                     | 353                             |                  |                  |                               |                                     |  |               |           |   |  |
|   | Driveway Pavement                        | 354                             | 335 (1)          | 418              | 0.32 - 0.42                   | 50 - 100 (5)                        | Ty III   | 24,000 (4500) |           |   |  |
|   | Shoulders                                | 423                             | 360 (2)          |                  |                               |                                     |  |               |           |   |  |
|   | Shoulder Curb                            | 483                             |                  |                  |                               |                                     |  |               |           |   |  |
| PP  | Pavement Patching                        | 442                             |                  |                  |                               |                                     |  |               |           |   | CA 7, CA 11, CA 13, CA 14, or CA 16              |
|   | Bridge Deck Patching (10)                |                                 |                  |                  |                               |                                     |  |               |           |   |  |
|   | PP-1                                     |                                 | 385              | 445              | 0.32 - 0.44                   | 50 - 100                            | 22,100 (4150)<br>Article 701.17(e)(3)b.<br>at 48 hours |               |           | 4.0 - 7.0                               |  |
|   | PP-2                                     |                                 | 365 (Ty III)     | 425 (Ty III)     | 0.32 - 0.38                   | 50 - 150                            | at 24 hours  |               |           | 4.0 - 6.0                               |  |
|   | PP-3                                     |                                 | 435              | 435              | 0.32 - 0.35                   | 50 - 100                            | at 16 hours  |               |           | 4.0 - 6.0                               |  |
|   | PP-4                                     |                                 | 435 (Ty III) (8) | 435 (Ty III) (8) | 0.32 - 0.50                   | 50 - 150                            | at 8 hours   |               |           | 4.0 - 6.0                               |  |
| PP-5  | 355 (9)                                  | 370 (9)                         | 0.32 - 0.40      | 50 - 200         | at 4 hours                    |                                     |  | 4.0 - 6.0     |           |   |  |
| RR  | Railroad Crossing                        | 422                             | 385              | 445              | 0.32 - 0.44                   | 50 - 100                            | 24,000 (4500)<br>at 48 hours                           |               |           | 4.0 - 7.0                               | CA 7, CA 11, or CA 14                            |
| BS  | Bridge Superstructure                    | 503                             | 365 (Ty III)     | 425 (Ty III)     | 0.32 - 0.44                   | 50 - 100 (5)                        | 27,500   |               | 5.0 - 8.0 | CA 7, CA 11, or CA 14 (7)               |  |
|   | Bridge Approach Slab                     |                                 | 360              | 418              |                               |                                     | (4650)   |               |           |   |  |
| PC  | Various Precast Concrete Items           | 1042                            | 335              | 418              | 0.32 - 0.44                   | 25 - 100                            | See Section 1042                                       |               |           | 5.0 - 8.0                               | CA7, CA11, CA13, CA 14, CA 16, or CA 7 & CA 16   |
|   | Wet Cast                                 |                                 | 335 (TY III)     | 418 (TY III)     | 0.25 - 0.40                   | 0 - 25                              |  |               |           | N/A                                     |  |
| PS  | Precast Prestressed Members              | 504                             | 335 (TY III)     | 418 (TY III)     | 0.32 - 0.44                   | 25 - 100                            |  |               | 5.0 - 8.0 | CA 11 (11), CA 13, CA 14 (11), or CA 16 |  |
|   | Precast Prestressed Piles and Extensions | 512                             |                  |                  |                               |                                     |  |               |           |   | Plans  |
|   | Precast Prestressed Sight Screen         | 639                             |                  |                  |                               |                                     |  |               |           |   | 34,500   |
|   |  |                                 |                  |                  |                               |                                     |  |               |           | 24,000                                  |  |

| TABLE 1. CLASSES OF CONCRETE AND MIX DESIGN CRITERIA (metric) |  |                                 |               |     |                               |                                     |   |               |                   |  |                                  |
|---|--|---------------------------------|---------------|-----|-------------------------------|-------------------------------------|---|---------------|-------------------|--|----------------------------------|
| Class of Conc.  | Use  | Specification Section Reference | Cement Factor |     | Water / Cement Ratio<br>kg/kg | S<br>l<br>u<br>m<br>p<br><br>mm (4) | Mix Design Compressive Strength (Flexural Strength) |               |                   | Air Content %  | Coarse Aggregate Gradations (14) |
|   |  |                                 | kg/cu m (3)   |     |                               |                                     | kPa, minimum  |               |                   |  |                                  |
|   |  |                                 | Min.          | Max |                               |                                     | Days  |               |                   |  |                                  |
|   |  |                                 |               |     |                               |                                     | 3   | 14            | 28                |  |                                  |
| DS  | Drilled Shaft (12)                                   | 516                             | 395           | 418 | 0.32 - 0.44                   | 150 -200 (6)                        |   | 27,500 (4650) | 5.0 - 8.0         | CA 13, CA 14, CA 16, or a blend of these gradations.   |                                  |
|   | Metal Shell Piles (12)                               | 512                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Sign Structures                                      | 734                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Drilled Shaft (12)                                   |                                 |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Light Tower Foundation (12)                          | 837                             |               |     |                               |                                     |   |               |                   |  |                                  |
| SC  | Seal Coat  | 503                             | 335 (1)       | 418 | 0.32 - 0.44                   | 75 - 125                            |   | 24,000 (4500) | Optional 6.0 max. | CA 3 & CA 7, CA 3 & CA 11, CA 5 & CA 7, CA 7 & CA 11, CA 7, or CA 11                           |                                  |
| SI  | Structures (except Superstructure)                   | 503                             | 335 (1)       | 418 | 0.32 - 0.44                   | 50 - 100 (5)                        |   | 24,000 (4500) | 5.0 - 8.0         | CA 3 & CA 7, CA 3 & CA 11, CA 5 & CA 7, CA 5 7 CA 11, CA 7, CA 11, CA 13, CA 14, or CA 16 (13) |                                  |
|   | Sidewalk   | 424                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Slope Wall   | 511                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Encasement   | 512                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Box Culverts   | 540                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | End Section and Collar                               | 542                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Curb, Gutter, Curb & Gutter, Median, and Paved Ditch | 606                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Concrete Barrier                                     | 637                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Sign Structures                                      | 734                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Spread Footing                                       |                                 |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Concrete Foundation                                  |                                 |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Pole Foundation (12)                                 | 836                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Traffic Signal Foundation                            | 878                             |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Drilled Shaft (12)                                   |                                 |               |     |                               |                                     |   |               |                   |  |                                  |
|   | Square or Rectangular                                |                                 |               |     |                               |                                     |   |               |                   |  |                                  |

- Notes:
- (1) Central-mixed.
  - (2) Truck-mixed or shrink-mixed. Shrink-mixed concrete will not be permitted for Class PV concrete.
  - (3) For Class SC concrete and for any other class of concrete that is to be placed underwater, except Class DS concrete, the cement factor shall be increased by ten percent.
  - (4) The maximum slump may be increased to 175 mm when a high range water-reducing admixture is used for all classes of concrete except Class PV, SC, and PP. For Class SC, the maximum slump may be increased to 200 mm. For Class PP-1, the maximum slump may be increased to 150 mm. For Class PS, the 175 mm maximum slump may be increased to 215 mm if the high range water-reducing admixture is the polycarboxylate type.
  - (5) The slump range for slipform construction shall be 13 to 40 mm.
  - (6) If concrete is placed to displace drilling fluid, or against temporary casing, the slump shall be 200 - 250 mm at the point of placement. If a water-reducing admixture is used in lieu of a high range water-reducing admixture according to Article 1020.05(b)(7), the slump shall be 50 - 100 mm.
  - (7) For Class BS concrete used in bridge deck patching, the coarse aggregate gradation shall be CA 13, CA 14, or CA 16, except CA 11 may be used for full-depth patching.
  - (8) In addition to the Type III portland cement, 60 kg/cu m of ground granulated blast-furnace slag and 30 kg/cu m of microsilica (silica fume) shall be used. For an air temperature greater than 30 °C, the Type III portland cement may be replaced with Type I or II portland cement.
  - (9) The cement shall be a rapid hardening cement from the Department's "Approved List of Packaged, Dry, Rapid Hardening Cementitious Materials for Concrete Repairs" for PP-4 and calcium aluminate cement for PP-5.
  - (10) For Class PP concrete used in bridge deck patching, the aggregate gradation shall be CA 13, CA 14, or CA 16, except CA 11 may be used for full-depth patching. In addition, the mix design shall have 72 hours to obtain a 27,500 kPa compressive or 4,650 kPa flexural.
  - (11) The nominal maximum size permitted is 19 mm. Nominal maximum size is defined as the largest sieve which retains any of the aggregate sample particles.
  - (12) The concrete mix shall be designed to remain fluid throughout the anticipated duration of the pour plus one hour. At the Engineer's discretion, the Contractor may be required to conduct a minimum 1.5 cu m trial batch to verify the mix design.
  - (13) CA 3 or CA 5 may be used when the nominal maximum size does not exceed two-thirds the clear distance between parallel reinforcement bars, or between the reinforcement bar and the form. Nominal maximum size is defined in Note 11.
  - (14) Alternate combinations of gradation sizes may be used with the approval of the Engineer. Refer also to Article 1004.02(d) for additional information on combining sizes.

**1020.05 Other Concrete Criteria.** The concrete shall be according to the following.

- (a) **Proportioning and Mix Design.** For all Classes of concrete, it shall be the Contractors responsibility to determine mix design material proportions and to proportion each batch of concrete. A Level III PCC Technician shall develop the mix design for all Classes of concrete, except Classes PC and PS. The mix design, submittal information, trial batch, and Engineer verification shall be according to the "Portland Cement Concrete Level III Technician" course material.

The Contractor shall provide the mix designs a minimum of 45 calendar days prior to production. More than one mix design may be submitted for each class of concrete.

The Engineer will verify the mix design submitted by the Contractor. Verification of a mix design shall in no manner be construed as acceptance of any mixture produced. Once a mix design has been verified, the Engineer shall be notified of any proposed changes.

Tests performed at the jobsite will determine if a mix design can meet specifications. If the tests indicate it cannot, the Contractor shall make adjustments to a mix design, or submit a new mix design if necessary, to comply with the specifications.

- (b) Admixtures. The Contractor shall be responsible for using admixtures and determining dosages for all Classes of concrete, cement aggregate mixture II, and controlled low-strength material that will produce a mixture with suitable workability, consistency, and plasticity. In addition, admixture dosages shall result in the mixture meeting the specified plastic and hardened properties. The Contractor shall obtain approval from the Engineer to use an accelerator when the concrete temperature is greater than 60 °F (16 °C). However, this accelerator approval will not be required for Class PP, RR, PC, and PS concrete. The accelerator shall be the non-chloride type unless otherwise specified in the contract plans.

The Department will maintain an Approved List of Corrosion Inhibitors. Corrosion inhibitor dosage rates shall be according to Article 1020.05(b)(10). For information on approved controlled low-strength material air-entraining admixtures, refer to Article 1019.02. The Department will also maintain an Approved List of Concrete Admixtures, and an admixture technical representative shall be consulted by the Contractor prior to the pour when determining an admixture dosage from this list or when making minor admixture dosage adjustments at the jobsite. The dosage shall be within the range indicated on the approved list unless the influence by other admixtures, jobsite conditions (such as a very short haul time), or other circumstances warrant a dosage outside the range. The Engineer shall be notified when a dosage is proposed outside the range. To determine an admixture dosage, air temperature, concrete temperature, cement source and quantity, finely divided mineral sources and quantity, influence of other admixtures, haul time, placement conditions, and other factors as appropriate shall be considered. The Engineer may request the Contractor to have a batch of concrete mixed in the lab or field to verify the admixture dosage is correct. An admixture dosage or combination of admixture dosages shall not delay the initial set of concrete by more than one hour. When a retarding admixture is required or appropriate for a bridge deck or bridge deck overlay pour, the initial set time shall be delayed until the deflections due to the concrete dead load are no longer a concern for inducing cracks in the completed work. However, a retarding admixture shall not be used to further extend the pour time and justify the alteration of a bridge deck pour sequence.

When determining water in admixtures for water/cement ratio, the Contractor shall calculate 70 percent of the admixture dosage as water, except a value of 50 percent shall be used for a latex admixture used in bridge deck latex concrete overlays.

The sequence, method, and equipment for adding the admixtures shall be approved by the Engineer. Admixtures shall be added to the concrete separately. An accelerator shall always be added prior to a high range water-reducing admixture, if both are used.

Admixture use shall be according to the following.

- (1) When the atmosphere or concrete temperature is 65 °F (18 °C) or higher, a retarding admixture shall be used in the Class BS concrete and concrete bridge deck overlays. The proportions of the ingredients of the concrete shall be the same as without the retarding admixture, except that the amount of mixing water shall be reduced, as may be necessary, in order to maintain the consistency of the concrete as required. In addition, a high range water-reducing admixture shall be used in bridge deck concrete. At the option of the Contractor, a water-reducing admixture may be used with the high range water-reducing admixture in Class BS concrete.

- (2) At the Contractor's option, admixtures in addition to an air-entraining admixture may be used for Class PP-1 or RR concrete. When the air temperature is less than 55 °F (13 °C) and an accelerator is used, the non-chloride accelerator shall be calcium nitrite.
- (3) When Class C fly ash or ground granulated blast-furnace slag is used in Class PP-1 or RR concrete, a water-reducing or high range water-reducing admixture shall be used.
- (4) For Class PP-2 or PP-3 concrete, a non-chloride accelerator followed by a high range water-reducing admixture shall be used, in addition to the air-entraining admixture. The Contractor has the option to use a water-reducing admixture with the high range water-reducing admixture. For Class PP-3 concrete, the non-chloride accelerator shall be calcium nitrite. For Class PP-2 concrete, the non-chloride accelerator shall be calcium nitrite when the air temperature is less than 55 °F (13 °C).
- (5) For Class PP-4 concrete, a high range water-reducing admixture shall be used in addition to the air-entraining admixture. The Contractor has the option to use a water-reducing admixture with the high range water-reducing admixture. An accelerator shall not be used. For stationary or truck-mixed concrete, a retarding admixture shall be used to allow for haul time. The Contractor has the option to use a mobile portland cement concrete plant, but a retarding admixture shall not be used unless approved by the Engineer.

For PP-5 concrete, a non-chloride accelerator, high range water-reducing admixture, and air-entraining admixture shall be used. The accelerator, high range water-reducing admixture, and air-entraining admixture shall be per the Contractor's recommendation and dosage. The approved list of concrete admixtures shall not apply. A mobile portland cement concrete plant shall be used to produce the patching mixture.

- (6) When a calcium chloride accelerator is specified in the contract, the maximum chloride dosage shall be 1.0 quart (1.0 L) of solution per 100 lb (45 kg) of cement. The dosage may be increased to a maximum 2.0 quarts (2.0 L) per 100 lb (45 kg) of cement if approved by the Engineer. When a calcium chloride accelerator for Class PP-2 concrete is specified in the contract, the maximum chloride dosage shall be 1.3 quarts (1.3 L) of solution per 100 lb (45 kg) of cement. The dosage may be increased to a maximum 2.6 quarts (2.6 L) per 100 lb (45 kg) of cement if approved by the Engineer.
- (7) For Class DS concrete a retarding admixture and a high range water-reducing admixture shall be used. For dry excavations that are 10 ft (3 m) or less, the high range water-reducing admixture may be replaced with a water-reducing admixture if the concrete is vibrated. The use of admixtures shall take into consideration the slump loss limits specified in Article 516.12 and the fluidity requirement in Article 1020.04 (Note 12).

- (8) At the Contractor's option, when a water-reducing admixture or a high range water-reducing admixture is used for Class PV, PP-1, RR, SC, and SI concrete, the cement factor may be reduced a maximum 0.30 hundredweight/cu yd (18 kg/cu m). However, a cement factor reduction will not be allowed for concrete placed underwater.
- (9) When Type F or Type G high range water-reducing admixtures are used, the initial slump shall be a minimum of 1 1/2 in. (40 mm) prior to addition of the Type F or Type G admixture, except as approved by the Engineer.
- (10) When specified, a corrosion inhibitor shall be added to the concrete mixture utilized in the manufacture of precast, prestressed concrete members and/or other applications. It shall be added, at the same rate, to all grout around post-tensioning steel when specified.

When calcium nitrite is used, it shall be added at the rate of 4 gal/cu yd (20 L/cu m), and shall be added to the mix immediately after all compatible admixtures have been introduced to the batch.

When Rheocrete 222+ is used, it shall be added at the rate of 1.0 gal/cu yd (5.0 L/cu m), and the batching sequence shall be according to the manufacturer's instructions.

- (c) Finely Divided Minerals. Use of finely divided minerals shall be according to the following.

- (1) Fly Ash. At the Contractor's option, fly ash from approved sources may partially replace portland cement in cement aggregate mixture II, Class PV, PP-1, PP-2, RR, BS, PC, PS, DS, SC, and SI concrete.

The use of fly ash shall be according to the following.

- a. Measurements of fly ash and portland cement shall be rounded up to the nearest 5 lb (2.5 kg).
  - b. When Class F fly ash is used in cement aggregate mixture II, Class PV, BS, PC, PS, DS, SC, and SI concrete, the amount of portland cement replaced shall not exceed 25 percent by weight (mass).
  - c. When Class C fly ash is used in cement aggregate mixture II, Class PV, PP-1, PP-2, RR, BS, PC, PS, DS, SC, and SI concrete, the amount of portland cement replaced shall not exceed 30 percent by weight (mass).
  - d. Fly ash may be used in concrete mixtures when the air temperature is below 40 °F (4 °C), but the Engineer may request a trial batch of the concrete mixture to show the mix design strength requirement will be met.
- (2) Ground Granulated Blast-Furnace (GGBF) Slag. At the Contractor's option, GGBF slag may partially replace portland cement in concrete mixtures, for Class PV, PP-1, PP-2, RR, BS, PC, PS, DS, SC, and SI concrete. For Class PP-3 concrete, GGBF slag shall be used according to Article 1020.04.

The use of GGBF slag shall be according to the following.

- a. Measurements of GGBF slag and portland cement shall be rounded up to the nearest 5 lb (2.5 kg).
  - b. When GGBF slag is used in Class PV, PP-1, PP-2, RR, BS, PC, PS, DS, SC and SI concrete, the amount of portland cement replaced shall not exceed 35 percent by weight (mass).
  - c. GGBF slag may be used in concrete mixtures when the air temperature is below 40 °F (4 °C), but the Engineer may request a trial batch of the concrete mixture to show the mix design strength requirement will be met.
- (3) Microsilica. At the Contractor's option, microsilica may be added at a maximum of 5.0 percent by weight (mass) of the cement and finely divided minerals summed together.

Microsilica shall be used in Class PP-3 concrete according to Article 1020.04.

- (4) High Reactivity Metakaolin (HRM). At the Contractor's option, HRM may be added at a maximum of 5.0 percent by weight (mass) of the cement and finely divided minerals summed together.
- (5) Mixtures with Multiple Finely Divided Minerals. Except as specified for Class PP-3 concrete, the Contractor has the option to use more than one finely divided mineral in Class PV, PP-1, PP-2, RR, BS, PC, PS, DS, SC, and SI concrete as follows.
- a. The mixture shall contain a maximum of two finely divided minerals. The finely divided mineral in portland-pozzolan cement or portland blast-furnace slag cement shall count toward the total number of finely divided minerals allowed. The finely divided minerals shall constitute a maximum of 35.0 percent of the total cement plus finely divided minerals. The fly ash portion shall not exceed 30.0 percent for Class C fly ash or 25.0 percent for Class F fly ash. The Class C and F fly ash combination shall not exceed 30.0 percent. The ground granulated blast-furnace slag portion shall not exceed 35.0 percent. The microsilica or high-reactivity metakaolin portion used together or separately shall not exceed ten percent. The finely divided mineral in the portland-pozzolan cement or portland blast-furnace slag blended cement shall apply to the maximum 35.0 percent.
  - b. Central Mixed. For Class PV, SC, and SI concrete, the mixture shall contain a minimum of 565 lbs/cu yd (335 kg/cu m) of cement and finely divided minerals summed together. If a water-reducing or high-range water-reducing admixture is used, the Contractor has the option to use a minimum of 535 lbs/cu yd (320 kg/cu m).
  - c. Truck-Mixed or Shrink-Mixed. For Class PV (only truck-mixed permitted), SC, and SI concrete, the mixture shall contain a minimum of 605 lbs/cu yd (360 kg/cu m) of cement and finely divided minerals summed together. If a water-reducing or high-range water-reducing admixture is used, the Contractor has the option to use a minimum of 575 lbs/cu yd (345 kg/cu m).

- d. Central-Mixed, Truck-Mixed or Shrink-Mixed. For Class PP-1 and RR concrete, the mixture shall contain a minimum of 650 lbs/cu yd (385 kg/cu m) of cement and finely divided minerals summed together. For Class PP-1 and RR concrete using Type III portland cement, the mixture shall contain a minimum of 620 lbs/cu yd (365 kg/cu m).

For Class PP-2 concrete, the mixture shall contain a minimum of 735 lbs/cu yd (435 kg/cu m) of cement and finely divided minerals summed together. For Class BS concrete, the mixture shall contain a minimum of 605 lbs/cu yd (360 kg/cu m). For Class DS concrete, the mixture shall contain a minimum of 665 lbs/cu yd (395 kg/cu m).

If a water-reducing or high range water-reducing admixture is used in Class PP-1 and RR concrete, the Contractor has the option to use a minimum of 620 lbs/cu yd (365 kg/cu m) of cement and finely divided minerals summed together. If a water-reducing or high-range water-reducing admixture is used with Type III portland cement in Class PP-1 and RR concrete, the Contractor has the option to use a minimum of 590 lbs/cu yd (350 kg/cu m).

- e. Central-Mixed or Truck-Mixed. For Class PC and PS concrete, the mixture shall contain a minimum of 565 lbs/cu yd (335 kg/cu m) of cement and finely divided minerals summed together.
- f. The mixture shall contain a maximum of 705 lbs/cu yd (418 kg/cu m) of cement and finely divided mineral(s) summed together for Class PV, BS, PC, PS, DS, SC, and SI concrete. For Class PP-1 and RR concrete, the mixture shall contain a maximum of 750 lbs/cu yd (445 kg/cu m). For Class PP-1 and RR concrete using Type III portland cement, the mixture shall contain a maximum of 720 lbs/cu yd (425 kg/cu m). For Class PP-2 concrete, the mixture shall contain a maximum of 735 lbs/cu yd (435 kg/cu m).
- g. For Class SC concrete and for any other class of concrete that is to be placed underwater, except Class DS concrete, the allowable cement and finely divided minerals summed together shall be increased by ten percent.
- h. The combination of cement and finely divided minerals shall comply with Article 1020.05(d).
- (d) Alkali-Silica Reaction. For cast-in-place (includes cement aggregate mixture II), precast, and precast prestressed concrete, one of the mixture options provided in Article 1020.05(d)(2) shall be used to reduce the risk of a deleterious alkali-silica reaction in concrete exposed to humid or wet conditions. The mixture options are not intended or adequate for concrete exposed to potassium acetate, potassium formate, sodium acetate, or sodium formate. The mixture options will not be required for the dry environment (humidity less than 60 percent) found inside buildings for residential or commercial occupancy.

The mixture options shall not apply to concrete revetment mats, insertion lining of pipe culverts, portland cement mortar fairing course, controlled low-strength material,

miscellaneous grouts that are not prepackaged, Class PP-3 concrete, Class PP-4 concrete, and Class PP-5 concrete.

- (1) 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<br>Coarse Aggregate<br>Blend | Fine Aggregate Or<br>Fine Aggregate Blend |                |           |
|  | ASTM C 1260 Expansion                     |                |           |
| ASTM C 1260<br>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  |

- (2) Mixture Options. Based upon the aggregate group, the following mixture options shall be used. However, the Department may prohibit a mixture option if field performance shows a deleterious alkali-silika reaction or Department testing indicates the mixture may experience a deleterious alkali-silica reaction.

Group I – Mixture options are not applicable. Use any cement or finely divided mineral.

Group II – Mixture options 1, 2, 3, 4, or 5 shall be used.

Group III – Mixture options 1, combine 2 with 3, 4 or 5 shall be used.

Group IV – Mixture options 1, combine 2 with 4, or 5 shall be used.

- a. Mixture Option 1. The coarse or fine aggregates shall be blended to place the material in a group that will allow the selected cement or finely divided mineral to be used. Coarse aggregate may only be blended with another coarse aggregate. Fine aggregate may only be blended with another fine aggregate. Blending of coarse with fine aggregate to place the material in another group will not be permitted.

When a coarse for fine aggregate is blended, the weighted expansion value shall be calculated separately for the coarse and fine aggregate as follows:

$$\text{Weighted Expansion Value} = (a/100 \times A) + (b/100 \times B) + (c/100 \times C) + \dots$$

Where: a, b, c... = percentage of aggregate in the blend;  
 A, B, C... = expansion value for that aggregate.

- b. Mixture Option 2. A finely divided mineral shall be used as described in 1), 2), 3), or 4) that follow.

1. Class F Fly Ash. For cement aggregate mixture II, Class PV, BS, PC, PS, MS, DS, SC and SI concrete, the Class F fly ash shall be a minimum 25.0 percent by weight (mass) of the cement and finely divided minerals summed together.

If the maximum total equivalent available alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) exceeds 4.50 percent for the Class F fly ash, it may be used only if it complies with Mixture Option 5.

2. Class C Fly Ash. For cement aggregate mixture II, Class PV, PP-1, PP-2, RR, BS, PC, PS, DS, SC, and SI concrete, Class C fly ash shall be a minimum of 25.0 percent by weight (mass) of the cement and finely divided minerals summed together.

If the maximum total equivalent available alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) exceeds 4.50 percent or the calcium oxide exceeds 26.50 percent for the Class C fly ash, it may be used only per Mixture Option 5.

3. Ground Granulated Blast-Furnace Slag. For Class PV, PP-1, PP-2, RR, BS, PC, PS, DS, SC, and SI concrete, ground granulated blast-furnace slag shall be a minimum of 25.0 percent by weight (mass) of the cement and finely divided minerals summed together.

If the maximum total equivalent available alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) exceeds 1.00 percent for the ground granulated blast-furnace slag, it may be used only per Mixture Option 5.

4. Microsilica or High Reactivity Metakaolin, Microsilica solids or high reactivity metakaolin shall be a minimum 5.0 percent by weight (mass) of the cement and finely divided minerals summed together.

If the maximum total equivalent available alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) exceeds 1.00 percent for the Microsilica or High Reactivity Metakaolin, it may be used only if it complies with Mixture Option 5.

- c. Mixture Option 3. The cement used shall have a maximum total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) of 0.60 percent. When aggregate in Group II is involved and the Contractor desires to use a finely divided mineral, any finely divided mineral may be used with the cement unless the maximum total equivalent available alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) exceeds 4.50 percent for the fly ash; or 1.00 percent for the ground granulated blast-furnace slag, microsilica or high reactivity metakaolin. If the alkali content is exceeded, the finely divided mineral may be used only per Mixture Option 5.
- d. Mixture option 4. The cement used shall have a maximum total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) of 0.45 percent. When aggregate in Group II or III is involved and the Contractor desires to use a finely divided mineral, any finely divided mineral may be used with the cement unless the maximum total equivalent available alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) exceeds 4.50 percent for the fly ash; or 1.00 percent for the ground granulated blast-furnace slag, microsilica, or high reactivity metakaolin. If the alkali content is exceeded, the finely divided mineral may be used only per Mixture Option 5.

- e. Mixture Option 5. The proposed cement or finely divided mineral may be used if the ASTM C 1567 expansion value is  $\leq 0.16$  percent when performed on the aggregate in the concrete mixture with the highest ASTM C 1260 test result. The laboratory performing the ASTM C 1567 test shall be approved by the Department according to the current Bureau of Materials and Physical Research Policy Memorandum "Minimum Laboratory Requirements for Alkali-Silica Reactivity (ASR) Testing". The ASTM C 1567 test will be valid for two years, unless the Engineer determines the materials have changed significantly. For latex concrete, the ASTM C 1567 test shall be performed without the latex. The 0.20 percent autoclave expansion limit in ASTM C 1567 shall not apply.

If during the two year time period the Contractor needs to replace the cement, and the replacement cement has an equal or lower total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ), a new ASTM C 1567 test will not be required.

The Engineer reserved the right to verify a Contractor's ASTM C 1567 test result. When the Contractor performs the test, a split sample may be requested by the Engineer. The Engineer may also independently obtain a sample at any time. The proposed cement or finely divided mineral will not be allowed for use if the Contractor or Engineer obtains an expansion value greater than 0.16 percent.

**1020.06 Water/Cement Ratio.** The water/cement ratio shall be determined on a weight (mass) basis. When a maximum water/cement ratio is specified, the water shall include mixing water, water in admixtures, free moisture on the aggregates, and water added at the jobsite. The quantity of water may be adjusted within the limit specified to meet slump requirements.

When fly ash, ground granulated blast-furnace slag, high-reactivity metakaolin, or microsilica (silica fume) are used in a concrete mix, the water/cement ratio will be based on the total cement and finely divided minerals contained in the mixture.

**1020.07 Slump.** The slump shall be determined according to Illinois Modified AASHTO T 119.

If the measured slump falls outside the limits specified, a check test will be made. In the event of a second failure, the Engineer may refuse to permit the use of the batch of concrete represented.

If the Contractor is unable to add water to prepare concrete of the specified slump without exceeding the maximum design water/cement ratio, additional cement or water-reducing admixture shall be added.

**1020.08 Air Content.** The air content shall be determined according to Illinois Modified AASHTO T 152 or Illinois Modified AASHTO T 196. The air-entrainment shall be obtained by the use of cement with an approved air-entraining admixture added during the mixing of the concrete or the use of air-entraining cement.

If the air-entraining cement furnished is found to produce concrete having an air content outside the limits specified, its use shall be discontinued immediately and the Contractor shall provide other air-entraining cement which will produce air contents within the specified limits.

If the air content obtained is above the specified maximum limit at the jobsite, the Contractor, with the Engineer's approval, may add to the truck mixer non air-entraining cement in the proportion necessary to bring the air content within the specified limits, or the concrete may be further mixed, within the limits of time and revolutions specified, to reduce the air content. If the air content obtained is below the specified minimum limit, the Contractor may add to the concrete a sufficient quantity of an approved air-entraining admixture at the jobsite to bring the air content within the specified limits.

**1020.09 Strength Tests.** The specimens shall be molded and cured according to Illinois Modified AASHTO T 23. Specimens shall be field cured with the construction item as specified in Illinois Modified AASHTO T 23. The compressive strength shall be determined according to Illinois Modified AASHTO T 22. The flexural strength shall be determined according to Illinois Modified AASHTO T 177.

Except for Class PC and PS concrete, the Contractor shall transport the strength specimens from the site of the work to the field laboratory or other location as instructed by the Engineer. During transportation in a suitable light truck, the specimens shall be embedded in straw, burlap, or other acceptable material in a manner meeting with the approval of the Engineer to protect them from damage; care shall be taken to avoid impacts during hauling and handling. For strength specimens, the Contractor shall provide a water storage tank for curing.

**1020.10 Handling, Measuring, and Batching Materials.** Aggregates shall be handled in a manner to prevent mixing with soil and other foreign material.

Aggregates shall be handled in a manner which produces a uniform gradation, before placement in the plant bins. Aggregates delivered to the plant in a nonuniform gradation condition shall be stockpiled. The stockpiled aggregate shall be mixed uniformly before placement in the plant bins.

Aggregates shall have a uniform moisture content before placement in the plant bins. This may require aggregates to be stockpiled for 12 hours or more to allow drainage, or water added to the stockpile, or other methods approved by the Engineer. Moisture content requirements for crushed slag or lightweight aggregate shall be according to Article 1004.01(e).

Aggregates, cement, and finely divided minerals shall be measured by weight (mass). Water and admixtures shall be measured by volume or weight (mass).

The Engineer may permit aggregates, cement, and finely divided minerals to be measured by volume for small isolated structures and for miscellaneous items. Aggregates, cement, and finely divided minerals shall be measured individually. The volume shall be based upon dry, loose materials.

**1020.11 Mixing Portland Cement Concrete.** The mixing of concrete shall be according to the following.

- (a) Ready-Mixed Concrete. Ready-mixed concrete is central-mixed, truck-mixed, or shrink-mixed concrete transported and delivered in a plastic state ready for placement in the work and shall be according to the following.

- (1) Central-Mixed Concrete. Central-mixed concrete is concrete which has been completely mixed in a stationary mixer and delivered in a truck agitator, a truck mixer operating at agitating speed, or a nonagitator truck.

The stationary mixer shall operate at the drum speed for which it was designed. The batch shall be charged into the drum so that some of the water shall enter in advance of the cement, finely divided minerals, and aggregates. The flow of the water shall be uniform and all water shall be in the drum by the end of the first 15 seconds of the mixing period. Water shall begin to enter the drum from zero to two seconds in advance of solid material and shall stop flowing within two seconds of the beginning of mixing time.

Some coarse aggregate shall enter in advance of other solid materials. For the balance of the charging time for solid materials, the aggregates, finely divided minerals, and cement (to assure thorough blending) shall each flow at acceptably uniform rates, as determined by visual observation. Coarse aggregate shall enter two seconds in advance of other solid materials and a uniform rate of flow shall continue to within two seconds of the completion of charging time.

The entire contents of the drum, or of each single compartment of a multiple-drum mixer, shall be discharged before the succeeding batch is introduced.

The volume of concrete mixed per batch shall not exceed the mixer's rated capacity as shown on the standard rating plate on the mixer by more than ten percent.

The minimum mixing time shall be 75 seconds for a stationary mixer having a capacity greater than 2 cu yd (1.5 cu m). For a mixer with a capacity equal to or less than 2 cu yd (1.5 cu m) the mixing time shall be 60 seconds. Transfer time in multiple drum mixers is included in the mixing time. Mixing time shall begin when all materials are in the mixing compartment and shall end when the discharge of any part of the batch is started. The required mixing times will be established by the Engineer for all types of stationary mixers.

When central-mixed concrete is to be transported in a truck agitator or a truck mixer, the stationary-mixed batch shall be transferred to the agitating unit without delay and without loss of any portion of the batch. Agitating shall start immediately thereafter and shall continue without interruption until the batch is discharged from the agitator. The ingredients of the batch shall be completely discharged from the agitator before the succeeding batch is introduced. Drums and auxiliary parts of the equipment shall be kept free from accumulations of materials.

The vehicles used for transporting the mixed concrete shall be of such capacity, or the batches shall be so proportioned, that the entire contents of the mixer drum can be discharged into each vehicle load.

- (2) Truck-Mixed Concrete. Truck-mixed concrete is completely mixed and delivered in a truck mixer. When the mixer is charged with fine and coarse aggregates simultaneously, not less than 60 nor more than 100 revolutions of the drum or blades at mixing speed shall be required, after all of the ingredients including water are in the drum. When fine and coarse aggregates are charged separately, not less than 70 revolutions will be required. Additional mixing beyond 100 revolutions shall be at agitating speed unless additions of water, admixtures, cement, or other materials are made at the jobsite. The mixing operation shall begin immediately after the cement and water, or the cement and wet aggregates, come in contact. The ingredients of the batch shall be completely discharged from the drum before the succeeding batch is introduced. The drum and auxiliary parts of the equipment shall be kept free from accumulations of materials. If additional water or an admixture is added at the jobsite, the concrete batch shall be mixed a minimum of 40 additional revolutions after each addition.
- (3) Shrink-Mixed Concrete. Shrink-mixed concrete is mixed partially in a stationary mixer and completed in a truck mixer for delivery. The mixing time of the stationary mixer may be reduced to a minimum of 30 seconds to intermingle the ingredients, before transferring to the truck mixer. All ingredients for the batch shall be in the stationary mixer and partially mixed before any of the mixture is discharged into the truck mixer. The partially mixed batch shall be transferred to the truck mixer without delay and without loss of any portion of the batch, and mixing in the truck mixer shall start immediately. The mixing time in the truck mixer shall be not less than 50 nor more than 100 revolutions of the drum or blades at mixing speed. Additional mixing beyond 100 revolutions shall be at agitating speed, unless additions of water, admixtures, cement, or other materials are made at the jobsite. Units designed as agitators shall not be used for shrink mixing. The ingredients of the batch shall be completely discharged from the drum before the succeeding batch is introduced. The drum and auxiliary parts of the equipment shall be kept free from accumulations of materials. If additional water or an admixture is added at the jobsite, the concrete batch shall be mixed a minimum of 40 additional revolutions after each addition.
- (4) Mixing Water. Wash water shall be completely discharged from the drum or container before a batch is introduced. All mixing water shall be added at the plant and any adjustment of water at the jobsite by the Contractor shall not exceed the specified maximum water/cement ratio or slump. If strength specimens have been made for a batch of concrete, and subsequently during discharge there is more water added, additional strength specimens shall be made for the batch of concrete. No additional water may be added at the jobsite to central-mixed concrete if the mix design has less than 565 lbs/cu yd (335 kg/cu m) of cement and finely divided minerals summed together.
- (5) Mixing and Agitating Speeds. The mixing or agitating speeds used for truck mixers or truck agitators shall be per the manufacturer's rating plate.
- (6) Capacities. The volume of plastic concrete in a given batch will be determined according to AASHTO T 121, based on the total weight (mass) of the batch, determined either from the weight (masses) of all materials, including water, entering the batch or directly from the net weight (mass) of the concrete in the batch as delivered.

The volume of mixed concrete in truck mixers or truck agitators shall in no case be greater than the rated capacity determined according to the Truck Mixer, Agitator, and Front Discharge Concrete Carrier Standards of the Truck Mixer Manufacturer's Bureau, as shown by the rating plate attached to the truck. If the truck mixer does not have a rating plate, the volume of mixed concrete shall not exceed 63 percent of the gross volume of the drum or container, disregarding the blades. For truck agitators, the value is 80 percent.

- (7) Time of Haul. Haul time shall begin when the delivery ticket is stamped. The delivery ticket shall be stamped no later than five minutes after the addition of the mixing water to the cement, or after the addition of the cement to the aggregate when the combined aggregates contain free moisture in excess of two percent by weight (mass). If more than one batch is required for charging a truck using a stationary mixer, the time of haul shall start with mixing of the first batch. Haul time shall end when the truck is emptied for incorporation of the concrete into the work.

The time elapsing from when water is added to the mix until it is deposited in place at the site of the work shall not exceed 30 minutes when the concrete is transported in nonagitator trucks.

The maximum haul time for concrete transported in truck mixers or truck agitators shall be according to the following.

| Concrete Temperature at Point of Discharge °F (°C) | Haul Time |         |
|--|-----------|---------|
|  | Hours     | Minutes |
| 50-64 (10-17.5)                                    | 1         | 30      |
| >64 (>17.5) - without retarder                     | 1         | 0       |
| >64 (>17.5) - with retarder                        | 1         | 30      |

To encourage start-up testing for mix adjustments at the plant, the first two trucks will be allowed an additional 15 minutes haul time whenever such testing is performed.

For a mixture which is not mixed on the jobsite, a delivery ticket shall be required for each load. The following information shall be recorded on each delivery ticket: (1) ticket number; (2) name of producer and plant location; (3) contract number; (4) name of Contractor; (5) stamped date and time batched; (6) truck number; (7) quantity batched; (8) amount of admixture(s) in the batch; (9) amount of water in the batch; and (10) Department mix design number.

For concrete mixed in jobsite stationary mixers, the above delivery ticket may be waived, but a method of verifying the haul time shall be established to the satisfaction of the Engineer.

- (8) Production and Delivery. The production of ready-mixed concrete shall be such that the operations of placing and finishing will be continuous insofar as the job operations require. The Contractor shall be responsible for producing concrete that will have the required workability, consistency, and plasticity when delivered to the work. Concrete which is unsuitable for placement as delivered will be rejected. The

Contractor shall minimize the need to adjust the mixture at the jobsite, such as adding water, admixtures, and cement prior to discharging.

- (9) Use of Multiple Plants in the Same Construction Item. The Contractor may simultaneously use central-mixed, truck-mixed, and shrink-mixed concrete from more than one plant, for the same construction item, on the same day, and in the same pour. However, the following criteria shall be met.
- a. Each plant shall use the same cement, finely divided minerals, aggregates, admixtures, and fibers.
  - b. Each plant shall use the same mix design. However, material proportions may be altered slightly in the field to meet slump and air content criteria. Field water adjustments shall not result in a difference that exceeds 0.02 between plants for water/cement ratio. The required cement factor for central-mixed concrete shall be increased to match truck-mixed or shrink-mixed concrete, if the latter two types of mixed concrete are used in the same pour.
  - c. The maximum slump difference between deliveries of concrete shall be 3/4 in. (19 mm) when tested at the jobsite. If the difference is exceeded, but test results are within specification limits, the concrete may be used. The Contractor shall take immediate corrective action and shall test subsequent deliveries of concrete until the slump difference is corrected. For each day, the first three truck loads of delivered concrete from each plant shall be tested for slump by the Contractor. Thereafter, when a specified test frequency for slump is to be performed, it shall be conducted for each plant at the same time.
  - d. The maximum air content difference between deliveries of concrete shall be 1.5 percent when tested at the jobsite. If the difference is exceeded, but test results are within specification limits, the concrete may be used. The Contractor shall take immediate corrective action and shall test subsequent deliveries of concrete until the air content difference is corrected. For each day, the first three truck loads of delivered concrete from each plant shall be tested for air content by the Contractor. Thereafter, when a specified test frequency for air content is to be performed, it shall be conducted for each plant at the same time.
  - e. Strength tests shall be performed and taken at the jobsite for each plant. When a specified strength test is to be performed, it shall be conducted for each plant at the same time. The difference between plants for strength shall not exceed 900 psi (6200 kPa) compressive and 90 psi (620 kPa) flexural. If the strength difference requirements are exceeded, the Contractor shall take corrective action.
  - f. The maximum haul time difference between deliveries of concrete shall be 15 minutes. If the difference is exceeded, but haul time is within specification limits, the concrete may be used. The Contractor shall take immediate corrective action and check subsequent deliveries of concrete.
- (b) Class PC Concrete. The concrete shall be central-mixed or truck-mixed. Variations in plastic concrete properties shall be minimized between batches.

(c) Class PV Concrete. The concrete shall be central-mixed or truck-mixed.

The required mixing time for stationary mixers with a capacity greater than 2 cu yd (1.5 cu m) may be less than 75 seconds upon satisfactory completion of a mixer performance test. Mixer performance tests may be requested by the Contractor when the quantity of concrete to be placed exceeds 50,000 sq yd (42,000 sq m). The testing shall be conducted according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Field Test Procedures for Mixer Performance and Concrete Uniformity Tests".

The Contractor will be allowed to test two mixing times within a range of 50 to 75 seconds. If satisfactory results are not obtained from the required tests, the mixing time shall continue to be 75 seconds for the remainder of the contract. If satisfactory results are obtained, the mixing time may be reduced. In no event will mixing time be less than 50 seconds.

The Contractor shall furnish the labor, equipment, and material required to perform the testing according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Field Test Procedures for Mixer Performance and Concrete Uniformity Tests".

A contract which has 12 ft (3.6 m) wide pavement or base course, and a continuous length of 1/2 mile (0.8 km) or more, shall have the following additional requirements.

- (1) The plant and truck delivery operation shall be able to provide a minimum of 50 cu yd (38 cu m) of concrete per hour.
- (2) The plant shall have automatic or semi-automatic batching equipment.

(d) All Other Classes of Concrete. The concrete shall be central-mixed, truck-mixed, or shrink-mixed concrete.

**1020.12 Mobile Portland Cement Concrete Plants.** The use of a mobile portland cement concrete plant may be approved under the provisions of Article 1020.10 for volumetric proportioning in small isolated structures, thin overlays, and for miscellaneous and incidental concrete items.

The first 1 cu ft (0.03 cu m) of concrete produced may not contain sufficient mortar and shall not be incorporated in the work. The side plate on the cement feeder shall be removed periodically (normally the first time the mixer is used each day) to see if cement is building up on the feed drum.

Sufficient mixing capacity of mixers shall be provided to enable continuous placing and finishing insofar as the job operations and the specifications require.

Slump and air tests made immediately after discharge of the mix may be misleading, since the aggregates may absorb a significant amount of water for four or five minutes after mixing.

**1020.13 Curing and Protection.** The method of curing, curing period, and method of protection for each type of concrete construction is included in the following Index Table.

FAI Routes 74 & 155 (I-74 & I-155)  
 Project ACIM-ACBRI-000S(907)  
 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620

| INDEX TABLE OF CURING AND PROTECTION OF CONCRETE CONSTRUCTION   |  |  |  |
|---|--|--|--|
| TYPE OF CONSTRUCTION  | CURING METHODS                             | CURING PERIOD DAYS                                       | LOW AIR TEMPERATURE PROTECTION METHODS |
| <b>Cast-in-Place Concrete <sup>11/</sup></b>  |  |  |  |
| Pavement Shoulder   | 1020.13(a)(1)(2)(3)(4)(5) <sup>3/ 5/</sup> | 3  | 1020.13(c)                             |
| Base Course<br>Base Course Widening   | 1020.13(a)(1)(2)(3)(4)(5) <sup>2/</sup>    | 3  | 1020.13(c)                             |
| Driveway<br>Median<br>Barrier<br>Curb<br>Gutter<br>Curb & Gutter<br>Sidewalk<br>Slope Wall<br>Paved Ditch | 1020.13(a)(1)(2)(3)(4)(5) <sup>4/ 5/</sup> | 3  | 1020.13(c) <sup>16/</sup>              |
| Catch Basin<br>Manhole<br>Inlet<br>Valve Vault  | 1020.13(a)(1)(2)(3)(4)(5) <sup>4/</sup>    | 3  | 1020.13(c)                             |
| Pavement Patching   | 1020.13(a)(1)(2)(3)(4)(5) <sup>2/</sup>    | 3 <sup>12/</sup>   | 1020.13(c)                             |
| Bridge Deck Patching  | 1020.13(a)(3)(5)                           | 3 or 7 <sup>12/</sup>                                    | 1020.13(c)                             |
| Railroad Crossing   | 1020.13(a)(3)(5)                           | 1  | 1020.13(c)                             |
| Piles and Drilled Shafts  | 1020.13(a)(3)(5)                           | 7  | 1020.13(d)(1)(2)(3)                    |
| Foundations & Footings  |  |  |  |
| Seal Coat   | 1020.13(a)(1)(2)(3)(4)(5) <sup>4/ 6/</sup> | 7  | 1020.13(d)(1)(2)(3)                    |
| Substructure  | 1020.13(a)(1)(2)(3)(4)(5) <sup>1/ 7/</sup> | 7  | 1020.13(d)(1)(2)(3)                    |
| Superstructure (except deck)  | 1020.13(a)(1)(2)(3)(5) <sup>B/</sup>       | 7  | 1020.13(d)(1)(2)                       |
| <b>Deck</b>   |  |  |  |
| Bridge Approach Slab  | 1020.13(a)(5)                              | 7  | 1020.13(d)(1)(2) <sup>17/</sup>        |
| Retaining Walls   | 1020.13(a)(1)(2)(3)(4)(5) <sup>1/ 7/</sup> | 7  | 1020.13(d)(1)(2)                       |
| Pump Houses   | 1020.13(a)(1)(2)(3)(4)(5) <sup>1/</sup>    | 7  | 1020.13(d)(1)(2)                       |
| Culverts  | 1020.13(a)(1)(2)(3)(4)(5) <sup>4/ 6/</sup> | 7  | 1020.13(d)(1)(2) <sup>18/</sup>        |
| Other Incidental Concrete   | 1020.13(a)(1)(2)(3)(5)                     | 3  | 1020.13(c)                             |
| <b>Precast Concrete <sup>11/</sup></b>  |  |  |  |
| Bridge Slabs<br>Piles and Pile Caps<br>Other Structural Members   | 1020.13(a)(3)(5) <sup>9/ 10/</sup>         | As <sup>13/</sup><br>Required                            | 9/                                     |
| All Other Precast Items   | 1020.13(a)(3)(4)(5) <sup>2/ 9/ 10/</sup>   | As <sup>14/</sup><br>Required                            | 9/                                     |
| <b>Precast, Prestressed Concrete <sup>11/</sup></b>   |  |  |  |
| All Items   | 1020(a)(3)(5) <sup>9/ 10/</sup>            | Until Strand<br>Tensioning is<br>Released <sup>15/</sup> | 9/                                     |

Notes-General:

- 1/ Type I, membrane curing only
- 2/ Type II, membrane curing only
- 3/ Type III, membrane curing only
- 4/ Type I, II and III membrane curing
- 5/ Membrane Curing will not be permitted between November 1 and April 15.

- 6/ The use of water to inundate foundations and footings, seal coats or the bottom slab of culverts is permissible when approved by the Engineer, provided the water temperature can be maintained at 45 °F (7 °C) or higher.
- 7/ Asphalt emulsion for waterproofing may be used in lieu of other curing methods when specified and permitted according to Article 503.18.
- 8/ On non-traffic surfaces which receive protective coat according to Article 503.19, a linseed oil emulsion curing compound may be used as a substitute for protective coat and other curing methods. The linseed oil emulsion curing compound will be permitted between April 16 and October 31 of the same year, provided it is applied with a mechanical sprayer according to Article 1101.09(b).
- 9/ Steam, supplemental heat, or insulated blankets (with or without steam/supplemental heat) are acceptable and shall be according to the Bureau of Materials and Physical Research's Policy Memorandum "Quality Control/Quality Assurance Program for Precast Concrete Products" and the "Manual for Fabrication of Precast, Prestressed Concrete Products".
- 10/ A moist room according to AASHTO M 201 is acceptable for curing.
- 11/ If curing is required and interrupted because of form removal for cast-in-place concrete items, precast concrete products, or precast prestressed concrete products, the curing shall be resumed within two hours from the start of the form removal.
- 12/ Curing maintained only until opening strength is attained for pavement patching, with a maximum curing period of three days. For bridge deck patching the curing period shall be three days if Class PP concrete is used and 7 days if Class BS concrete is used.
- 13/ The curing period shall end when the concrete has attained the mix design strength. The producer has the option to discontinue curing when the concrete has attained 80 percent of the mix design strength or after seven days. All strength test specimens shall remain with the units and shall be subjected to the same curing method and environmental condition as the units, until the time of testing.
- 14/ The producer shall determine the curing period or may elect to not cure the product. All strength test specimens shall remain with the units and shall be subjected to the same curing method and environmental condition as the units, until the time of testing.
- 15/ The producer has the option to continue curing after strand release.
- 16/ When structural steel or structural concrete is in place above slope wall, Article 1020.13(c) shall not apply. The protection method shall be according to Article 1020.13(d)(1).
- 17/ When Article 1020.13(d)(2) is used to protect the deck, the housing may enclose only the bottom and sides. The top surface shall be protected according to Article 1020.13(d)(1).

18/ For culverts having a waterway opening of 10 sq ft (1 sq m) or less, the culverts may be protected according to Article 1020.13(d)(3).

(a) Methods of Curing. Except as provided for in the Index Table of Curing and Protection of Concrete Construction, curing shall be accomplished by one of the following described methods. When water is required to wet the surface, it shall be applied as a fine spray so that it will not mar or pond on the surface. Except where otherwise specified, the curing period shall be at least 72 hours.

(1) Waterproof Paper Method. The surface of the concrete shall be covered with waterproof paper as soon as the concrete has hardened sufficiently to prevent marring the surface. The surface of the concrete shall be wetted immediately before the paper is placed. The blankets shall be lapped at least 12 in. (300 mm) end to end, and these laps shall be securely weighted with a windrow of earth, or other approved method, to form a closed joint. The same requirements shall apply to the longitudinal laps where separate strips are used for curing edges, except the lap shall be at least 9 in. (225 mm). The edges of the blanket shall be weighted securely with a continuous windrow of earth or any other means satisfactory to the Engineer to provide an air-tight cover. Any torn places or holes in the paper shall be repaired immediately by patches cemented over the openings, using a bituminous cement having a melting point of not less than 180 °F (82 °C). The blankets may be reused, provided they are air-tight and kept serviceable by proper repairs.

A longitudinal pleat shall be provided in the blanket to permit shrinkage where the width of the blanket is sufficient to cover the entire surface. The pleat will not be required where separate strips are used for the edges. Joints in the blanket shall be sewn or cemented together in such a manner that they will not separate during use.

(2) Polyethylene Sheeting Method. The surface of the concrete shall be covered with white polyethylene sheeting as soon as the concrete has hardened sufficiently to prevent marring the surface. The surface of the concrete shall be wetted immediately before the sheeting is placed. The edges of the sheeting shall be weighted securely with a continuous windrow of earth or any other means satisfactory to the Engineer to provide an air-tight cover. Adjoining sheets shall overlap not less than 12 in. (300 mm) and the laps shall be securely weighted with earth, or any other means satisfactory to the Engineer, to provide an air tight cover. For surface and base course concrete, the polyethylene sheets shall be not less than 100 ft (30 m) in length nor longer than can be conveniently handled, and shall be of such width that, when in place, they will cover the full width of the surface, including the edges, except that separate strips may be used to cover the edges. Any tears or holes in the sheeting shall be repaired. When sheets are no longer serviceable as a single unit, the Contractor may select from such sheets and reuse those which will serve for further applications, provided two sheets are used as a single unit; however, the double sheet units will be rejected when the Engineer deems that they no longer provide an air tight cover.

- (3) Wetted Burlap Method. The surface of the concrete shall be covered with wetted burlap blankets as soon as the concrete has hardened sufficiently to prevent marring the surface. The blankets shall overlap 6 in. (150 mm). At least two layers of wetted burlap shall be placed on the finished surface. The burlap shall be kept saturated by means of a mechanically operated sprinkling system. In place of the sprinkling system, at the Contractor's option, two layers of burlap covered with impermeable covering shall be used. The burlap shall be kept saturated with water. Plastic coated burlap may be substituted for one layer of burlap and impermeable covering.

The blankets shall be placed so that they are in contact with the edges of the concrete, and that portion of the material in contact with the edges shall be kept saturated with water.

- (4) Membrane Curing Method. Membrane curing will not be permitted where a protective coat, concrete sealer, or waterproofing is to be applied, or at areas where rubbing or a normal finish is required, or at construction joints other than those necessary in pavement or base course. Concrete at these locations shall be cured by another method specified in Article 1020.13(a).

After the concrete has been finished and the water sheen has disappeared from the surface, the concrete shall be immediately sealed with membrane curing compound of the type specified. The seal shall be maintained for the specified curing period. The edges of the concrete shall, likewise, be sealed immediately after the forms are removed. Two separate applications, applied at least one minute apart, each at the rate of not less than 1 gal/250 sq ft (0.16 L/sq m) will be required upon the surfaces and edges of the concrete. These applications shall be made with the mechanical equipment specified. Type III compound shall be agitated immediately before and during the application.

At locations where the coating is discontinuous or where pin holes show or where the coating is damaged due to any cause and on areas adjacent to sawed joints, immediately after sawing is completed, an additional coating of membrane curing compound shall be applied at the above specified rate. The equipment used may be of the same type as that used for coating variable widths of pavement. Before the additional coating is applied adjacent to sawed joints, the cut faces of the joint shall be protected by inserting a suitable flexible material in the joint, or placing an adhesive width of impermeable material over the joint, or by placing the permanent sealing compound in the joint. Material, other than the permanent sealing compound, used to protect cut faces of the joint, shall remain in place for the duration of the curing period. In lieu of applying the additional coating, the area of the sawed joint may be cured according to any other method permitted.

When rain occurs before an application of membrane curing compound has dried, and the coating is damaged, the Engineer may require another application be made in the same manner and at the same rate as the original coat. The Engineer may order curing by another method specified, if unsatisfactory results are obtained with membrane curing compound.

- (5) **Wetted Cotton Mat Method.** After the surface of concrete has been textured or finished, it shall be covered immediately with dry or damp cotton mats. The cotton mats shall be placed in a manner which will not mar the concrete surface. A texture resulting from the cotton mat material is acceptable. The cotton mats shall then be wetted immediately and thoroughly soaked with a gentle spray of water. For bridge decks, a foot bridge shall be used to place and wet the cotton mats.

The cotton mats shall be maintained in a wetted condition until the concrete has hardened sufficiently to place soaker hoses without marring the concrete surface. The soaker hoses shall be placed on top of the cotton mats at a maximum 4 ft (1.2 m) spacing. The cotton mats shall be kept wet with a continuous supply of water for the remainder of the curing period. Other continuous wetting systems may be used if approved by the Engineer.

After placement of the soaker hoses, the cotton mats shall be covered with white polyethylene sheeting or burlap-polyethylene blankets.

For construction items other than bridge decks, soaker hoses or a continuous wetting system will not be required if the alternative method keeps the cotton mats wet. Periodic wetting of the cotton mats is acceptable.

For areas inaccessible to the cotton mats on bridge decks, curing shall be according to Article 1020.13(a)(3).

- (b) **Removing and Replacing Curing Covering.** When curing methods specified above in Article 1020.13(a), (1), (2), or (3) are used for concrete pavement, the curing covering for each day's paving shall be removed to permit testing of the pavement surface with a profilograph or straightedge, as directed by the Engineer.

Immediately after testing, the surface of the pavement shall be wetted thoroughly and the curing coverings replaced. The top surface and the edges of the concrete shall not be left unprotected for a period of more than 1/2 hour.

- (c) **Protection of Concrete, Other Than Structures, From Low Air Temperatures.** When the official National Weather Service forecast for the construction area predicts a low of 32 °F (0 °C), or lower, or if the actual temperature drops to 32 °F (0 °C), or lower, concrete less than 72 hours old shall be provided at least the following protection.

| Minimum Temperature    | Protection   |
|------------------------|--|
| 25 – 32 °F (-4 – 0 °C) | Two layers of polyethylene sheeting, one layer of polyethylene and one layer of burlap, or two layers of waterproof paper. |
| Below 25 °F (-4 °C)    | 6 in. (150 mm) of straw covered with one layer of polyethylene sheeting or waterproof paper.                               |

These protective covers shall remain in place until the concrete is at least 96 hours old. When straw is required on pavement cured with membrane curing compound, the compound shall be covered with a layer of burlap, polyethylene sheeting or waterproof paper before the straw is applied.

After September 15, there shall be available to the work within four hours, sufficient clean, dry straw to cover at least two days production. Additional straw shall be provided as needed to afford the protection required. Regardless of the precautions taken, the Contractor shall be responsible for protection of the concrete placed and any concrete damaged by cold temperatures shall be removed and replaced.

- (d) Protection of Concrete Structures From Low Air Temperatures. When the official National Weather Service forecast for the construction area predicts a low below 45 °F (7 °C), or if the actual temperature drops below 45 °F (7 °C), concrete less than 72 hours old shall be provided protection. Concrete shall also be provided protection when placed during the winter period of December 1 through March 15. Concrete shall not be placed until the materials, facilities, and equipment for protection are approved by the Engineer.

When directed by the Engineer, the Contractor may be required to place concrete during the winter period. When winter construction is specified, the Contractor shall proceed with the construction, including excavation, pile driving, concrete, steel erection, and all appurtenant work required for the complete construction of the item, except at times when weather conditions make such operations impracticable.

Regardless of the precautions taken, the Contractor shall be responsible for protection of the concrete placed and any concrete damaged by cold temperatures shall be removed and replaced.

- (1) Protection Method I. The concrete shall be completely covered with insulating material such as fiberglass, rock wool, or other approved commercial insulating material having the minimum thermal resistance R, as defined in ASTM C 168, for the corresponding minimum dimension of the concrete unit being protected as shown in the following table.

| Minimum Pour Dimension |                | Thermal Resistance R |
|------------------------|----------------|----------------------|
| in.                    | (mm)           |                      |
| 6 or less              | (150 or less)  | R=16                 |
| > 6 to 12              | (> 150 to 300) | R=10                 |
| > 12 to 18             | (> 300 to 450) | R=6                  |
| > 18                   | (> 450)        | R=4                  |

The insulating material manufacturer shall clearly mark the insulating material with the thermal resistance R value.

The insulating material shall be completely enclosed on sides and edges with an approved waterproof liner and shall be maintained in a serviceable condition. Any tears in the liner shall be repaired in a manner approved by the Engineer. The Contractor shall provide means for checking the temperature of the surface of the concrete during the protection period.

On formed surfaces, the insulating material shall be attached to the outside of the forms with wood cleats or other suitable means to prevent any circulation of air under the insulation and shall be in place before the concrete is placed. The blanket insulation shall be applied tightly against the forms. The edges and ends shall be attached so as to exclude air and moisture. If the blankets are provided with nailing flanges, the flanges shall be attached to the studs with cleats. Where tie rods or reinforcement bars protrude, the areas adjacent to the rods or bars shall be adequately protected in a manner satisfactory to the Engineer. Where practicable, the insulation shall overlap any previously placed concrete by at least 1 ft (300 mm). Insulation on the underside of floors on steel members shall cover the top flanges of supporting members. On horizontal surfaces, the insulating material shall be placed as soon as the concrete has set, so that the surface will not be marred and shall be covered with canvas or other waterproof covering. The insulating material shall remain in place for a period of seven days after the concrete is placed.

The Contractor may remove the forms, providing the temperature is 35 °F (2 °C) and rising and the Contractor is able to wrap the particular section within two hours from the time of the start of the form removal. The insulation shall remain in place for the remainder of the seven days curing period.

- (2) Protection Method II. The concrete shall be enclosed in adequate housing and the air surrounding the concrete kept at a temperature of not less than 50 °F (10 °C) nor more than 80 °F (27 °C) for a period of seven days after the concrete is placed. The Contractor shall provide means for checking the temperature of the surface of the concrete or air temperature within the housing during the protection period. All exposed surfaces within the housing shall be cured according to the Index Table.

The Contractor shall provide adequate fire protection where heating is in progress and such protection shall be accessible at all times. The Contractor shall maintain labor to keep the heating equipment in continuous operation.

At the close of the heating period, the temperature shall be decreased to the approximate temperature of the outside air at a rate not to exceed 15 °F (8 °C) per 12 hour period, after which the housing maybe removed. The surface of the concrete shall be permitted to dry during the cooling period.

- (3) Protection Method III. As soon as the surface is sufficiently set to prevent marring, the concrete shall be covered with 12 in. (300 mm) of loose, dry straw followed by a layer of impermeable covering. The edges of the covering shall be sealed to prevent circulation of air and prevent the cover from flapping or blowing. The protection shall remain in place until the concrete is seven days old. If construction operations require removal, the protection removed shall be replaced immediately after completion or suspension of such operations.

**1020.14 Temperature Control for Placement.** Temperature control for concrete placement shall be according to the following.

- (a) Concrete other than Structures. Concrete may be placed when the air temperature is above 35 °F (2 °C) and rising, and concrete placement shall stop when the falling temperature reaches 40 °F (4 °C) or below, unless otherwise approved by the Engineer.

The temperature of concrete immediately before placement shall be a minimum of 50 °F (10 °C) and a maximum of 90 °F (32 °C). If concrete is pumped, the temperature of the concrete as placed in the forms shall be a minimum of 50 °F (10 °C) and a maximum of 90 °F (32 °C). A maximum concrete temperature shall not apply to Class PP concrete.

- (b) Concrete in Structures. Concrete may be placed when the air temperature is above 40 °F (4 °C) and rising, and concrete placement shall stop when the falling temperature reaches 45 °F (7 °C) or below, unless otherwise approved by the Engineer.

The temperature of the concrete immediately before placement shall be a minimum of 50 °F (10 °C) and a maximum of 90 °F (32 °C). If concrete is pumped, the temperature of the concrete as placed in the forms shall be a minimum of 50 °F (10 °C) and a maximum of 90 °F (32 °C).

When insulated forms are used, the maximum temperature of the concrete mixture immediately before placement shall be 80 °F (25 °C).

When concrete is placed in contact with previously placed concrete, the temperature of the mixed concrete may be increased to 80 °F (25 °C) by the Contractor to offset anticipated heat loss.

- (c) All Classes of Concrete. Aggregates and water shall be heated or cooled uniformly and as necessary to produce concrete within the specified temperature limits. No frozen aggregates shall be used in the concrete.
- (d) Temperature. The concrete temperature shall be determined according to Illinois Modified AASHTO T 309.

**1020.15 Heat of Hydration Control for Concrete Structures.** The Contractor shall control the heat of hydration for concrete structures when the least dimension for a drilled shaft, foundation, footing, substructure, or superstructure concrete pour exceeds 5.0 ft (1.5 m). The work shall be according to the following.

- (a) Temperature Restrictions. The maximum temperature of the concrete after placement shall not exceed 150 °F (66 °C). The maximum temperature differential between the internal concrete core and concrete 2 to 3 in. (50 to 75 mm) from the exposed surface shall not exceed 35 °F (19 °C). The Contractor shall perform temperature monitoring to ensure compliance with the temperature restrictions.
- (b) Thermal Control Plan. The Contractor shall provide a thermal control plan a minimum of 28 calendar days prior to concrete placement for review by the Engineer. Acceptance of the thermal control plan by the Engineer shall not preclude the Contractor from specification compliance, and from preventing cracks in the concrete. At a minimum, the thermal control plan shall provide detailed information on the following requested items and shall comply with the specific specifications indicated for each item.
- (1) Concrete mix design(s) to be used. Grout mix design if post-cooling with embedded pipe.

The mix design requirements in Articles 1020.04 and 1020.05 shall be revised to include the following additional requirements to control the heat of hydration.

- a. The concrete mixture shall be uniformly graded and preference for larger size aggregate shall be used in the mix design. Article 1004.02(d)(2) and information in the "Portland Cement Concrete Level III Technician Course – Manual of Instructions for Design of Concrete Mixtures" shall be used to develop the uniformly graded mixture.
- b. The following shall apply to all concrete except Class DS concrete or when self-consolidating concrete is desired. For central-mixed concrete, the Contractor shall have the option to develop a mixture with a minimum of 520 lbs/cu yd (309 kg/cu m) of cement and finely divided minerals summed together. For truck-mixed or shrink-mixed concrete, the Contractor shall have the option to develop a mixture with a minimum of 550 lbs/cu yd (326 kg/cu m) of cement and finely divided minerals summed together. A water-reducing or high range water-reducing admixture shall be used in the central mixed, truck-mixed or shrink-mixed concrete mixture. For any mixture to be placed underwater, the minimum cement and finely divided minerals shall be 550 lbs/cu yd (326 kg/cu m) for central-mixed concrete, and 580 lbs/cu yd (344 kg/cu m) for truck-mixed or shrink-mixed concrete.

For Class DS concrete, CA 11 may be used. If CA 11 is used, the Contractor shall have the option to develop a mixture with a minimum cement and finely divided minerals of 605 lbs/cu yd (360 kg/cu m) summed together. If CA 11 is used and either Class DS concrete is placed underwater or a self-consolidating concrete mixture is desired, the Contractor shall have the option to develop a mixture with a minimum cement and finely divided minerals of 635 lbs/cu yd (378 kg/cu m) summed together.

- c. The minimum portland cement content in the mixture shall be 375 lbs/cu yd (222 kg/cu m). When the total of organic processing additions, inorganic processing additions, and limestone addition exceed 5.0 percent in the cement, the minimum portland cement content in the mixture shall be 400 lbs/cu yd (237 kg/cu m). For a drilled shaft, foundation, footing, or substructure, the minimum portland cement may be reduced to as low as 330 lbs/cu yd (196 kg/cu m) if the concrete has adequate freeze/thaw durability. The Contractor shall provide freeze/thaw test results according to AASHTO T 161 Procedure A or B, and the relative dynamic modulus of elasticity of the mix design shall be a minimum of 80 percent. Freeze/thaw testing will not be required for concrete that will not be exposed to freezing and thawing conditions as determined by the Engineer.
- d. The maximum cement replacement with fly ash shall be 40.0 percent. The maximum cement replacement with ground granulated blast-furnace slag shall be 65.0 percent. When cement replacement with ground granulated blast-furnace slag exceeds 35.0 percent, only Grade 100 shall be used.

- e. The mixture may contain a maximum of two finely divided minerals. The finely divided mineral in portland-pozzolan cement or portland blast-furnace slag cement shall count toward the total number of finely divided minerals allowed. The finely divided minerals shall constitute a maximum of 65.0 percent of the total cement plus finely divided minerals. The fly ash portion shall not exceed 40.0 percent. The ground granulated blast-furnace slag portion shall not exceed 65.0 percent. The microsilica or high-reactivity metakaolin portion used together or separately shall not exceed 5.0 percent.
- f. The time to obtain the specified strength may be increased to a maximum 56 days, provided the curing period specified in Article 1020.13 is increased to a minimum of 14 days.

The minimum grout strength for filling embedded pipe shall be as specified for the concrete, and testing shall be according to AASHTO T 106.

- (2) The selected mathematical method for evaluating heat of hydration thermal effects, which shall include the calculated adiabatic temperature rise, calculated maximum concrete temperature, and calculated maximum temperature differential between the internal concrete core and concrete 2 to 3 in. (50 to 75 mm) from the exposed surface. The time when the maximum concrete temperature and maximum temperature differential will occur is required if the time frame will be more than seven days.

Acceptable mathematical methods include ACI 207.2R "Report on Thermal and Volume Change Effects on Cracking of Mass Concrete" as well as other proprietary methods. The Contractor shall perform heat of hydration testing on the cement and finely divided minerals to be used in the concrete mixture. The test shall be according to ASTM C 186 or other applicable test methods, and the result for heat shall be used in the equation to calculate adiabatic temperature rise.

The Contractor has the option to propose a higher maximum temperature differential between the internal concrete core and concrete 2 to 3 in. (50 to 75 mm) from the exposed surface, but the proposed value shall not exceed 50 °F (10 °C). In addition, based on strength gain of the concrete, multiple maximum temperature differentials at different times may be proposed. The proposed value shall be justified through a mathematical method.

- (3) Proposed maximum concrete temperature or temperature range prior to placement.

Article 1020.14 shall apply except a minimum 40 °F (10 °C) concrete temperature will be permitted.

- (4) Pre-cooling, post-cooling, and surface insulation methods that will be used to ensure the concrete will comply with the specified maximum temperature and specified or proposed temperature differential. For reinforcement that extends beyond the limits of the pour, the Contractor shall indicate if the reinforcement is required to be covered with insulation.

Refer to ACI 207.4R "Cooling and Insulating Systems for Mass Concrete" for acceptable methods that will be permitted. A copy of the ACI document shall be provided to the Engineer at the construction site. If embedded pipe is used for post-cooling, the material shall be polyvinyl chloride or polyethylene. The embedded pipe system shall be properly supported, and the Contractor shall subsequently inspect glued joints to ensure they are able to withstand free falling concrete. The embedded pipe system shall be leak tested after inspection of the glued joints, and prior to the concrete placement. The leak test shall be performed at maximum service pressure or higher for a minimum of 15 minutes. All leaks shall be repaired. The embedded pipe cooling water may be from natural sources such as streams and rivers, but shall be filtered to prevent system stoppages. When the embedded pipe is no longer needed, the surface connections to the pipe shall be removed to a depth of 4 in. (100 mm) below the surface of the concrete. The remaining pipe shall be completely filled with grout. The 4 in. (100 mm) deep concrete hole shall be filled with nonshrink grout. Form and insulation removal shall be done in a manner to prevent cracking and ensure the maximum temperature differential is maintained. Insulation shall be in good condition as determined by the Engineer and properly attached.

- (5) Dimensions of each concrete pour, location of construction joints, placement operations, pour pattern, lift heights, and time delays between lifts.

Refer to ACI 207.1R "Guide to Mass Concrete" for acceptable placement operations that will be permitted. A copy of the ACI document shall be provided to the Engineer at the construction site.

- (6) Type of temperature monitoring system, the number of temperature sensors, and location of sensors.

A minimum of two independent temperature monitoring systems and corresponding sensors shall be used.

The temperature monitoring system shall have a minimum temperature range of 32 °F (0 °C) to 212 °F (100 °C), an accuracy of  $\pm 2$  °F ( $\pm 1$  °C), and be able to automatically record temperatures without external power. Temperature monitoring shall begin once the sensor is encased in concrete, and with a maximum interval of one hour. Temperature monitoring may be discontinued after the maximum concrete temperature has been reached, post-cooling is no longer required, and the maximum temperature differential between the internal concrete core and the ambient air temperature does not exceed 35 °F (19 °C). The Contractor has the option to select a higher maximum temperature differential, but the proposed value shall not exceed 50 °F (28 °C). The proposed value shall be justified through a mathematical method.

At a minimum, a temperature sensor shall be located at the theoretical hottest portion of the concrete, normally the geometric center, and at the exterior face that will provide the maximum temperature differential. At the exterior face, the sensor shall be located 2 to 3 in. (50 to 75 mm) from the surface of the concrete. Sensors shall also be located a minimum of 1 in. (25 mm) away from reinforcement, and equidistant between cooling pipes if either applies. A sensor will also be required to

measure ambient air temperature. The entrant/exit cooling water temperature for embedded pipe shall also be monitored.

Temperature monitoring results shall be provided to the Engineer a minimum of once each day and whenever requested by the Engineer. The report may be electronic or hard copy. The report shall indicate the location of each sensor, the temperature recorded, and the time recorded. The report shall be for all sensors and shall include ambient air temperature and entrant/exit cooling water temperatures. The temperature data in the report may be provided in tabular or graphical format, and the report shall indicate any corrective actions during the monitoring period. At the completion of the monitoring period, the Contractor shall provide the Engineer a final report that includes all temperature data and corrective actions.

(7) Indicate contingency operations to be used if the maximum temperature or temperature differential of the concrete is reached after placement.

- (c) Temperature Restriction Violations. If the maximum temperature of the concrete after placement exceeds 150 °F (66 °C), but is less than 158 °F (70 °C), the concrete will be accepted if no cracking or other unacceptable defects are identified. If cracking or unacceptable defects are identified, Article 105.03 shall apply. If the concrete temperature exceeds 158 °F (70 °C), Article 105.03 shall apply.

If a temperature differential between the internal concrete core and concrete 2 to 3 in. (50 to 75 mm) from the exposed surface exceeds the specified or proposed maximum value allowed, the concrete will be accepted if no cracking or other unacceptable defects are identified. If unacceptable defects are identified, Article 105.03 shall apply.

When the maximum 150 °F (66 °C) concrete temperature or the maximum allowed temperature differential is violated, the Contractor shall implement corrective action prior to the next pour. In addition, the Engineer reserves the right to request a new thermal control plan for acceptance before the Contractor is allowed to pour again.

- (d) Inspection and Repair of Cracks. The Engineer will inspect the concrete for cracks after the temperature monitoring is discontinued, and the Contractor shall provide access for the Engineer to do the inspection. A crack may require repair by the Contractor as determined by the Engineer. The Contractor shall be responsible for the repair of all cracks. Protective coat or a concrete sealer shall be applied to a crack less than 0.007 in. (0.18 mm) in width. A crack that is 0.007 in. (0.18 mm) or greater shall be pressure injected with epoxy according to Section 590.

**PREFORMED PLASTIC PAVEMENT MARKING TYPE D - INLAID (BDE)**

Effective: April 1, 2012

Revise subparagraph (c) and add subparagraph (i) to Article 780.02 of the Standard Specifications:

- “(c) Preformed Plastic Pavement Markings, Type B and Type C ..... 1095.03  
(i) Preformed Plastic Pavement Marking, Type D ..... 1095.10”

Revise the first paragraph of Article 780.07(a) of the Standard Specifications to read:

“(a) Type B or D - Inlaid Application. On freshly placed HMA, the inlaid markings shall be applied before final compaction and when the pavement temperature has cooled to approximately 150 °F (65 °C) and when, in the opinion of the Engineer, the pavement is acceptable for vehicular traffic.”

Revise the first paragraph of Article 780.11 of the Standard Specifications to read:

“**780.11 Inspection.** The epoxy, thermoplastic, preformed thermoplastic, preformed plastic Type B, C, or D, and polyurea pavement markings will be inspected following installation, but no later than October 15 for preformed plastic markings, November 1 for thermoplastic and preformed thermoplastic markings, and December 15 for epoxy and polyurea markings. In addition, they will be inspected following a winter performance period that extends 180 days from November 1.”

Revise the ninth paragraph of Article 780.11 of the Standard Specifications to read:

“This performance inspection and performance acceptance of the epoxy, thermoplastic, preformed thermoplastic, preformed plastic Type B, C, or D, and polyurea markings shall not delay acceptance of the entire project and final payment due if the Contractor requires and receives from the subcontractor a third party "performance" bond naming the Department as obligee in the full amount of all pavement marking quantities listed in the contract, multiplied by the contract unit price. The bond shall be executed prior to acceptance and final payment of the non-pavement marking items and shall be in full force and effect until final performance inspection and performance acceptance of the epoxy, thermoplastic, preformed thermoplastic, preformed plastic, and polyurea pavement markings. Execution of the third party bond shall be the option of the Contractor.”

Revise the first paragraph of Article 780.13 of the Standard Specifications to read:

“**780.13 Basis of Payment.** This work will be paid for at the contract unit prices per foot (meter) of applied line width, as specified, for THERMOPLASTIC PAVEMENT MARKING - LINE; PAINT PAVEMENT MARKING - LINE; EPOXY PAVEMENT MARKING - LINE; PREFORMED PLASTIC PAVEMENT MARKING - LINE - TYPE B, C, B – INLAID, or D - INLAID; PREFORMED THERMOPLASTIC PAVEMENT MARKING – LINE, POLYUREA PAVEMENT MARKING TYPE I – LINE, POLYUREA PAVEMENT MARKING TYPE II - LINE; and/or per square foot (square meter) for THERMOPLASTIC PAVEMENT MARKING - LETTERS AND SYMBOLS; PAINT PAVEMENT MARKING - LETTERS AND SYMBOLS; EPOXY PAVEMENT MARKING - LETTERS AND SYMBOLS; PREFORMED PLASTIC PAVEMENT MARKING - TYPE B, C, B – INLAID, or D - INLAID - LETTERS AND SYMBOLS; PREFORMED THERMOPLASTIC PAVEMENT MARKING - LETTERS AND SYMBOLS.”

Add the following to Section 1095 of the Standard Specifications:

“**1095.10 Preformed Plastic Pavement Marking, Type D.** The preformed patterned markings shall consist of a white or yellow tape with wet retroreflective media incorporated to provide immediate and continuing retroreflection during both wet and dry conditions. The pavement marking shall be manufactured without the use of heavy metals including lead chromate pigments or other similar, lead-containing chemicals.

The white and yellow preformed plastic pavement markings shall meet the Type B requirements of Article 1095.03(b), (c), (d), (e), (i), (l), (m), (n) and the following.

- (a) Composition. The pliant polymer pavement markings shall consist of a mixture of high-quality polymeric materials, pigments and glass beads distributed throughout its base cross-sectional area, with a layer of wet retroreflective media bonded to a durable polyurethane topcoat surface. The patterned surface shall have approximately 40% ± 10% of the surface area raised and presenting a near vertical face to traffic from any direction. The channels between the raised areas shall be substantially free of exposed beads or particles.
- (b) Retroreflectance. The white and yellow markings shall meet the following for initial dry and wet retroreflectance.
  - (1) Dry Retroreflectance. Dry retroreflectance shall be measured under dry conditions according to ASTM D4061 and meet the values described in Article 1095.03(l) for Type B.
  - (2) Wet Retroreflectance. Wet retroreflectance shall be measured under wet conditions according to ASTM E2177 and meet the values shown in the following table.

**Wet Retroreflectance, Initial R<sub>L</sub>**

| Color  | R <sub>L</sub> 1.05/88.76 |
|--------|---------------------------|
| White  | 300                       |
| Yellow | 200                       |

- (c) Color. The material shall meet the following requirements for daylight reflectance and color, when tested, using a color spectrophotometer with 45 degrees circumferential/zero degree geometry, illuminant D65, and a two degree observer angle. The color instrument shall measure the visible spectrum from 380 to 720 nm with a wavelength measurement interval and spectral bandpass of 10 nm.

| Color   | Daylight Reflectance %Y |
|---------|-------------------------|
| White   | 65 minimum              |
| *Yellow | 36-59                   |

\*Shall match Federal 595 Color No. 33538 and the chromaticity limits as follows.

|   |       |       |       |       |
|---|-------|-------|-------|-------|
| x | 0.490 | 0.475 | 0.485 | 0.530 |
| y | 0.470 | 0.438 | 0.425 | 0.456 |

- (d) Sampling, Testing, Acceptance, and Certification. Prior to approval and use of the preformed pavement marking materials, the manufacturer shall submit a notarized certification from an independent laboratory, together with the results of all tests, stating that the material meets the requirements as set forth herein. The certification test report shall state the lot tested, manufacturer's name, and date of manufacture.

After approval by the Department, samples and certification by the manufacturer shall be submitted for each batch used. The manufacturer shall submit a certification stating that the material meets the requirements as set forth herein and is essentially identical to the material sent for qualification. The certification shall state the lot tested, manufacturer's name, and date of manufacture."

## **QUALITY CONTROL/QUALITY ASSURANCE OF CONCRETE MIXTURES (BDE)**

Effective: January 1, 2012

Add the following to Section 1020 of the Standard Specifications:

**"1020.16 Quality Control/Quality Assurance of Concrete Mixtures.** This Article specifies the quality control responsibilities of the Contractor for concrete mixtures (except Class PC and PS concrete), cement aggregate mixture II, and controlled low-strength material incorporated in the project, and defines the quality assurance and acceptance responsibilities of the Engineer.

A list of quality control/quality assurance (QC/QA) documents is provided in Article 1020.16(g), Schedule D.

A Level I Portland Cement Concrete (PCC) Technician shall be defined as an individual who has successfully completed the Department's training for concrete testing.

A Level II Portland Cement Concrete (PCC) Technician shall be defined as an individual who has successfully completed the Department's training for concrete proportioning.

A Level III Portland Cement Concrete (PCC) Technician shall be defined as an individual who has successfully completed the Department's training for concrete mix design.

A Concrete Tester shall be defined as an individual who has successfully completed the Department's training to assist with concrete testing and is monitored on a daily basis.

Aggregate Technician shall be defined as an individual who has successfully completed the Department's training for gradation testing involving aggregate production and mixtures.

Mixture Aggregate Technician shall be defined as an individual who has successfully completed the Department's training for gradation testing involving mixtures.

Gradation Technician shall be defined as an individual who has successfully completed the Department's training to assist with gradation testing and is monitored on a daily basis.

- (a) Equipment/Laboratory. The Contractor shall provide a laboratory and test equipment to perform their quality control testing.

The laboratory shall be of sufficient size and be furnished with the necessary equipment, supplies, and current published test methods for adequately and safely performing all required tests. The laboratory will be approved by the Engineer according to the current Bureau of Materials and Physical Research Policy Memorandum "Minimum Private Laboratory Requirements for Construction Materials Testing or Mix Design". Production of a mixture shall not begin until the Engineer provides written approval of the laboratory. The Contractor shall refer to the Department's "Required Sampling and Testing Equipment for Concrete" for equipment requirements.

Test equipment shall be maintained and calibrated as required by the appropriate test method, and when required by the Engineer. This information shall be documented on the Department's "Calibration of Concrete Testing Equipment" form.

Test equipment used to determine compressive or flexural strength shall be calibrated each 12 month period by an independent agency, using calibration equipment traceable to the National Institute of Standards and Technology (NIST). The Contractor shall have the calibration documentation available at the test equipment location.

The Engineer will have unrestricted access to the plant and laboratory at any time to inspect measuring and testing equipment, and will notify the Contractor of any deficiencies. Defective equipment shall be immediately repaired or replaced by the Contractor.

- (b) Quality Control Plan. The Contractor shall submit, in writing, a proposed Quality Control (QC) Plan to the Engineer. The QC Plan shall be submitted a minimum of 45 calendar days prior to the production of a mixture. The QC Plan shall address the quality control of the concrete, cement aggregate mixture II, and controlled low-strength material incorporated in the project. The Contractor shall refer to the Department's "Model Quality Control Plan for Concrete Production" to prepare a QC Plan. The Engineer will respond in writing to the Contractor's proposed QC Plan within 15 calendar days of receipt.

Production of a mixture shall not begin until the Engineer provides written approval of the QC Plan. The approved QC Plan shall become a part of the contract between the Department and the Contractor, but shall not be construed as acceptance of any mixture produced.

The QC Plan may be amended during the progress of the work, by either party, subject to mutual agreement. The Engineer will respond in writing to a Contractor's proposed QC Plan amendment within 15 calendar days of receipt. The response will indicate the approval or denial of the Contractor's proposed QC Plan amendment.

- (c) Quality Control by Contractor. The Contractor shall perform quality control inspection, sampling, testing, and documentation to meet contract requirements. Quality control includes the recognition of obvious defects and their immediate correction. Quality control also includes appropriate action when passing test results are near specification limits, or to resolve test result differences with the Engineer. Quality control may require increased testing, communication of test results to the plant or the jobsite, modification of operations, suspension of mixture production, rejection of material, or other actions as appropriate. The Engineer shall be immediately notified of any failing tests and subsequent remedial action. Passing tests shall be reported no later than the start of the next work day.

When a mixture does not comply with specifications, the Contractor shall reject the material; unless the Engineer accepts the material for incorporation in the work, according to Article 105.03.

- (1) Personnel Requirements. The Contractor shall provide a Quality Control (QC) Manager who will have overall responsibility and authority for quality control. The jobsite and plant personnel shall be able to contact the QC Manager by cellular phone, two-way radio or other methods approved by the Engineer.

The QC Manager shall visit the jobsite a minimum of once a week. A visit shall be performed the day of a bridge deck pour, the day a non-routine mixture is placed as determined by the Engineer, or the day a plant is anticipated to produce more than 1000 cu yd (765 cu m). Any of the three required visits may be used to meet the once per week minimum requirement.

The Contractor shall provide personnel to perform the required inspections, sampling, testing and documentation in a timely manner. The Contractor shall refer to the Department's "Qualifications and Duties of Concrete Quality Control Personnel" document.

A Level I PCC Technician shall be provided at the jobsite during mixture production and placement, and may supervise concurrent pours on the project. For concurrent pours, a minimum of one Concrete Tester shall be required at each pour location. If the Level I PCC Technician is at one of the pour locations, a Concrete Tester is still required at the same location. Each Concrete Tester shall be able to contact the Level I PCC Technician by cellular phone, two-way radio or other methods approved by the Engineer. A single Level I PCC Technician shall not supervise concurrent pours for multiple contracts.

A Level II PCC Technician shall be provided at the plant, or shall be available, during mixture production and placement. A Level II PCC Technician may supervise a maximum of three plants. Whenever the Level II PCC Technician is not at the plant during mixture production and placement, a Concrete Tester or Level I PCC Technician shall be present at the plant to perform any necessary concrete tests. The Concrete Tester, Level I PCC Technician, or other individual shall also be trained to perform any necessary aggregate moisture tests, if the Level II PCC Technician is not at the plant during mixture production and placement. The Concrete Tester, Level I PCC Technician, plant personnel, and jobsite personnel

shall have the ability to contact the Level II PCC Technician by cellular phone, two-way radio, or other methods approved by the Engineer.

For a mixture which is produced and placed with a mobile portland cement concrete plant as defined in Article 1103.04, a Level II PCC Technician shall be provided. The Level II PCC Technician shall be present at all times during mixture production and placement.

A Concrete Tester, Mixture Aggregate Technician, and Aggregate Technician may provide assistance with sampling and testing. A Gradation Technician may provide assistance with testing. A Concrete Tester shall be supervised by a Level I or Level II PCC Technician. A Gradation Technician shall be supervised by a Level II PCC Technician, Mixture Aggregate Technician, or Aggregate Technician.

- (2) Required Plant Tests. Sampling and testing shall be performed at the plant, or at a location approved by the Engineer, to control the production of a mixture. The required minimum Contractor plant sampling and testing is indicated in Article 1020.16(g) Schedule A.
- (3) Required Field Tests. Sampling and testing shall be performed at the jobsite to control the production of a mixture, and to comply with specifications for placement. For standard curing, after initial curing, and for strength testing; the location shall be approved by the Engineer. The required minimum Contractor jobsite sampling and testing is indicated in Article 1020.16(g), Schedule B.
- (d) Quality Assurance by Engineer. The Engineer will perform quality assurance tests on independent samples and split samples. An independent sample is a field sample obtained and tested by only one party. A split sample is one of two equal portions of a field sample, where two parties each receive one portion for testing. The Engineer may request the Contractor to obtain a split sample. Aggregate split samples and any failing strength specimen shall be retained until permission is given by the Engineer for disposal. The results of all quality assurance tests by the Engineer will be made available to the Contractor. However, Contractor split sample test results shall be provided to the Engineer before Department test results are revealed. The Engineer's quality assurance independent sample and split sample testing is indicated in Article 1020.16(g), Schedule C.
  - (1) Strength Testing. For strength testing, Article 1020.09 shall apply, except the Contractor and Engineer beam strength specimens may be cured in the same tank.
  - (2) Comparing Test Results. Differences between the Engineer's and the Contractor's split sample test results will not be considered extreme if within the following limits:

| Test Parameter       | Acceptable Limits of Precision  |
|----------------------|---|
| Slump                | 0.75 in. (20 mm)  |
| Air Content          | 0.9%  |
| Compressive Strength | 900 psi (6200 kPa)  |
| Flexural Strength    | 90 psi (620 kPa)  |
| Aggregate Gradation  | See "Guideline for Sample Comparison" in Appendix "A" of the Manual of Test Procedures for Materials. |

When acceptable limits of precision have been met, but only one party is within specification limits, the failing test shall be resolved before the material may be considered for acceptance.

(3) Test Results and Specification Limits.

a. Split Sample Testing. If either the Engineer's or the Contractor's split sample test result is not within specification limits, and the other party is within specification limits; immediate retests on a split sample shall be performed for slump, air content, or aggregate gradation. A passing retest result by each party will require no further action. If either the Engineer's or Contractor's slump, air content, or aggregate gradation split sample retest result is a failure; or if either the Engineer's or Contractor's strength test result is a failure, and the other party is within specification limits; the following actions shall be initiated to investigate the test failure:

1. The Engineer and the Contractor shall investigate the sampling method, test procedure, equipment condition, equipment calibration, and other factors.
2. The Engineer or the Contractor shall replace test equipment, as determined by the Engineer.
3. The Engineer and the Contractor shall perform additional testing on split samples, as determined by the Engineer.

For aggregate gradation, jobsite slump, and jobsite air content; if the failing split sample test result is not resolved according to 1., 2., or 3., and the mixture has not been placed, the Contractor shall reject the material; unless the Engineer accepts the material for incorporation in the work according to Article 105.03. If the mixture has already been placed, or if a failing strength test result is not resolved according to 1., 2., or 3., the material will be considered unacceptable.

If a continued trend of difference exists between the Engineer's and the Contractor's split sample test results, or if split sample test results exceed the acceptable limits of precision, the Engineer and the Contractor shall investigate according to items 1, 2, and 3.

b. Independent Sample Testing. For aggregate gradation, jobsite slump, and jobsite air content; if the result of a quality assurance test on a sample independently obtained by the Engineer is not within specification limits, and the mixture has not been placed, the Contractor shall reject the material, unless the Engineer accepts the material for incorporation in the work according to Article 105.03. If the mixture has already been placed or the Engineer obtains a failing strength test result, the material will be considered unacceptable.

(e) Acceptance by the Engineer. Final acceptance will be based on the Standard Specifications and the following:

- (1) The Contractor's compliance with all contract documents for quality control.

- (2) Validation of Contractor quality control test results by comparison with the Engineer's quality assurance test results using split samples. Any quality control or quality assurance test determined to be flawed may be declared invalid only when reviewed and approved by the Engineer. The Engineer will declare a test result invalid only if it is proven that improper sampling or testing occurred. The test result is to be recorded and the reason for declaring the test invalid will be provided by the Engineer.
- (3) Comparison of the Engineer's quality assurance test results with specification limits using samples independently obtained by the Engineer.

The Engineer may suspend mixture production, reject materials, or take other appropriate action if the Contractor does not control the quality of concrete, cement aggregate mixture II, or controlled low-strength material for acceptance. The decision will be determined according to (1), (2), or (3).

(f) Documentation.

- (1) Records. The Contractor shall be responsible for documenting all observations, inspections, adjustments to the mix design, test results, retest results, and corrective actions in a bound hardback field book, bound hardback diary, or appropriate Department form, which shall become the property of the Department. The documentation shall include a method to compare the Engineer's test results with the Contractor's results. The Contractor shall be responsible for the maintenance of all permanent records whether obtained by the Contractor, the consultants, the subcontractors, or the producer of the mixture. The Contractor shall provide the Engineer full access to all documentation throughout the progress of the work.

The Department's form MI 504M, form BMPR MI654, and form BMPR MI655 shall be completed by the Contractor, and shall be submitted to the Engineer weekly or as required by the Engineer. A correctly completed form MI 504M, form BMPR MI654, and form BMPR MI655 are required to authorize payment by the Engineer, for applicable pay items.

- (2) Delivery Truck Ticket. The following information shall be recorded on each delivery ticket or in a bound hardback field book: initial/final revolution counter reading, at the jobsite, if the mixture is truck-mixed; time discharged at the jobsite; total amount of each admixture added at the jobsite; total amount of water added at the jobsite; and total amount of cement added at the jobsite if the air content needed adjustment.

- (g) Basis of Payment and Schedules. Quality Control/Quality Assurance of portland cement concrete mixtures will not be paid for separately, but shall be considered as included in the cost of the various concrete contract items.

SCHEDULE A

| CONTRACTOR PLANT SAMPLING AND TESTING              |  |  |   |
|--|--|--|---|
| Item   | Test   | Frequency  | IL Modified AASHTO or Department Test Method <sup>1/</sup>                        |
| Aggregates (Arriving at Plant)                     | Gradation <sup>2/</sup>                                  | As needed to check source for each gradation number                          | T 2, T 11, T 27, and T 248  |
| Aggregates (Stored at Plant in Stockpiles or Bins) | Gradation <sup>2/</sup>                                  | 2,500 cu yd (1,900 cu m) for each gradation number <sup>3/</sup>             | T 2, T 11, T 27, and T 248  |
| Aggregates (Stored at Plant in Stockpiles or Bins) | Moisture <sup>4/</sup> :<br>Fine Aggregate               | Once per week for moisture sensor, otherwise daily for each gradation number | Flask, Dunagan, Pycnometer Jar, or T 255  |
|  | Moisture <sup>4/</sup> :<br>Coarse Aggregate             | As needed to control production for each gradation number                    | Dunagan, Pycnometer Jar, or T 255   |
| Mixture <sup>5/</sup>                              | Slump, Air Content, Unit Weight / Yield, and Temperature | As needed to control production  | T 141 and T 119<br>T 141 and T 152 or T 196<br>T 141 and T 121<br>T 141 and T 309 |

- 1/ Refer to the Department's "Manual of Test Procedures for Materials".
- 2/ All gradation tests shall be washed. Testing shall be completed no later than 24 hours after the aggregate has been sampled.
- 3/ One per week (Sunday through Saturday) minimum unless the stockpile has not received additional aggregate material since the previous test.  
One per day minimum for a bridge deck pour unless the stockpile has not received additional aggregate material since the previous test. The sample shall be taken and testing completed prior to the pour. The bridge deck aggregate sample may be taken the day before the pour or as approved by the Engineer.
- 4/ If the moisture test and moisture sensor disagree by more than 0.5 percent, retest. If the difference remains, adjust the moisture sensor to an average of two or more moisture tests, using the Dunagan or Illinois Modified AASHTO T 255 test method. The Department's "Water/Cement Ratio Worksheet" form shall be completed when applicable.
- 5/ The Contractor may also perform strength testing according to Illinois Modified AASHTO T 141, T 23, and T 22 or T 177; or water content testing according to Illinois Modified AASHTO T 318; or other tests at the plant to control mixture production.

SCHEDULE B

| CONTRACTOR JOBSITE SAMPLING & TESTING <sup>1/</sup>  |   |  |   |
|--|---|--|---|
| Item   | Measured Property   | Random Sample Testing Frequency per Mix Design and per Plant <sup>2/</sup> | IL Modified AASHTO Test Method                            |
| Pavement,<br>Shoulder,<br>Base Course,<br>Base Course Widening,<br>Driveway Pavement,<br>Railroad Crossing,<br>Cement Aggregate<br>Mixture II  | Slump <sup>3/ 4/</sup>  | 1 per 500 cu yd<br>(400 cu m) or<br>minimum 1/day                          | T 141 and T 119   |
|  | Air Content <sup>3/ 5/</sup><br><sub>6/</sub>   | 1 per 100 cu yd<br>(80 cu m) or<br>minimum 1/day                           | T 141<br>And<br>T 152 or T 196                            |
|  | Compressive<br>Strength <sup>7/ 8/</sup><br>or<br>Flexural<br>Strength <sup>7/ 8/</sup> | 1 per 1250 cu yd<br>(1000 cu m) or<br>minimum 1/day                        | T 141, T 22 and<br>T 23<br>Or<br>T 141, T 177 and<br>T 23 |
| Bridge Approach Slab <sup>9/</sup> ,<br>Bridge Deck <sup>9/</sup> ,<br>Bridge Deck Overlay <sup>9/</sup> ,<br>Superstructure <sup>9/</sup> ,<br>Substructure,<br>Culvert,<br>Miscellaneous Drainage<br>Structures,<br>Retaining Wall,<br>Building Wall,<br>Drilled Shaft<br>Pile & Encasement<br>Footing,<br>Foundation,<br>Pavement Patching,<br>Structural Repairs | Slump <sup>3/ 4/</sup>  | 1 per 50 cu yd<br>(40 cu m) or<br>minimum 1/day                            | T 141 and T 119   |
|  | Air Content <sup>3/ 5/</sup><br><sub>6/</sub>   | 1 per 50 cu yd<br>(40 cu m) or<br>minimum 1/day                            | T 141<br>And<br>T 152 or T 196                            |
|  | Compressive<br>Strength <sup>7/ 8/</sup><br>or<br>Flexural<br>Strength <sup>7/ 8/</sup> | 1 per 250 cu yd<br>(200 cu m) or<br>minimum 1/day                          | T 141, T 22 and<br>T 23<br>Or<br>T 141, T 177 and<br>T 23 |
| Seal Coat  | Slump <sup>3/</sup>   | 1 per 250 cu yd<br>(200 cu m)<br>or<br>minimum 1/day                       | T 141 and T 119   |
|  | Air Content <sup>3/ 6/</sup>  | As needed to control<br>production   | T 141<br>And<br>T 152 or T 196                            |
|  | Compressive<br>Strength <sup>7/ 8/</sup><br>or<br>Flexural<br>Strength <sup>7/ 8/</sup> | 1 per 250 cu yd<br>(200 cu m)<br>or<br>minimum 1/day                       | T 141, T 22 and<br>T 23<br>Or<br>T 141, T 177 and<br>T 23 |

| CONTRACTOR JOBSITE SAMPLING & TESTING <sup>1/</sup>  |   |   |  |
|--|---|---|--|
| Curb,<br>Gutter,<br>Median,<br>Barrier,<br>Sidewalk,<br>Slope Wall,<br>Paved Ditch,<br>Fabric Formed<br>Concrete Revetment<br>Mat <sup>10/</sup> ,<br>Miscellaneous Items,<br>Incidental Items | Slump <sup>3/ 4/</sup>  | 1 per 100 cu yd<br>(80 cu m) or<br>minimum 1/day  | T 141 and T 119  |
|  | Air Content <sup>3/ 5/ 6/</sup>   | 1 per 50 cu yd<br>(40 cu m) or<br>minimum 1/day   | T 141<br>And<br>T 152 or T 196                         |
|  | Compressive<br>Strength <sup>7/ 8/</sup><br>or<br>Flexural<br>Strength <sup>7/ 8/</sup> | 1 per 400 cu yd<br>(300 cu m)<br>or minimum 1/day | T 141, T 22 and T 23<br>Or<br>T 141, T 177 and<br>T 23 |
| All  | Temperature <sup>3/</sup>   | As needed to control<br>production                | T 141 and<br>T 309                                     |
| Controlled Low-Strength<br>Material (CLSM)   | Flow, Air Content<br>and<br>Compressive<br>Strength                                     | As needed to control<br>production                | Illinois Test Procedure<br>307                         |

1/ Sampling and testing of small quantities of curb, gutter, median, barrier, sidewalk, slope wall, paved ditch, miscellaneous items, and incidental items may be waived by the Engineer if requested by the Contractor. However, quality control personnel are still required according to Article 1020.16(c)(1) The Contractor shall also provide recent evidence that similar material has been found to be satisfactory under normal sampling and testing procedures. The total quantity that may be waived for testing shall not exceed 100 cu yd (76 cu m) per contract.

2/ If one mix design is being used for several construction items during a day's production, one testing frequency may be selected to include all items. The construction items shall have the same slump, air content, and water/cement ratio specifications. The frequency selected shall equal or exceed the testing required for the construction item.

One sufficiently sized sample shall be taken to perform the required test(s). Random numbers shall be determined according to the Department's "Method for Obtaining Random Samples for Concrete". The Engineer will provide random sample locations.

3/ The temperature, slump, and air content tests shall be performed on the first truck load delivered, for each pour. Unless a random sample is required for the first truck load, testing the first truck load does not satisfy random sampling requirements.

4/ The slump random sample testing frequency shall be a minimum 1/day for a construction item which is slipformed.

- 5/ If a pump or conveyor is used for placement, a correction factor shall be established to allow for a loss of air content during transport. The first three truck loads delivered shall be tested, before and after transport by the pump or conveyor, to establish the correction factor. Once the correction is determined, it shall be re-checked after an additional 50 cu yd (40 cu m) is pumped, or an additional 100 cu yd (80 cu m) is conveyed. This shall continue throughout the pour. If the re-check indicates the correction factor has changed, a minimum of two truckloads is required to re-establish the correction factor. The correction factor shall also be re-established when significant changes in temperature, distance, pump or conveyor arrangement, and other factors have occurred. If the correction factor is 3.0 percent or more, the Contractor shall take corrective action to reduce the loss of air content during transport by the pump or conveyor. The Contractor shall record all air content test results, correction factors and corrected air contents. The corrected air content shall be reported on form BMRP MI654.
- 6/ If the Contractor's or Engineer's air content test result is within the specification limits, and 0.2 percent or closer to either limit, the next truck load delivered shall be tested by the Contractor. For example, if the specified air content range is 5.0 to 8.0 percent and the test result is 5.0, 5.1, 5.2, 7.8, 7.9 or 8.0 percent, the next truck shall be tested by the Contractor.  
  
If the Contractor's or Engineer's air content or slump test result is not within the specification limits, all subsequent truck loads delivered shall be tested by the Contractor until the problem is corrected.
- 7/ The test of record for strength shall be the day indicated in Article 1020.04. For cement aggregate mixture II, a strength requirement is not specified and testing is not required. Additional strength testing to determine early falsework and form removal, early pavement or bridge opening to traffic, or to monitor strengths is at the discretion of the Contractor. Strength shall be defined as the average of at least two cylinder or two beam breaks for field tests.
- 8/ In addition to the strength test, an air test, slump test, and temperature test shall be performed on the same sample. For mixtures pumped or conveyed, the Contractor shall sample according to Illinois Modified AASHTO T 141.
- 9/ The air content test will be required for each delivered truck load.
- 10/ For fabric formed concrete revetment mat, the slump test is not required and the flexural strength test is not applicable.

SCHEDULE C

| ENGINEER QUALITY ASSURANCE INDEPENDENT SAMPLE TESTING |   |                                 |
|---|---|---------------------------------|
| Location  | Measured Property   | Testing Frequency <sup>1/</sup> |
| Plant   | Gradation of aggregates stored in stockpiles or bins, Slump and Air Content | As determined by the Engineer.  |
| Jobsite   | Slump, Air Content and Strength   | As determined by the Engineer.  |

| ENGINEER QUALITY ASSURANCE SPLIT SAMPLE TESTING |  |  |
|---|--|--|
| Location  | Measured Property  | Testing Frequency <sup>1/</sup>  |
| Plant   | Gradation of aggregates stored in stockpiles or bins <sup>2/</sup> | At the beginning of the project, the first test performed by the Contractor. Thereafter, a minimum of 10% of total tests required of the Contractor will be performed per aggregate gradation number and per plant.                              |
|   | Slump and Air Content  | As determined by the Engineer.   |
| Jobsite   | Slump <sup>2/</sup> and Air Content <sup>2/3/</sup>                | At the beginning of the project, the first three tests performed by the Contractor. Thereafter, a minimum of 20% of total tests required of the Contractor will be performed per plant, which will include a minimum of one test per mix design. |
|   | Strength <sup>2/</sup>   | At the beginning of the project, the first test performed by the Contractor. Thereafter, a minimum of 20% of total tests required of the Contractor will be performed per plant, which will include a minimum of one test per mix design.        |

- 1/ The Engineer will perform the testing throughout the period of quality control testing by the Contractor.
- 2/ The Engineer will witness and take immediate possession of or otherwise secure the Department's split sample obtained by the Contractor.
- 3/ Before transport by pump or conveyor, a minimum of 20 percent of total tests required of the Contractor will be performed per mix design and per plant. After transport by pump or conveyor, a minimum of 20 percent of total tests required of the Contractor will be performed per mix design and per plant.

SCHEDULE D

CONCRETE QUALITY CONTROL AND QUALITY ASSURANCE DOCUMENTS

- (a) Model Quality Control Plan for Concrete Production (\*)
- (b) Qualifications and Duties of Concrete Quality Control Personnel (\*)
- (c) Development of Gradation Bands on Incoming Aggregate at Mix Plants (\*)
- (d) Required Sampling and Testing Equipment for Concrete (\*)
- (e) Method for Obtaining Random Samples for Concrete (\*)
- (f) Calibration of Concrete Testing Equipment (BMPR PCCQ01 through BMPR PCCQ09) (\*)
- (g) Water/Cement Ratio Worksheet (BMPR PCCW01) (\*)
- (h) Field/Lab Gradations (MI 504M) (\*)
- (i) Concrete Air, Slump and Quantity (BMPR MI654) (\*)
- (j) P.C. Concrete Strengths (BMPR MI655) (\*)
- (k) Aggregate Technician Course or Mixture Aggregate Technician Course (\*)
- (l) Portland Cement Concrete Tester Course (\*)
- (m) Portland Cement Concrete Level I Technician Course - Manual of Instructions for Concrete Testing (\*)
- (n) Portland Cement Concrete Level II Technician Course - Manual of Instructions for Concrete Proportioning (\*)
- (o) Portland Cement Concrete Level III Technician Course - Manual of Instructions for Design of Concrete Mixtures (\*)
- (p) Manual of Test Procedures for Materials

\* Refer to Appendix C of the Manual of Test Procedures for Materials for more information.”

**RECLAIMED ASPHALT PAVEMENT (RAP) (BDE)**

Effective: January 1, 2007

Revised: August 1, 2012

Revise Section 1031 of the Standard Specifications to read:

**“SECTION 1031. RECLAIMED ASPHALT PAVEMENT**

**1031.01 Description.** Reclaimed asphalt pavement (RAP) is from the material produced by cold milling or crushing of an existing hot-mix asphalt (HMA) pavement. The Contractor shall supply written documentation that the RAP originated from routes or airfields under federal, state, or local agency jurisdiction.

**1031.02 Stockpiles.** The Contractor shall construct individual, sealed RAP stockpiles meeting one of the following definitions. No additional RAP shall be added to the pile after the pile has been sealed. Stockpiles shall be sufficiently separated to prevent intermingling at the base. Stockpiles shall be identified by signs indicating the type as listed below (i.e. "Homogeneous Surface").

Prior to milling, the Contractor shall request the District to provide verification of the quality of the RAP to clarify appropriate stockpile.

- (a) Fractionated RAP (FRAP). FRAP shall consist of RAP from Class I, HMA (High and Low ESAL) mixtures. The coarse aggregate in FRAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least C quality. All FRAP shall be fractionated prior to testing by screening into a minimum of two size fractions with the separation occurring on or between the #4 (4.75 mm) and 1/2 in. (12.5 mm) sieves. Agglomerations shall be minimized such that 100 percent of the RAP shall pass the sieve size specified below for the mix the FRAP will be used in.

| Mixture FRAP will be used in: | Sieve Size that 100% of FRAP Shall Pass |
|-------------------------------|---|
| IL-25.0                       | 2 in. (50 mm)                           |
| IL-19.0                       | 1 1/2 in. (40 mm)                       |
| IL-12.5                       | 1 in. (25 mm)                           |
| IL-9.5                        | 3/4 in. (20 mm)                         |
| IL-4.75                       | 1/2 in. (13 mm)                         |

- (b) Homogeneous. Homogeneous RAP stockpiles shall consist of RAP from Class I, HMA (High and Low ESAL) mixtures and represent: 1) the same aggregate quality, but shall be at least C quality; 2) the same type of crushed aggregate (either crushed natural aggregate, ACBF slag, or steel slag); 3) similar gradation; and 4) similar asphalt binder content. If approved by the Engineer, combined single pass surface/binder millings may be considered "homogenous" with a quality rating dictated by the lowest coarse aggregate quality present in the mixture.
- (c) Conglomerate. Conglomerate RAP stockpiles shall consist of RAP from Class I, HMA (High and Low ESAL) mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least C quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate RAP shall be processed prior to testing by crushing to where all RAP shall pass the 5/8 in. (16 mm) or smaller screen. Conglomerate RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.

- (d) Conglomerate “D” Quality (DQ). Conglomerate DQ RAP stockpiles shall consist of RAP from Class I, HMA (High or Low ESAL), or “All Other” (as defined by Article 1030.04(a)(3)) mixtures. The coarse aggregate in this RAP may be crushed or round but shall be at least D quality. This RAP may have an inconsistent gradation and/or asphalt binder content. Conglomerate DQ RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.
- (e) Non-Quality. RAP stockpiles that do not meet the requirements of the stockpile categories listed above shall be classified as “Non-Quality”.

RAP/FRAP containing contaminants, such as earth, brick, sand, concrete, sheet asphalt, bituminous surface treatment (i.e. chip seal), pavement fabric, joint sealants, etc., will be unacceptable unless the contaminants are removed to the satisfaction of the Engineer. Sheet asphalt shall be stockpiled separately.

**1031.03 Testing.** When used in HMA, the RAP/FRAP shall be sampled and tested either during or after stockpiling.

For testing during stockpiling, washed extraction samples shall be run at the minimum frequency of one sample per 500 tons (450 metric tons) for the first 2000 tons (1800 metric tons) and one sample per 2000 tons (1800 metric tons) thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons (3600 metric tons).

For testing after stockpiling, the Contractor shall submit a plan for approval to the District proposing a satisfactory method of sampling and testing the RAP/FRAP pile either in-situ or by restockpiling. The sampling plan shall meet the minimum frequency required above and detail the procedure used to obtain representative samples throughout the pile for testing.

Before extraction, each field sample shall be split to obtain two samples of test sample size. One of the two test samples from the final split shall be labeled and stored for Department use. The Contractor shall extract the other test sample according to Department procedure. The Engineer reserves the right to test any sample (split or Department-taken) to verify Contractor test results.

**Evaluation of Test Results.** All of the extraction results shall be compiled and averaged for asphalt binder content and gradation and, when applicable  $G_{mm}$ . Individual extraction test results, when compared to the averages, will be accepted if within the tolerances listed below.

| Parameter         | FRAP/Homogeneous/Conglomerate | Conglomerate “D” Quality |
|-------------------|-------------------------------|--------------------------|
| 1 in. (25 mm)     |                               | ± 5 %                    |
| 1/2 in. (12.5 mm) | ± 8 %                         | ± 15 %                   |
| No. 4 (4.75 mm)   | ± 6 %                         | ± 13 %                   |
| No. 8 (2.36 mm)   | ± 5 %                         |                          |
| No. 16 (1.18 mm)  |                               | ± 15 %                   |
| No. 30 (600 μm)   | ± 5 %                         |                          |
| No. 200 (75 μm)   | ± 2.0 %                       | ± 4.0 %                  |
| Asphalt Binder    | ± 0.4 % <sup>1/</sup>         | ± 0.5 %                  |
| $G_{mm}$          | ± 0.03                        |                          |

1/ The tolerance for FRAP shall be  $\pm 0.3$  %.

If more than 20 percent of the individual sieves are out of the gradation tolerances, or if more than 20 percent of the asphalt binder content test results fall outside the appropriate tolerances, the RAP/FRAP shall not be used in HMA unless the RAP/FRAP representing the failing tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the District for evaluation.

With the approval of the Engineer, the ignition oven may be substituted for extractions according to the Illinois Test Procedure, "Calibration of the Ignition Oven for the Purpose of Characterizing Reclaimed Asphalt Pavement (RAP)".

#### **1031.04 Quality Designation of Aggregate in RAP/FRAP.**

(a) The aggregate quality of the RAP for homogenous, conglomerate, and conglomerate "D" quality stockpiles shall be set by the lowest quality of coarse aggregate in the RAP stockpile and are designated as follows.

(1) RAP from Class I, Superpave (High ESAL)/HMA (High ESAL), or HMA (Low ESAL) IL-9.5L surface mixtures are designated as containing Class B quality coarse aggregate.

(2) RAP from Superpave (Low ESAL)/HMA (Low ESAL) IL-19.0L binder mixture is designated as Class D quality coarse aggregate.

(3) RAP from Class I, Superpave (High ESAL), or HMA (High ESAL) binder mixtures, bituminous base course mixtures, and bituminous base course widening mixtures are designated as containing Class C quality coarse aggregate.

(4) RAP from bituminous stabilized subbase and BAM shoulders are designated as containing Class D quality coarse aggregate.

(b) The aggregate quality of FRAP shall be determined as follows.

(1) If the Engineer has documentation of the quality of the FRAP aggregate, the Contractor shall use the assigned quality provided by the Engineer. If the quality is not known, the quality shall be determined according to Article 1031.04(b)(2).

(2) Coarse and fine FRAP stockpiles containing plus #4 (4.75 mm) sieve coarse aggregate shall have a maximum tonnage of 5000 tons (4500 metric tons). The Contractor shall obtain a representative sample witnessed by the Engineer. The sample shall be a minimum of 50 lb (25 kg). The sample shall be extracted according to Illinois Modified AASHTO T 164 by a consultant prequalified by the Department for the specified testing. The consultant shall submit the test results along with the recovered aggregate to the District Office. The cost for this testing shall be paid by the Contractor. The District will forward the sample to the BMPR Aggregate Lab for MicroDeval Testing, according to Illinois Modified AASHTO T 327. A maximum loss of 15.0 percent will be applied for all HMA applications."

**1031.05 Use of RAP/FRAP in HMA.** The use of RAP/FRAP shall be a Contractor's option when constructing HMA in all contracts. The use of RAP/FRAP in HMA shall be as follows.

- (a) Coarse Aggregate Size. The coarse aggregate in all RAP shall be equal to or less than the nominal maximum size requirement for the HMA mixture to be produced.
- (b) Steel Slag Stockpiles. RAP stockpiles containing steel slag or other expansive material, as determined by the Department, shall be homogeneous and will be approved for use in HMA (High ESAL and Low ESAL) surface mixtures only.
- (c) Use in HMA Surface Mixtures (High and Low ESAL). RAP/FRAP stockpiles for use in HMA surface mixtures (High and Low ESAL) shall be FRAP or homogeneous in which the coarse aggregate is Class B quality or better. RAP/FRAP shall be considered equivalent to limestone for frictional considerations unless produced/screened to minus 3/8 in. (10 mm).
- (d) Use in HMA Binder Mixtures (High and Low ESAL), HMA Base Course, and HMA Base Course Widening. RAP/FRAP stockpiles for use in HMA binder mixtures (High and Low ESAL), HMA base course, and HMA base course widening shall be FRAP, homogeneous, or conglomerate, in which the coarse aggregate is Class C quality or better.
- (e) Use in Shoulders and Subbase. RAP/FRAP stockpiles for use in HMA shoulders and stabilized subbase (HMA) shall be FRAP, homogeneous, conglomerate, or conglomerate DQ.
- (f) When the Contractor chooses the RAP option, the percentage of RAP shall not exceed the amounts indicated in the table below for a given N Design.

Max RAP Percentage

| HMA Mixtures <sup>1/, 3/</sup> | Maximum % RAP         |                        |         |                  |
|--------------------------------|-----------------------|------------------------|---------|------------------|
|                                | Ndesign               | Binder/Leveling Binder | Surface | Polymer Modified |
| 30                             | 30                    | 30                     | 10      | 10               |
| 50                             | 25                    | 15                     | 10      | 10               |
| 70                             | 15 / 25 <sup>2/</sup> | 10 / 15 <sup>2/</sup>  | 10      | 10               |
| 90                             | 10                    | 10                     | 10      | 10               |
| 105                            | 10                    | 10                     | 10      | 10               |

1/ For HMA “All Other” (shoulder and stabilized subbase) N-30, the amount of RAP shall not exceed 50% of the mixture.

2/ Value of Max % RAP if homogeneous RAP stockpile of IL-9.5 RAP is utilized.

3/ When RAP exceeds 20 percent, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent RAP would require a virgin asphalt binder grade of PG64-22 to be reduced to a PG58-28). If warm mix asphalt (WMA) technology is utilized, and production temperatures do not exceed 275 °F (135 °C) the high and low virgin asphalt binder grades shall each be reduced by one grade when RAP exceeds 25 percent (i.e. 26 percent RAP would require a virgin asphalt binder grade of PG64-22 to be reduced to a PG58-28).

- (g) When the Contractor chooses the FRAP option, the percentage of FRAP shall not exceed the amounts indicated in the table below for a given N Design.

(1) Level 1 Maximum FRAP Percentage.

| HMA Mixtures <sup>1/, 2/</sup> | Level 1 - Maximum % FRAP |                        |         |
|--------------------------------|--------------------------|------------------------|---------|
|                                | Ndesign                  | Binder/Leveling Binder | Surface |
| 30                             | 35                       | 35                     | 10      |
| 50                             | 30                       | 25                     | 10      |
| 70                             | 25                       | 20                     | 10      |
| 90                             | 20                       | 15                     | 10      |
| 105                            | 10                       | 10                     | 10      |

- 1/ For HMA "All Other" (shoulder and stabilized subbase) N30, the amount of FRAP shall not exceed 50 percent of the mixture.
- 2/ When FRAP exceeds 20 percent for all mixes, except for SMA and IL-4.75, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent FRAP would require a virgin asphalt binder grade of PG64-22 to be reduced to a PG58-28). If warm mix asphalt (WMA) technology is utilized, and production temperatures do not exceed 275 °F (135 °C) the high and low virgin asphalt binder grades shall each be reduced by one grade when FRAP exceeds 25 percent (i.e. 26 percent FRAP would require a virgin asphalt binder grade of PG64-22 to be reduced to a PG58-28).
- 3/ For SMA the maximum FRAP shall be 20 percent. When the FRAP usage in SMA exceeds 10 percent, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 15 percent asphalt binder replacement would require a virgin asphalt binder grade of PG76-22 to be reduced to a PG70-28).
- 4/ For IL-4.75 mix the amount of minus #4 fine fraction FRAP shall not exceed 20 percent. When the FRAP usage in IL-4.75 exceeds 10 percent, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 15 percent asphalt binder replacement would require a virgin asphalt binder grade of PG76-22 to be reduced to a PG70-28).

(2) Level 2 Maximum FRAP percentage.

| HMA Mixtures <sup>1/, 2/</sup> | Level 2 - Maximum % FRAP |                        |         |
|--------------------------------|--------------------------|------------------------|---------|
|                                | Ndesign                  | Binder/Leveling Binder | Surface |
| 30                             | 40                       | 40                     | 10      |
| 50                             | 40                       | 30                     | 10      |
| 70                             | 30                       | 20                     | 10      |
| 90                             | 30                       | 20                     | 10      |
| 105                            | 30                       | 15                     | 10      |

- 1/ For HMA "All Other" (shoulder and stabilized subbase) N30, the amount of FRAP shall not exceed 50 percent of the mixture.

- 2/ When FRAP exceeds 20 percent for all mixes, except for SMA and IL-4.75, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent FRAP would require a virgin asphalt binder grade of PG64-22 to be reduced to a PG58-28). If warm mix asphalt (WMA) technology is utilized, and production temperatures do not exceed 275 °F (135 °C) the high and low virgin asphalt binder grades shall each be reduced by one grade when FRAP exceeds 25 percent (i.e. 26 percent FRAP would require a virgin asphalt binder grade of PG64-22 to be reduced to a PG58-28).
- 3/ For SMA the maximum FRAP shall be 20 percent. When the FRAP usage in SMA exceeds 10 percent, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 15 percent asphalt binder replacement would require a virgin asphalt binder grade of PG76-22 to be reduced to a PG70-28).
- 4/ For IL-4.75 mix the amount of minus #4 fine fraction FRAP shall not exceed 30 percent. When the FRAP usage in IL-4.75 exceeds 10 percent, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 15 percent asphalt binder replacement would require a virgin asphalt binder grade of PG76-22 to be reduced to a PG70-28).

**1031.06 HMA Mix Designs.** At the Contractor's option, HMA mixtures may be constructed utilizing RAP/FRAP material meeting the above detailed requirements.

FRAP mix designs exceeding the Level 1 FRAP percentages shall be tested prior to submittal for verification, according to Illinois Modified AASHTO T324 (Hamburg Wheel) and shall meet the following requirements.

| Asphalt Binder Grade | # Repetitions | Max. Rut Depth<br>in. (mm) |
|----------------------|---------------|----------------------------|
| PG76-XX              | 20,000        | 1/2 (12.5)                 |
| PG70-XX              | 15,000        | 1/2 (12.5)                 |
| PG64-XX              | 10,000        | 1/2 (12.5)                 |
| PG58-XX              | 10,000        | 1/2 (12.5)                 |

RAP/FRAP designs shall be submitted for volumetric verification. If additional RAP/FRAP stockpiles are tested and found that no more than 20 percent of the results, as defined under "Testing" herein, are outside of the control tolerances set for the original RAP/FRAP stockpile and HMA mix design, and meets all of the requirements herein, the additional RAP/FRAP stockpiles may be used in the original mix design at the percent previously verified.

**1031.07 HMA Production.** Mixture production where the FRAP percentage exceeds the Level 1 limits shall be sampled within the first 500 tons (450 metric tons) on the first day of production with a split reserved for the Department. The mix sample shall be tested according to the Illinois Modified AASHTO T324 and shall meet the requirements specified herein. FRAP mix production shall not exceed 1500 tons (1350 metric tons) or one days production, whichever comes first, until the testing is completed and the mixture is found to be in conformance. The requirement to cease mix production may be waived if the plant produced FRAP mixture conformance is demonstrated prior to start of mix production for the contract.

The coarse aggregate in all RAP used shall be equal to or less than the nominal maximum size requirement for the HMA mixture being produced.

To remove or reduce agglomerated material, a scalping screen, gator, crushing unit, or comparable sizing device approved by the Engineer shall be used in the RAP feed system to remove or reduce oversized material. If material passing the sizing device adversely affects the mix production or quality of the mix, the sizing device shall be set at a size specified by the Engineer.

If the RAP/FRAP control tolerances or QC/QA test results require corrective action, the Contractor shall cease production of the mixture containing RAP/FRAP and either switch to the virgin aggregate design or submit a new RAP/FRAP design.

HMA plants utilizing RAP/FRAP shall be capable of automatically recording and printing the following information.

(a) Dryer Drum Plants.

- (1) Date, month, year, and time to the nearest minute for each print.
- (2) HMA mix number assigned by the Department.
- (3) Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).
- (4) Accumulated dry weight of RAP/FRAP in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).
- (5) Accumulated mineral filler in revolutions, tons (metric tons), etc. to the nearest 0.1 unit.
- (6) Accumulated asphalt binder in gallons (liters), tons (metric tons), etc. to the nearest 0.1 unit.
- (7) Residual asphalt binder in the RAP/FRAP material as a percent of the total mix to the nearest 0.1 percent.
- (8) Aggregate and RAP/FRAP moisture compensators in percent as set on the control panel. (Required when accumulated or individual aggregate and RAP/FRAP are printed in wet condition.)

(b) Batch Plants.

- (1) Date, month, year, and time to the nearest minute for each print.
- (2) HMA mix number assigned by the Department.
- (3) Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram).
- (4) Mineral filler weight to the nearest pound (kilogram).
- (5) RAP/FRAP weight to the nearest pound (kilogram).
- (6) Virgin asphalt binder weight to the nearest pound (kilogram).

- (7) Residual asphalt binder in the RAP/FRAP material as a percent of the total mix to the nearest 0.1 percent.

The printouts shall be maintained in a file at the plant for a minimum of one year or as directed by the Engineer and shall be made available upon request. The printing system will be inspected by the Engineer prior to production and verified at the beginning of each construction season thereafter.

**1031.08 RAP in Aggregate Surface Course and Aggregate Shoulders.** The use of RAP in aggregate surface course and aggregate shoulders shall be as follows.

- (a) Stockpiles and Testing. RAP stockpiles may be any of those listed in Article 1031.02, except "Non-Quality" and "FRAP". The testing requirements of Article 1031.03 shall not apply.
- (b) Gradation. One hundred percent of the RAP material shall pass the 1 1/2 in. (37.5 mm) sieve. The RAP material shall be reasonably well graded from coarse to fine. RAP material that is gap-graded or single sized will not be accepted."

#### **RECLAIMED ASPHALT SHINGLES (RAS) (BDE)**

Effective: January 1, 2012

Description. Reclaimed asphalt shingles (RAS) meeting the requirements herein will be permitted in all HMA mixtures used for overlay applications only. RAS shall not be used in full-depth HMA pavement. When RAS is used in conjunction with Reclaimed Asphalt Pavement (RAP), the RAP shall be according to the special provision, "Reclaimed Asphalt Pavement (RAP)"

Definitions. RAS shall be a clean and uniform material with a maximum of 0.5 percent unacceptable materials, as defined in Bureau of Materials and Physical Research Policy Memorandum "Reclaimed Asphalt Shingle (RAS) Sources", by weight of RAS. All RAS used shall come from a Bureau of Materials and Physical Research approved processing facility where it shall be ground and processed to 100 percent passing the 3/8 in. (9.5 mm) sieve and 93 percent passing the #4 (4.75 mm) sieve based on a dry shake gradation. RAS shall be uniform in gradation and asphalt binder content and shall meet the testing requirements specified herein. In addition, RAS shall meet the following Type 1 or Type 2 requirements.

- (a) Type 1. Type 1 RAS shall be processed, preconsumer asphalt shingles salvaged from the manufacture of residential asphalt roofing shingles.
- (b) Type 2. Type 2 RAS shall be processed post-consumer shingles only, salvaged from residential, or four unit or less dwellings not subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP).

Stockpiles. Type 1 and Type 2 RAS shall be stockpiled separately and shall not be intermingled. Each stockpile shall be signed indicating what type of RAS is present.

Unless otherwise approved by the Engineer, mechanically blending manufactured sand (FM 20 or FM 22) up to an equal weight of RAS with the processed RAS will be permitted to improve workability. The sand shall be "B Quality" or better from an approved Aggregate Gradation Control System source. The sand shall be accounted for in the mix design and during HMA production.

Records identifying the shingle processing facility supplying the RAS, RAS type and lot number shall be maintained by project contract number and kept for a minimum of 3 years.

Testing. RAS shall be sampled and tested during stockpiling.

For testing during stockpiling, washed extraction, and testing for unacceptable materials shall be run at the minimum frequency of one sample per 200 tons (180 metric tons) for the first 1000 tons (900 metric tons) and one sample per 250 tons (225 metric tons) thereafter. A minimum of five tests are required for stockpiles less than 1000 tons (900 metric tons). Once a  $\leq 1000$  ton (900 metric ton), five-test stockpile has been established it shall be sealed. Additional incoming RAS shall be stockpiled in a separate working pile as designated in the Quality Control plan and only added to the sealed stockpile when the test results of the working pile are complete and are found to meet the tolerances specified herein for the original sealed RAS stockpile.

Before testing, each field sample shall be split to obtain two samples. One of the two test samples from the final split shall be labeled and stored for Department use. The Contractor shall extract the other test sample according to Department procedures. The Engineer reserves the right to test any sample (split or Department-taken) to verify Contractor test results.

Evaluation of Test Results. All of the test results, with the exception of percent unacceptable materials, shall be compiled and averaged for asphalt binder content and gradation. Individual test results, when compared to the averages, will be accepted if within the tolerances listed below.

| Parameter                   | RAS         |
|-----------------------------|-------------|
| No. 8 (2.36 mm)             | $\pm 5\%$   |
| No. 16 (1.18 mm)            | $\pm 5\%$   |
| No. 30 (600 $\mu\text{m}$ ) | $\pm 4\%$   |
| No. 200 (75 $\mu\text{m}$ ) | $\pm 2.0\%$ |
| Asphalt Binder Content      | $\pm 1.5\%$ |

If more than 20 percent of the individual sieves are out of the gradation tolerances, or if more than 20 percent of the asphalt binder content, or if the percent unacceptable materials exceeds 0.5 percent by weight of material retained on the # 4 (4.75 mm) sieve, the RAS shall not be used in Department projects. All test data and acceptance ranges shall be sent to the District for evaluation.

Use of RAS in HMA. Type 1 or Type 2 RAS may be used alone or in conjunction with Reclaimed Asphalt Pavement (RAP) in all HMA mixtures up to a maximum of 5.0 percent by weight of total mix.

- (a) Level 1 asphalt binder replacement. The maximum Level 1 RAS or RAS/RAP blend usage will be dictated by the Level 1 – Maximum Asphalt Binder Replacement (MABR) table listed below.

| HMA Mixtures <sup>1/, 2/</sup> | Level 1 – Maximum Asphalt Binder Replacement, % |                        |         |
|--------------------------------|---|------------------------|---------|
|                                | Ndesign   | Binder/Leveling Binder | Surface |
| 30                             | 35  | 35                     | 10      |
| 50                             | 30  | 25                     | 10      |
| 70                             | 25  | 20                     | 10      |
| 90                             | 20  | 15                     | 10      |
| 105                            | 10  | 10                     | 10      |

- 1/ For HMA shoulder and stabilized subbase (HMA “All Other”) N-30, the maximum binder replacement shall be 50 percent.
- 2/ When the asphalt binder replacement exceeds 20 percent for all mixtures, except for SMA and IL-4.75, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 25 percent asphalt binder replacement would require a virgin asphalt binder grade of PG64-22 to be reduced to a PG58-28).
- 3/ For SMA the maximum asphalt binder replacement shall be 20 percent. When the binder replacement exceeds 10 percent, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 15 percent asphalt binder replacement would require a virgin asphalt binder grade of PG76-22 to be reduced to PG70-28).
- 4/ For IL-4.75 mix the maximum asphalt binder replacement shall not exceed 20 percent. When the asphalt binder replacement exceeds 10 percent, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 15 percent asphalt binder replacement would require a virgin asphalt binder grade of PG76-22 to be reduced to a PG70-28).

- (b) Level 2 asphalt binder replacement. The maximum Level 2 RAS or RAS/RAP blend usage will be dictated by the Level 2 – MABR table listed below.

| HMA Mixtures <sup>1/, 2/</sup> | Level 2 – Maximum Asphalt Binder Replacement, % |                        |         |
|--------------------------------|---|------------------------|---------|
|                                | Ndesign   | Binder/Leveling Binder | Surface |
| 30                             | 40  | 40                     | 10      |
| 50                             | 40  | 30                     | 10      |
| 70                             | 30  | 20                     | 10      |
| 90                             | 30  | 20                     | 10      |
| 105                            | 30  | 15                     | 10      |

- 1/ For HMA shoulder and stabilized subbase (HMA “All Other”) N-30, the maximum binder replacement shall be 50 percent.
- 2/ When the asphalt binder replacement exceeds 20 percent for all mixtures, except for SMA and IL-4.75, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 25 percent asphalt binder replacement would require a virgin asphalt binder grade of PG64-22 to be reduced to a PG58-28).

- 3/ For SMA the maximum asphalt binder replacement shall be 20 percent. When the binder replacement exceeds 10 percent, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 15 percent asphalt binder replacement would require a virgin asphalt binder grade of PG76-22 to be reduced to PG70-28).
- 4/ For IL-4.75 mix the maximum asphalt binder replacement shall not exceed 30 percent. When the asphalt binder replacement exceeds 10 percent, the high and low virgin asphalt binder grade shall each be reduced by one grade (i.e. 15 percent asphalt binder replacement would require a virgin asphalt binder grade of PG76-22 to be reduced to a PG70-28).

HMA Mix Designs. RAS and RAS/RAP designs shall be submitted for volumetric verification. Type 1 and Type 2 RAS are not interchangeable in a mix design. A RAS stone bulk specific gravity (Gsb) of 2.500 shall be used for mix design purposes.

RAS and RAS/RAP mix designs with asphalt binder replacements exceeding the Level 1 – MABR limits specified herein, shall be tested prior to submittal for verification, according to Illinois Modified AASHTO T324 (Hamburg Wheel). RAS and RAS/RAP mixtures exceeding the Level 1 MABR limits shall meet the following requirements.

| Asphalt Binder Grade | # Repetitions | Maximum Rut Depth<br>in. (mm) |
|----------------------|---------------|-------------------------------|
| PG76-XX              | 20,000        | 1/2 (12.5)                    |
| PG70-XX              | 15,000        | 1/2 (12.5)                    |
| PG64-XX              | 10,000        | 1/2 (12.5)                    |
| PG58-XX              | 10,000        | 1/2 (12.5)                    |

HMA Production. Mixture production, where the RAS and RAS/RAP asphalt binder replacement exceeds the Level 1 MABR, shall be sampled within the first 500 tons (450 metric tons) on the first day of production with a split reserved for the Department. The mix sample shall be tested according to Illinois Modified AASHTO T324 and shall meet the requirements specified herein. RAS and RAS/RAP mix production shall not exceed 1500 tons (1350 metric tons) or one day’s production, whichever comes first, until the testing is completed and the mixture is found to be in conformance. The requirement to cease mix production may be waived if the RAS and RAS/RAP plant produced mixture conformance is demonstrated prior to start of mix production for a State contract.

RAS shall be incorporated into the HMA mixture either by a separate weight depletion system or by using the RAP weigh belt. Either feed system shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all rates of production and batch sizes. The portion of RAS shall be controlled accurately to within ± 0.5 percent of the amount of RAS utilized. When using the weight depletion system, flow indicators or sensing devices shall be provided and interlocked with the plant controls such that the mixture production is halted when RAS flow is interrupted.

When producing HMA containing RAS, a positive duct control system shall be utilized.

HMA plants utilizing RAS shall be capable of automatically recording and printing the following information.

(a) Dryer Drum Plants.

- (1) Date, month, year, and time to the nearest minute for each print.
- (2) HMA mix number assigned by the Department.
- (3) Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).
- (4) Accumulated dry weight of RAS in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).
- (5) Accumulated mineral filler in revolutions, tons (metric tons), etc. to the nearest 0.1 unit.
- (6) Accumulated asphalt binder in gallons (liters), tons (metric tons), etc. to the nearest 0.1 unit.
- (7) Residual asphalt binder in the RAS material as a percent of the total mix to the nearest 0.1 percent.
- (8) Aggregate and RAS moisture compensators in percent as set on the control panel. (Required when accumulated or individual aggregate and RAS are printed in wet condition.)

(b) Batch Plants.

- (1) Date, month, year, and time to the nearest minute for each print.
- (2) HMA mix number assigned by the Department.
- (3) Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram).
- (4) Mineral Filler weight to the nearest pound (kilogram).
- (5) RAS weight to the nearest pound (kilogram).
- (6) Virgin asphalt binder weight to the nearest pound (kilogram).
- (7) Residual asphalt binder in the RAS material as a percent of the total mix to the nearest 0.1 percent.

The printouts shall be maintained in a file at the plant for a minimum of one year or as directed by the Engineer and shall be made available upon request. The printing will be inspected by the Engineer prior to production and verified at the beginning of each construction season thereafter.

**SELF-CONSOLIDATING CONCRETE FOR CAST-IN-PLACE CONSTRUCTION (BDE)**

Effective: November 1, 2005

Revised: April 1, 2012

Description. This work shall consist of constructing cast-in-place items involving Class DS or SI concrete with self-consolidating concrete. The concrete shall be according to the special provision, "Portland Cement Concrete", except as modified herein.

Definition. Self-consolidating concrete is a flowable mixture that does not require mechanical vibration for consolidation.

Mix Design Criteria. Article 1020.04 shall apply, except as follows:

- (a) The slump requirements shall not apply.
- (b) The concrete mixture shall be uniformly graded, and information in the “Portland Cement Concrete Level III Technician Course – Manual of Instructions for Design of Concrete Mixtures” shall be used to develop the uniformly graded mix design. The coarse aggregate gradations shall be CA 11, CA 13, CA 14, CA 16, or a blend of these gradations. However, the final gradation when using a single coarse aggregate or combination of coarse aggregates shall have 100 percent pass the 1 in. (25 mm) sieve, and 95 percent pass the 3/4 in. (19 mm) sieve. The fine aggregate proportion shall be a maximum 50 percent by weight (mass) of the total aggregate used.
- (c) The slump flow range shall be 22 in. (560 mm) minimum to 28 in. (710 mm) maximum.
- (d) The visual stability index shall be a maximum of 1.
- (e) The J-ring value shall be a maximum of 2 in. (50 mm).
- (f) The L-box blocking ratio shall be a minimum of 80 percent.
- (g) The hardened visual stability index shall be a maximum of 1.

Test Methods. Illinois Test Procedures SCC-1, SCC-2, SCC-3, SCC-4, SCC-6, SCC-8 (Option C) and Illinois Modified AASHTO T 22, 23, 121, 141, 152, 177, 196, and 309 shall be used for testing of self-consolidating concrete mixtures.

Mixing Portland Cement Concrete. In addition to Article 1020.11, the mixing time for central-mixed concrete shall not be reduced as a result of a mixer performance test. Truck-mixed or shrink-mixed concrete shall be mixed in a truck mixer for a minimum of 100 revolutions.

The batch sequence, mixing speed, and mixing time shall be appropriate to prevent cement balls and mix foaming for central-mixed, truck-mixed, and shrink-mixed concrete.

Falsework and Forms. In addition to Articles 503.05 and 503.06 of the Standard Specifications, the Contractor shall ensure the design of the falsework and forms is adequate for the additional form pressure caused by the fluid concrete. Forms shall be tight to prevent leakage of fluid concrete.

When the form height for placing the self-consolidating concrete is greater than 10.0 ft (3.0 m), direct monitoring of form pressure shall be performed according to Illinois Test Procedure SCC-10. The monitoring requirement is a minimum, and the Contractor shall remain responsible for adequate design of the falsework and forms. The Contractor shall record the formwork pressure during concrete placement. This information shall be used by the Contractor to prevent the placement rate from exceeding the maximum formwork pressure allowed, to monitor the thixotropic change in the concrete during the pour, and to make appropriate adjustments to the mix design. This information shall be provided to the Engineer during the pour.

Placing and Consolidating. Concrete placement and consolidation shall be according to Article 503.07 of the Standard Specifications, except as follows:

Revise the third paragraph of Article 503.07 of the Standard Specifications to read:

“Open troughs and chutes shall extend as nearly as practicable to the point of deposit. The drop distance of concrete shall not exceed 5 ft (1.5 m). If necessary, a tremie shall be used to meet this requirement. The maximum distance of horizontal flow from the point of deposit shall be 25 ft (7.6 m). However, when the maximum distance of horizontal flow from the point of discharge exceeds 15 ft (4.6 m), the dynamic segregation index shall be a maximum 10.0 percent. If the maximum is exceeded, the maximum distance of horizontal flow from the point of deposit will not be allowed to exceed 15 ft (4.6 m). For drilled shafts, free fall placement will not be permitted.”

Delete the seventh, eighth, ninth, and tenth paragraphs of Article 503.07 of the Standard Specifications.

Add to the end of the eleventh paragraph of Article 503.07 of the Standard Specifications the following:

“Concrete shall be rodded with a piece of lumber, conduit, or vibrator if the material has lost its fluidity prior to placement of additional concrete. The vibrator will be permitted if it can be used in a manner that does not cause coarse aggregate separation from the mortar as determined by the Engineer. Any other method for restoring the fluidity of the concrete shall be approved by the Engineer.”

If the contract requires QC/QA for concrete, the following four sections shall supplement the special provision Quality Control/Quality Assurance of Concrete Mixtures. If QC/QC is not required, the following four sections shall be disregarded by the Contractor and the Engineer will perform QA testing as appropriate.

Quality Control by Contractor at Plant. The specified test frequencies for aggregate gradation, aggregate moisture, air content, unit weight/yield, and temperature shall be performed as indicated in the contract.

Slump flow, visual stability index, and J-ring or L-box tests shall be performed as needed to control production. The hardened visual stability index test will not be required to be performed at the plant.

Quality Control by Contractor at Jobsite. The specified test frequencies for air content, strength, and temperature shall be performed as indicated in the contract.

Slump flow, visual stability index, and J-ring or L-box tests shall be performed on the first two truck deliveries of the day, and every 50 cu yd (40 cu m) thereafter. The Contractor shall select either the J-ring or L-box test for jobsite testing.

If the self-consolidating concrete horizontal flow will exceed 15 ft (4.6 m), the dynamic segregation index test shall be performed at start of production for each mix design and per contract.

The hardened visual stability index test shall be performed on the first truck delivery of the day, and every 300 cu yd (230 cu m) thereafter. Slump flow, visual stability index, J-ring value or L-box blocking ratio, air content, and concrete temperature shall be recorded for each hardened visual stability index test.

The Contractor shall retain all hardened visual stability index cut cylinder specimens until the Engineer notifies the Contractor that the specimens may be discarded.

If mix foaming or other potential detrimental material is observed during placement or at the completion of the pour, the material shall be removed while the concrete is still plastic.

Quality Assurance by Engineer at Plant. For air content and aggregate gradation, quality assurance independent sample testing and split sample testing will be performed as indicated in the contract.

For slump flow, visual stability index, and J-ring or L-box tests, quality assurance independent sample testing and split sample testing will be performed as determined by the Engineer.

Quality Assurance by Engineer at Jobsite. For air content and strength, quality assurance independent sample testing and split sample testing will be performed as indicated in the contract.

For slump flow, visual stability index, J-ring or L-box, dynamic segregation index, and hardened visual stability index tests, quality assurance independent sample testing will be performed as determined by the Engineer.

For slump flow and visual stability index quality assurance split sample testing, the Engineer will perform tests at the beginning of the project on the first three tests performed by the Contractor. Thereafter, a minimum of ten percent of total tests required of the Contractor will be performed per plant, which will include a minimum of one test per mix design. The acceptable limit of precision will be 1.5 in. (40 mm) for slump flow and a limit of precision will not apply to the visual stability index.

For the J-ring or the L-box quality assurance split sample testing, a minimum of 80 percent of the total tests required of the Contractor will be witnessed by the Engineer per plant, which will include a minimum of one witnessed test per mix design. The Engineer reserves the right to conduct quality assurance split sample testing. The acceptable limit of precision will be 1.5 in. (40 mm) for the J-ring value and ten percent for the L-box blocking ratio.

For dynamic segregation index, quality assurance split sample testing will be performed as determined by the Engineer. The acceptable limit of precision will be 1.0 percent.

For each hardened visual stability index test performed by the Contractor, the cut cylinders shall be presented to the Engineer for determination of the rating. The Engineer reserves the right to conduct quality assurance split sample testing. A limit of precision will not apply to the hardened visual stability index.

**SELF-CONSOLIDATING CONCRETE FOR PRECAST AND PRECAST PRESTRESSED PRODUCTS (BDE)**

Effective: July 1, 2004

Revised: April 1, 2012

Description. This work shall consist of constructing precast and precast prestressed concrete products with self-consolidating concrete. The concrete shall be according to the special provision, "Portland Cement Concrete", except as modified herein.

Definition. Self-consolidating concrete is a flowable mixture that does not require mechanical vibration for consolidation.

Mix Design Criteria. Article 1020.04 shall apply, except as follows:

- (a) If the maximum cement factor is not specified for the product, it shall not exceed 7.05 cwt/cu yd (418 kg/cu m).
- (b) If the maximum allowable water/cement ratio is not specified for the product, it shall not exceed 0.44.
- (c) The slump requirements shall not apply.
- (d) The concrete mixture shall be uniformly graded, and information in the "Portland Cement Concrete Level III Technician Course – Manual of Instructions for Design of Concrete Mixtures" shall be used to develop the uniformly graded mix design. The coarse aggregate gradations shall be CA 11, CA 13, CA 14, CA 16, or a blend of these gradations. However, the final gradation when using a single coarse aggregate or combination of coarse aggregates shall have 100 percent pass the 1 in. (25 mm) sieve, and 95 percent pass the 3/4 in. (19 mm) sieve. The fine aggregate proportion shall be a maximum 50 percent by weight (mass) of the total aggregate used.
- (e) The slump flow range shall be 22 in. (560 mm) minimum to 28 in. (710 mm) maximum.
- (f) The visual stability index shall be a maximum of 1.
- (g) The J-ring value shall be a maximum of 2 in. (50 mm).
- (h) The L-box blocking ratio shall be a minimum of 80 percent.
- (i) The hardened visual stability index shall be a maximum of 1.

Test Methods. Illinois Test Procedures SCC-1, SCC-2, SCC-3, SCC-4, SCC-6, SCC-8, (Option C) and Illinois Modified AASHTO T 22, 23, 121, 141, 152, 196, and 309 shall be used for testing of self-consolidating mixtures.

Mixing Portland Cement Concrete. In addition to Article 1020.11, the mixing time for central-mixed concrete shall not be reduced as a result of a mixer performance test. Truck-mixed concrete shall be mixed in a truck mixer for a minimum of 100 revolutions.

The batch sequence, mixing speed, and mixing time shall be appropriate to prevent cement balls and mix foaming for central-mixed and truck-mixed concrete.

Concrete Placement for Precast Products. The maximum distance of horizontal flow from the point of deposit shall not exceed 25 ft (7.6 m) for precast products. However, when the maximum distance of horizontal flow from the point of discharge exceeds 15 ft (4.6 m), the dynamic segregation index shall be a maximum 10.0 percent. If the maximum is exceeded, the maximum distance of horizontal flow from the point of deposit will not be allowed to exceed 15 ft (4.6 m).

Concrete Placement for Precast Prestressed Products. The maximum distance of horizontal flow from the point of deposit shall not exceed 15 ft (4.6 m) for precast prestressed products. In addition, the placement operation shall be moved as required to ensure the leading edge of the flowing concrete does not exceed 15 ft (4.6 m). For a bed of beams, a single beam shall be completely filled with concrete before placement of concrete in the next beam. For deck beams with void tubes installed in place prior to the pour, the concrete shall be placed on one side of the void tube until the concrete flows completely under the void tube to the other side. Once this has been completed, the concrete placement operation may be moved to the other side.

Consolidation. Concrete shall be rodded with a piece of lumber, conduit, or vibrator if the material has lost its fluidity prior to placement of additional concrete. The vibrator will be permitted if it can be used in a manner that does not cause coarse aggregate separation from the mortar as determined by the Engineer. Any other method for restoring the fluidity of the concrete shall be approved by the Engineer.

#### **SHOULDER RUMBLE STRIPS (BDE)**

Effective: January 1, 2012

Revise Article 642.05 of the Standard Specifications to read:

**“642.05 Basis of Payment.** This work will be paid for at the contract unit price per foot (meter) for SHOULDER RUMBLE STRIPS, 8 INCH (200 MM) or SHOULDER RUMBLE STRIPS, 16 INCH, (400 MM).’

#### **SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)**

Effective: April 2, 2005

Revised: April 1, 2011

To account for the preparatory work and operations necessary for the movement of subcontractor personnel, equipment, supplies, and incidentals to the project site and for all other work or operations that must be performed or costs incurred when beginning work approved for subcontracting according to Article 108.01 of the Standard Specifications, the Contractor shall make a mobilization payment to each subcontractor.

This mobilization payment shall be made at least 14 days prior to the subcontractor starting work. The amount paid shall be equal to 3 percent of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor’s work.

The mobilization payment to the subcontractor is an advance payment of the reported amount of the subcontract and is not a payment in addition to the amount of the subcontract; therefore, the amount of the advance payment will be deducted from future progress payments.

This provision shall be incorporated directly or by reference into each subcontract approved by the Department.

## **SURFACE TESTING OF PAVEMENTS (BDE)**

Effective: April 1, 2002

Revised: January 1, 2007

### **Hot-Mix Asphalt (HMA) Overlays**

Revise Article 406.03(h) of the Standard Specifications to read:

“(h) Pavement Surface Test Equipment ..... 1101.10”

Revise Article 406.11 of the Standard Specifications to read:

“**406.11 Surface Tests.** The finished surface of the pavement shall be tested for smoothness within three days of paving. Testing shall be performed in the presence of the Engineer.

Prior to testing, a copy of the approval letter and recorded settings from the Profile Equipment Verification (PEV) Program shall be submitted to the Engineer; and all objects and debris shall be removed from the pavement.

#### (a) Test Sections/Equipment.

(1) High-Speed Mainline Pavement. High-speed mainline pavement shall consist of pavements, ramps, and loops with a posted speed greater than 45 mph. These sections shall be tested using a profile testing device.

(2) Low-Speed Mainline Pavement. Low-speed mainline pavement shall consist of pavements, ramps, and loops with a posted speed of 45 mph or less. These sections shall be tested using a profile testing device.

(3) Miscellaneous Pavement. Miscellaneous pavement shall consist of:

a. pavement on horizontal curves with a centerline radius of curvature of less than or equal to 1000 ft (300 m) and pavement within the superelevation transition of such curves;

b. pavement on vertical curves having a length of less than or equal to 200 ft (60 m) in combination with an algebraic change in tangent grades greater than or equal to three percent, as may occur on urban ramps or other constricted-space facilities;

c. the first or last 15 ft (4.5 m) of a pavement section where the Contractor is not responsible for the adjoining surface;

- d. intersections;
- e. variable width pavements;
- f. side street returns;
- g. crossovers;
- h. connector pavement from mainline pavement expansion joint to the bridge approach pavement;
- i. bridge approach pavement; and
- j. other miscellaneous pavement surfaces (i.e. a turn lane) as determined by the Engineer.

Miscellaneous pavement shall be tested using a 16 ft (5 m) straightedge set to a 3/8 in. (10 mm) tolerance.

(b) Lots/Sublots. Mainline pavement test sections will be divided into lots and sublots.

(1) Lots. A lot will be defined as a continuous strip of pavement 1 mile (1600 m) long and one lane wide. When the length of a continuous strip of pavement is less than 1 mile (1600 m), that pavement will be included in an adjacent lot. Structures will be omitted when measuring pavement length.

(2) Sublots. Lots will be divided into 0.1 mile (160 m) sublots. A partial subplot greater than or equal to 250 ft (76 m) resulting from an interruption in the pavement will be subject to the same evaluation as a whole subplot. Partial sublots less than 250 ft (76 m) shall be included with the previous subplot for evaluation purposes.

(c) Testing Procedure. One wheel track shall be tested per lane. Testing shall be performed 3 ft (1 m) from and parallel to the edge of the lane away from traffic. A guide shall be used to maintain the proper distance.

The profile trace generated shall have stationing indicated every 500 ft (150 m) at a minimum. Both ends of the profile trace shall be labeled with the following information: contract number, beginning and ending stationing, which direction is up on the trace, which direction the data was collected, and the device operator name(s). The top portion of the Department supplied form, "Profile Report of Pavement Smoothness" shall be completed and secured around the trace roll.

Although surface testing of intermediate lifts will not be required, they may be performed at the Contractor's option. When this option is chosen, the testing shall be performed and the profile traces shall be generated as described above.

The Engineer may perform his/her own testing at any time for monitoring and comparison purposes.

- (d) Trace Reduction and Bump Locating Procedure. All traces shall be reduced. Traces produced by a mechanical recorder shall be reduced using an electronic scanner and computer software. This software shall calculate the profile index of each subplot in in./mile (mm/km) and indicate any high points (bumps) in excess of 0.30 in. (8 mm) with a line intersecting the profile on the printout. Computerized recorders shall provide the same information.

The profile index of each track, average profile index of each subplot, average profile index of the lot and locations of bumps shall be recorded on the form.

All traces and reports shall be provided within two working days of completing the testing to the Engineer for the project file. Traces from either a computerized profile testing device or analysis software used with a manual profile testing device shall display the settings used for the data reduction. The Engineer will compare these settings with the approved settings from the PEV Program. If the settings do not match, the results will be rejected and the section shall be retested/reanalyzed with the appropriate settings.

The Engineer will use the results of the testing to evaluate paving methods and equipment. If the average profile index of a lot exceeds 40.0 in./mile (635 mm/km) for high-speed mainline pavement or 65.0 in./mile (1025 mm/km) for low-speed mainline pavement, the paving operation will be suspended until corrective action is taken by the Contractor.

- (e) Corrective Work. All bumps in excess of 0.30 in. (8 mm) in a length of 25 ft (8 m) or less shall be corrected. If the bump is greater than 0.50 in. (13 mm), the pavement shall be removed and replaced. The minimum length of pavement to be removed shall be 3 ft (900 mm).

(1) High-Speed Mainline Pavement. Any subplot having a profile index within the range of, greater than 30.0 to 40.0 in./mile (475 to 635 mm/km) including bumps, shall be corrected to reduce the profile index to 30.0 in./mile (475 mm/km) or less on each trace. Any subplot having a profile index greater than 40.0 in./mile (635 mm/km) including bumps, shall be corrected to reduce the profile index to 30.0 in./mile (475 mm/km) or less on each trace, or replaced at the Contractor's option.

(2) Low-Speed Mainline Pavement. Any subplot having a profile index within the range of, greater than 45.0 to 65.0 in./mile (710 to 1025 mm/km) including bumps, shall be corrected to reduce the profile index to 45.0 in./mile (710 mm/km) or less on each trace. Any subplot having a profile index greater than 65.0 in./mile (1025 mm/km) including bumps, shall be corrected to reduce the profile index to 45.0 in./mile (710 mm/km) or less on each trace, or replaced at the Contractor's option.

(3) Miscellaneous Pavement. Surface variations which exceed the 3/8 in. (10 mm) tolerance will be marked by the Engineer and shall be corrected by the Contractor.

Corrective work shall be completed using either an approved grinding device consisting of multiple saws or by removing and replacing the pavement. Corrective work shall be applied to the full lane width. When completed, the corrected area shall have uniform texture and appearance, with the beginning and ending of the corrected area squared normal to the centerline of the paved surface.

Upon completion of the corrective work, the surface of the subplot(s) shall be retested. The Contractor shall furnish the profile tracing(s) and the completed form(s) to the Engineer within two working days after corrections are made. If the profile index and/or bumps still do not meet the requirements, additional corrective work shall be performed.

Corrective work shall be at no additional cost to the Department.

- (f) Smoothness Assessments. Assessments will be paid to or deducted from the Contractor for each subplot of mainline pavement, per the Smoothness Assessment Schedule. Assessments will be based on the average profile index of each subplot prior to performing any corrective work unless the Contractor has chosen to remove and replace the subplot. For sublots that are replaced, assessments will be based on the profile index determined after replacement.

Assessments will not be paid or deducted until all other contract requirements for the pavement are satisfied. Pavement that is corrected or replaced for reasons other than smoothness, shall be retested as stated herein.

| SMOOTHNESS ASSESSMENT SCHEDULE (HMA Overlays)                             |  |                           |
|---|--|---------------------------|
| High-Speed Mainline Pavement<br>Average Profile Index<br>in./mile (mm/km) | Low-Speed Mainline Pavement<br>Average Profile Index<br>in./mile (mm/km) | Assessment<br>per subplot |
| 6.0 (95) or less  | 15.0 (240) or less   | +\$150.00                 |
| >6.0 (95) to 10.0 (160)   | >15.0 (240) to 25.0 (400)  | +\$80.00                  |
| >10.0 (160) to 30.0 (475)   | >25.0 (400) to 45.0 (710)  | +\$0.00                   |
| >30.0 (475) to 40.0 (635)   | >45.0 (710) to 65.0 (1025)   | +\$0.00                   |
| Greater than 40.0 (635)   | Greater than 65.0 (1025)   | -\$300.00                 |

Smoothness assessments will not be applied to miscellaneous pavement sections.”

**Hot-Mix Asphalt (HMA) Pavement (Full-Depth)**

Revise Article 407.09 of the Standard Specifications to read:

“**407.09 Surface Tests.** The finished surface of the pavement shall be tested for smoothness according to Article 406.11, except as follows:

Two wheel tracks shall be tested per lane. Testing shall be performed 3 ft (1 m) from and parallel to each lane edge.

| SMOOTHNESS ASSESSMENT SCHEDULE (Full-Depth HMA)                           |  |                           |
|---|--|---------------------------|
| High-Speed Mainline Pavement<br>Average Profile Index<br>in./mile (mm/km) | Low-Speed Mainline Pavement<br>Average Profile Index<br>in./mile (mm/km) | Assessment<br>per subplot |
| 6.0 (95) or less  |  | +\$800.00                 |
| >6.0 (95) to 11.0 (175)   | 15.0 (240) or less   | +\$550.00                 |
| >11.0 (175) to 17.0 (270)   | >15.0 (240) to 25.0 (400)  | +\$350.00                 |
| >17.0 (270) to 30.0 (475)   | >25.0 (400) to 45.0 (710)  | +\$0.00                   |
| >30.0 (475) to 40.0 (635)   | >45.0 (710) to 65.0 (1025)   | +\$0.00                   |
| Greater than 40.0 (635)   | Greater than 65.0 (1025)   | -\$500.00"                |

Delete the third paragraph of Article 407.12 of the Standard Specifications.

### Portland Cement Concrete Pavement

Revise Article 420.10 of the Standard Specifications to read:

**“420.10 Surface Tests.** The finished surface of the pavement shall be tested for smoothness according to Article 406.11, except as follows:

The finished surface of the pavement shall be tested for smoothness once the pavement has attained a flexural strength of 550 psi (3800 kPa) or a compressive strength of 3000 psi (20,700 kPa).

Two wheel tracks shall be tested per lane. Testing shall be performed 3 ft (1 m) from and parallel to each lane edge.

Membrane curing damaged during testing shall be repaired as directed by the Engineer at no additional cost to the Department.

No further texturing for skid resistance will be required for areas corrected by grinding. Protective coat shall be reapplied to ground areas according to Article 420.18 at no additional cost to the Department.

For pavement that is corrected by removal and replacement, the minimum length to be removed shall meet the requirements of either Class A or Class B patching.

| SMOOTHNESS ASSESSMENT SCHEDULE (PCC)                                      |  |                           |
|---|--|---------------------------|
| High-Speed Mainline Pavement<br>Average Profile Index<br>in./mile (mm/km) | Low-Speed Mainline Pavement<br>Average Profile Index<br>in./mile (mm/km) | Assessment<br>per subplot |
| 6.0 (95) or less  |  | +\$1200.00                |
| >6.0 (95) to 11.0 (175)   | 15.0 (240) or less   | +\$950.00                 |
| >11.0 (175) to 17.0 (270)   | >15.0 (240) to 25.0 (400)  | +\$600.00                 |
| >17.0 (270) to 30.0 (475)   | >25.0 (400) to 45.0 (710)  | +\$0.00                   |
| >30.0 (475) to 40.0 (635)   | >45.0 (710) to 65.0 (1025)   | +\$0.00                   |
| Greater than 40.0 (635)   | Greater than 65.0 (1025)   | -\$750.00"                |

Delete the fourth paragraph of Article 420.20 of the Standard Specifications.

### Testing Equipment

Revise Article 1101.10 of the Standard Specifications to read:

**“1101.10 Pavement Surface Test Equipment.** Required surface testing and analysis equipment and their jobsite transportation shall be provided by the Contractor.

- (a) 16 ft (5 m) Straightedge. The 16 ft (5 m) straightedge shall consist of a metal I-beam mounted between two wheels spaced 16 ft (5 m) between the axles. Scratcher bolts which can be easily and accurately adjusted, shall be set at the 1/4, 1/2, and 3/4 points between the axles. A handle suitable for pushing and guiding shall be attached to the straightedge.
- (b) Profile Testing Device. The profile testing device shall have a decal displayed to indicate it has been tested through the Profile Equipment Verification (PEV) Program administered by the Department.
  - (1) California Profilograph. The California Profilograph shall be either computerized or manual and have a frame 25 ft (8 m) in length supported upon multiple wheels at either end. The profile shall be recorded from the vertical movement of a wheel attached to the frame at mid point.

The California Profilograph shall be calibrated according to the manufacturer's recommendations and California Test 526. All calibration traces and calculations shall be submitted to the Engineer for the project file.

- (2) Inertial Profiler. The inertial profiler shall be either an independent device or a system that can be attached to another vehicle using one or two non-contact sensors to measure the pavement profile. The inertial profiler shall be capable of performing a simulation of the California Profilograph to provide results in the Profile Index format.

The inertial profiler shall be calibrated according to the manufacturer's recommendations. All calibration traces and calculations shall be submitted to the Engineer for the project file.

- (3) Trace Analysis. The Contractor shall reduce/evaluate these traces using a 0.00 in. (0.0 mm) blanking band and determine a Profile Index in in./mile (mm/km) for each section of finished pavement surface. Traces produced using a computerized profile testing device will be evaluated without further reduction. When using a manual profile testing device, the Contractor shall provide an electronic scanner, a computer, and software to reduce the trace. All analysis equipment (electronic scanner, computerized recorder, etc.) shall be able to accept 0.00 in. (0.0 mm) for the blanking band.

All traces from pavement sections tested with the profile testing device shall be recorded on paper with scales of 300:1 longitudinally and 1:1 vertically. Equipment and software settings of the profile testing device and analysis equipment shall be set to those values approved through the PEV Program.

The Engineer may retest the pavement at any time to verify the accuracy of the equipment.”

#### **TEMPORARY EROSION AND SEDIMENT CONTROL (BDE)**

Effective: January 1, 2012

Revise the first paragraph of Article 280.04(f) of the Standard Specifications to read:

- “(f) Temporary Erosion Control Seeding. This system consists of seeding all erodible/bare areas to minimize the amount of exposed surface area. Seed bed preparation will not be required if the surface of the soil is uniformly smooth and in a loose condition. Light disking shall be done if the soil is hard packed or caked. Erosion rills greater than 1 in. (25 mm) in depth shall be filled and area blended with the surrounding soil. Fertilizer nutrients will not be required.”

Delete the last sentence of Article 280.08(e) of the Standard Specifications.

#### **TRACKING THE USE OF PESTICIDES (BDE)**

Effective: August 1, 2012

Add the following paragraph after the first paragraph of Article 107.23 of the Standard Specifications:

“Within 48 hours of the application of pesticides, including but not limited to herbicides, insecticides, algaecides, and fungicides, the Contractor shall complete and return to the Engineer, Operations form “OPER 2720”.”

## **TRAFFIC CONTROL DEFICIENCY DEDUCTION (BDE)**

Effective: August 1, 2011

Revise the third sentence of the third paragraph of Article 105.03(b) of the Standard Specifications to read:

“The daily monetary deduction will be \$2,500.”

## **TRAINING SPECIAL PROVISIONS**

This Training Special Provision supersedes Section 7b of the Special Provision entitled “Specific Equal Employment Opportunity Responsibilities,” and is in implementation of 23 U.S.C. 140(a).

As part of the contractor’s equal employment opportunity affirmative action program, training shall be provided as follows:

The contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade or job classification involved. The number of trainees to be trained under this contract will be 4 . In the event the contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the contractors’ needs and the availability of journeymen in the various classifications within the reasonable area of recruitment. Prior to commencing construction, the contractor shall submit to the Illinois Department of Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g. by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Illinois Department of Transportation and the Federal Highway Administration. The Illinois Department of Transportation and the Federal Highway Administration shall approve a program, if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved by not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Illinois Department of Transportation and the Federal Highway Administration. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirement of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program.

It is not required that all trainees be on board for the entire length of the contract. A contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The contractor shall furnish the trainee a copy of the program he will follow in providing the training. The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

METHOD OF MEASUREMENT The unit of measurement is in hours.

BASIS OF PAYMENT This work will be paid for at the contract unit price of 80 cents per hour for TRAINEES. The estimated total number of hours, unit price and total price have been included in the schedule of prices.

## **IDOT TRAINING PROGRAM GRADUATE ON-THE-JOB TRAINING SPECIAL PROVISION (TPG)**

Effective: August 1, 2012

In addition to the Contractor's equal employment opportunity affirmative action efforts undertaken as elsewhere required by this Contract, the Contractor is encouraged to participate in the incentive program to provide additional on-the-job training to certified graduates of IDOT's community college pre-apprenticeship programs outlined by this Special Provision.

It is the policy of IDOT to fund IDOT pre-apprenticeship training programs based at Illinois Community Colleges throughout Illinois, by Intergovernmental Agreement with the Illinois Community College Board, to provide training and skill-improvement opportunities to assure the increased participation of minority groups, disadvantaged persons and women in all phases of the highway construction industry. The intent of this IDOT Training Program Graduate (TPG) Special Provision is to place certified graduates of these IDOT funded pre-apprentice training programs on IDOT project sites when feasible, and provide the graduates with meaningful on-the-job training intended to lead to journey-level employment. IDOT and its sub-recipients, in carrying out the responsibilities of a state contract, shall determine which state funded construction contracts shall include "Training Program Graduate (TPG) Special Provisions." To benefit from the incentives to encourage the participation in the additional on-the-job training under this Training Program Graduate (TPG) Special Provision, the Contractor shall make every reasonable effort to employ certified graduates of the IDOT funded Pre-apprenticeship Training Program to the extent such persons are available within a reasonable recruitment area.

Participation pursuant to IDOT's requirements by the Contractor or subcontractor in this Training Program Graduate (TPG) Special Provision entitles the Contractor or subcontractor to be reimbursed at \$10.00 per hour for training given a certified graduate trainee on this contract. As approved by the Department, reimbursement will be made for training persons as specified herein. This reimbursement will be made even though the Contractor or subcontractor may receive additional training program funds from other sources for other trainees, provided such other source does not specifically prohibit the Contractor or subcontractor from receiving other reimbursement. For purposes of this Special Provision the Contractor is not relieved of requirements under the Illinois Prevailing Wage Act and is not eligible for other training fund reimbursements in addition to the Training Program Graduate (TPG) Special Provision reimbursement.

No payment shall be made to the Contractor if the Contractor or subcontractor fails to provide the required training. It is normally expected that a TPG will begin training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project through completion of the contract, so long as training opportunities exist in his work classification or until he has completed his training program. Should the TPG's employment end in advance of the completion of the contract, the Contractor shall promptly notify the designated IDOT staff member under this Special Provision that the TPG's involvement in the contract has ended and supply a written report of the reason for the end of the involvement, the hours completed by the TPG under the Contract and the number of hours for which the incentive payment provided under this Special Provision will be or has been claimed for the TPG.

The Contractor will provide for the maintenance of records and furnish periodic reports documenting its performance under this Special Provision.

METHOD OF MEASUREMENT: The unit of measurement is in hours.

BASIS OF PAYMENT: This work will be paid for at the contract unit price of \$10.00 per hour for TRAINEES TRAINING PROGRAM GRADUATE. The estimated total number of hours, unit price and total price have been included in the schedule of prices.

The Contractor shall provide training opportunities aimed at developing full journeyworker in the type of trade or job classification involved. The initial number of TPGs for which the incentive is available under this contract is 4. During the course of performance of the Contract the Contractor may seek approval from the Department for additional incentive eligible TPGs. In the event the Contractor subcontracts a portion of the contract work, it shall determine how many, if any, of the TPGs are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this Special Provision. The Contractor shall also insure that this Training Program Graduate Special Provision is made applicable to such subcontract if the TPGs are to be trained by a subcontractor and that the incentive payment is passed on to each subcontractor.

For the Contractor to meet the obligations for participation in this TPG incentive program under this Special Provision, the Department has contracted by Intergovernmental Agreement with the Illinois Community College Board to provide screening, tutoring and pre-training to individuals interested in working in the applicable construction classification and has certified those students who have successfully completed the program and are eligible to be TPGs. A designated IDOT staff member, the Director of the Office of Business and Workforce Diversity (OBWD), will be responsible for providing assistance and referrals to the Contractor for the applicable TPGs. For this contract, the Director of OBWD is designated as the responsible IDOT staff member to provide the assistance and referral services related to the placement for this Special Provision. For purposes of this Contract, contacting the Director of OBWD and interviewing each candidate he/she recommends constitutes reasonable recruitment.

Prior to commencing construction, the Contractor shall submit to the Department for approval the TPGs to be trained in each selected classification. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. No employee shall be employed as a TPG in any classification in which he/she has successfully completed a training course leading to journeyman status or in which he/she has been employed as a journeyman. Notwithstanding the on-the-job training purpose of this TPG Special Provision, some offsite training is permissible as long as the offsite training is an integral part of the work of the contract and does not comprise a significant part of the overall training.

Training and upgrading of TPGs of IDOT pre-apprentice training programs is intended to move said TPGs toward journeyman status and is the primary objective of this Training Program Graduate Special Provision. Accordingly, the Contractor shall make every effort to enroll TPGs by recruitment through the IDOT Illinois Community College Program to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that it has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance and entitled to the Training Program Graduate TPG Special Provision \$10.00 an hour incentive.

The Contractor or subcontractor shall provide each TPG with a certification showing the type and length of training satisfactorily completed.

#### **UTILITY COORDINATION AND CONFLICTS (BDE)**

Effective: April 1, 2011

Revised: January 1, 2012

Revise Article 105.07 of the Standard Specifications to read:

**“105.07 Cooperation with Utilities.** The Department reserves the right at any time to allow work by utilities on or near the work covered by the contract. The Contractor shall conduct his/her work so as not to interfere with or hinder the progress or completion of the work being performed by utilities. The Contractor shall also arrange the work and shall place and dispose of the materials being used so as not to interfere with the operations of utility work in the area.

The Contractor shall cooperate with the owners of utilities in their removal and rearrangement operations so work may progress in a reasonable manner, duplication or rearrangement of work may be reduced to a minimum, and services rendered by those parties will not be unnecessarily interrupted.

The Contractor shall coordinate with any planned utility adjustment or new installation and the Contractor shall take all precautions to prevent disturbance or damage to utility facilities. Any failure on the part of the utility owner, or their representative, to proceed with any planned utility adjustment or new installation shall be reported promptly by the Contractor to the Engineer.”

Revise the first sentence of the last paragraph of Article 107.19 of the Standard Specifications to read:

“When the Contractor encounters unexpected regulated substances due to the presence of utilities in unanticipated locations, the provisions of Article 107.40 shall apply; otherwise, if the Engineer does not direct a resumption of operations, the provisions of Article 108.07 shall apply.”

Revise Article 107.31 of the Standard Specification to read:

“**107.31 Reserved.**”

Add the following four Articles to Section 107 of the Standard Specifications:

“**107.37 Locations of Utilities within the Project Limits.** All known utilities existing within the limits of construction are either indicated on the plans or visible above ground. For the purpose of this Article, the limits of proposed construction are defined as follows:

(a) Limits of Proposed Construction for Utilities Paralleling the Roadway.

- (1) The horizontal limits shall be a vertical plane, outside of, parallel to, and 2 ft (600 mm) distant at right angles from the plan or revised slope limits.

In cases where the limits of excavation for structures are not shown on the plans, the horizontal limits shall be a vertical plane 4 ft (1.2 m) outside the edges of structure footings or the structure where no footings are required.

- (2) The upper vertical limits shall be the regulations governing the roadbed clearance for the specific utility involved.
- (3) The lower vertical limits shall be either the top of the utility at the depth below the proposed grade as prescribed by the governing agency or the limits of excavation, whichever is less.

(b) Limits of Proposed Construction for Utilities Crossing the Roadway in a Generally Transverse Direction.

- (1) Utilities crossing excavations for structures that are normally made by trenching such as sewers, underdrains, etc. and all minor structures such as manholes, inlets, foundations for signs, foundations for traffic signals, etc., the limits shall be the space to be occupied by the proposed permanent construction, unless otherwise required by the regulations governing the specific utility involved.

- (2) For utilities crossing the proposed site of major structures such as bridges, sign trusses, etc., the limits shall be as defined above for utilities extending in the same general direction as the roadway.

It is understood and agreed that the Contractor has considered in the bid all of the permanent and temporary utilities in their present and/or adjusted positions as indicated in the contract. It is further understood the actual location of the utilities may be located anywhere within the tolerances provided in 220 ILCS 50/2.8 or Administrative Code Title 92 Part 530.40(c), and the proximity of some utilities to construction may require extraordinary measures by the Contractor to protect those utilities.

No additional compensation will be allowed for any delays, inconveniences, or damages sustained by the Contractor due to the presence of or any claimed interference from known utility facilities or any adjustment of them, except as specifically provided in the contract.

**107.38 Adjustments of Utilities within the Project Limits.** The adjustment of utilities consists of the relocation, removal, replacement, rearrangements, reconstruction, improvement, disconnection, connection, shifting, new installation, or altering of an existing utility facility in any manner.

Utilities which are to be adjusted shall be adjusted by the utility owner or the owner's representative or by the Contractor as a contract item. Generally, arrangements for adjusting known utilities will be made by the Department prior to project construction; however, utilities will not necessarily be adjusted in advance of project construction and, in some cases, utilities will not be removed from the proposed construction limits as described in Article 107.37. When utility adjustments must be performed in conjunction with construction, the utility adjustment work will be indicated in the contract.

The Contractor may make arrangements for adjustment of utilities indicated in the contract, but not scheduled by the Department for adjustment, provided the Contractor furnishes the Department with a signed agreement with the utility owner covering the adjustments to be made. The cost of any such adjustments shall be the responsibility of the Contractor.

**107.39 Contractor's Responsibility for Locating and Protecting Utility Property and Services.** At points where the Contractor's operations are adjacent to properties or facilities of utility companies, or are adjacent to other property, damage to which might result in considerable expense, loss, or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

Within the State of Illinois, a State-Wide One Call Notice System has been established for notifying utilities. Outside the city limits of the City of Chicago, the system is known as the Joint Utility Locating Information for Excavators (JULIE) System. Within the city limits of the City of Chicago the system is known as DIGGER. All utility companies and municipalities which have buried utility facilities in the State of Illinois are a part of this system.

The Contractor shall call JULIE (800-892-0123) or DIGGER (312-744-7000), a minimum of 48 hours in advance of work being done in the area, and they will notify all member utility companies involved their respective utility should be located.

For utilities which are not members of JULIE or DIGGER, the Contractor shall contact the owners directly. The plan general notes will indicate which utilities are not members of JULIE or DIGGER.

The following table indicates the color of markings required of the State-Wide One Call Notification System.

| <b>Utility Service</b>                        | <b>Color</b>                                       |
|---|--|
| Electric Power, Distribution and Transmission | Safety Red   |
| Municipal Electric Systems                    | Safety Red   |
| Gas Distribution and Transmission             | High Visibility Safety Yellow                      |
| Oil Distribution and Transmission             | High Visibility Safety Yellow                      |
| Telephone and Telegraph System                | Safety Alert Orange                                |
| Community Antenna Television Systems          | Safety Alert Orange                                |
| Water Systems                                 | Safety Precaution Blue                             |
| Sewer Systems                                 | Safety Green                                       |
| Non-Potable Water and Slurry Lines            | Safety Purple                                      |
| Temporary Survey                              | Safety Pink  |
| Proposed Excavation                           | Safety White<br>(Black when snow is on the ground) |

The State-Wide One Call Notification System will provide for horizontal locations of utilities. When it is determined that the vertical location of the utility is necessary to facilitate construction, the Engineer may make the request for location from the utility after receipt of notice from the Contractor. If the utility owner does not field locate their facilities to the satisfaction of the Engineer, the Engineer will authorize the Contractor in writing to proceed to locate the facilities in the most economical and reasonable manner, subject to the approval of the Engineer, and be paid according to Article 109.04.

The Contractor shall be responsible for maintaining the excavations or markers provided by the utility owners.

The Contractor shall take all necessary precautions for the protection of the utility facilities. The Contractor shall be responsible for any damage or destruction of utility facilities resulting from neglect, misconduct, or omission in the Contractor's manner or method of execution or non-execution of the work, or caused by defective work or the use of unsatisfactory materials. Whenever any damage or destruction of a utility facility occurs as a result of work performed by the Contractor, the utility company will be immediately notified. The utility company will make arrangements to restore such facility to a condition equal to that existing before any such damage or destruction was done.

In the event of interruption of utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with the said authority in the restoration of service. If water service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

**107.40 Conflicts with Utilities.** Except as provided hereinafter, the discovery of a utility in an unanticipated location will be evaluated according to Article 104.03. It is understood and agreed that the Contractor has considered in the bid all facilities not meeting the definition of a utility in an unanticipated location and no additional compensation will be allowed for any delays, inconveniences, or damages sustained by the Contractor due to the presence of or any claimed interference from such facilities.

When the Contractor discovers a utility in an unanticipated location, the Contractor shall not interfere with said utility, shall take proper precautions to prevent damage or interruption of the utility, and shall promptly notify the Engineer of the nature and location of said utility.

(a) Definition. A utility in an unanticipated location is defined as an active or inactive utility, which is either:

(1) Located underground and (a) not shown in any way in any location on the contract documents; (b) not identified in writing by the Department to the Contractor prior to the letting; or (c) not located relative to the location shown in the contract within the tolerances provided in 220 ILCS 50/2.8 or Administrative Code Title 92 Part 530.40(c); or

(2) Located above ground or underground and not relocated as provided in the contract.

Service connections shall not be considered to be utilities in unanticipated locations.

(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 applicable to the utility 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 Contractor's operation is completely stopped by a utility in an unanticipated location for more than two hours, but not to exceed three weeks.

(2) Major Delay. A major delay occurs when the Contractor's operation is completely stopped by a utility in an unanticipated location for more than three weeks.

(3) Reduced Rate of Production Delay. A reduced rate of production delay occurs when the contractor's rate of production decreases by more than 25 percent and lasts longer than seven days.

(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 three weeks plus the cost of move-out to either the Contractor's yard or another job, whichever is less. Rental equipment may be paid for longer than three 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 days. Determination of compensation will be in accordance with Article 104.02, except labor and material additives will not be permitted.

Whether covered by (1), (2) or (3) above, additional traffic control required as a result of the operation(s) delayed will be paid for according to Article 109.04 for the total length of the delay.

If the delay is clearly shown to have caused work, which would have otherwise been completed, to be done after material or labor costs have increased, such increases may be paid. Payment for materials will be limited to increased cost substantiated by documentation furnished by the Contractor. Payment for increased labor rates will include those items in Article 109.04(b)(1) and (2), except the 35 percent and ten percent additives will not be permitted. On a working day contract, a delay occurring between November 30 and May 1, when work has not started, will not be considered as eligible for payment of measured labor and material costs.

Project overhead (not including interest) will be allowed when all progress on the contract has been delayed, and will be calculated as 15 percent of the delay claim.

(d) Other Obligations of Contractor. Upon payment of a claim 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."

## **WARM MIX ASPHALT (BDE)**

Effective: January 1, 2012

Description. This work shall consist of designing, producing and constructing Warm Mix Asphalt (WMA) in lieu of Hot Mix Asphalt (HMA) for N30, N50, and N70 mixtures at the Contractor's option. Work shall be according to Sections 406, 407, 408, 1030, and 1102 of the Standard Specifications, except as modified herein. In addition, any references to HMA in the Standard Specifications, or the special provisions shall be construed to include WMA.

WMA is an asphalt mixture which can be produced at temperatures lower than allowed for HMA utilizing approved WMA technologies. WMA technologies are defined as the use of additives or processes which allow a reduction in the temperatures at which HMA mixes are produced and placed. WMA is produced by the use of additives, a water foaming process, or combination of both. Additives include minerals, chemicals or organics incorporated into the asphalt binder stream in a dedicated delivery system. The process of foaming injects water into the asphalt binder stream, just prior to incorporation of the asphalt binder with the aggregate.

Approved WMA technologies may also be used in HMA provided all the requirements specified herein, with the exception of temperature, are met. However, asphalt mixtures produced at temperatures in excess of 275 °F (135 °C) will not be considered WMA when determining the grade reduction of the virgin asphalt binder grade.

### Materials.

Add the following to Article 1030.02 of the Standard Specifications.

“(h) Warm Mix Asphalt (WMA) Technologies (Note 3)”

Add the following note to Article 1030.02 of the Standard Specifications.

“Note 3. Warm mix additives or foaming processes shall be selected from the current Bureau of Materials and Physical Research Approved List, “Warm-Mix Asphalt Technologies”.”

### Equipment.

Revise the first paragraph of Article 1102.01 of the Standard Specifications to read:

**“1102.01 Hot-Mix Asphalt Plant.** The hot-mix asphalt (HMA) plant shall be the batch-type, continuous-type, or dryer drum plant. The plants shall be evaluated for prequalification rating and approval to produce HMA according to the current Bureau of Materials and Physical Research Policy Memorandum, “Approval of Hot-Mix Asphalt Plants and Equipment”. Once approved, the Contractor shall notify the Bureau of Materials and Physical Research to obtain approval of all plant modifications. The plants shall not be used to produce mixtures concurrently for more than one project or for private work unless permission is granted in writing by the Engineer. The plant units shall be so designed, coordinated and operated that they will function properly and produce HMA having uniform temperatures and compositions within the tolerances specified. The plant units shall meet the following requirements.”

Add the following to Article 1102.01(a) of the Standard Specifications.

“(13) Equipment for Warm Mix Technologies.

- a. Foaming. Metering equipment for foamed asphalt shall have an accuracy of  $\pm 2$  percent of the actual water metered. The foaming control system shall be electronically interfaced with the asphalt binder meter.
- b. Additives. Additives shall be introduced into the plant according to the supplier’s recommendations and shall be approved by the Engineer. The system for introducing the WMA additive shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all rates of production and batch sizes.”

Mix Design Verification.

Add the following to Article 1030.04 of the Standard Specifications.

“(d) Warm Mix Technologies.

- (1) Foaming. WMA mix design verification will not be required when foaming technology is used alone (without WMA additives). However, the foaming technology shall only be used on HMA designs previously approved by the Department.
- (2) Additives. WMA mix designs utilizing additives shall be submitted to the Engineer for mix design verification. Additional mixture verification requirements include Hamburg Wheel testing according to Illinois Modified AASHTO T324 and tensile strength testing according to Illinois Modified AASHTO T283 which shall meet the criteria in Tables 1 and 2 respectively herein. The Contractor shall provide the additional material as follows:
  - a. Four gyratory specimens to be prepared in the Contractor’s lab according to Illinois Modified AASHTO T324.
  - b. Sufficient mixture to conduct tensile strength testing according to Illinois Modified AASHTO T283.

Table 1. Illinois Modified AASHTO T324 Requirements <sup>1/</sup>

| Asphalt Binder Grade | # Wheel Passes | Max Rut Depth in. (mm) |
|----------------------|----------------|------------------------|
| PG 76-XX             | 20,000         | 1/2 in. (12.5 mm)      |
| PG 70-XX             | 15,000         | 1/2 in. (12.5 mm)      |
| PG 64-XX             | 10,000         | 1/2 in. (12.5 mm)      |
| PG 58-XX             |                |                        |

1/ Loose WMA shall be oven aged at  $270 \pm 5$  °F ( $132 \pm 3$  °C) for two hours prior to gyratory compaction of Hamburg Wheel specimens.

Table 2. Tensile Strength Requirements

| Asphalt Binder Grade | Tensile Strength psi (kPa) |             |
|----------------------|----------------------------|-------------|
|                      | Minimum                    | Maximum     |
| PG 76-XX             | 80 (552)                   | 200 (1379)  |
| PG 70-XX             |                            |             |
| PG 64-XX             | 60 (414)                   | 200 (1379)" |
| PG 58-XX             |                            |             |

Production.

Revise the second paragraph of Article 1030.06(a) of the Standard Specifications to read:

“At the start of mix production for HMA, WMA, and HMA using WMA technologies, QC/QA mixture start-up will be required for the following situations; at the beginning of production of a new mix of a new mixture design, at the beginning of each production season, and at every plant utilized to produce mixtures, regardless of the mix.”

Insert the following after the sixth paragraph of Article 1030.06(a) of the Standard Specifications:

“Warm mix technologies shall be as follows.

- (1) Mixture sampled to represent the test strip shall include additional material sufficient for the Department to conduct Hamburg Wheel testing according to Illinois Modified AASHTO T324 and tensile strength testing according to Illinois Modified AASHTO T283 (approximately 110 lb (50 kg) total).
- (2) Upon completion of the start-up, WMA production shall cease. The Contractor may revert to HMA production provided a start-up has been previously completed for the current construction season for the mix design. WMA may resume once all the test results, including Hamburg Wheel results are completed and found acceptable by the Engineer.”

Add the following after the first paragraph of Article 1030.05(d)(2)c. of the Standard Specifications:

“During production of each WMA mixture or HMA utilizing WMA technologies, the Engineer will request a minimum of one randomly located sample, identified by the Engineer, for Hamburg Wheel testing to determine compliance with the requirements specified in Table 1 herein.”

Quality Control/Quality Assurance Testing.

Revise the table in Article 1030.05(d)(2)a. of the Standard Specifications to read:

FAI Routes 74 & 155 (I-74 & I-155)  
 Project ACIM-ACBRI-000S(907)  
 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620

| Parameter   | Frequency of Tests   |   | Test Method<br>See Manual of<br>Test Procedures<br>for Materials |
|---|--|---|--|
|   | High ESAL Mixture<br>Low ESAL Mixture  | All Other Mixtures  |  |
| Aggregate Gradation<br><br>% passing sieves:<br>1/2 in. (12.5 mm),<br>No. 4 (4.75 mm),<br>No. 8 (2.36 mm),<br>No. 30 (600 μm)<br>No. 200 (75 μm)<br><br>Note 1. | 1 washed ignition oven test on the mix per half day of production<br><br>Note 4.   | 1 washed ignition oven test on the mix per day of production<br><br>Note 4. | Illinois Procedure   |
| Asphalt Binder Content by Ignition Oven<br><br>Note 2.  | 1 per half day of production   | 1 per day   | Illinois-Modified AASHTO T 308                                   |
| VMA<br><br>Note 3.  | Day's production ≥ 1200 tons:<br><br>1 per half day of production<br><br>Day's production < 1200 tons:<br><br>1 per half day of production for first 2 days and 1 per day thereafter (first sample of the day) | N/A   | Illinois-Modified AASHTO R 35                                    |
| Air Voids<br><br>Bulk Specific Gravity of Gyratory Sample<br><br>Note 5.  | Day's production ≥ 1200 tons:<br><br>1 per half day of production<br><br>Day's production < 1200 tons:<br><br>1 per half day of production for first 2 days and 1 per day thereafter (first sample of the day) | 1 per day   | Illinois-Modified AASHTO T 312                                   |
| Maximum Specific Gravity of Mixture   | Day's production ≥ 1200 tons:<br><br>1 per half day of production<br><br>Day's production < 1200 tons:<br><br>1 per half day of production for first 2 days and 1 per day thereafter (first sample of the day) | 1 per day   | Illinois-Modified AASHTO T 209                                   |

Note 1. The No. 8 (2.36 mm) and No. 30 (600  $\mu$ m) sieves are not required for All Other Mixtures.

Note 2. The Engineer may waive the ignition oven requirement for asphalt binder content if the aggregates to be used are known to have ignition asphalt binder content calibration factors which exceed 1.5 percent. If the ignition oven requirement is waived, other Department approved methods shall be used to determine the asphalt binder content.

Note 3. The  $G_{sb}$  used in the voids in the mineral aggregate (VMA) calculation shall be the same average  $G_{sb}$  value listed in the mix design.

Note 4. The Engineer reserves the right to require additional hot bin gradations for batch

Note 5. The WMA compaction temperature for mixture volumetric testing shall be  $270 \pm 5$  °F ( $132 \pm 3$  °C) for quality control testing. The WMA compaction temperature for quality assurance testing will be  $270 \pm 5$  °F ( $132 \pm 3$  °C) if the mixture is not allowed to cool to room temperature. If the mixture is allowed to cool to room temperature it shall be reheated to standard HMA compaction temperatures.”

#### Construction Requirements.

Revise the second paragraph of Article 406.06(b)(1) of the Standard Specifications to read:

“The HMA shall be delivered at a temperature of 250 to 350 °F (120 to 175 °C).  
WMA shall be delivered at a minimum temperature of 215 °F (102 °C).”

#### Basis of Payment.

This work will be paid at the contract unit price bid for the HMA pay items involved. Anti-strip will not be paid for separately, but shall be considered as included in the cost of the work.

#### **WEEKLY DBE TRUCKING REPORTS (BDE)**

Effective: June 2, 2012

The Contractor shall provide 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 on the jobsite; or used for the delivery and/or removal of equipment/material to and from the jobsite. The jobsite shall also include offsite locations, such as plant sites or storage sites, when those locations are used solely for this contract.

The report shall be submitted on the form provided by the Department within ten business days following the reporting period. The reporting period shall be Monday through Sunday for each week reportable trucking activities occur. The report shall be submitted to the Engineer and a copy shall be provided to the district EEO Officer.

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.

### **STEEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)**

Effective: April 2, 2004

Revised: April 1, 2009

Description. Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in steel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form or failure to indicate contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment.

Types of Steel Products. An adjustment will be made for fluctuations in the cost of steel used in the manufacture of the following items:

Metal Piling (excluding temporary sheet piling)  
Structural Steel  
Reinforcing Steel

Other steel materials such as dowel bars, tie bars, mesh reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), and frames and grates will be subject to a steel cost adjustment when the pay items they are used in has a contract value of \$10,000 or greater.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

- (a) The dates and quantity of steel, in lb (kg), shipped from the mill to the fabricator.
- (b) The quantity of steel, in lb (kg), incorporated into the various items of work covered by this special provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment. Steel cost adjustments will be computed as follows:

$$SCA = Q \times D$$

Where: SCA = steel cost adjustment, in dollars  
Q = quantity of steel incorporated into the work, in lb (kg)  
D = price factor, in dollars per lb (kg)

$$D = MPI_M - MPI_L$$

Where:  $MPI_M$  = The Materials Cost Index for steel as published by the Engineering News-Record for the month the steel is shipped from the mill. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

$MPI_L$  = The Materials Cost Index for steel as published by the Engineering News-Record for the month prior to the letting. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

The unit weights (masses) of steel that will be used to calculate the steel cost adjustment for the various items are shown in the attached table.

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the letting date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the  $MPI_M$  will be based on the date the steel arrives at the job site. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment. Steel cost adjustments may be positive or negative but will only be made when there is a difference between the  $MPI_L$  and  $MPI_M$  in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(MPI_L - MPI_M) \div MPI_L\} \times 100$$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

FAI Routes 74 & 155 (I-74 & I-155)  
 Project ACIM-ACBRI-000S(907)  
 Section 90-[14R;(14HB-4,14,14HVB)BR]  
 Tazewell County  
 Contract No. 68620

**Attachment**

| Item  | Unit Mass (Weight)             |
|---|--------------------------------|
| Metal Piling (excluding temporary sheet piling)                                   |                                |
| Furnishing Metal Pile Shells 12 in. (305 mm), 0.179 in. (3.80 mm) wall thickness) | 23 lb/ft (34 kg/m)             |
| Furnishing Metal Pile Shells 12 in. (305 mm), 0.250 in. (6.35 mm) wall thickness) | 32 lb/ft (48 kg/m)             |
| Furnishing Metal Pile Shells 14 in. (356 mm), 0.250 in. (6.35 mm) wall thickness) | 37 lb/ft (55 kg/m)             |
| Other piling  | See plans                      |
| Structural Steel  | See plans for weights (masses) |
| Reinforcing Steel   | See plans for weights (masses) |
| Dowel Bars and Tie Bars   | 6 lb (3 kg) each               |
| Mesh Reinforcement  | 63 lb/100 sq ft (310 kg/sq m)  |
| Guardrail   |                                |
| Steel Plate Beam Guardrail, Type A w/steel posts                                  | 20 lb/ft (30 kg/m)             |
| Steel Plate Beam Guardrail, Type B w/steel posts                                  | 30 lb/ft (45 kg/m)             |
| Steel Plate Beam Guardrail, Types A and B w/wood posts                            | 8 lb/ft (12 kg/m)              |
| Steel Plate Beam Guardrail, Type 2  | 305 lb (140 kg) each           |
| Steel Plate Beam Guardrail, Type 6  | 1260 lb (570 kg) each          |
| Traffic Barrier Terminal, Type 1 Special (Tangent)                                | 730 lb (330 kg) each           |
| Traffic Barrier Terminal, Type 1 Special (Flared)                                 | 410 lb (185 kg) each           |
| Steel Traffic Signal and Light Poles, Towers and Mast Arms                        |                                |
| Traffic Signal Post   | 11 lb/ft (16 kg/m)             |
| Light Pole, Tenon Mount and Twin Mount, 30 - 40 ft (9 - 12 m)                     | 14 lb/ft (21 kg/m)             |
| Light Pole, Tenon Mount and Twin Mount, 45 - 55 ft (13.5 - 16.5 m)                | 21 lb/ft (31 kg/m)             |
| Light Pole w/Mast Arm, 30 - 50 ft (9 - 15.2 m)                                    | 13 lb/ft (19 kg/m)             |
| Light Pole w/Mast Arm, 55 - 60 ft (16.5 - 18 m)                                   | 19 lb/ft (28 kg/m)             |
| Light Tower w/Luminaire Mount, 80 - 110 ft (24 - 33.5 m)                          | 31 lb/ft (46 kg/m)             |
| Light Tower w/Luminaire Mount, 120 - 140 ft (36.5 - 42.5 m)                       | 65 lb/ft (97 kg/m)             |
| Light Tower w/Luminaire Mount, 150 - 160 ft (45.5 - 48.5 m)                       | 80 lb/ft (119 kg/m)            |
| Metal Railings (excluding wire fence)   |                                |
| Steel Railing, Type SM  | 64 lb/ft (95 kg/m)             |
| Steel Railing, Type S-1   | 39 lb/ft (58 kg/m)             |
| Steel Railing, Type T-1   | 53 lb/ft (79 kg/m)             |
| Steel Bridge Rail   | 52 lb/ft (77 kg/m)             |
| Frames and Grates   |                                |
| Frame   | 250 lb (115 kg)                |
| Lids and Grates   | 150 lb (70 kg)                 |

## RETURN WITH BID

### ILLINOIS DEPARTMENT OF TRANSPORTATION

### OPTION FOR STEEL COST ADJUSTMENT

The bidder shall submit this completed form with his/her bid. Failure to submit the form or properly complete contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment. After award, this form, when submitted shall become part of the contract.

**Contract No.:** \_\_\_\_\_

**Company Name:** \_\_\_\_\_

#### Contractor's Option:

Is your company opting to include this special provision as part of the contract plans for the following items of work?

|  |     |                          |
|--|-----|--------------------------|
| Metal Piling   | Yes | <input type="checkbox"/> |
| Structural Steel   | Yes | <input type="checkbox"/> |
| Reinforcing Steel  | Yes | <input type="checkbox"/> |
| Dowel Bars, Tie Bars and Mesh Reinforcement                | Yes | <input type="checkbox"/> |
| Guardrail  | Yes | <input type="checkbox"/> |
| Steel Traffic Signal and Light Poles, Towers and Mast Arms | Yes | <input type="checkbox"/> |
| Metal Railings (excluding wire fence)                      | Yes | <input type="checkbox"/> |
| Frames and Grates  | Yes | <input type="checkbox"/> |

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**FUEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)**

Effective: April 1, 2009

Revised: July 1, 2009

Description. Fuel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in fuel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form or failure to indicate contract number, company name and sign and date the form shall make this contract exempt of fuel cost adjustments for all categories of work. Failure to indicate "Yes" for any category of work will make that category of work exempt from fuel cost adjustment.

General. The fuel cost adjustment shall apply to contract pay items as grouped by category. The adjustment shall only apply to those categories of work checked "Yes", and only when the cumulative plan quantities for a category exceed the required threshold. Adjustments to work items in a category, either up or down, and work added by adjusted unit price will be subject to fuel cost adjustment only when the category representing the added work was subject to the fuel cost adjustment. Added work paid for by time and materials will not be subject to fuel cost adjustment. Category descriptions and thresholds for application and the fuel usage factors which are applicable to each are as follows:

(a) Categories of Work.

- (1) Category A: Earthwork. Contract pay items performed under Sections 202, 204, and 206 including any modified standard or nonstandard items where the character of the work to be performed is considered earthwork. The cumulative total of all applicable item plan quantities shall exceed 25,000 cu yd (20,000 cu m). Included in the fuel usage factor is a weighted average 0.10 gal/cu yd (0.50 liters/cu m) factor for trucking.
- (2) Category B: Subbases and Aggregate Base Courses. Contract pay items constructed under Sections 311, 312 and 351 including any modified standard or nonstandard items where the character of the work to be performed is considered construction of a subbase or aggregate, stabilized or modified base course. The cumulative total of all applicable item plan quantities shall exceed 5000 tons (4500 metric tons). Included in the fuel usage factor is a 0.60 gal/ton (2.50 liters/metric ton) factor for trucking.
- (3) Category C: Hot-Mix Asphalt (HMA) Bases, Pavements and Shoulders. Contract pay items constructed under Sections 355, 406, 407 and 482 including any modified standard or nonstandard items where the character of the work to be performed is considered HMA bases, pavements and shoulders. The cumulative total of all applicable item plan quantities shall exceed 5000 tons (4500 metric tons). Included in the fuel usage factor is 0.60 gal/ton (2.50 liters/metric ton) factor for trucking.

- (4) Category D: Portland Cement Concrete (PCC) Bases, Pavements and Shoulders. Contract pay items constructed under Sections 353, 420, 421 and 483 including any modified standard or nonstandard items where the character of the work to be performed is considered PCC base, pavement or shoulder. The cumulative total of all applicable item plan quantities shall exceed 7500 sq yd (6000 sq m). Included in the fuel usage factor is 1.20 gal/cu yd (5.94 liters/cu m) factor for trucking.
- (5) Category E: Structures. Structure items having a cumulative bid price that exceeds \$250,000 for pay items constructed under Sections 502, 503, 504, 505, 512, 516 and 540 including any modified standard or nonstandard items where the character of the work to be performed is considered structure work when similar to that performed under these sections and not included in categories A through D.

(b) Fuel Usage Factors.

| English Units                          |        |              |
|--|--------|--------------|
| Category                               | Factor | Units        |
| A - Earthwork                          | 0.34   | gal / cu yd  |
| B – Subbase and Aggregate Base courses | 0.62   | gal / ton    |
| C – HMA Bases, Pavements and Shoulders | 1.05   | gal / ton    |
| D – PCC Bases, Pavements and Shoulders | 2.53   | gal / cu yd  |
| E – Structures                         | 8.00   | gal / \$1000 |

| Metric Units                           |        |                     |
|--|--------|---------------------|
| Category                               | Factor | Units               |
| A - Earthwork                          | 1.68   | liters / cu m       |
| B – Subbase and Aggregate Base courses | 2.58   | liters / metric ton |
| C – HMA Bases, Pavements and Shoulders | 4.37   | liters / metric ton |
| D – PCC Bases, Pavements and Shoulders | 12.52  | liters / cu m       |
| E – Structures                         | 30.28  | liters / \$1000     |

(c) Quantity Conversion Factors.

| Category | Conversion         | Factor                               |
|----------|--------------------|--------------------------------------|
| B        | sq yd to ton       | 0.057 ton / sq yd / in depth         |
|          | sq m to metric ton | 0.00243 metric ton / sq m / mm depth |
| C        | sq yd to ton       | 0.056 ton / sq yd / in depth         |
|          | sq m to metric ton | 0.00239 m ton / sq m / mm depth      |
| D        | sq yd to cu yd     | 0.028 cu yd / sq yd / in depth       |
|          | sq m to cu m       | 0.001 cu m / sq m / mm depth         |

Method of Adjustment. Fuel cost adjustments will be computed as follows.

$$CA = (FPI_P - FPI_L) \times FUF \times Q$$

Where: CA = Cost Adjustment, \$  
FPI<sub>P</sub> = Fuel Price Index, as published by the Department for the month the work is performed, \$/gal (\$/liter)  
FPI<sub>L</sub> = Fuel Price Index, as published by the Department for the month prior to the letting, \$/gal (\$/liter)  
FUF = Fuel Usage Factor in the pay item(s) being adjusted  
Q = Authorized construction Quantity, tons (metric tons) or cu yd (cu m)

The entire FUF indicated in paragraph (b) will be used regardless of use of trucking to perform the work.

Progress Payments. Fuel cost adjustments will be calculated for each calendar month in which applicable work is performed; and will be paid or deducted when all other contract requirements for the items of work are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Final Quantities. Upon completion of the work and determination of final pay quantities, an adjustment will be prepared to reconcile any differences between estimated quantities previously paid and the final quantities. The value for the balancing adjustment will be based on a weighted average of FPI<sub>P</sub> and Q only for those months requiring the cost adjustment. The cost adjustment will be applicable to the final measured quantities of all applicable pay items.

Basis of Payment. Fuel cost adjustments may be positive or negative but will only be made when there is a difference between the FPI<sub>L</sub> and FPI<sub>P</sub> in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(FPI_L - FPI_P) \div FPI_L\} \times 100$$

Return With Bid

**ILLINOIS DEPARTMENT  
OF TRANSPORTATION**

**OPTION FOR  
FUEL COST ADJUSTMENT**

The bidder shall submit this completed form with his/her bid. Failure to submit the form or properly complete contract number, company name, and sign and date the form shall make this contract exempt of fuel cost adjustments in all categories. Failure to indicate "Yes" for any category of work at the time of bid will make that category of work exempt from fuel cost adjustment. After award, this form, when submitted shall become part of the contract.

**Contract No.:** \_\_\_\_\_

**Company Name:** \_\_\_\_\_

**Contractor's Option:**

Is your company opting to include this special provision as part of the contract plans for the following categories of work?

- |  |     |                          |
|--|-----|--------------------------|
| Category A Earthwork.                          | Yes | <input type="checkbox"/> |
| Category B Subbases and Aggregate Base Courses | Yes | <input type="checkbox"/> |
| Category C HMA Bases, Pavements and Shoulders  | Yes | <input type="checkbox"/> |
| Category D PCC Bases, Pavements and Shoulders  | Yes | <input type="checkbox"/> |
| Category E Structures                          | Yes | <input type="checkbox"/> |

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**BITUMINOUS MATERIALS COST ADJUSTMENTS (BDE) (RETURN FORM WITH BID)**

Effective: November 2, 2006

Revised: January 1, 2012

Description. Bituminous material cost adjustments will be made to provide additional compensation to the Contractor, or credit to the Department, for fluctuations in the cost of bituminous materials when optioned by the Contractor. The adjustments shall apply to permanent and temporary hot-mix asphalt (HMA) mixtures, bituminous surface treatments (cover and seal coats), and preventative maintenance type surface treatments. The adjustments shall not apply to bituminous prime coats, tack coats, crack filling/sealing, or joint filling/sealing.

The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of bituminous materials cost adjustments.

Method of Adjustment. Bituminous materials cost adjustments will be computed as follows.

$$CA = (BPI_P - BPI_L) \times (\%AC_V / 100) \times Q$$

- Where: CA = Cost Adjustment, \$.  
BPI<sub>P</sub> = Bituminous Price Index, as published by the Department for the month the work is performed, \$/ton (\$/metric ton).  
BPI<sub>L</sub> = Bituminous Price Index, as published by the Department for the month prior to the letting, \$/ton (\$/metric ton).  
%AC<sub>V</sub> = Percent of virgin Asphalt Cement in the Quantity being adjusted. For HMA mixtures, the % AC<sub>V</sub> will be determined from the adjusted job mix formula. For bituminous materials applied, a performance graded or cutback asphalt will be considered to be 100% AC<sub>V</sub> and undiluted emulsified asphalt will be considered to be 65% AC<sub>V</sub>.  
Q = Authorized construction Quantity, tons (metric tons) (see below).

For HMA mixtures measured in square yards:  $Q, \text{ tons} = A \times D \times (G_{mb} \times 46.8) / 2000$ . For HMA mixtures measured in square meters:  $Q, \text{ metric tons} = A \times D \times (G_{mb} \times 24.99) / 1000$ . When computing adjustments for full-depth HMA pavement, separate calculations will be made for the binder and surface courses to account for their different  $G_{mb}$  and % AC<sub>V</sub>.

For bituminous materials measured in gallons:  $Q, \text{ tons} = V \times 8.33 \text{ lb/gal} \times SG / 2000$   
For bituminous materials measured in liters:  $Q, \text{ metric tons} = V \times 1.0 \text{ kg/L} \times SG / 1000$

- Where: A = Area of the HMA mixture, sq yd (sq m).  
D = Depth of the HMA mixture, in. (mm).  
G<sub>mb</sub> = Average bulk specific gravity of the mixture, from the approved mix design.  
V = Volume of the bituminous material, gal (L).  
SG = Specific Gravity of bituminous material as shown on the bill of lading.

Basis of Payment. Bituminous materials cost adjustments may be positive or negative but will only be made when there is a difference between the BPI<sub>L</sub> and BPI<sub>P</sub> in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(BPI_L - BPI_P) \div BPI_L\} \times 100$$

Bituminous materials cost adjustments will be calculated for each calendar month in which applicable bituminous material is placed; and will be paid or deducted when all other contract requirements for the work placed during the month are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

FAI Routes 74 & 155 (I-74 & I-155)  
Project ACIM-ACBRI-000S(907)  
Section 90-[14R;(14HB-4,14,14HVB)BR]  
Tazewell County  
Contract No. 68620

Return With Bid

**ILLINOIS DEPARTMENT  
OF TRANSPORTATION**

**OPTION FOR  
BITUMINOUS MATERIALS COST ADJUSTMENTS**

The bidder shall submit this completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of bituminous materials cost adjustments. After award, this form, when submitted, shall become part of the contract.

**Contract No.:** \_\_\_\_\_

**Company Name:** \_\_\_\_\_

**Contractor's Option:**

Is your company opting to include this special provision as part of the contract?

Yes  No

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**STORM WATER POLLUTION PREVENTION PLAN**



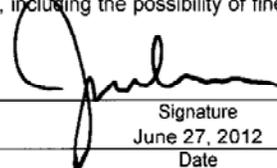
**Storm Water Pollution Prevention Plan**

|         |                                      |              |                         |
|---------|--------------------------------------|--------------|-------------------------|
| Route   | <u>FAI 74 &amp; FAI 155</u>          | Marked Rte.  | <u>I-74 &amp; I-155</u> |
| Section | <u>90-[14R;(14-HB-4,14,14HVB)BR]</u> | Project No.  | <u></u>                 |
| County  | <u>Tazewell</u>                      | Contract No. | <u>68620</u>            |

This plan has been prepared to comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit No. ILR10 (Permit ILR10), issued by the Illinois Environmental Protection Agency (IEPA) for storm water discharges from construction site activities.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Joseph E. Crowe  
Print Name  
Deputy Director of Highways/Region Three Engineer  
Title  
Illinois Department of Transportation  
Agency

  
Signature  
June 27, 2012  
Date

**I. Site Description:**

- A. Provide a description of the project location (include latitude and longitude):  

This project is located on interstate 74 beginning just east of the I-74/I-474 interchange and ending just east of the I-74/Morton Avenue interchange in Morton in Tazewell County. Project coordinates are 40 degrees 37.25 minutes north latitude, 89 degrees 29.13 minutes west longitude.
- B. Provide a description of the construction activity which is the subject of this plan:  

The improvements consist of the complete reconstruction of the I-74/I-155 interchange and the reconfiguration of the I-74/Morton Avenue interchange. The work includes pavement removal and reconstruction, add lanes on I-74, bridge removal and reconstruction, tunnel removal at Jefferson Street, addition of highway lighting, interstate signing, intelligent transportation systems hardware, earthwork, drainage, safety improvements, and other collateral work necessary to complete the project.
- C. Provide the estimated duration of this project:  

This project will begin in the spring of 2013 and extend until early fall of 2015. The approximate time duration is 30 months.
- D. The total area of the construction site is estimated to be 194.5 acres.  

The total area of the site estimated to be disturbed by excavation, grading or other activities is 158.3 acres.
- E. The following is a weighted average of the runoff coefficient for this project after construction activities are completed:  

0.60

- F. List all soils found within project boundaries. Include map unit name, slope information, and erosivity:

A review of the Tazewell County soil survey indicates that the soil within the project limits is composed of five distinct types: Tama Silt Loam, Ipava Silt Loam, Sable Silty Loam, Downs Silt Loam and Orthents Loamy. The slope for these respective soils varies from 0 to 7 percent. All soils should be considered susceptible to erosion and should be protected accordingly.

The majority of the existing roadway is on compacted embankment material of varying height which consists of stiff to very stiff clay loam. At locations of new alignment, approximately the top 1 foot of the existing soil is composed of topsoil. Beneath that the existing borings indicate a relatively uniform subsurface stratum which generally consists of a soft to medium stiff compressible silty loam to clay loam to a depth of approximately 20 feet, which is underlain by a silty loam to clay loam till for a depth of 100 feet or greater. The groundwater is variable throughout the project but tends to be encountered at depths beginning at 9 feet below grade.

- G. Provide an aerial extent of wetland acreage at the site:

None.

- H. Provide a description of potentially erosive areas associated with this project:

Areas subject to erosive potential during construction include the bridge cones at the structures due to their steep grades, placement of embankment, which can become windblown or erode from storms prior to establishing vegetation. Secondary locations include the foreslopes, backslopes, ditches and interchange infields prior to placement of topsoil and establishment of vegetation.

- I. The following is a description of soil disturbing activities by stages, their locations, and their erosive factors (e.g. steepness of slopes, length of slopes, etc):

Earthwork in the form of excavation and embankment placement will be performed along the length of the project. The foreslopes will be constructed at 1:6 slope to the outside of the clear zone and will break to 1:3 slope outside of the clear zone to the toe of the slope or ditch bottom. Locations shielded by guardrail will vary to as steep as 1:2 foreslopes, generally at locations of the bridge cones. The backslopes will be constructed at a 1:3 slope. There are a total of 14 stages of construction for the duration of the project. Each stage has earthwork associated with it and the potential for erosive action if steps are not taken to mitigate it.

- J. See the erosion control plans and/or drainage plans for this contract for information regarding drainage patterns, approximate slopes anticipated before and after major grading activities, locations where vehicles enter or exit the site and controls to prevent offsite sediment tracking (to be added after contractor identifies locations), areas of soil disturbance, the location of major structural and non-structural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands) and locations where storm water is discharged to surface water including wetlands.

- K. Identify who owns the drainage system (municipality or agency) this project will drain into:

This project has two (2) locations where storm water run-off will be channeled to. The first location is at the I-74/I-155 interchange. Run-off from the interchange and surrounding area will be collected and channeled into the Westshore Subdivision Finger Lake immediately north of the interchange in accordance with the current overland drainage of the area. Finger Lake is a private on-stream containment that was created when a dam was placed across the natural stream. Given that it is a private lake, the residences of the subdivision retain jurisdiction. The second location is near the Morton Avenue exit ramp from eastbound I-74 to northbound and southbound Morton Avenue at a 42" storm sewer outlet behind the Kroger grocery store. Storm water will collect via a series of field tiles, ditches, and storm sewer to that outlet and will be conveyed via storm sewer and open drainage channel through Morton to a series of detention ponds at the south side of town. The storm water will be released at a controlled rate into an existing drainage known as Prairie Creek. The village of Morton will have jurisdiction of the storm water upon its release from the project site behind the Kroger grocery store.

- L. The following is a list of receiving water(s) and the ultimate receiving water(s) for this site. The location of the receiving waters can be found on the erosion and sediment control plans:

As noted above, the primary receiving waters are the lake at the Westshore Subdivision and Prairie Creek south of the village of Morton.

M. Describe areas of the site that are to be protected or remain undisturbed. These areas may include steep slopes, highly erodible soils, streams, stream buffers, specimen trees, natural vegetation, nature preserves, etc.

None

N. The following sensitive environmental resources are associated with this project, and may have the potential to be impacted by the proposed development:

- Floodplain
- Wetland Riparian
- Threatened and Endangered Species
- Historic Preservation
- 303(d) Listed receiving waters for suspended solids, turbidity, or siltation
- Receiving waters with Total Maximum Daily Load (TMDL) for sediment, total suspended solids, turbidity or siltation
- Applicable Federal, Tribal, State or Local Programs
- Other

1. 303(d) Listed receiving waters (fill out this section if checked above):

None

a. The name(s) of the listed water body, and identification of all pollutants causing impairment:

n/a

b. Provide a description of how erosion and sediment control practices will prevent a discharge of sediment resulting from a storm event equal to or greater than a twenty-five (25) year, twenty-four (24) hour rainfall event:

n/a

c. Provide a description of the location(s) of direct discharge from the project site to the 303(d) water body:

n/a

d. Provide a description of the location(s) of any dewatering discharges to the MS4 and/or water body:

n/a

2. TMDL (fill out this section if checked above)

a. The name(s) of the listed water body:

n/a

b. Provide a description of the erosion and sediment control strategy that will be incorporated into the site design that is consistent with the assumptions and requirements of the TMDL:

n/a

c. If a specific numeric waste load allocation has been established that would apply to the project's discharges, provide a description of the necessary steps to meet that allocation:

n/a

O. The following pollutants of concern will be associated with this construction project:

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Soil Sediment             | <input checked="" type="checkbox"/> Petroleum (gas, diesel, oil, kerosene, hydraulic oil / fluids) |
| <input checked="" type="checkbox"/> Concrete                  | <input checked="" type="checkbox"/> Antifreeze / Coolants  |
| <input checked="" type="checkbox"/> Concrete Truck Waste      | <input checked="" type="checkbox"/> Waste water from cleaning construction equipment               |
| <input checked="" type="checkbox"/> Concrete Curing Compounds | <input type="checkbox"/> Other (specify)   |
| <input checked="" type="checkbox"/> Solid Waste Debris        | <input type="checkbox"/> Other (specify)   |
| <input checked="" type="checkbox"/> Paints                    | <input type="checkbox"/> Other (specify)   |
| <input type="checkbox"/> Solvents                             | <input type="checkbox"/> Other (specify)   |
| <input checked="" type="checkbox"/> Fertilizers / Pesticides  | <input type="checkbox"/> Other (specify)   |

**II. Controls:**

This section of the plan addresses the controls that will be implemented for each of the major construction activities described in I.C. above and for all use areas, borrow sites, and waste sites. For each measure discussed, the Contractor will be responsible for its implementation as indicated. The Contractor shall provide to the Resident Engineer a plan for the implementation of the measures indicated. The Contractor, and subcontractors, will notify the Resident Engineer of any proposed changes, maintenance, or modifications to keep construction activities compliant with the Permit ILR10. Each such Contractor has signed the required certification on forms which are attached to, and are a part of, this plan:

**A. Erosion and Sediment Controls**

1. **Stabilized Practices:** Provided below is a description of interim and permanent stabilization practices, including site specific scheduling of the implementation of the practices. Site plans will ensure that existing vegetation is preserved where attainable and disturbed portions of the site will be stabilized. Stabilization practices may include but are not limited to: temporary seeding, permanent seeding, mulching, geotextiles, sodding, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Except as provided below in II(A)(1)(a) and II(A)(3), stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than seven (7) days after the construction activity in that portion of the site has temporarily or permanently ceases on all disturbed portions of the site where construction will not occur for a period of fourteen (14) or more calendar days.

Where the initiation of stabilization measures by the seventh day after construction activity temporarily or permanently ceases is precluded by snow cover, stabilization measures shall be initiated as soon as practicable thereafter.

The following stabilization practices will be used for this project:

- |   |  |
|---|--|
| <input type="checkbox"/> Preservation of Mature Vegetation            | <input checked="" type="checkbox"/> Erosion Control Blanket / Mulching |
| <input type="checkbox"/> Vegetated Buffer Strips                      | <input type="checkbox"/> Sodding                                       |
| <input type="checkbox"/> Protection of Trees                          | <input type="checkbox"/> Geotextiles                                   |
| <input checked="" type="checkbox"/> Temporary Erosion Control Seeding | <input type="checkbox"/> Other (specify)                               |
| <input type="checkbox"/> Temporary Turf (Seeding, Class 7)            | <input type="checkbox"/> Other (specify)                               |
| <input checked="" type="checkbox"/> Temporary Mulching                | <input type="checkbox"/> Other (specify)                               |
| <input checked="" type="checkbox"/> Permanent Seeding                 | <input type="checkbox"/> Other (specify)                               |

Describe how the stabilization practices listed above will be utilized during construction:

As part of the completion of each stage of construction, temporary erosion control seeding with mulch and/or erosion control blanket will be used in conjunction with the temporary soil arresting measures listed below to alleviate the erosion potential of the exposed earth slopes until final grading and topsoil placement with permanent seeding can be placed.

Describe how the stabilization practices listed above will be utilized after construction activities have been completed:

The temporary applications will be removed upon establishment of the permanent vegetation on the slopes, infields and ditches along the project. The permanent seeding will act as the long-term stabilization of the soil along the project.

2. **Structural Practices:** Provided below is a description of structural practices that will be implemented, to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include but are not limited to: perimeter erosion barrier, earth dikes, drainage swales, sediment traps, ditch checks, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. The installation of these devices may be subject to Section 404 of the Clean Water Act.

The following structural practices will be used for this project:

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Perimeter Erosion Barrier    | <input type="checkbox"/> Rock Outlet Protection  |
| <input checked="" type="checkbox"/> Temporary Ditch Check        | <input checked="" type="checkbox"/> Riprap       |
| <input checked="" type="checkbox"/> Storm Drain Inlet Protection | <input type="checkbox"/> Gabions                 |
| <input type="checkbox"/> Sediment Trap                           | <input type="checkbox"/> Slope Mattress          |
| <input type="checkbox"/> Temporary Pipe Slope Drain              | <input type="checkbox"/> Retaining Walls         |
| <input type="checkbox"/> Temporary Sediment Basin                | <input type="checkbox"/> Slope Walls             |
| <input type="checkbox"/> Temporary Stream Crossing               | <input type="checkbox"/> Concrete Revetment Mats |
| <input type="checkbox"/> Stabilized Construction Exits           | <input type="checkbox"/> Level Spreaders         |
| <input type="checkbox"/> Turf Reinforcement Mats                 | <input type="checkbox"/> Other (specify)         |
| <input type="checkbox"/> Permanent Check Dams                    | <input type="checkbox"/> Other (specify)         |
| <input checked="" type="checkbox"/> Permanent Sediment Basin     | <input type="checkbox"/> Other (specify)         |
| <input type="checkbox"/> Aggregate Ditch                         | <input type="checkbox"/> Other (specify)         |
| <input type="checkbox"/> Paved Ditch                             | <input type="checkbox"/> Other (specify)         |

Describe how the structural practices listed above will be utilized during construction:

Temporary practices such as temporary ditch checks, perimeter erosion barrier, inlet and pipe protection at entrance culverts will be established immediately upon removal of the vegetation project wide. Monitoring of these soil-arresting measures will be immediate and ongoing after placement to ensure that the receiving waters remain clear of loose soil infiltration.

Permanent applications, such as sediment basins, are designed at infield locations at the I-74/I-155 and I-74/Morton Avenue interchanges to detain storm water run-off, settle out suspended soil particles and release the storm water at a controlled rate to alleviate downstream erosion and sediment transportation. Permanent riprap will be placed at the outlets of culverts that are calculated to have high discharge and/or outlet velocities. Permanent riprap will also be placed along ditch bottoms in which the slope of the ditches produced high flow velocities.

Describe how the structural practices listed above will be utilized after construction activities have been completed:

As noted above, the permanent applications will be provided to settle out suspended soil particles and dissipate the energy of the flow water, thereby reducing the transport of sediment, and reducing the discharge and velocity of the storm water in ditches, infields and culvert outlets to alleviate erosion potential and establish vegetation in and around the drainage ways.

3. **Storm Water Management:** Provided below is a description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the Clean Water Act.

- a. Such practices may include but are not limited to: storm water detention structures (including wet ponds), storm water retention structures, flow attenuation by use of open vegetated swales and natural depressions, infiltration of runoff on site, and sequential systems (which combine several practices).

The practices selected for implementation were determined on the basis of the technical guidance in Chapter 41 (Construction Site Storm Water Pollution Control) of the IDOT Bureau of Design and Environment Manual. If practices other than those discussed in Chapter 41 are selected for implementation or if practices are applied to situations different from those covered in Chapter 41, the technical basis for such decisions will be explained below.

- b. Velocity dissipation devices will be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

Description of storm water management controls:

Permanent applications of storm water management controls will consist primarily of establishing permanent seeding of the foreslopes, backslopes and ditches to ensure that no exposed soil can migrate. In addition, permanent applications, such as sediment basins, are designed at infield locations at the I-74/I-155 and I-74/Morton Avenue interchanges to detain storm water run-off, settle out suspended soil particles and release the storm water at a controlled rate to alleviate downstream erosion and sediment transportation. Permanent riprap will be placed at the outlets of culverts that are calculated to have high discharge and/or outlet velocities. Permanent riprap will also be placed along ditch bottoms in which the slope of the ditches produce high flow velocities.

4. **Approved State or Local Laws:** The management practices, controls and provisions contained in this plan will be in accordance with IDOT specifications, which are at least as protective as the requirements contained in the Illinois Environmental Protection Agency's Illinois Urban Manual. Procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials shall be described or incorporated by reference in the space provided below. Requirements specified in sediment and erosion site plans, site permits, storm water management site plans or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of an NOI, to be authorized to discharge under the Permit ILR10 incorporated by reference and are enforceable under this permit even if they are not specifically included in the plan.

Description of procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials:

This plan has not been reviewed or approved by any local official.

5. **Contractor Required Submittals:** Prior to conducting any professional services at the site covered by this plan, the Contractor and each subcontractor responsible for compliance with the permit shall submit to the Resident Engineer a Contractor Certification Statement, BDE 2342a.
- a. The Contractor shall provide a construction schedule containing an adequate level of detail to show major activities with implementation of pollution prevention BMPs, including the following items:
- Approximate duration of the project, including each stage of the project
  - Rainy season, dry season, and winter shutdown dates
  - Temporary stabilization measures to be employed by contract phases
  - Mobilization timeframe
  - Mass clearing and grubbing/roadside clearing dates
  - Deployment of Erosion Control Practices
  - Deployment of Sediment Control Practices (including stabilized construction entrances/exits)
  - Deployment of Construction Site Management Practices (including concrete washout facilities, chemical storage, refueling locations, etc.)
  - Paving, saw-cutting, and any other pavement related operations
  - Major planned stockpiling operations
  - Timeframe for other significant long-term operations or activities that may plan non-storm water discharges such as dewatering, grinding, etc.
  - Permanent stabilization activities for each area of the project
- b. The Contractor and each subcontractor shall provide, as an attachment to their signed Contractor Certification Statement, a discussion of how they will comply with the requirements of the permit in regard to the following items and provide a graphical representation showing location and type of BMPs to be used when applicable:
- Vehicle Entrances and Exits – Identify type and location of stabilized construction entrances and exits to be used and how they will be maintained.
  - Material Delivery, Storage and Use – Discuss where and how materials including chemicals, concrete curing compounds, petroleum products, etc. will be stored for this project.
  - Stockpile Management – Discuss what BMPs will be used to prevent pollution of storm water from stockpiles.
  - Waste Disposal – Discuss methods of waste disposal that will be used for this project.
  - Spill Prevention and Control – Discuss steps that will be taken in the event of a material spill (chemicals, concrete curing compounds, petroleum, etc.)
  - Concrete Residuals and Washout Wastes – Discuss the location and type of concrete washout facilities to be used on this project and how they will be signed and maintained.
  - Litter Management – Discuss how litter will be maintained for this project (education of employees, number of dumpsters, frequency of dumpster pick-up, etc.).
  - Vehicle and Equipment Fueling – Identify equipment fueling locations for this project and what BMPs will be used to ensure containment and spill prevention.
  - Vehicle and Equipment Cleaning and Maintenance – Identify where equipment cleaning and maintenance locations for this project and what BMPs will be used to ensure containment and spill prevention.
  - Additional measures indicated in the plan.

**III. Maintenance:**

When requested by the Contractor, the Resident Engineer will provide general maintenance guides to the Contractor for the practices associated with this project. The following additional procedures will be used to maintain, in good and effective operating conditions, the vegetation, erosion and sediment control measures and other protective measures identified in this plan. It will be the Contractor's responsibility to attain maintenance guidelines for any manufactured BMPs which are to be installed and maintained per manufacture's specifications.

All temporary erosion control measures will be installed at the onset of the project prior to any activities that will remove existing vegetation. Upon installation of the temporary erosion control measures, a schedule of periodic cleanout and maintenance of the erosion control items will be developed by the Contractor and approved by the Engineer. That schedule will be adhered to for the life of the project. The schedule would be adhered to as a minimum requirement for addressing the erosion control. It may be necessary to supplement cleanout and maintenance of the temporary erosion control items as deemed necessary by the Engineer during construction.

Exposed earth slopes along the project will be mulched and seeded immediately upon completion of final grading and topsoil placement. If washout of these items takes place from a significant storm event, or any unforeseen event, a second application will be placed immediately on the next calendar day after the event is concluded.

**IV. Inspections:**

Qualified personnel shall inspect disturbed areas of the construction site which have not yet been finally stabilized, structural control measures, and locations where vehicles and equipment enter and exit the site using IDOT Storm Water Pollution Prevention Plan Erosion Control Inspection Report (BC 2259). Such inspections shall be conducted at least once every seven (7) calendar days and within twenty-four (24) hours of the end of a storm that is 0.5 inch or greater or equivalent snowfall.

If any violation of the provisions of this plan is identified during the conduct of the construction work covered by this plan, the Resident Engineer shall notify the appropriate IEPA Field Operations Section office by email at: [epa.swnoncomp@illinois.gov](mailto:epa.swnoncomp@illinois.gov), telephone or fax within twenty-four (24) hours of the incident. The Resident Engineer shall then complete and submit an "Incidence of Non-Compliance" (ION) report for the identified violation within five (5) days of the incident. The Resident Engineer shall use forms provided by IEPA and shall include specific information on the cause of noncompliance, actions which were taken to prevent any further causes of noncompliance, and a statement detailing any environmental impact which may have resulted from the noncompliance. All reports of non-compliance shall be signed by a responsible authority in accordance with Part VI. G of the Permit ILR10.

The Incidence of Non-Compliance shall be mailed to the following address:

Illinois Environmental Protection Agency  
Division of Water Pollution Control  
Attn: Compliance Assurance Section  
1021 North Grand East  
Post Office Box 19276  
Springfield, Illinois 62794-9276

**V. Failure to Comply:**

Failure to comply with any provisions of this Storm Water Pollution Prevention Plan will result in the implementation of a National Pollutant Discharge Elimination System/Erosion and Sediment Control Deficiency Deduction against the Contractor and/or penalties under the Permit ILR10 which could be passed on to the Contractor.



## REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

### ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

#### I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

#### II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

**1. Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

**2. EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

**3. Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

**4. Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

**5. Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If

the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

## **6. Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

**7. Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

**8. Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

**9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

**10. Assurance Required by 49 CFR 26.13(b):**

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor 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 DOT-assisted contracts. 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 contracting agency deems appropriate.

**11. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

**III. NONSEGREGATED FACILITIES**

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color,

religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

**IV. Davis-Bacon and Related Act Provisions**

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

**1. Minimum wages**

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

## 2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such

action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

## 3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee ( e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### 4. Apprentices and trainees

##### a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

##### b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

##### d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

**6. Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

**7. Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for

debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

#### **10. Certification of eligibility.**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

#### **V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

**1. Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

**2. Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

**3. Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such

contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

**4. Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

#### **VI. SUBLETTING OR ASSIGNING THE CONTRACT**

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

## **VII. SAFETY: ACCIDENT PREVENTION**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

## **VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

## **IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

## **X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

### **1. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded,"

as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

\* \* \* \* \*

## **2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with

commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

### **2. Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the

certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

\* \* \* \* \*

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

\* \* \* \* \*

**XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**MINIMUM WAGES FOR FEDERAL AND FEDERALLY  
ASSISTED CONSTRUCTION CONTRACTS**

This project is funded, in part, with Federal-aid funds and, as such, is subject to the provisions of the Davis-Bacon Act of March 3, 1931, as amended (46 Sta. 1494, as amended, 40 U.S.C. 276a) and of other Federal statutes referred to in a 29 CFR Part 1, Appendix A, as well as such additional statutes as may from time to time be enacted containing provisions for the payment of wages determined to be prevailing by the Secretary of Labor in accordance with the Davis-Bacon Act and pursuant to the provisions of 29 CFR Part 1. The prevailing rates and fringe benefits shown in the General Wage Determination Decisions issued by the U.S. Department of Labor shall, in accordance with the provisions of the foregoing statutes, constitute the minimum wages payable on Federal and federally assisted construction projects to laborers and mechanics of the specified classes engaged on contract work of the character and in the localities described therein.

General Wage Determination Decisions, modifications and supersedes decisions thereto are to be used in accordance with the provisions of 29 CFR Parts 1 and 5. Accordingly, the applicable decision, together with any modifications issued, must be made a part of every contract for performance of the described work within the geographic area indicated as required by an applicable DBRA Federal prevailing wage law and 29 CFR Part 5. The wage rates and fringe benefits contained in the General Wage Determination Decision shall be the minimum paid by contractors and subcontractors to laborers and mechanics.

**NOTICE**

The most current **General Wage Determination Decisions** (wage rates) are available on the IDOT web site. They are located on the Letting and Bidding page at <http://www.dot.state.il.us/desenv/delett.html>.

In addition, ten (10) days prior to the letting, the applicable Federal wage rates will be e-mailed to subscribers. It is recommended that all contractors subscribe to the Federal Wage Rates List or the Contractor's Packet through IDOT's subscription service.

PLEASE NOTE: if you have already subscribed to the Contractor's Packet you will automatically receive the Federal Wage Rates.

The instructions for subscribing are at <http://www.dot.state.il.us/desenv/subsc.html>.

If you have any questions concerning the wage rates, please contact IDOT's Chief Contract Official at 217-782-7806.