

BID PROPOSAL 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.

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.

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.

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 service emails are an added courtesy the Department provides. It is suggested that bidders check IDOT's website at <http://www.idot.illinois.gov/doing-business/procurements/construction-services/construction-bulletins/transportation-bulletin/index#TransportationBulletin> 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 DOT.DE-Contracts@Illinois.gov

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

STANDARD GUIDELINES FOR SUBMITTING PAPER 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. It has the item number in large bold type 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 if you are awarded the project.
- 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.

BID SUBMITTAL CHECKLIST

- Cover page** (the sheet that has the item number on it) – This should be the first page of your bid proposal, **followed by your bid (the Schedule of Prices/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) with an annual value over \$50,000. Include the subcontractor(s) name, address, general type of work to be performed and the dollar amount. If you will use subcontractor(s) but are uncertain who or the dollar amount; check “YES” but leave the lines blank.
- After page 4** – Insert the following documents: Cost Adjustments for Steel, Bituminous and Fuel (if applicable) and the Contractor Letter of Assent (if applicable). The general rule should be, if you don’t know where it goes, put it after page 4.
- 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 name of the apprenticeship and training program sponsor holding the certificate of registration from the US Department of Labor. If no applicable program exists, please indicate the work/job category. **Do not include certificates with your bid.** Keep the certificates in your office in case they are requested by IDOT.
- Page 11 (Paragraph L)** – 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 completed Form A.
- 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 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(s) 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(s) 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”.

- Proposal Bid Bond** – (Insert after the proposal signature page) Submit your Proposal Bid Bond (if applicable) using the current Proposal Bid Bond form provided in the proposal package. The Power of Attorney page should be stapled to the Proposal Bid Bond. If you are using an electronic bond, include your bid bond number on the Proposal Bid Bond and attach the Proof of Insurance printed from the Surety’s Web Site.
- Disadvantaged Business Utilization Plan and/or Good Faith Effort – Do Not Submit with Bid** The bidder shall submit a Disadvantaged Business Utilization Plan on completed Department forms SBE 2025 and 2026. (1) The final Utilization Plan must be submitted within five calendar days after the date of the letting. (2) To meet the five day requirement, the bidder may send the Utilization Plan electronically by scanning and sending to DOT.DBE.UP@illinois.gov or faxing to (217) 785-1524. The subject line must include the bid Item Number and the Letting date. The Utilization Plan should be sent as one .pdf file, rather than multiple files and emails for the same Item Number. It is the responsibility of the bidder to obtain confirmation of email or fax delivery.

Alternatively, the Utilization Plan may be sent by certified mail or delivery service within the five calendar day period. If a question arises concerning the mailing date of a Utilization Plan, the mailing date will be established by the U.S. Postal Service postmark on the certified mail receipt from the U.S. Postal Service or the receipt issued by a delivery service. It is the responsibility of the bidder to ensure the postmark or receipt date is affixed within the five days if the bidder intends to rely upon mailing or delivery to satisfy the submission day requirement. The Utilization Plan is to be submitted to:

Illinois Department of Transportation
 Bureau of Small Business Enterprises
 Contract Compliance Section
 2300 South Dirksen Parkway, Room 319
 Springfield, Illinois 62764

The 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.

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 Web page for the current letting.

QUESTIONS: pre-letting up to execution of the contract

Contractor 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

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

RETURN WITH BID

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Proposal Submitted By
Name
Address
City

Letting September 16, 2016

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.

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. 60X56
COOK County
Section 1517R-1(13)
Route FAI 90/FAI 190
Project ACNHPP-0090(401)
District 1 Construction Funds**

PLEASE MARK THE APPROPRIATE BOX BELOW:

- A Bid Bond is included.
- A Cashier's Check or a Certified Check is included
- An Annual Bid Bond is included or is on file with IDOT.

Prepared by

Checked by

F

Page intentionally left blank

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. 60X56
COOK County
Section 1517R-1(13)
Project ACNHPP-0090(401)
Route FAI 90/FAI 190
District 1 Construction Funds**

This project consists of constructing a new flyover bridge from eastbound I-90 that will span the CTA Blue Line and eastbound I-190; and a new eastbound collector distributor roadway exiting to southbound Cumberland Avenue.

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 will govern performance and payments.

RETURN WITH BID

3. **ASSURANCE OF EXAMINATION AND INSPECTION/WAIVER.** The undersigned bidder further declares that he/she has carefully examined the proposal, plans, specifications, addenda form of contract and contract bond, and special provisions, and that he/she has inspected in detail the site of the proposed work, and that he/she has familiarized themselves with all of the local conditions affecting the contract and the detailed requirements of construction, and understands that in making this bid proposal he/she waives all right to plead any misunderstanding regarding the same.

4. **EXECUTION OF CONTRACT AND CONTRACT BOND.** The undersigned bidder further agrees to execute a contract for this work and present the same to the department within fifteen (15) days after the contract has been mailed to him/her. The undersigned further agrees that he/she and his/her surety will execute and present within fifteen (15) days after the contract has been mailed to him/her contract bond satisfactory to and in the form prescribed by the Department of Transportation, in the penal sum of the full amount of the contract, or as specified in the special provisions, guaranteeing the faithful performance of the work in accordance with the terms of the contract.

5. **PROPOSAL GUARANTY.** Accompanying this proposal is either a bid bond on the department form, executed by a corporate surety company satisfactory to the department, or a proposal guaranty check consisting of a bank cashier's check or a properly certified check for not less than 5 per cent of the amount bid or for the amount specified in the following schedule:

<u>Amount of Bid</u>		<u>Proposal Guaranty</u>	<u>Amount of Bid</u>		<u>Proposal Guaranty</u>	
Up to	\$5,000	\$150	\$2,000,000	to	\$3,000,000	\$100,000
\$5,000	to \$10,000	\$300	\$3,000,000	to	\$5,000,000	\$150,000
\$10,000	to \$50,000	\$1,000	\$5,000,000	to	\$7,500,000	\$250,000
\$50,000	to \$100,000	\$3,000	\$7,500,000	to	\$10,000,000	\$400,000
\$100,000	to \$150,000	\$5,000	\$10,000,000	to	\$15,000,000	\$500,000
\$150,000	to \$250,000	\$7,500	\$15,000,000	to	\$20,000,000	\$600,000
\$250,000	to \$500,000	\$12,500	\$20,000,000	to	\$25,000,000	\$700,000
\$500,000	to \$1,000,000	\$25,000	\$25,000,000	to	\$30,000,000	\$800,000
\$1,000,000	to \$1,500,000	\$50,000	\$30,000,000	to	\$35,000,000	\$900,000
\$1,500,000	to \$2,000,000	\$75,000	over		\$35,000,000	\$1,000,000

Bank cashier's checks or properly certified checks accompanying bid proposals will be made payable to the Treasurer, State of Illinois.

If a combination bid is submitted, the proposal guaranties which accompany the individual bid proposals making up the combination will be considered as also covering the combination bid.

The amount of the proposal guaranty check is _____ \$(_____). If this proposal is accepted and the undersigned will fail to execute a contract bond as required herein, it is hereby agreed that the amount of the proposal guaranty will become the property of the State of Illinois, and shall be considered as payment of damages due to delay and other causes suffered by the State because of the failure to execute said contract and contract bond; otherwise, the bid bond will become void or the proposal guaranty check will be returned to the undersigned.

Attach Cashier's Check or Certified Check Here

In the event that one proposal guaranty check is intended to cover two or more bid proposals, the amount must be equal to the sum of the proposal guaranties which would be required for each individual bid proposal. If the guaranty check is placed in another bid proposal, state below where it may be found.

The proposal guaranty check will be found in the bid proposal for:

Item _____

Section No. _____

County _____

Mark the proposal cover sheet as to the type of proposal guaranty submitted.

RETURN WITH BID

6. **COMBINATION BIDS.** The undersigned bidder 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 contract 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 will 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 transact business or conduct affairs in the State of Illinois prior to submitting the bid.
9. **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.
10. **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)

ILLINOIS DEPARTMENT OF TRANSPORTATION
 SCHEDULE OF PRICES
 CONTRACT
 NUMBER - 60X56

State Job # - C-91-133-14

County Name - COOK - -

Code - 31 - -

District - 1 - -

Section Number - 1517R-1(13)

Project Number
 ACNHPP-0090/401/

Route
 FAI 90
 FAI 190

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
JI312022	STABIL SUBBASE WMA 3	SQ YD	981.000				
JI406510	WMA SC "D" N70	TON	197.000				
JI420010	PCC PAVEMENT 12 JOINT	SQ YD	828.000				
JI420027	PROTECTIVE COAT	SQ YD	1,026.000				
JI420040	BRIDGE APPROACH SLAB	SQ YD	274.000				
JI420041	TRANS APPROACH SLAB	SQ YD	248.000				
JI440015	HMA REMOVAL VAR DEPTH	SQ YD	195.000				
JI481070	AGG SHLDR SPEC TYPE C	TON	64.000				
JI481130	AGG SHLDR FLTFAB TB 4	SQ YD	130.000				
JI482104	WMA SHOULDERS 6	SQ YD	1,219.000				
JI503010	HP CONC SUP-STR	CU YD	1,057.400				
JI602030	CATCH BASIN TG-2	EACH	3.000				
JI606010	GUTTER TG-2	FOOT	153.000				
JI606015	GUTTER TG-2,MOD	FOOT	907.000				
JI606040	CONCRETE FLUME	FOOT	25.000				

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JI630004	GSPBGR TA 9FT POSTS	FOOT	200.000				
JI631112	TRAF BAR TERM,T1-A SP	EACH	2.000				
JI631120	TRAF BAR TERM,T2	EACH	1.000				
JI631130	TRAF BAR TERM,T6	EACH	1.000				
JI631135	TRAF BAR TERM TT6B	EACH	1.000				
JI631140	TRAF BAR TERM TT10	EACH	1.000				
JI635010	ROADWAY DELINEATORS	EACH	9.000				
JI642014	ASPH SH RUM STRIP 16"	FOOT	653.000				
JI680120	SLOP HDWL TIII 6 1:3	EACH	2.000				
JI680131	SLOP HDWL TIII 12 1:4	EACH	1.000				
JI782014	GDRL BAR REFL, TYPE B	EACH	5.000				
JI782022	BARR WALL REF TYPE C	EACH	29.000				
JI782110	TERMINAL MARKER DA	EACH	3.000				
JS733B40	OSS CANT TY STL 40 FT	FOOT	40.000				
JS734B10	FDN OSS CANT T IVBW	CU YD	46.300				

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 FAI 190

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
JS810879	UNDRGRD C CNC 4	FOOT	45.000				
JS813083	JUN BX SS AS 18X18X8	EACH	1.000				
JS816076	UD 4#2#4GXLP USE 2 CNC	FOOT	645.000				
JS817214	EC C XLP USE 1C 4	FOOT	1,190.000				
JS817215	EC C XLP USE 1C 2	FOOT	4,310.000				
JS821100	LUM LED HM	EACH	7.000				
JS830003	GM LP ALUM 50H 15MA	EACH	1.000				
JS830006	BM LP ALUM 50H 12MA	EACH	4.000				
JS830013	WM LP ALUM 50H 12MA	EACH	2.000				
JS836002	LPF (RDWY) SH-10'	EACH	1.000				
JS846001	MAINTAIN LIGHT SYS	L SUM	1.000				
JT211A11	SUBGRADE AGGREGATE 12	CU YD	1,146.000				
JT525125	BOND PREF JT SEAL 2	FOOT	32.000				
JT599032	FORM LINER MOCKUP	L SUM	1.000				
JT599034	FORM LINER	SQ FT	11,436.000				

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JT780JA1	GROOVING RPM LN 5 GR	FOOT	2,058.000				
JT780300	MULTI-POLY PM LINE 4	FOOT	3,870.000				
JT780310	MULTI-POLY PM LINE 6	FOOT	38.000				
JT780320	MULTI-POLY PM LINE 10	FOOT	900.000				
JT780325	MULTI-POLY PM LINE 12	FOOT	335.000				
JT830042	WOOD POLE 90 CL 2	EACH	1.000				
X0322247	MAIN EX TRAFFIC SURV	L SUM	1.000				
X0322441	DIG LOOP DET SEN U 4C	EACH	4.000				
X0322442	TONE EQ 3 FRE REC PRG	EACH	13.000				
X0322443	TONE EQ 3 FREQ TR PRG	EACH	13.000				
X0322444	TONE EQ POWER SUPPLY	EACH	4.000				
X0322445	TONE EQ MOUNT FRAME	EACH	4.000				
X0322916	PRO SS CONN TO EX SS	EACH	3.000				
X0323261	TEMP SEDIMENT BASIN	EACH	1.000				
X0323524	REM EX SURVEIL CAM EQ	EACH	4.000				

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X0323917	CABINET MODEL 334	EACH	4.000				
X0324597	CCTV CABINET	EACH	3.000				
X0325003	REM EX VALVE & VAULT	EACH	1.000				
X0325040	FO INNERDUCT 1 1/4"	FOOT	14,199.000				
X0325405	FILL EX STORM SEWERS	CU YD	892.000				
X0325476	RADAR VEH DETECT SYST	EACH	4.000				
X0326266	ETHERNET SWITCH	EACH	7.000				
X0326465	MOD EX VID DSTN SYS	L SUM	1.000				
X0326945	CCTV CAMERA EQUIPMENT	EACH	7.000				
X0327114	RADAR VEH SENSING SYS	EACH	1.000				
X0327117	ATMS SYS INTEGRATION	L SUM	1.000				
X0327216	CCTV CAMERA	EACH	7.000				
X0327261	CAB HOUSING EQU TY 4	EACH	1.000				
X0327303	REM EX SIGN LT UNT NS	EACH	1.000				
X0327392	WOOD POLE 60 CL 4	EACH	3.000				

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X0327393	WOOD POLE 100 CL 2	EACH	25.000				
X0327601	CCTV CAM STR FD 80 MH	FOOT	83.000				
X0327602	CCTV CAM STR GS 80 MH	EACH	4.000				
X0327606	FIBER OPT SPL-LATERAL	EACH	17.000				
X0327976	TRACK MONITORING	CAL DA	90.000				
X0327979	PAVMT MRKG REM GRIND	SQ FT	35,318.000				
X0327980	PAVMT MRKG REM WTR BL	SQ FT	8,743.000				
X1200071	WTR MTR IN VAULT 8"	EACH	1.000				
X1200072	STL CAS P BOR/JKD 16	FOOT	470.000				
X1200074	CDWM PRMT/TSTNG FEES	L SUM	1.000				
X1400170	FOC SPL CLOSURE WT	EACH	5.000				
X1400171	FO SPLICE ENCLOSURE	EACH	1.000				
X1400172	ELCBL C COMM 19 6PR	FOOT	924.000				
X1700016	CONC BAR SF 54 SPL	FOOT	100.000				
X4060002	P HMA BC SMA 12.5 N80	TON	4,126.000				

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X4060006	P HMA SC SMA 12.5 N80	TON	4,126.000				
X5030225	CONC STRUCT SPL	CU YD	151.000				
X5210120	HLMR BRG GUID EXP 250	EACH	12.000				
X5210220	HLMR BRG GUID EXP 750	EACH	12.000				
X5210370	HLMR BRNG FIXED 800K	EACH	6.000				
X5610651	ABAN EX WM FILL CLSM	FOOT	1,525.000				
X5860110	GRANULAR BACKFILL STR	CU YD	1,135.000				
X6020094	MAN TA 6D T1F CL R-P	EACH	1.000				
X6060097	CLASS SI CONC OUT SPL	CU YD	2.000				
X6370159	CONC BAR 1F 32HT SPL	FOOT	1,245.000				
X6370700	CONC BAR TRANS SPL	FOOT	75.000				
X6700410	ENGR FLD OFF A SPL	CAL MO	24.000				
X7011015	TR C-PROT EXPRESSWAYS	L SUM	1.000				
X7013820	TR CONT SURVEIL EXPWY	CAL DA	600.000				
X7030025	WET REF TEM TP T3 L&S	SQ FT	149.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X7030030	WET REF TEM TAPE T3 4	FOOT	27,371.000				
X7030035	WET REF TEM TAPE T3 5	FOOT	7,960.000				
X7030045	WET REF TEM TAPE T3 8	FOOT	8,891.000				
X7030050	WET REF TEM TPE T3 12	FOOT	100.000				
X7040125	PIN TEMP CONC BARRIER	EACH	1,590.000				
X8040310	ELECT SERV DISCONNECT	EACH	1.000				
X8130115	DRILL EX JUNCTION BOX	EACH	6.000				
X8210080	TEMP LUM HPSV HM1000W	EACH	25.000				
X8420502	REM LT TOWER NO SALV	EACH	8.000				
X8420510	REM TOWER FDN	EACH	8.000				
X8710035	FIB OPT CBL 96F SM	FOOT	11,790.000				
X8710036	FIB OPT CBL 12F SM	FOOT	8,321.000				
X8710054	FO TERM PANEL 12F 24F	EACH	9.000				
X8730312	EC C LEAD 18 4C TW SH	FOOT	740.000				
X8772115	TEMP MA A 15	EACH	25.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X8780105	CONC FDN SPL	EACH	4.000				
X8850102	INDUCTION LOOP	FOOT	526.000				
X8950510	REM FOC FR CONDUIT	FOOT	951.000				
X8950700	REM TEMP INTERCONNECT	L SUM	1.000				
Z0005216	HMA STAB 6 AT SPBGR	SQ YD	921.000				
Z0007510	ENGINEERED BARRIER	SQ YD	1,475.000				
Z0013797	STAB CONSTR ENTRANCE	SQ YD	209.000				
Z0013798	CONSTRUCTION LAYOUT	L SUM	1.000				
Z0018100	DRAINAGE STR ADJ SPL	EACH	15.000				
Z0018500	DRAINAGE STR CLEANED	EACH	46.000				
Z0019600	DUST CONTROL WATERING	UNIT	60.000				
Z0022800	FENCE REMOVAL	FOOT	2,198.000				
Z0030850	TEMP INFO SIGNING	SQ FT	1,105.000				
Z0033020	LUM SFTY CABLE ASMBLY	EACH	5.000				
Z0033028	MAINTAIN LIGHTING SYS	CAL MO	21.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
Z0033052	COMMUNICATIONS VAULT	EACH	9.000				
Z0034105	MATL TRANSFER DEVICE	TON	8,252.000				
Z0034393	MODULAR EXPAN JT 9	FOOT	76.000				
Z0046306	P UNDR FOR STRUCT 6	FOOT	1,227.000				
Z0048665	RR PROT LIABILITY INS	L SUM	1.000				
Z0056678	SS 2 WAT MN 36	FOOT	28.000				
Z0062456	TEMP PAVEMENT	SQ YD	2,154.000				
Z0065745	SLOT DR 12" W/2.5" SL	FOOT	590.000				
Z0076600	TRAINEES	HOUR	2,000.000		0.800		1,600.000
Z0076604	TRAINEES TPG	HOUR	2,000.000		15.000		30,000.000
20100110	TREE REMOV 6-15	UNIT	843.000				
20100210	TREE REMOV OVER 15	UNIT	224.000				
20101000	TEMPORARY FENCE	FOOT	545.000				
20200100	EARTH EXCAVATION	CU YD	13,145.000				
20201200	REM & DISP UNS MATL	CU YD	5,360.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
20400800	FURNISHED EXCAVATION	CU YD	2,685.000				
20800150	TRENCH BACKFILL	CU YD	20,784.000				
21001000	GEOTECH FAB F/GR STAB	SQ YD	28,541.000				
21101625	TOPSOIL F & P 6	SQ YD	17,124.000				
25000210	SEEDING CL 2A	ACRE	7.800				
25000400	NITROGEN FERT NUTR	POUND	699.000				
25000600	POTASSIUM FERT NUTR	POUND	699.000				
25100115	MULCH METHOD 2	ACRE	2.000				
25100630	EROSION CONTR BLANKET	SQ YD	34,399.000				
28000250	TEMP EROS CONTR SEED	POUND	711.000				
28000305	TEMP DITCH CHECKS	FOOT	168.000				
28000400	PERIMETER EROS BAR	FOOT	5,326.000				
28000510	INLET FILTERS	EACH	124.000				
28001100	TEMP EROS CONTR BLANK	SQ YD	34,399.000				
28100101	STONE RIPRAP CL A1	SQ YD	7.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
28200200	FILTER FABRIC	SQ YD	7.000				
30300001	AGG SUBGRADE IMPROVE	CU YD	7,598.000				
30300112	AGG SUBGRADE IMPR 12	SQ YD	28,541.000				
31101200	SUB GRAN MAT B 4	SQ YD	2,154.000				
35501314	HMA BASE CSE 7 1/2	SQ YD	15,495.000				
40600290	BIT MATLS TACK CT	POUND	48,387.000				
40600982	HMA SURF REM BUTT JT	SQ YD	65.000				
40603085	HMA BC IL-19.0 N70	TON	591.000				
40603340	HMA SC "D" N70	TON	800.000				
42001300	PROTECTIVE COAT	SQ YD	2,609.000				
44000100	PAVEMENT REM	SQ YD	8,312.000				
44000165	HMA SURF REM 4	SQ YD	25,320.000				
44000500	COMB CURB GUTTER REM	FOOT	310.000				
44001980	CONC BARRIER REMOV	FOOT	392.000				
44004250	PAVED SHLD REMOVAL	SQ YD	10,298.000				

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44300200	STRIP REF CR CON TR	FOOT	2,843.000				
48101600	AGGREGATE SHLDS B 8	SQ YD	1,943.000				
48203043	HMA SHOULDERS 11 1/2	SQ YD	7,486.000				
48203052	HMA SHOULDERS 13 3/4	SQ YD	3,576.000				
50157300	PROTECTIVE SHIELD	SQ YD	2,228.000				
50200100	STRUCTURE EXCAVATION	CU YD	3,539.000				
50300225	CONC STRUCT	CU YD	3,255.000				
50300255	CONC SUP-STR	CU YD	415.400				
50300260	BR DECK GROOVING	SQ YD	3,599.000				
50300300	PROTECTIVE COAT	SQ YD	5,730.000				
50500105	F & E STRUCT STEEL	L SUM	1.000				
50500505	STUD SHEAR CONNECTORS	EACH	15,987.000				
50800205	REINF BARS, EPOXY CTD	POUND	794,831.000				
50800515	BAR SPLICERS	EACH	82.000				
51200956	FUR M S PILE 12X0.179	FOOT	16,496.000				

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51201400	FUR STL PILE HP10X42	FOOT	725.000				
51201800	FUR STL PILE HP14X73	FOOT	9,595.000				
51202305	DRIVING PILES	FOOT	26,816.000				
51203200	TEST PILE MET SHELLS	EACH	7.000				
51203400	TEST PILE ST HP10X42	EACH	2.000				
51203800	TEST PILE ST HP14X73	EACH	5.000				
51500100	NAME PLATES	EACH	1.000				
52100540	ANCHOR BOLTS 1 1/2	EACH	132.000				
54213657	PRC FLAR END SEC 12	EACH	1.000				
54213681	PRC FLAR END SEC 36	EACH	1.000				
550A0050	STORM SEW CL A 1 12	FOOT	89.000				
550A0070	STORM SEW CL A 1 15	FOOT	289.000				
550A0110	STORM SEW CL A 1 21	FOOT	21.000				
550A0120	STORM SEW CL A 1 24	FOOT	210.000				
550A0340	STORM SEW CL A 2 12	FOOT	828.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
550A0360	STORM SEW CL A 2 15	FOOT	35.000				
550A0380	STORM SEW CL A 2 18	FOOT	68.000				
550A0410	STORM SEW CL A 2 24	FOOT	415.000				
550A0430	STORM SEW CL A 2 30	FOOT	246.000				
550A0450	STORM SEW CL A 2 36	FOOT	280.000				
550A0750	STORM SEW CL A 3 36	FOOT	1,024.000				
550A0770	STORM SEW CL A 3 42	FOOT	166.000				
550A0780	STORM SEW CL A 3 48	FOOT	140.000				
550A0790	STORM SEW CL A 3 54	FOOT	360.000				
550A1050	STORM SEW CL A 4 36	FOOT	75.000				
550A1090	STORM SEW CL A 4 54	FOOT	370.000				
550A1110	STORM SEW CL A 4 66	FOOT	1,693.000				
55100500	STORM SEWER REM 12	FOOT	520.000				
55101200	STORM SEWER REM 24	FOOT	37.000				
55101600	STORM SEWER REM 36	FOOT	33.000				

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55102200	STORM SEWER REM 66	FOOT	693.000				
55201300	STORM SEWERS JKD 36	FOOT	50.000				
55201700	STORM SEWERS JKD 54	FOOT	50.000				
56103100	D I WATER MAIN 8	FOOT	1,395.000				
58700300	CONCRETE SEALER	SQ FT	6,610.000				
59100100	GEOCOMPOSITE WALL DR	SQ YD	1,265.000				
60108106	PIPE UNDERDR T 1 6	FOOT	3,005.000				
60108200	PIPE UNDERDRAIN 6 SP	FOOT	23.000				
60200805	CB TA 4 DIA T8G	EACH	1.000				
60201310	CB TA 4 DIA T20F&G	EACH	30.000				
60205010	CB TA 5 DIA T20F&G	EACH	1.000				
60218400	MAN TA 4 DIA T1F CL	EACH	4.000				
60221100	MAN TA 5 DIA T1F CL	EACH	7.000				
60223800	MAN TA 6 DIA T1F CL	EACH	2.000				
60224446	MAN TA 7 DIA T1F CL	EACH	10.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
60224469	MAN TA 9 DIA T1F CL	EACH	3.000				
60237420	INLETS TA T20F&G	EACH	21.000				
60240324	INLETS TB T20F&G	EACH	10.000				
60250200	CB ADJUST	EACH	27.000				
60255500	MAN ADJUST	EACH	1.000				
60260100	INLETS ADJUST	EACH	18.000				
60500040	REMOV MANHOLES	EACH	5.000				
60500050	REMOV CATCH BAS	EACH	5.000				
60500060	REMOV INLETS	EACH	3.000				
60602800	CONC GUTTER TB	FOOT	392.000				
63000001	SPBGR TY A 6FT POSTS	FOOT	1,650.000				
63100045	TRAF BAR TERM T2	EACH	1.000				
63100070	TRAF BAR TERM T5	EACH	1.000				
63100085	TRAF BAR TERM T6	EACH	4.000				
63100167	TR BAR TRM T1 SPL TAN	EACH	4.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
63200310	GUARDRAIL REMOV	FOOT	1,001.000				
63500105	DELINEATORS	EACH	40.000				
63700155	CONC BAR 1F 32HT	FOOT	538.000				
63700255	CONC BAR 2F 32HT	FOOT	2,263.000				
63700805	CONC BAR TRANS	FOOT	13.000				
63700900	CONC BARRIER BASE	FOOT	2,901.000				
64200116	SHOULDER RUM STRIP 16	FOOT	15,771.000				
66400105	CH LK FENCE 4	FOOT	2,176.000				
66900200	NON SPL WASTE DISPOSL	CU YD	18,500.000				
66900450	SPL WASTE PLNS/REPORT	L SUM	1.000				
66900530	SOIL DISPOSAL ANALY	EACH	9.000				
67000600	ENGR FIELD LAB	CAL MO	21.000				
67100100	MOBILIZATION	L SUM	1.000				
70106800	CHANGEABLE MESSAGE SN	CAL MO	55.000				
70300240	TEMP PVT MK LINE 6	FOOT	9,876.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
70300906	PAVT MARK TAPE T4 6	FOOT	800.000				
70400100	TEMP CONC BARRIER	FOOT	5,291.000				
70400200	REL TEMP CONC BARRIER	FOOT	4,319.000				
70600250	IMP ATTN TEMP NRD TL3	EACH	3.000				
70600260	IMP ATTN TEMP FRN TL3	EACH	1.000				
70600350	IMP ATTN REL NRD TL3	EACH	4.000				
72000200	SIGN PANEL T2	SQ FT	64.000				
72000300	SIGN PANEL T3	SQ FT	3,965.000				
72400200	REMOV SIN PAN ASSY TB	EACH	7.000				
72400310	REMOV SIGN PANEL T1	SQ FT	9.000				
72400320	REMOV SIGN PANEL T2	SQ FT	67.000				
72400330	REMOV SIGN PANEL T3	SQ FT	1,274.000				
72400600	RELOC SIN PAN ASSY TB	EACH	1.000				
72400720	RELOC SIGN PANEL T2	SQ FT	24.000				
72501000	TERMINAL MARKER - DA	EACH	6.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
72700100	STR STL SIN SUP BA	POUND	10,007.000				
72900200	METAL POST TY B	FOOT	132.000				
73000100	WOOD SIN SUPPORT	FOOT	26.000				
73300100	OVHD SIN STR-SPAN T1A	FOOT	118.000				
73300300	OVHD SIN STR-SPAN T3A	FOOT	100.000				
73302200	OSS CANT 3CA 2-6X7-0	FOOT	35.000				
73400100	CONC FOUNDATION	CU YD	15.800				
73400200	DRILL SHAFT CONC FDN	CU YD	107.400				
73600100	REMOV OH SIN STR-SPAN	EACH	2.000				
73700100	REM GR MT SIN SUPPORT	EACH	13.000				
73700200	REM CONC FDN-GR MT	EACH	13.000				
73700300	REM CONC FDN-OVHD	EACH	2.000				
78000100	THPL PVT MK LTR & SYM	SQ FT	218.000				
78000200	THPL PVT MK LINE 4	FOOT	14,042.000				
78000500	THPL PVT MK LINE 8	FOOT	7,681.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
78000600	THPL PVT MK LINE 12	FOOT	972.000				
78004220	PREF PL PM TB INL L5	FOOT	3,021.000				
78004240	PREF PL PM TB INL L8	FOOT	703.000				
78005100	EPOXY PVT MK LTR-SYM	SQ FT	388.000				
78005110	EPOXY PVT MK LINE 4	FOOT	11,723.000				
78005120	EPOXY PVT MK LINE 5	FOOT	4,674.000				
78005140	EPOXY PVT MK LINE 8	FOOT	15,896.000				
78005150	EPOXY PVT MK LINE 12	FOOT	1,080.000				
78009004	MOD URETH PM LINE 4	FOOT	261.000				
78009005	MOD URETH PM LINE 5	FOOT	65.000				
78009008	MOD URETH PM LINE 8	FOOT	327.000				
78100100	RAISED REFL PAVT MKR	EACH	410.000				
78100105	RAISED REF PVT MKR BR	EACH	13.000				
78200420	GUARDRAIL MKR TYPE B	EACH	31.000				
78200530	BAR WALL MKR TYPE C	EACH	925.000				

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78300200	RAISED REF PVT MK REM	EACH	260.000				
80400200	ELECT UTIL SERV CONN	L SUM	1.000				
81028200	UNDRGRD C GALVS 2	FOOT	3,967.000				
81028220	UNDRGRD C GALVS 3	FOOT	576.000				
81028240	UNDRGRD C GALVS 4	FOOT	1,024.000				
81028730	UNDRGRD C CNC 1 1/4	FOOT	27.000				
81100320	CON AT ST 1 PVC GS	FOOT	280.000				
81100805	CON AT ST 3 PVC GALVS	FOOT	120.000				
81300220	JUN BX SS AS 6X6X4	EACH	4.000				
81300530	JUN BX SS AS 12X10X6	EACH	1.000				
81300800	JUN BX SS AS 18X12X6	EACH	1.000				
81400200	HD HANDHOLE	EACH	16.000				
81603080	UD 3#2#4GXLP USE 1 1/4	FOOT	4,480.000				
81702110	EC C XLP USE 1C 10	FOOT	1,120.000				
81702120	EC C XLP USE 1C 8	FOOT	333.000				

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81702130	EC C XLP USE 1C 6	FOOT	7,149.000				
81702140	EC C XLP USE 1C 4	FOOT	1,823.000				
81800230	A CBL 2-1C6 MESS WIRE	FOOT	2,053.000				
81800300	A CBL 3-1C2 MESS WIRE	FOOT	7,245.000				
81800400	A CBL 4-1C2 MESS WIRE	FOOT	132.000				
82102400	LUM SV HOR MT 400W	EACH	5.000				
82105600	LUM SV HM HOR MT 400W	EACH	84.000				
82107100	UNDERPAS LUM 70W HPS	EACH	4.000				
83050825	LT P A 47.5MH 15DA	EACH	5.000				
83504500	LT TOWER 120MH LM 8	EACH	6.000				
83504700	LT TOWER 120MH LM 12	EACH	1.000				
83600200	LIGHT POLE FDN 24D	FOOT	40.000				
83700350	LT TOWER FDN 54D	FOOT	210.000				
84100110	REM TEMP LIGHT UNIT	EACH	25.000				
84200600	REM LT U NO SALV	EACH	7.000				

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84200804	REM POLE FDN	EACH	7.000				
84500120	REMOV ELECT SERV INST	EACH	1.000				
87200400	SPAN WIRE	FOOT	3,752.000				
87800200	CONC FDN TY D	FOOT	4.000				
87900205	DRILL EX HD HANDHOLE	EACH	9.000				
89502300	REM ELCBL FR CON	FOOT	2,576.000				
89502380	REMOV EX HANDHOLE	EACH	4.000				
89502385	REMOV EX CONC FDN	EACH	5.000				

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THIS IS THE TOTAL BID

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NOTES:

1. Each PAY ITEM should have a UNIT PRICE and a TOTAL PRICE.
2. The UNIT PRICE shall govern if no TOTAL PRICE is shown or if there is a discrepancy between the product of the UNIT PRICE multiplied by the QUANTITY.
3. If a UNIT PRICE is omitted, the TOTAL PRICE will be divided by the QUANTITY in order to establish a UNIT PRICE.
4. A bid may be declared UNACCEPTABLE if neither a unit price nor a total price is shown.

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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.

I acknowledge, understand and accept these terms and conditions.

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

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 State 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 State 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 calendar 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.

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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. Information concerning the exemption process is available from the Department upon request.

B. Negotiations

Section 50-15. Negotiations.

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.

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

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 provide a submission to a vendor portal or 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, not making a submission to a vendor portal, or who withholds a bid or submission to a vendor portal in consideration of the promise for the payment of money or other valuable thing is guilty of a Class 4 felony.

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

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.

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

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.

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 or submission to a vendor portal is submitted.

F. Confidentiality

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.

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.

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G. Insider Information

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.

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.

I acknowledge, understand and accept these terms and conditions for the above assurances.

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

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 2012.

(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.

The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50-5.

B. Felons

Section 50-10. Felons.

(a) 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.

(b) Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Code and every vendor's submission to a vendor portal 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.

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C. Debt Delinquency

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

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

The bidder or contractor or subcontractor, respectively, certifies in accordance with Section 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

Section 50-14 Environmental Protection Act violations.

The bidder or contractor or subcontractor, respectively, certifies in accordance with Section 50-14 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

Section 3 of the Educational Loan Default Act, 5 ILCS 385/3.

Pursuant to the Educational Loan Default Act no State agency shall contract with an individual for goods or services if that individual is in default on an educational loan.

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

Section 33E-11 of the Criminal Code of 2012, 720 ILCS 5/3BE-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.

(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.

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.

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H. International Anti-Boycott

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

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

I. Drug Free Workplace

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.

The bidder certifies that if awarded a contract in excess of \$5,000 it will provide a drug free workplace in compliance with the provisions of the Act.

J. Disclosure of Business Operations in Iran

Section 50-36 of the Code 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 may cause the bid, offer or proposal to be considered not responsive. The disclosure will be considered when evaluating the bid 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 on the attached document.

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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.**

Additionally, Section 30-22 of the Code requires that the bidder certify that an Illinois office be maintained as the primary place of employment for persons employed for this contract.

NA-FEDERAL

The requirements of these certifications and disclosures are a material part of the contract, and the contractor shall require these certification provisions 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.

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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 or any other procurement opportunity 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 bidder 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: _____

I acknowledge, understand and accept these terms and conditions for the above certifications.

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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 \$50,000 and all submissions to a vendor portal 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 100 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any individual 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 individual 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 individual 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 100 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any individual 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 an individual 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 individual 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 an individual that is authorized to execute contracts for your organization. The individual signing can be, but does not have to be, the individual 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 an individual that is authorized to execute contracts for your company.

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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.

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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 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 \$50,000, 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. Suspension or 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: suspension or 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 Representative

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.

_____ Date _____
Signature of Authorized Representative

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 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 all bids.

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 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 Act 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 Title 44, Illinois Administrative Code, Section 750.120. 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. 60X56
COOK County
Section 1517R-1(13)
Project ACNHPP-0090(401)
Route FAI 90/FAI 190
District 1 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 **Illinois 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. 60X56
COOK County
Section 1517R-1(13)
Project ACNHPP-0090(401)
Route FAI 90/FAI 190
District 1 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 _____
Attest _____
Signature _____
(IF A JOINT VENTURE, USE THIS SECTION FOR THE MANAGING PARTY AND THE SECOND PARTY SHOULD SIGN BELOW)
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.



This Annual Proposal Bid Bond shall become effective at 12:01 AM (CDST) on _____ and shall be valid until _____ 11:59 PM (CDST).

KNOW ALL PERSONS BY THESE PRESENTS, That We _____

as PRINCIPAL, and _____

as SURETY, and 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 may submit bid proposal(s) to the STATE OF ILLINOIS, acting through the Department of Transportation, for various improvements published in the Transportation Bulletin during the effective term indicated above.

NOW, THEREFORE, if the Department shall accept the bid proposal(s) of the PRINCIPAL; and if the PRINCIPAL shall, within the time and as specified in the bidding and contract documents; 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 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 has caused this instrument to be signed by its officer _____ day of _____ A.D., _____

In TESTIMONY WHEREOF, the said SURETY has caused this instrument to be signed by its officer _____ day of _____ A.D., _____

(Company Name)

(Company Name)

By _____
(Signature and Title)

By _____
(Signature of Attorney-in-Fact)

Notary for PRINCIPAL

Notary for SURETY

STATE OF _____
COUNTY OF _____

STATE OF _____
COUNTY OF _____

Signed and attested before me on _____ (date)

Signed and attested before me on _____ (date)

by _____
(Name of Notary Public)

by _____
(Name of Notary Public)

(Seal) _____
(Signature of Notary Public)

(Seal) _____
(Signature of Notary Public)

(Date Commission Expires)

(Date Commission Expires)

In lieu of completing the above section of the Annual Proposal Bid Bond form, the Principal may file an Electronic Bid Bond. By signing the proposal(s) 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
--------------------------	---------------------	---------------------

This bond may be terminated, at Surety's request, upon giving not less than thirty (30) days prior written notice of the cancellation/termination of the bond. Said written notice shall be issued to the Illinois Department of Transportation, Chief Contracts Official, 2300 South Dirksen Parkway, Springfield, Illinois, 62764, and shall be served in person, by receipted courier delivery or certified or registered mail, return receipt requested. Said notice period shall commence on the first calendar day following the Department's receipt of written cancellation/termination notice. Surety shall remain firmly bound to all obligations herein for proposals submitted prior to the cancellation/termination. Surety shall be released and discharged from any obligation(s) for proposals submitted for any letting or date after the effective date of cancellation/termination.



Return with Bid

Division of Highways
Proposal Bid Bond

Item No. _____

Letting Date _____

KNOW ALL PERSONS BY THESE PRESENTS, That We _____

as PRINCIPAL, and _____

as SURETY, and 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; 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 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 has caused this instrument to be signed by its officer _____ day of _____ A.D., _____

In TESTIMONY WHEREOF, the said SURETY has caused this instrument to be signed by its officer _____ day of _____ A.D., _____

(Company Name)

(Company Name)

By _____ (Signature and Title)

By _____ (Signature of Attorney-in-Fact)

Notary for PRINCIPAL

Notary for SURETY

STATE OF _____
COUNTY OF _____

STATE OF _____
COUNTY OF _____

Signed and attested before me on _____ (date)
by _____

Signed and attested before me on _____ (date)
by _____

(Name of Notary Public)

(Name of Notary Public)

(Seal) _____ (Signature of Notary Public)

(Seal) _____ (Signature of Notary Public)

(Date Commission Expires)

(Date Commission Expires)

In lieu of completing the above section of the Proposal Bid Bond form, the Principal may file an Electronic Bid Bond. By signing the proposal 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 _____ (Percent) _____ (Dollar Amount)
Project _____	
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
2300 South Dirksen Parkway
Springfield, Illinois 62764

Local Let Projects
Submit forms to the
Local Agency

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. 60X56
COOK County
Section 1517R-1(13)
Project ACNHPP-0090(401)
Route FAI 90/FAI 190
District 1 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

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 2012.

(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.

The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50-5.

B. Felons

Section 50-10. Felons.

(a) 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.

(b) 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

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

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 500/50-14 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 scuspended 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 100 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any individual 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 individual 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 individual 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.

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 100 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any individual 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 an individual 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 individual 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 an individual that is authorized to execute contracts for your organization. The individual signing can be, but does not have to be, the individual 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 an individual 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 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.

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.

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 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. Suspension or 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: suspension or 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 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 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. Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). Paper-based bids are to be submitted to the Chief Procurement Officer for the Department of Transportation in care of the Chief Contracts Official at the Harry R. Hanley Building, 2300 South Dirksen Parkway, in Springfield, Illinois until 10:00 a.m. September 16, 2016. 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 10:00 a.m.
- 2. DESCRIPTION OF WORK.** The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

**Contract No. 60X56
COOK County
Section 1517R-1(13)
Project ACNHPP-0090(401)
Route FAI 90/FAI 190
District 1 Construction Funds**

This project consists of constructing a new flyover bridge from eastbound I-90 that will span the CTA Blue Line and eastbound I-190; and a new eastbound collector distributor roadway exiting to southbound Cumberland Avenue.

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

(b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.
- 4. AWARD CRITERIA AND REJECTION OF BIDS.** This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.

By Order of the
Illinois Department of Transportation

Randall S. Blankenhorn,
Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted April 1, 2016

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS, frequently used RECURRING SPECIAL PROVISIONS, and LOCAL ROADS AND STREETS RECURRING SPECIAL PROVISIONS.

No ERRATA this year.

SUPPLEMENTAL SPECIFICATIONS

Std. Spec. Sec.

Page No.

No Supplemental Specifications this year.

RECURRING SPECIAL PROVISIONS

The following RECURRING SPECIAL PROVISIONS indicated by an "X" are applicable to this contract and are included by reference:

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STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the “Standard Specifications for Road and Bridge Construction,” adopted April 1, 2016, 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 bid; and the Supplemental Specifications and Recurring Special Provisions indicated on the Check Sheet included herein, and the “Tollway Supplemental Specifications to the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction,” adopted April 1, 2016, issued April 1, 2016; which apply to and govern the construction of FAI Route 90 / FAI Route 190 (I-90/190), Project ACNHPP-0090 (401), Section 1517R-1(13), Cook County, Contract No. 60X56 and in case of conflict with any or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

FAI Route 90/FAI Route 190 (I-90/190)
Project ACNHPP-0090 (401)
Section 1517R-1(13)
Cook County
Contract No. 60X56

LOCATION OF IMPROVEMENT

Eastbound I-190 from just east of Des Plaines River to the merge with eastbound I-90, just east of Jane Addams Memorial Tollway and I-90 / I-190 continuing from the merge to Cumberland Avenue. Improvements are within the City of Chicago in Cook County, Illinois and covers a total length along all roadways of approximately 9720 feet (1.84 miles).

DESCRIPTION OF IMPROVEMENT

A new flyover bridge from the Jane Addams Memorial Tollway will consist of four spans for an approximate length of 845-ft; spanning the CTA Blue Line and eastbound I-190. Four retaining walls are located at the flyover structure. The roadway improvements consist of roadway reconstruction, widening, and resurfacing of I-190 and roadway widening and resurfacing of I-90; including the installation of proposed storm sewer, lighting, signing, signing structures, pavement markings and collateral work necessary to complete the project as shown in the plans described herein.

MAINTENANCE OF ROADWAYS (D-1)

Effective: September 30, 1985

Revised: November 1, 1996

Beginning on the date that work begins on this project, the Contractor shall assume responsibility for normal maintenance of all existing roadways within the limits of the improvement. This normal maintenance shall include all repair work deemed necessary by the Engineer, but shall not include snow removal operations. Traffic control and protection for maintenance of roadways will be provided by the Contractor as required by the Engineer.

If items of work have not been provided in the contract, or otherwise specified for payment, such items, including the accompanying traffic control and protection required by the Engineer, will be paid for in accordance with Article 109.04 of the Standard Specifications.

COORDINATION WITH ADJACENT AND/OR OVERLAPPING CONTRACTS

This contract abuts and/or overlaps with other concurrent contracts listed below. The Contractor shall cooperate with the other contractors in the phasing and performance of his/her work so as not to delay, interrupt or hinder the progress or completion of work being performed by the other contractors.

I-90 Jane Addams Memorial Tollway Improvement Contract RR-15-5711 & I-14-4212

The project will consist of roadway and bridge reconstruction and widening just east of Plaza 19 (River Road). The estimated completion date is 10/28/16.

Critical items affecting the above contract: MOT coordination, signing coordination and coordination to removal temporary barrier wall to open the flyover ramp to traffic.

Contract 62A64 – East River Road Reconstruction

The East River Road project will consist of the removal and replacement of the East River Road bridge over I-90 (SN 016-2124; Existing) (SN 016-2280; Proposed) and roadway reconstruction. Other items of work include drainage, lighting, pavement markings, sign maintenance and water main improvements. The estimated completion date is 10/31/16.

Critical items affecting the above contract: MOT coordination and utility relocations.

Contract 60Y38 – I-90 Widening and Reconstruction

The I-90 project will include roadway reconstruction, widening, and resurfacing of I-90 from Cumberland Avenue to Harlem Avenue; including the installation of proposed storm sewer, lighting, signing, signing structures, and water main. The estimated completion date is 10/31/17.

Critical items affecting the above contract: MOT coordination.

Chicago Transit Authority – Your New Blue Modernization

The Your New Blue (YNB) project includes upgrades to signal, traction power and communications systems, as well as structure rehabilitation, track replacement and passenger station rehabilitation on the Blue Line by Harlem and Cumberland CTA stations. The estimated completion date is 11/31/16

Critical items affecting the above contract: MOT coordination.

Add the following paragraph to the beginning of Article 105.08; “The Contractor shall identify all such work items (including the critical items listed above) at the beginning of the contract and coordinate the sequence and timing of their execution and completion with the other Contractor through the Engineer. All of these work items shall be identified as separate line items in the Contractor’s proposed Construction Progress Schedule. Additional compensation or the extension of contract time will not be allowed for the progress of work items affected by the lack of such coordination by the Contractor”.

COORDINATION OF THE CONTRACT DOCUMENTS

Coordination of contract documents shall be in accordance with Article 105.05. The Illinois Tollway Supplemental Specifications to the Illinois Department of Transportation Standard Specification for Road and Bridge Construction will be applicable as the supplemental specification designated in Article 105.05 for all items of work within the Tollway jurisdictional limits.

The Contractor shall not commence any work on the Illinois Tollway under this contract until all the insurance as specified in Article 107.26 and 107.27 of the Tollway Supplemental Specifications or any Special Provisions has been provided and approved. The Contractor must provide a copy of the Certificate of Insurance to the Tollway. The permit to commence work on the Tollway’s property will not be issued until receipt of the Certificate of Insurance.

The Tollway and its officers, agents, directors, and employees shall be listed as additional insured parties in the general liability insurance and the Tollway shall be added as an additional protected party on all performance bonds required by the Contractor. The insurance shall be maintained throughout construction of the project.

UTILITIES TO BE WATCHED AND PROTECTED

The following utilities within the contract limits have been identified to watch and protect during proposed construction.

LOCATION / STAGE	TYPE	DESCRIPTION	NAME & ADDRESS OF UTILITY	ACTION
EX I-90 Sta. 3013+75	Underground duct package	No anticipated conflict with the transverse crossing of a 2' wide, 4 duct package with proposed roadway improvements and storm sewer (134' RT). Proposed storm sewer will be below existing duct package. No conflict. AT&T to support their duct package during construction of the storm sewer.	AT&T Legal Mandate Team 1000 Commerce Drive Oak Brook, IL 60523	"Watch and Protect"
EX I-90 Sta. 3011+35	Underground Duct Bank	No anticipated conflicts with the transverse crossing of underground duct bank and cable.	ComEd Two Lincoln Center, 8th Floor Oakbrook Terrace, IL 60181	"Watch and Protect"
EX I-90 Sta. 3013+31	Underground Duct Bank	Contractor to locate existing duct package prior to placement of adjacent Storm Sewer structures and pipe. Structures and pipe are to be field adjusted to eliminate conflicts		
EX I-90 Sta. 3026+43	12" Gas Line	No anticipated conflict with the transverse crossing of a 12" main with proposed roadway improvements and storm sewer (121' RT).	People's Gas	"Watch and Protect"

The following contact information is what was used during the preparation of the plans as provided by the owner of the facility.

Agency/Company Responsible to Resolve Conflict	Name of contact	Address	Phone	e-mail address
ComEd	Arture R. Salinas / Michelle Ho	Two Lincoln Center, 8th Floor Oakbrook Terrace, IL 60181	773-509-3284	
Peoples Gas	Mr. Robert Mirabal	200 East Randolph, floor 24-s, Chicago IL 60601	312-240-4707	
AT&T	Stanley Plodzien	1000 Commerce Drive, Floor 1 Oak Brook, IL 60523	630-573-5453	
CTA	Abdin Carillo	567 West Lake Street 9 th Floor Chicago, IL 60661-1465	See CTA FLAGGING AND DCOORDINATION specification for contact and coordination information	

The above represents the best information available to the Department and is included for the convenience of the bidder. The days required for conflict resolution should be taken into account in the bid as this information has also been factored into the timeline identified for the project when setting the completion date. The applicable portions of the Standard Specifications for Road and Bridge Construction shall apply.

EXISTING UTILITIES

The Contractor shall familiarize himself with the locations of all utilities and structures that may be found in the vicinity of the construction. The Contractor shall conduct his operations to avoid damage to the above-mentioned utilities and structures. Should any damage occur due to the Contractor's negligence, repairs shall be made by the Contractor at his expense in a manner acceptable to the Engineer.

The Contractor shall notify all utility owners of his construction schedule and shall coordinate constructions operations with utility owners so that relocation of utility lines and structures may proceed in an orderly manner. Notification shall be in writing, with copies transmitted to the Engineer.

TOLLWAY PERMIT

The Contractor will be required to obtain a permit from the Illinois State Toll Highway Authority (Tollway) in accordance with Article 107.04 of the Standard Specifications prior to initiating any lane closures on the Tollway or doing any work on the Tollway right of way. As part of the permit, the Contractor will be required to insure the Tollway as part of the surety bond. The Contractor will furnish a copy of the authorized permit to the Engineer.

To perform work under, over, or on the Tollway, the Contractor shall submit in writing to the Tollway requesting a Construction Permit to:

The Illinois State Toll Highway Authority
Mr. Dana Havraneck
Permit/Utility Sections
2700 Ogden Avenue
Downers Grove, IL 60515

The Contractor will furnish a copy of the authorized permit to the Engineer.

No work is allowed on the Tollway through Thanksgiving Holidays. Wednesday through Monday at 9:00 am.

COMPLETION DATE PLUS WORKING DAYS (D-1)

Effective: September 30, 1985

Revised: January 1, 2007

Revise Article 108.05 (b) of the Standard Specifications as follows:

"When a completion date plus working days is specified, the Contractor shall complete all contract items and safely open all roadways to traffic by 11:59 PM on (**November 25, 2018**) except as specified herein.

The Contractor will be allowed to complete all clean-up work and punch list items within 10 working days after the completion date for opening the roadway to traffic. Under extenuating circumstances the Engineer may direct that certain items of work, not affecting the safe opening of the roadway to traffic, may be completed within the working days allowed for clean-up work and punch list items. Temporary lane closures for this work may be allowed at the discretion of the Engineer.

The Special Provision for "Failure to Complete the Work on Time" shall apply to both the completion date and the number of working days.

FAILURE TO COMPLETE THE WORK ON TIME (D-1)

Effective: September 30, 1985

Revised: January 1, 2007

Should the Contractor fail to complete the work on or before the completion date as specified in the Special Provisions for "Interim Completion Date" or "Completion Date Plus Working Days", or within such extended time as may have been allowed by the Department, the Contractor shall be liable to the Department in the amount of **\$5,800**, not as a penalty but as liquidated damages, for each calendar day or a portion thereof of overrun in the contract time or such extended time as may have been allowed.

In fixing the damages as set out herein, the desire is to establish a certain mode of calculation for the work since 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 said 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 in order to recover these liquidated damages provided herein, as said 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 shown on the calendar and starts at 12:00 midnight and ends at the following 12:00 midnight, twenty-four hours later.

WORK RESTRICTIONS

To conserve the Indiana and Northern long-eared bat species, trees will not be cleared from April 1 through September 30.

Chicago Department of Water Management states that water mains can be shut down only during the months between September 15 and May 15.

FAA COORDINATION

Coordination for this project was required with the Federal Aviation Administration (FAA) during the design phase. Permits were required and submitted to the FAA. Approval was given by the FAA for the height of all permanent features of the project above the ground line. In addition, the Department secured approval for temporary use of construction equipment for the planned work items. FAA permit details are available from the Department prior to the letting. Please contact the Project Manager listed on the cover sheet. Assumptions were made for the temporary use portion, any deviations to the approved FAA permits based on the contractor's means and methods are the responsibility of the contractor to secure through a permit resubmittal to the FAA for approval. The minimum review time on permit submittals is 45 days. Any deviations from the approved permit or subsequent permit review time will not be considered justification for additional time and the contractor will be expected to complete the project in accordance with the specified completion date.

CTA FLAGGING AND COORDINATION

All work to be done by the Contractor on, over, or in close proximity of the CTA (Chicago Transit Authority) right-of-way and infrastructure shall be performed according to Article 107.12 of the Standard Specifications and this specification. This specification includes language from CTA Master Specification Section 01 35 15, "Special Project Procedures for Adjacent Construction." No interruption to CTA service will be allowed unless approved in writing by the CTA.

The CTA's Representative for this project will be:

Mr. Abdin Carrillo
Project Manager, Construction Oversight
(312) 681-3913

1.01 SUMMARY

- A. This section includes the requirements for safe construction operations on, above, below and adjacent to operating tracks of the CTA rail system. The Contractor shall be responsible for compliance with the CTA, *Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System* (in effect at such time).
- B. After the letting of the contract and prior to performing any work, the CTA Representative shall be notified by the Department to attend the preconstruction meeting. In this meeting, the Contractor shall confer with the CTA's Representative regarding the CTA's requirements for the protection of clearances, operations and safety.

- C. Prior to the start of any work on or over the CTA's right-of-way, the Contractor shall meet with the CTA Representative to determine his requirements for flagmen and all other necessary items related to the work activities on, over and next to the CTA facilities and to receive CTA's approval for the Contractor's proposed operations. At least twenty-one (21) calendar days prior to the start of work the Contractor must request CTA to prepare a Right-of-Entry document. The Contractor must also conform to all requirements of the "CTA Requirements for Contractors Working along the Right-of-Way (R.O.W.)", included in Appendix
- D. The Contractor shall notify the CTA Representative 72-hours in advance of the time he intends to enter upon the CTA right-of-way for the performance of any work.
- E. The scope of work under this contract includes construction activities adjacent to and above CTA tunnels. Work activities shall protect the existing CTA infrastructure and allow unimpeded service to CTA customers unless specifically allowed by CTA as identified herein.

1.02 PROJECT CONDITIONS

- A. The Chicago Transit Authority (CTA) is an operating transportation agency and must maintain rail operations at all scheduled times for the benefit of the public. The Contractor shall conduct his operations in such a manner as not to cause damage to the CTA equipment, put the public or the CTA personnel in danger, cause inconvenience to the customers, interrupt train service (except as permitted herein) or cause avoidable inconvenience to the public and the surrounding communities.
- B. The CTA will be operating trains during the construction of this project. The rail operations are 24 hours per day, seven days per week.
- C. Certain portions of the project may be performed on, above or adjacent to sections of track where rail service is suspended in order to facilitate the work. For any work occurring within, above or adjacent to a section of track to be taken out of service, the Contractor shall confirm with the CTA that track within the work limits has been taken out of service and the third rail de-energized, as required, prior to beginning the work.
- D. If the CTA deems any of the Contractor's work or operations hazardous to the CTA's operations or to the public, the CTA shall contact the Engineer. The Engineer may elect to order the Contractor to immediately suspend work until reasonable remedial measures are taken satisfactory to the CTA.

- E. The CTA may review any of the Contractor's procedures, methods, temporary structures, tools or equipment that will be utilized within the CTA Right-of-Way. These reviews do not relieve the Contractor of responsibility for the safety, maintenance, and repairs of any temporary structure or work, or for the safety, construction, and maintenance of the work, or from any liability whatsoever on account of any procedure or method employed, or due to any failure or movement of any temporary structure, tools or equipment furnished as necessary to execute work on CTA Right-of-Way.
- F. At least five (5) weeks prior to the start of any work on, above or adjacent to the CTA right-of-way, the Contractor will be required to attend weekly coordination meetings with CTA Operations and other CTA departments to review and coordinate proposed work activities of the Contractor(s). The Contractor will be required to provide a five week look-ahead schedule, in a format acceptable to CTA, reflecting proposed work activities within the CTA Right-of-Way.
- G. The Contractor, through the Engineer, shall submit a Rail Service Bulletin Request form to the CTA at least twenty-one (21) calendar days in advance of the Contractor's proposed scheduled time to enter upon the CTA Right-of-Way for the performance of any work under this Contract. Bulletin requests will be required when performing work which impacts rail operations such as prior to each phase of staged station construction, Track Access Occurrences, track survey, etc.
- H. CTA generally permits only one Track Access Occurrence at a time on any given route. Other work on CTA's system, including required operations and/or maintenance by CTA, or work by other contractors elsewhere on the route, may limit the available dates of track access occurrences for this project. The Contractor is strongly encouraged to submit Rail Service Bulletin requests with more than the twenty-one (21) day minimum required advance notice. The CTA has indicated that they typically will not grant Track Access Occurrences on consecutive weekend periods in order to provide scheduled service to customers.
- I. The Contractor shall at all times observe all rules, safety regulations and other requirements of the CTA, including, but not limited to, the following Standard Operating Procedures (SOP's).
- No. 7037, "Flagging on the Right-of-Way".
 - No. 7038, "Train Operation Through Slow Zones".
 - No. 7041, "Slow Zones".
 - No. 8111, "Workers Ahead Warning System".
 - No. 8130, "Safety on Rapid Transit Tracks".
 - No. 8212, "Test Train Procedures"
 - Sketch 2000-SZ-1, Slow Zone Equipment

1.03 REIMBURSEMENT OF COSTS

- A. The cost of all flagmen, infrastructure crews, engineering inspection, switchmen, and other workmen furnished by the CTA and authorized by the Engineer shall be paid for directly to the CTA by the Contractor.
- B. The costs associated with Track Access Occurrences granted and established by the CTA shall be paid for directly to the CTA by the Contractor.
- C. The amount paid to the Contractor shall be the amount charged to the Contractor for all authorized CTA charges including CTA additive rates audited and accepted by the Department, according to Article 107.12 and Article 109.05 of the Standard Specifications.
- D. Following approval of the CTA invoices by the Department, the Contractor shall pay all monies to the CTA as invoiced and shall submit to the Department certified and notarized evidence of the amount of payments. No overhead or profit will be allowed on these payments.
- E. There are maximum amounts of flagger shifts identified within this specification. If Contractor operations require flagger shifts that are granted by the CTA beyond these limits, the Contractor shall pay for the services, but will receive no reimbursement.
- F. The Department will not be liable for any delays by the CTA in providing flagmen, establishing track closures or other service provided by the CTA and identified within this special provision.

1.04 RAIL SAFETY TRAINING

- A. All Contractor and Subcontractor employees assigned to work on, over or near the CTA Right-of-Way shall be required to attend an all-day Rail Right-of-Way Safety Training Session in accordance with the CTA, *Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System*. The cost of this training is currently \$200.00 per employee, paid by the Contractor in advance. The certification is good for one calendar year from the date of issuance. The Contractor shall coordinate rail safety training with the Engineer. The cost of training shall be paid directly to the CTA by the Contractor.
- B. Rail Right-of-Way Safety Training for Contractor and subcontractor personnel will be scheduled by CTA as training slots become available. The Contractor is advised that the Contractor's failure to request training sufficiently in advance of when the employee is required on the work site shall not be cause for relaxing the requirement for Rail Right-of-Way Safety Training.

- C. The \$200.00 fee is non-refundable. If any individual fails to report for training or is rejected for training and must be rescheduled, an additional \$200.00 will be required. No additional compensation will be made for the rescheduling of any training.
- D. Upon successful completion of CTA Rail Safety Training, each trainee will be issued a non-transferable Rail Safety Tour Identification Card with the trainee's photo and a decal with pressure sensitive adhesive to be affixed on the hard hat. The Rail Safety Tour Identification Card and the decal are valid for one (1) year from the date of issue. The validity of the Card and the decal are in no way related to the length of this Contract.
- E. Contractor and Subcontractor personnel must renew their Rail Safety Tour Identification Cards annually by successfully completing Rail Safety Training again. Contractor or Subcontractor personnel who fail to maintain a valid Rail Safety Tour Identification Card are not permitted to work on, above or adjacent to the CTA Rail Right of Way and CTA reserves the right to remove such personnel from the work site.
- F. The costs incurred by the Contractor for CTA Rail Safety Training will not be reimbursed.

1.05 MANDATORY ITEMS FOR EMPLOYEES ON CTA RIGHT-OF-WAY

- A. Contractor's and Subcontractor's employees assigned to work on the CTA Right-of-Way:
 - 1. Contractor's and Subcontractor's employees will be given individual property permits. These permits shall be carried by each employee at all times while on CTA property. All permits issued shall be returned to CTA at the completion of the project, if the employee no longer works on this project, or on the date of expiration.
 - 2. Each employee shall carry a valid Rail Safety Tour Identification Card at all times while on CTA right-of-way in accordance with Article 2-2 of the CTA Safety Manual.
 - 3. All employees shall wear an undamaged hard hat with current rail safety sticker affixed, CTA standard safety vest and eye protection at all times while on CTA right-of-way. Noise protection shall be used when necessary. The Contractor must also comply with all OSHA requirements as required for the work. The CTA shall provide the rail safety sticker to each Contractor employee upon successful completion of the Rail Right-of-Way Safety Training.

4. Contractor personnel shall wear suitable work shoes with defined heel and non-slip soles. Steel toes or metal cleats on the sole or heel of shoes are prohibited. Shoelaces are to be kept short so they do not pose a tripping hazard. Athletic shoes, sandals, open-toed shoes, moccasins and/or shoes with heels higher than 1" are not permitted.
 5. Contractor personnel shall have a non-metallic, working flashlight after dark or when working in the subway.
- B. Contractor and Subcontractor employees assigned to work adjacent to or above the CTA right-of-way shall wear a CTA standard safety vest at all times. Personnel without current Rail Safety Training and a valid property permit shall not enter onto any CTA Right-of-Way.

1.06 WORK AREA AVAILABILITY

A. DEFINITIONS

1. RIGHT-OF-WAY WORK: Any work performed at, above, or below track level within the CTA Right-of-Way.
2. IN-SERVICE TRACK: All CTA tracks are in service seven days a week, 24 hours a day, unless specifically removed from service for specific times by a Rail Service Bulletin issued by the Vice President, Rail Operations. Copies of the CTA's current train schedule for the lines affected by this project is available on the CTA's website and are subject to changes at any time, before or during, the Contract.
3. OUT-OF-SERVICE TRACK: The CTA tracks within limits defined by CTA that are temporarily removed from service for the purpose of completing specific work. Traction power will remain on at all times unless power removal is requested by the Contractor and approved by the CTA. In such cases, traction power must be removed and restored by CTA personnel. The Contractor may request the CTA to de-energize portions of the CTA right-of-way to perform work on, or near an Out-of-Service Track when no revenue service is scheduled, or as specified under a Rail Service Bulletin. Upon completion of the Out-of-Service Work, the Contractor shall maintain sufficient personnel on-site to correct any deficiencies in the Contractor's Work discovered by the CTA during power and service restoration and testing.
4. TRACK ACCESS OCCURRENCE: A condition(s) which provides a modification to the normal operation of CTA service to facilitate access for a Contractor(s) to perform work on or near the CTA Right-of-Way as defined and limited herein.

5. RE-ROUTE: Modification to the normal routing of trains in order to remove rail traffic from a section of track to facilitate access for a Contractor(s) to perform work on or near the CTA Right-of-Way as defined and limited herein.
6. LINE CUT: A temporary cessation of all service on a transit line; meaning total stoppage of transit service on all tracks and at all stations within the closure zone to facilitate access for a contractor(s) to perform work on or near the CTA Right-of-Way as defined and limited herein.
7. SINGLE-TRACK: A temporary operation established by operating trains bi-directionally on one track while the adjacent track is taken out-of-service as defined in paragraph 1.05.a.4, above. Only one single-track at a time can be set up on a line and only for very limited time periods. If CTA or a separate contractor(s) request single track operations along the same line concurrently with the Contractor for this contract, CTA shall have the exclusive authority to determine which request shall be granted.
8. RUSH HOURS: Monday through Friday, from 0500 to 0900 hours and from 1500 to 1900 hours.
9. FLAGGER SHIFT: A flagger shift is defined as the services of a CTA Flagman up to, but no more than eight (8) hours including travel and required breaks. For example:
 - a. A Contractor five hour work shift which requires 3 flaggers will use 3 flagger shifts.
 - b. A Contractor eight hour work shift requiring 3 flaggers shall use 6 flagger shifts (because travel & break time will increase the flaggers work hours beyond eight).
 - c. A Contractor ten hour work shift requiring 3 flaggers will use 6 flagger shifts.
10. INFRASTRUCTURE SHIFT: An infrastructure shift is defined as up to, but no more than eight (8) hours worked per CTA Infrastructure employee. For example:
 - a. A Contractor five hour work shift requiring 2 signal maintainers will use 2 infrastructure shifts.
 - b. A Contractor eight hour work shift requiring 2 towermen shall use 2 infrastructure shifts.
 - c. A ten hour work shift requiring 2 lineman will use 4 infrastructure shifts.

11. PERSON-IN-CHARGE (PIC): A person or persons, specified in a CTA Rail Service Bulletin, who is solely in charge of a work zone and is the single point contact between CTA and all persons (Contractor's, CTA and others) working in a work zone. The Rail Service Bulletin may identify the PIC by name or by radio call number. The Engineer or the Engineer's designee shall serve as PIC.
 12. POWER & WAY SERVICE BULLETIN (PWS Bulletin): A document authorized by the CTA Infrastructure Division intended to supplement a CTA Rail Service Bulletin by defining power/signal removal and restoration procedures and other work zone protection measures required to safely perform construction and/or maintenance work on or adjacent to the CTA Right-of-Way (ROW).
- B. No service disruptions will be allowed for the completion of this work, except as noted herein. If the CTA deems it necessary, the CTA will impact operations to avoid a hazardous condition to either the passengers or employees and charge the Contractor for all associated costs and damages incurred. No compensation will be made for CTA charges to the Contractor due to unauthorized Contractor access or other unapproved impacts to CTA operations.

1.07 CTA OPERATING REQUIREMENTS

- A. Strictly comply with operating requirements of the Chicago Transit Authority while construction work is in progress, specifically as follows:
1. All work performed on the CTA Right-of-Way will be allowed during the Construction Period only in accordance with the Article 1.08 "ALLOWABLE HOURS OF CONSTRUCTION". During most periods of construction, a "slow zone" shall be established at the work site and flagging personnel shall be deployed to facilitate safe and continuous train operations and to protect Contractor, CTA employees, passengers, the general public and property in the vicinity.
 2. No one is permitted to enter the CTA Right-of-Way during Rush Hours. Access to the underside of the existing or proposed bridge structure within the limits of the CTA Right-of-Way will not be permitted.
- B. As much work as possible is to be done under normal CTA operating conditions (under traffic) without disruption of train movements. A maximum interruption of service to the CTA traffic of 15 minutes or as agreed upon with the CTA will be allowed. No interruption to CTA service will be allowed unless approved in writing by the CTA. The CTA has indicated during overnight periods, train headways are between fifteen (15) and thirty (30) minutes.

- C. Pedestrian traffic access to CTA station facilities, shall be maintained at all times. Barricades and signage for sidewalk closures as well as all details for pedestrian crossings of street intersections at the entrance of the station must be coordinated with the CTA at least twenty-eight (28) days prior to modifications to staging.
- D. Bus traffic access to CTA station facilities must be maintained. Any proposed changes to bus routes or normal access by pedestrians will need to be coordinated and approved by CTA (and Pace where applicable).
- E. Access control of the CTA Right-of-Way must be maintained at all times. This includes eliminating openings directly to the Right-of-Way where existing median barriers are to be removed. All planned removals of existing access control must be coordinated with the CTA, with plans for counter measures provided to the CTA at least three (3) weeks prior to removals. If the CTA grants the removal of a portion of the existing access control, the Contractor shall provide a fence system to enclose the Contractor's work area and provide a visual separation between the Contractor's work area and the CTA operating track(s). The fence shall be designed and installed to meet all CTA requirements, including, but not limited to, horizontal clearance requirements, minimum wind and vertical loading, foundation embedment, screening, fencing connections, installation requirements, maintenance of the fence throughout the installed period, removal of the fence at the completion of the period for the fence need and restoration of the CTA Right-of-Way. The Engineer and CTA shall approve all fence designs, components and installation procedures prior to the start of fence installation. The cost to design, install, maintain and remove the fence shall be considered included in the work required to be performed within the CTA Right-of-Way and will not be paid for separately.

1.08 ALLOWABLE HOURS OF CONSTRUCTION

- A. Construction activities within CTA Right-of-Way are not permitted during Rush Hours. Access to the underside of the existing or proposed bridge structure within the limits of the CTA Right-of-Way will not be permitted during Rush Hours.
- B. Construction activities within CTA Right-of-Way may be permitted during non-Rush Hour periods under flagging protection with the advance concurrence of the CTA as follows:
 - 1. Monday thru Friday: From 0900 to 1500 and 1900 hours to 0500 hours the next day (the power shall remain on for these hours unless allowed via specific Track Access Occurrence).
 - 2. Weekends: 1900 hours Friday to 0500 hours Monday

- C. Track Access Occurrences:
1. The total number of Track Access Occurrences shall be as specified below:
 - a. Overnight Single Tracks: A maximum of (TBD) Overnight Single-Track Track Access Occurrences will be permitted. Construction activities within the CTA Right-of-Way may be permitted between the hours of 22:00 and 04:00 the following morning, including any time required for test trains stipulated in the Rail Service Bulletin.
 - b. Weekend Single Tracks: A maximum of (TBD) Weekend Single-Track Track Access Occurrences will be permitted. Construction activities within the CTA Right-of-Way may be permitted between the hours of 22:00 Friday night and 04:00 the following Monday morning, including any time required for test trains stipulated in the Rail Service Bulletin.
 - c. If proposed work requires that CTA operations be suspended due to any circumstance, the Engineer must be informed immediately to coordinate the service suspension with the CTA. Any reimbursement to the CTA for the granting of a Track Access Occurrence must be approved by the Engineer.
 2. The exact dates and hours for all Track Access Occurrences are subject to change by the CTA depending on the nature of the work, access requirements of CTA personnel, work performed under separate contract or operational requirements of the CTA. The approval of specific dates and times for Track Access Occurrences on this Contract may be affected by major events or by a Track Access Occurrence scheduled elsewhere on that route or the CTA System. The CTA has indicated that they typically will not grant Track Access Occurrences on consecutive weekend periods in order to provide scheduled service to customers.
 3. Contractors completing other Department projects may also request Track Access Occurrences along the same section of track as described herein. These projects are identified in CONTRACTOR COOPERATION. Provided these Track Access Occurrences are approved, scheduled and initiated by the CTA, the Contractor shall be able to access CTA Right-of-Way with no impact to the total count of Track Access Occurrences attributed to this Contract.
- D. The CTA reserves the right to modify the allowable dates or hours of track access occurrences based on service requirements for the subject route and manpower availability for the date and location requested.

- E. The CTA reserves the right to deny or to cancel a previously approved request for a Track Access Occurrence based on service requirements for the time period requested. The CTA may notify the Contractor of such denial or cancellation no later than 1 day prior to a Track Access Occurrence. Service requirements may be affected by major events (e.g., festivals, White Sox and Cubs games, concerts), or by a Track Access Occurrence scheduled elsewhere on that route or the CTA System.
- F. The Contractor will not be permitted to perform work requiring a Track Access Occurrence or Flagging during the following special events:
1. Taste of Chicago
 2. Independence Day
 3. Chicago Air and Water Show
 4. Chicago Marathon
 5. Chicago Jazz Festival
 6. Chicago Blues Festival
 7. Chicago St. Patrick's Day Parade
 8. The Saturday before Thanksgiving Day through the Monday following Thanksgiving
 9. New Year's Eve and New Year's Day
 10. Easter Sunday
 11. Gospel Fest
 12. Chicago White Sox Home Games
 13. Chicago Cubs Home Games
 14. Chicago Bears Home Games
 15. Lollapalooza
 16. Pride Parade

In addition, CTA reserves the right to limit or deny access to the system during other major special events that may develop and that may impact service needs, during emergencies, and during severe weather conditions.

The CTA, at their discretion, may provide a Track Access Occurrence or Flagging during a time period identified above provided the request is made in conformance with this specification and is properly scheduled with the CTA as required.

1.09 CONSTRUCTION PROCESS PLAN

- A. CTA will require the Contractor to submit a Construction Process Plan whenever any work, in the opinion of the CTA, affects the safety or causes disruption of service or inconvenience to transit users, CTA Operations or impacts CTA Right-of-Way including, but not limited to: protection of CTA tracks/ CTA Right-of-Way, demolition, temporary shoring installation, drilled shaft installation, pier construction, structural steel erection over CTA tracks/ CTA Right-of-Way, temporary pedestrian bridge to CTA's station entrance, and any other necessary temporary construction related to the above listed items. At a minimum, an individual Construction Process Plan shall be required for each instance the Contractor requests a Track Access Occurrence from CTA and for any work that requires flagging protection from CTA.
- B. A draft Construction Process Plan must be submitted to CTA by such method as the CTA may direct, at least twenty-one (21) calendar days in advance of work and at least fourteen (14) calendar days prior to a pre-activity meeting. The plan shall include/address the following:
1. Applicable Contract Documents
 2. Options
 3. Possible conflicts
 4. Compatibility problems
 5. Time schedules
 6. Weather limitations
 7. Temporary facilities & signage
 8. Space and access limitations
 9. Governing regulations
 10. Safe Work Plans (including Hazard Analysis)
 11. CTA Operations Impact
 12. Proposed Traffic Control & Staging Areas
 13. Lift Plan
 14. For construction processes where failure of temporary structures will result in service interruptions and/or damage to CTA infrastructure CTA will require calculations and drawings signed and sealed by an Illinois SE. These processes include but are not limited to temporary Earth Retention Structures, formwork, lift plans and demolition. CTA also reserves the right to require a 3rd party SE review of the calculations, drawings and installation.
- C. The draft plan must also include reference to all Contractor Requests for Information (RFI's) and submittals that pertain to work identified in the plan.

- D. In addition, for any work to be performed during a Track Access Occurrence, the Contractor shall provide the following to the CTA:
1. A track access plan submitted to and approved by the CTA specifically identifying the area(s) of power removal and work zone protection methods being requested by the Contractor.
 2. Work zone protection methods to be performed by the Contractor
 3. Name, title, contact information, and work hours for Contractor's on-site supervision
 4. Work zone protection requested by the Contractor for implementation by the CTA (subject to CTA approval).
 5. Pre-approved Safety and Quality Control Checklists, applicable to the work elements being performed during the specific track(s) outage request for completion by the Contractor and submission to the Person-In-Charge during Track Access Occurrence.
 6. A general schedule reflecting proposed work to be performed within the requested Track Access Occurrence.
- E. After pre-activity meeting minutes have been agreed to, all comments from the meeting must be incorporated into a final Construction Process Plan. This plan must be submitted and approved by the Engineer and CTA prior to the start of related work.
- F. Prior to the CTA implementing an authorized Track Access Occurrence, the Contractor must provide, at least 48 hours in advance, an hourly schedule broken into tasks with a defined critical path that clearly establishes milestones that may be monitored. The hourly schedule shall also include, but not be limited to:
1. Name, title, contact information, and work hours for Contractor's on-site supervision.
 2. Power removal (min 1 hour)
 3. Proposed work activities.
 4. Activities for inspection and completion of safety & quality checklists by Contractor.
 5. Submission of safety & quality checklists to the CTA's Person-In-Charge (PIC) during Track Access Occurrence. The checklists shall be submitted to the PIC prior to commencing power restoration activities.

6. Power, Signal Restoration (min 1 hour).
 7. Test train (min ½ hour).
- G. The CTA intends to issue Power & Way Service Bulletins to supplement CTA Rail Service Bulletins. The Power & Way Service Bulletins are intended to provide procedural guidelines for safely removing and restoring the CTA's power & way systems (primarily traction power & signal) within the limits defined by the contract and Contractors specific track outage plan(s).
- H. CTA labor shall be required to de-energize and re-energize traction power and perform such other work as may be deemed by the CTA to be required pursuant to the Contractor's work activities and authorized Track Access Occurrences, etc. CTA Signal Maintainer shall also be required to observe and witness the Contractor disconnection and reconnection of temporary signal work at each location where modifications are performed to support construction activities. One Signal Maintainer will be required to witness testing at each location or housing where it is taking place. CTA Signal Maintainer shall also be required to witness the Contractor restoration safety testing, prior to the line being returned to the CTA.
- I. Two Linemen will be required at each location where traction power is energized or de-energized. The Contractor's schedule must include travel time for the CTA Electrician's (min ½ hour) if they are to energize or de-energize traction power at more than one location.
- J. Failure of the Contractor to provide the CTA the minimum specified time required for the removal and restoration of all Power & Way systems within an authorized Track Access Occurrence will result in specified liquidated damages for failure to return track(s) to service in accordance with the contract requirements. There will be no reimbursement for liquidated damages charged to the Contractor by CTA. The following schedule for liquidated damages has been established by the CTA:
- From 1 minute through 29 minutes delay - \$5,000.00
- From 30 minutes through 59 minutes delay – an additional \$5,000.00
- For each additional hour or fraction thereof - \$30,000.00 per hour
- K. When scope of work under this Contract includes construction activities adjacent to the existing CTA tunnels. The construction process plan shall identify the following items to be approved by the CTA prior to all construction near the CTA tunnels:
1. The scope and sequence of work near the CTA tunnel
 2. The type of equipment to be used adjacent to the tunnel

3. Equipment to be operated, stored or serviced within the limits of the projected edges of the CTA tunnels up to ground
 4. Specialized pads, racks, mats or other supports for any equipment to be operated or stored or materials to be stored over CTA tunnels
 5. Excavation limits in the area of the CTA tunnels, braced excavation or temporary earth retention system designs to be used (if applicable), excavation procedures (including hand, vacuum, hydro and other non-mechanical techniques), and other elements related to the excavations near the CTA tunnels
 6. Materials and activities to protect the CTA tunnels during excavations and proposed construction near the CTA tunnels
 7. Emergency plan and communication protocol in the event there is confirmed damage to the CTA tunnels due to Contractor activities
 8. Restoration plan and construction techniques to restore the soil fill around and over the CTA tunnels
- L. Placing equipment and materials in the area above the CTA tunnels is at the discretion of the CTA, and must be authorized prior to the start of any activities above and around the tunnel. In order for the CTA to evaluate the impact due to Contractor activities, a Structural Assessment Report shall be prepared concerning the CTA tunnel structures.
1. The Contractor shall retain the services of an engineering firm, prequalified in the IDOT consultant selection category of Highway Bridge (Advance Typical / Complex), for preparation of the Structural Assessment Report(s). Contractor's pre-approval shall not be applicable for this project. Preparation of the Structural Assessment Report(s) shall be at the Contractor's expense.
 2. The Contractor is advised that the existing structures most likely contain elements that are in deteriorated conditions with reduced load carrying capacities. It is the Contractor's responsibility to account for the condition of existing structures when developing construction procedures for using them to support construction loads.

3. The Contractor shall verify that the structural demands of the applied loads due to the Contractor's means and methods will not exceed the available capacity of the structure at the time loads are applied nor will any overstress to the tunnel structure occur. The Contractor may need to provide modifications to the existing tunnels (or other methods of retrofitting) to support construction loads. Locations and design of such modifications system will be the responsibility of the Contractor, will not be paid for separately, and will be subject to the review and approval of the CTA.
4. The modifications may include constructing elements adjacent to the CTA tunnels to reduce the load transfer to the tunnel structures. Any proposed improvements within the area of the tunnel to support Contractor operations will not be paid for separately, but will be included in the cost of other items.

1.10 HAZARDOUS WORKING CONDITIONS

- A. The Contractor shall caution all employees of the presence of electric third rail (600 volts DC), live cables and moving trains on CTA tracks. The Contractor shall take all necessary precautions to prevent damage to life or property through contact with the electrical or operations systems. The Contractor shall caution all employees that any contact with live electric third rail or "live" portions of train undercarriage may result in a severe burn or death.
- B. The Contractor shall establish third-rail safety precautions in accordance with CTA regulations, such as using insulating hoods or covers for live third rail or cables adjacent to the work. On every day and at every work site where a live third rail hazard exists, the Contractor shall instruct all employees of the emergency procedures. Knowledge of the disconnect switch locations or manner of disconnection shall be available at all times to the personnel on the job. Unless otherwise noted, only CTA Electricians are allowed to disconnect power.
- C. The third rail may be de-energized during authorized Track Access Occurrences. The planning and implementation of the de-energizing shall be listed in the Contractor's process plan and include documenting checklist requirements.

1.11 TRACK SAFETY

- A. The Contractor shall, at all times, take special care to conduct operations over, on, under, adjacent to, or adjoining, the CTA Right-of-Way in such a manner as not to cause damage, settlement or displacement of any structures, tracks or any portion thereof. Contractor will monitor CTA tracks for vertical and horizontal movements. Contractor to refer to the requirements as identified under the Special Provision, "Track Monitoring".

- B. Any damages to the CTA tracks, supporting structures or other existing facilities and properties caused by the Contractor's operations shall be replaced or repaired by the Contractor to the satisfaction of the CTA without reimbursement. Contractor shall obtain photo documentation of damaged property to the CTA prior to performing any repair or replacement work.
- C. The CTA shall have the right to perform any work it deems to be of an emergency nature and/or necessary to permit normal train operations during construction operations by the Contractor. The work to be completed by the CTA may impact the ongoing Contractor operations. If the emergency work is required due to Contractor actions, the cost of such service or emergency work provided by the CTA shall be borne by the Contractor with no reimbursement by the Department.
- D. All work shall comply with the CTA, *Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System* and CTA Standard Operating Procedures.
- E. Train Clearances
 - 1. Minimum 7'-2" Horizontal Clearance:

The Contractor shall take such precautions as are necessary to ensure the safety and continuity of the CTA operations and passengers. The Contractor shall provide a minimum horizontal clearance of 7'-2" from the centerline of the nearest tangent track to any falsework, bracing and forms or other temporary obstruction during the work under this Contract. The clearance requirements for curved track sections must be calculated by the Contractor to ensure encroachment into the clearance envelope will not occur. Prepare, submit and obtain approval of detailed drawings prepared and sealed by a licensed structural engineer in the state of Illinois for all falsework, sheeting and construction procedures adjacent to and under the tracks before doing any work on same. After obtaining approval of such plans, said falsework, sheeting and construction procedures shall be constructed strictly in accordance with the approved drawings and specifications. All submittals must be submitted to the Engineer to be provided to the CTA In case of any settlement or displacement of structures or tracks, the Contractor shall immediately proceed with all shoring or other work necessary to maintain the CTA property in a safe condition for the operation of train service. If the Contractor fails to undertake this work within 24 hours after notice by the Engineer in writing, the CTA may proceed to repair or shore any such structure or tracks; and the cost thereof shall be billed to the Contractor with no compensation. If the settlement or displacement is severe enough to limit train service, the repairs shall be made immediately. All costs of any disruption to the CTA service due to the Contractor's operations or negligence shall be at the Contractor's expense with no compensation.

2. Limited minimum 6'-1" Horizontal Clearance:
In limited cases and with advance authorization by the CTA, a minimum horizontal clearance of 6'-1" between the centerline of the nearest tangent track and an obstruction may be allowed. This clearance does not allow CTA or Contractor personnel to safely stand between the obstruction and an operating train. In addition, an obstruction at this clearance is a hazard to motormen with a cab window open. Any required flagging by the CTA will need to be requested as described herein.
3. 14'-6" Vertical Clearance:
Vertical clearance A minimum vertical clearance of 14'-6" (4.42 m) above the high running rail the CTA tracks must be provided at all times.

F. Protective Shield

1. The Contractor shall furnish, install, and later remove protective shields to protect the CTA traffic from damage due to (a) falling material and (b) work on bridge piers.
2. Protective shields will be necessary for any demolition/repair/new construction activities.
3. The protective shield may be a platform, a net, or any other Department approved structure that can support the construction debris and satisfy train clearance requirements.
4. Required protective shield for falling material, as indicated on the plans and the supporting members shall be designed to sustain a load of 200 pounds per square foot in addition to its own weight.
5. Required protective shield for work on bridge piers shall be designed for a 30 psf minimum wind load pressure or greater as determined by Contractor's engineer for site specific conditions. Any other loads that can be imposed by Contractor's construction activities shall also be included. Preferred material for shield is wood.
6. Drawings and design calculations for the protective shields shall be stamped by an Illinois Licensed Structural Engineer and shall be submitted to the Department for approval. The protective shield shall be constructed only after the Department has approved the drawings and the design.

- G. Work adjacent and above the CTA tunnels must consider the protection of the tunnel structures in addition to items described above related to open track conditions. The protection of the tunnel structure is critical to maintain continuous transit operations. Section 1.09K describes the required items as part of the Construction Process near the tunnel structures. The CTA, at their discretion, may place inspectors, or other personnel, within adjacent tunnel sections during Contractor operations. The CTA personnel will alert the Engineer if the Contractor actions appear to be damaging the CTA tunnel structure(s).

1.12 TRACK FLAGGING OPERATIONS

- A. Temporary Track Flagging slow zones per CTA SOP 7041 and CTA, *Safety Manual for Contract Construction On, Above or Adjacent to the CTA Rail System* are restricted in the following manner:
 - 1. Temporary track flagging slow zones can only be mobilized, utilized and demobilized in non-rush hour time periods and no more than one (1) Track Flagging Operation zone will be permitted at any given time. The Contractor will be the responsible party responsible to furnish and install the required slow zone signage and equipment. A Track Flagging Operation zone is defined as a contiguous work zone, of no more than 600 feet in length, regardless of the number of tracks fouled. The costs for all manpower, signage and equipment for flagging operations will be billed by the CTA to the Contractor with reimbursement as defined herein.
 - 2. Current Standard Operating Procedures require Slow Zone with flagging protection whenever any workers are scheduled to work on, across or near a section of track. Flagging protection shall be ordered and assigned according to the CTA Flagmen Requirements Manual. These standards must be adhered to and the number of flagmen assigned to a work location shall be as required by the CTA Flagmen Requirements Manual that is available for public viewing at CTA Headquarters upon request. If the work will take place in an area of restricted visibility then flagmen must be assigned (for any number of workers/duration of work) and a slow zone must be established.
 - 3. Temporary Track Flagging slow zone signs will be placed, removed or turned by the CTA so the sign cannot be read from the motor cab or hooded to cover the sign so it may not be read from the motor cab when the work crew clears the Right-of-Way.
 - 4. The Contractor shall provide the Engineer with a written request for flagmen and other personnel at least seventy two (72) hours (two normal working days and before noon) prior to the date, and time the work will be performed and the CTA personnel are requested. The Engineer or the Engineer's designee will coordinate all flagmen requests with the CTA.

5. A maximum of zero (0) flagger shifts will be reimbursed as part of the Contract. The costs for additional flagger shifts required for the Contractor's operations that are requested and granted by the CTA will be reviewed after the flagger shift request has been made to the Engineer.

- B. The providing of such personnel and any other safety precautions taken by the CTA shall not relieve the Contractor of any liability for death, injury or damage arising in connection with the construction operations. See CTA SOP No. 7037, "Flagging on the right-of-way", for a description of flagging personnel duties.

- C. To minimize flagmen usage, the Contractor shall use approved barricades, barricaded scaffolds and/or safety railings. Barricades and safety railing arrangements shall be in accordance with Section 4-5.3 of the CTA, *Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System*.

- D. The CTA does not guarantee that flagging or other personnel will always be available when requested. The Contractor shall be advised that requests for flagging manpower must conform to the CTA Flagman Requirements Manual, and certain work locations require multiple flagging personnel when only one track is fouled by the work.

- E. The Contractor shall pay for all flagging and other personnel costs incurred and charged by the CTA. The cost for the each flagger shift shall be approximately \$900.00 per flagger shift (exact cost will be based on actual wage rates, fringes and overhead). The Contractor shall also be responsible to reimburse the CTA for all costs associated with the use of other personnel for infrastructure shifts throughout the duration of the contract. The cost for any other CTA personnel (signalmen, linemen, towermen, inspectors, etc.) shall be approximately \$1,100.00 per infrastructure shift (exact cost will be based on actual wage rates, fringes and overhead). CTA personnel assigned to monitor CTA tunnels during Contractor operations identified within Section 1.11I are considered as infrastructure shifts.

- F. By labor contract, CTA flagging personnel are entitled to a 30-minute break after a continuous 5-1/2 hour work period, including report and travel time. The 5-1/2 hour period begins when the person reports to work at his or her home terminal. Additionally, flagging personnel are entitled to occasional personal breaks (to use the washroom facilities) during the normal course of work. When flagging personnel leave the work site, work must cease unless provision is made for a relief flagger. The Contractor shall coordinate the Project work schedule with the flagging personnel break periods.

- G. All employees of the Contractor and subcontractors shall report any actions of perceived CTA employee misconduct, or if any CTA employee does not provide a full level of cooperation in support of the contract; immediately and directly to the Engineer. The Engineer will provide written correspondence to the CTA Project Manager, as well as CTA Operations. Only with timely, written documentation will CTA be enabled to resolve work site personnel issues and take appropriate disciplinary action, when necessary.
- H. If the Contractor, Engineer, CTA Construction or Safety Inspector believes that the Flagman is unable to perform his/her duties responsibly, work shall be stopped immediately, ensure that the Right-of-Way is safe for train operations, and the Work Crew shall exit, without delay, the Rail System Right-of-Way. The Contractor must contribute incident information to the Engineer to that a written report can be submitted to the CTA prior to the end of the workday.
 - 1. In addition, all employees of the Contractor and subcontractors must report any actions of perceived CTA employee misconduct, or if any CTA employee does not provide a full level of cooperation in support of the contract immediately to the Engineer. The Engineer will then contact the CTA's Control Center and/or CTA Rail Operations Route Manager. Within 24 hours of alleged incident, the Engineer must provide a written report to the CTA including detailed explanation of incident, employee badge numbers, location of incident, etc. The Contractor must contribute incident information to the Engineer.
 - 2. Failure to make the proper notification in writing may adversely affect any claim that the Department may file with respect to CTA employee performance or lack thereof.
- I. CTA Flaggers only provide flagging protection for the CTA Right-of-Way, and only CTA Flaggers are permitted to provide flagging protection for the CTA Right-of-Way. Flaggers for streets, highways or other railroads are solely the responsibility of the Contractor, and will not be permitted to provide flagging protection for the CTA Right-of-Way. Any additional flagging required by other agencies or railroads is the responsibility of the Contractor.

1.13 TRACK ACCESS OCCURRENCES

- A. The entire system must be fully operational when the tracks are put back into service after a Track Access Occurrence. The track where work was conducted must be returned to the CTA in revenue condition; all stations must be open, fully functional and properly cleaned. The Contractor shall be immediately available with sufficient staff for up to one hour after revenue operation begins to ensure that all systems are functioning properly.

- B. The Contractor shall allow enough time prior to putting the tracks back into service to make sure the line can be fully operational. A test train shall be required after any construction activity, determined by the Engineer or CTA, to require a test train. The scheduling of test trains must include travel time to and from the location being tested. Additional time should also be allowed for any possible remedial work required before the system can be made fully operational.
- C. All components of the system, including, but not limited to, tracks, signals, stations, entrances, etc. must be fully and properly operational prior to putting the tracks and facilities back into service. Any facilities under demolition or construction and any temporary facilities must be safe and secure so they do not impact revenue service operations.
- D. The Contractor shall be subject to fines if any station, facility, yard, structure, track, or component is not fully operational and useable at the prescribed predetermined time; including all planned staging of construction sites. The CTA will identify appropriate fines at the time of the incident. No compensation will be made for fines levied by the CTA due to Contractor actions or delays in providing CTA facilities at prescribed times.
- E. The Contractor shall clean all debris and equipment from the work or staging areas after work has been completed after each work day. In the event the Contractor fails to so clean to the CTA's satisfaction, the CTA may perform any necessary cleaning and fine the Contractor the cost of such cleaning. No compensation will be made for fines levied by the CTA due to delays and cleaning costs.

RAILROAD PROTECTIVE LIABILITY INSURANCE (BDE)

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
Chicago Transit Authority (CTA) 120 N. Racine Avenue Chicago, IL 60607-2010	Blue Line 382 trains/day @ 55 mph	-0-
DOT/AAR No.: N/A RR Division: CTA	RR Mile Post: N/A RR Sub-Division: Blue Line	
For Freight/Passenger Information Contact: <u>Rick Herndobler</u> For Insurance Information Contact: <u>Mike Wrenn</u>		Phone: <u>(312) 681-3921</u> Phone: <u>(312) 681-3646</u>

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.

KEEPING THE EXPRESSWAY OPEN TO TRAFFIC

Effective: March 22, 1996

Revised: January 21, 2015

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

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

LOCATION: I-90/94 Kennedy: E. River Road to Ohio

WEEK NIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS		
			to	
Sunday - Thursday	1-Lane	9:00 PM	to	5:00 AM
	2-Lane	11:59 PM	to	5:00 AM
Friday	1-Lane	10:00 PM (Fri)	to	8:00 AM (Sat)
	2-Lane	11:59 PM (Fri)	to	6:00 AM (Sat)
Saturday	1-Lane	9:00 PM (Sat)	to	10:00 AM (Sun)
	2-Lane	11:59 PM (Sat)	to	8:00 AM (Sun)

Full Expressway Closures on I-90/94 will only be permitted for a maximum of 15 minutes at a time during the low traffic volume hours of 1:00 A.M. to 5:00 A.M. Monday thru Friday and from 1:00 A.M. to 7:00 A.M. on Sunday. During Full Expressway Closures, the Contractor will be required to close off all lanes except one, using Freeway Standard Closures. Police forces should be notified and requested to close off the remaining lane at which time the work item may be removed or set in place. The District One Expressway Traffic Control Supervisor (847-705-4151) **shall be** notified at least 3 working days (weekends and holidays DO NOT count into this 72 hours notification) in advance of the proposed road closure and will coordinate the closure operations with police forces. Liquidated Damages as specified in the Failure to Open Traffic Lanes to Traffic for One lane or ramp blocked shall be assessed to the Contract for every 15 minutes beyond the initial 15 minutes all lanes are blocked.

LOCATION: I-190: Bessie Coleman to E. River Road

WEEK NIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS					
		INBOUND (Toward Chicago)			OUTBOUND (Toward O'Hare)		
Sunday - Thurs	One Lane	11:00 PM	to	5:00 AM	10:00 PM	to	4:00 AM
Friday	One Lane	11:59 PM (Fri)	to	7:00 AM (Sat)	11:00 PM (Fri)	to	6:00 AM (Sat)
Saturday	One Lane	9:00 PM (Sat)	to	7:00 AM (Sun)	8:00 PM (Sat)	to	5:00 AM (Sun)

Full Expressway Closures on I-190 will only be permitted for a maximum of 15 minutes at a time during the low traffic volume hours of 12:00 A.M. to 4:00 A.M. Monday thru Friday and from 11:00 P.M. Saturday to 5:00 A.M. on Sunday. During Full Expressway Closures, the Contractor will be required to close off all lanes except one, using Freeway Standard Closures. Police forces should be notified and requested to close off the remaining lane at which time the work item may be removed or set in place. The District One Expressway Traffic Control Supervisor (847-705-4151) **shall be** notified at least 3 working days (weekends and holidays DO NOT count into this 72 hours notification) in advance of the proposed road closure and will coordinate the closure operations with police forces. Liquidated Damages as specified in the Failure to Open Traffic Lanes to Traffic for One lane or ramp blocked shall be assessed to the Contract for every 15 minutes beyond the initial 15 minutes all lanes are blocked.

In addition to the hours noted above, temporary shoulder and non-system interchange partial ramp closures are allowed weekdays between 9:00 A.M. and 3:00 P.M. and between 7:00 P.M. and 5:00 A.M.

Narrow Lanes and permanent shoulder closures will not be allowed between Dec. 1st and April 1st.

All stage changes requiring the stopping and/or the pacing of traffic shall take place during the allowable hours for Full Expressway Closures and shall be approved by the Department. The Contractor shall notify the District One Expressway Traffic Control Supervisor at least 3 working days (weekends and holidays DO NOT count into this 72 hours notification) in advance of any proposed stage change.

A Maintenance of Traffic Plan shall be submitted to the District One Expressway Traffic Control Supervisor 14 days in advance of any stages changes or full expressway closures. The Maintenance of Traffic Plan shall include, but not be limited to: lane and ramp closures, existing geometrics, and equipment and material location.

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

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

All lane closure signs shall not be erected any earlier than one-half (1/2) hour before the starting hours listed above. Also, these signs should be taken down within one-half (1/2) hour after the closure is removed.

The Contractor will be required to cooperate with all other contractors when erecting lane closures on the expressway. All lane closures (includes the taper lengths) without a three (3) mile gap between each other, in one direction of the expressway, shall be on the same side of the pavement. Lane closures on the same side of the pavement with a one (1) mile or less gap between the end of one work zone and the start of taper of next work zone should be connected. The maximum length of any lane closure on the project and combined with any adjacent projects shall be three (3) miles. Gaps between successive permanent lane closures shall be no less than two (2) miles in length.

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

Check barricades shall be placed every 1000' within a lane closure to prevent vehicles from driving through closed lanes.

Temporary ramp closures for service interchanges will only be permitted at night during the restricted hours listed for temporary one-lane closures within the project limits. However, no two (2) adjacent entrance and exit ramps in one direction of the expressway shall be closed at the same time.

Freeway to freeway (system interchange) full ramp closures for two lane ramps will not be permitted. Partial ramp closures of system ramps may be allowed during the 1-lane closure hours above. System ramp full closures for single lane ramps are only permitted for a maximum of four (4) hours

- between the hours of 1:00 a.m. and 5:00 a.m. on Monday thru Friday
- between the hours of 1:00 a.m. and 6:00 a.m. on Saturday, and
- between the hours of 1:00 a.m. and 7:00 a.m. on Sunday.

The Contractor shall furnish and install large (48" X 48") "DETOUR with arrow" signs as directed by the Engineer for all system ramp closures. In addition, one portable changeable message sign will be required to be placed in advance of the ramp closure. The cost of these signs and PCMS board shall be included in the cost of traffic control and protection (6 static signs maximum per closure).

Should the Contractor fail to completely open, and keep open, the ramps to traffic in accordance with the above limitations, the Contractor shall be liable to the Department for liquidated damages as noted under the Special Provision, "Failure to Open Traffic Lanes to Traffic".

FAILURE TO OPEN TRAFFIC LANES TO TRAFFIC (D-1)

Effective: March 22, 1996

Revised: February 9, 2005

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

One lane or ramp blocked = **\$ 3,000**

Two lanes blocked = **\$ 6,000**

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

TOLLWAY MAINTENANCE OF TRAFFIC AND LANE CLOSURES RESTRICTIONS

DESCRIPTION

This work shall be in accordance with Section 701 of the Tollway Supplemental Specifications, plans, details, and as further defined and prescribed herein. This item shall be used for maintenance of traffic for the eastbound mainline, ramp, and Toll Plaza 19 of the Jane Addams Memorial Tollway (I-90).

GENERAL REQUIREMENTS

Special attention is called to Sections 701 of the Tollway Supplemental Specifications and the following Tollway Standards relating to traffic control:

D4 E1 E2 E3 E6

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 construction zone. The Contractor shall arrange his/her operations to keep the closing of lanes and/or roads to a minimum.

COORDINATION

Per Tollway Supplemental Specifications Article 701.04 (a) except as modified herein.

If an alternate traffic pattern is required within the contract, the Contractor shall submit a maintenance of traffic deviation plan, 21 days prior of the changes for approval by the Tollway. In addition, The Contractor is required to attend a maintenance of traffic meeting arranged by the Tollway Construction Manager with representatives of the Tollway to review the proposed changes in the maintenance of traffic 2 days prior to the implementation of the new maintenance of traffic stage changes.

In the event that this Contract fails to meet the interim completion dates, it will be the responsibility of the Contractor to provide, install and maintain any and all traffic control measures necessary to maintain traffic with adjacent sections. Such measures, with the exception of advance signing shall be located entirely within the limits of this Contract. These measures shall include, and may not be limited to, barricades, arrow boards and/or portable changeable message signs, moveable barrier wall, and pavement markings, and shall be installed in the form of a traffic shift meeting the requirements of all applicable Tollway standard drawings. No additional payment shall be made for this work.

Contractor shall coordinate all work with Plaza Manager, Michael Wayne (mwayne@getipass.com) and Art Manaois (amanois@getipass.com) and shall contact the Plaza Manager a minimum of 1 week prior to any stage changes.

ALLOWABLE LANE CLOSURES

Temporary lane closures within the contract limits will be permitted only with the Tollway’s approval. All temporary lane and shoulder closures must be approved by the Tollway and shall be submitted by the Contractor to the Construction Manager (CM) by 7:00 AM weekdays at least one business day before the closure. The lane closure coordination must be routed through the CM and no contact should be made directly with the Tollway. Closures along the Jane Addams Memorial Tollway (I-90) shall be in accordance with the Tollway’s Standard E2,

The allowable lane closure hours for the contract shall be as follows:

DAY	ALLOWABLE 1-LANE CLOSURE TIMES
	Eastbound
Monday	10:00 p.m. - 5:00 a.m. Tues.
Tuesday	10:00 p.m. - 5:00 a.m. Wed.
Wednesday	10:00 p.m. - 5:00 a.m. Thru.
Thursday	10:00 p.m. - 5:00 a.m. Fri.
Friday	11:00 p.m. - 7:00 a.m. Sat.
Saturday	11:00 p.m. - 8:00 a.m. Sun.
Sunday	10:00 p.m.- 5:00 a.m. Mon.

The Contractor shall strictly adhere to the temporary lane closure hours set out above throughout the duration of the contract. Temporary lane closures will not be allowed, or must be removed, if so directed by the Engineer, due to inclement weather or heavy traffic, in accordance with the Standard Specifications.

No lane closure signs shall be erected any earlier than one-half (1/2) hour before the starting hours listed above. Also, these signs should be taken down within one-half (1/2) hour after the closure is removed.

When off-peak hour or weekend closures are required, a portable changeable message sign shall be installed one week prior to the closure. The wording and location shall be determined by the engineer.

In all cases, the Contractor is expected to be working in the areas closed due to the temporary lane closures. The Contractor shall remove the temporary lane closure when the scheduled work shift is over or when so required by the Contract Documents, whichever occurs first.

NON-COMPLIANCE

Should the Contractor fail to re-open lanes of traffic, in accordance with the above time limits, the Contractor shall be considered Non-Compliant with the Maintenance of Traffic Specifications, per Article 701.01(b)(1) & (2) of the Tollway Supplemental Specifications. For this Contract, it is understood "incident" is defined as every 10 minute interval, or portion thereof, where the Contractor fails to re-open the lanes of traffic by the time limit specified.

The Contractor shall notify the Engineer two (2) weeks in advance of beginning of his work, and shall obtain written approval of the Engineer of his intended work; however, the Engineer may require alteration of the intended work procedure as dictated by prevailing traffic conditions. Temporary, daytime, off-peak hour, one-lane closures must be requested in writing by the Contractor.

The Contractor shall notify the Engineer, all communications shall be through the Engineer, by 7 a.m. the working day preceding the requested two-lane closure. The Tollway will be notified of closures as required by the Lane Closure Reference Guide. Two-lane closures on a three-lane directional roadway for any purpose will only be permitted during off-peak night-time hours and only with the specific approval of the Engineer. The Contractor shall be required to schedule the implementation of any traffic stage or subsequent stage change which requires two-lane closures on a three-lane directional roadway to ensure that such lane closures are limited to a single night-time period per direction of traffic. In order to minimize the length of lane closures during work operations, the following are required:

The signs posted for the temporary lane closures shall also be removed within one half hour after the lane closure is removed.

HOLIDAY PERIODS

Holiday periods shall be per Tollway Supplemental Specifications Section 701.12 with the following additions.

A. Christmas-New Year's Day

A1 12:00 Noon, Thursday December 24, 2015 through 9:00 A.M. Monday January 4, 2016

B. Easter Weekend

B1 12:00 Noon, Thursday, March 24, 2016 through 9:00 A.M. Monday
March 28, 2016

C. Memorial Weekend

C1 12:00 Noon, Friday May 27, 2016 through 9:00 A.M. Tuesday May 31, 2016

D. Independence Day

D1 12:00 Noon, Thursday, June 30, 2016 through 9:00 A.M. Monday July 5, 2016

E. Labor Day Weekend

E1 12:00 Noon, Friday September 2, 2016 through 9:00 A.M. Tuesday
September 6, 2016

F. Thanksgiving Day Weekend

F1 12:00 Noon, Wednesday November 23, 2016 through 9:00 A.M. Monday
November 28, 2016

G. Christmas-New Year's Day

G1 12:00 Noon, Friday December 23, 2016 through 9:00 A.M. Monday
January 2, 2017

H. Easter Weekend

H1 12:00 Noon, Thursday, April 13, 2017 through 9:00 A.M. Monday
April 17, 2017

TRAFFIC CONTROL PLAN (D-1)

Effective: September 30, 1985

Revised: January 1, 2007

Traffic Control shall be according to the applicable sections of the Standard Specifications, the Supplemental Specifications, the "Illinois Manual on Uniform Traffic Control Devices for Streets and Highways", any special details and Highway Standards contained in the plans, and the Special Provisions contained herein.

Special attention is called to Article 107.09 of the Standard Specifications and the following Highway Standards, Details, Quality Standard for Work Zone Traffic Control Devices, Recurring Special Provisions and Special Provisions contained herein, relating to traffic control.

The Contractor shall contact the District One Bureau of Traffic at least 72 hours in advance of beginning work.

PLANS:

SUGGESTED STAGES OF CONSTRUCTION AND TRAFFIC CONTROL SHEETS

STANDARDS:

701101	OFF-RD OPERATIONS, MULTILANE, 15' TO 24" FROM PAVEMENT EDGE
701106	OFF-RD OPERATIONS, MULTILANE, MORE THAN 15' AWAY
701400	APPROACH TO LANE CLOSURE, FREEWAY/EXPRESSWAY
701401	LANE CLOSURE, FREEWAY/EXPRESSWAY
701411	LANE CLOSURE, MULTILANE, AT ENTRANCE OR EXIT RAMP, FOR SPEEDS >= 45 MPH
701428	TRAFFIC CONTROL SETUP AND REMOVAL FREEWAY/EXPRESSWAY
701446	TWO LANE CLOSURE FREEWAY/EXPRESSWAY
701901	TRAFFIC CONTROL DEVICES
704001	TEMPORARY CONCRETE BARRIER

DISTRICT 1 DETAILS:

TC-08	EXTRANCE AND EXIT RAMP CLOSURE DETAILS
TC-09	TRAFFIC CONTROL DETAILS FOR FREEWAY SINGLE & MULTI-LANE WEAVE
TC-12	MULTI-LANE FREEWAY PAVEMENT MARKING (2 SHEETS)
TC-13	DISTRICT ONE TYPICAL PAVEMENT MARKING
TC-16	PAVEMENT MARKINGS LETTERS AND SYMBOLS FOR TRAFFIC STAGING
TC-17	TRAFFIC CONTROL FOR SHOULDER CLOSURES AND PARTICAL RAMP CLOSURES
TC-18	SIGNING FOR FLAGGING OPERATIONS AT WORK ZONE OPENINGS
TC-21	DETOUR SIGNING FOR CLOSING STATE HIGHWAYS
TC-22	ARTERIAL ROAD INFORMATION SIGN

DISTRICT 1 SPECIAL PROVISIONS:

MAINTENANCE OF ROADWAYS
KEEPING THE EXPRESSWAYS OPEN TO TRAFFIC (D-1)
FAILURE TO OPEN TRAFFIC LANES TO TRAFFIC (D-1)
PUBLIC CONVENIENCE AND SAFETY (D-1)
TRAFFIC CONTROL PLAN (D-1)
TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS) (D-1)
TRAFFIC CONTROL FOR WORK ZONE AREAS (D-1)
TRAFFIC CONTROL SURVEILLANCE (EXPRESSWAYS)
TRAFFIC CONTROL SURVEILLANCE (SPECIAL)
TEMPORARY INFORMATION SIGNING (D-1)
WET REFLECTIVE TEMPORARY TAPE TYPE III (D-1)
TEMPORARY PAVEMENT
SPEED DISPLAY TRAILER (D-1)

CONTRACT SPECIAL PROVISIONS:

CLEANING OF TRAFFIC CONTROL DEVICES

SUPPLEMENTAL SPECIFICATIONS

IMPACT ATTENUATORS, TEMPORARY

RECURRING SPECIAL PROVISIONS

WORK ZONE PUBLIC INFORMATION SIGNS
PAVEMENT MARKING REMOVAL

BDE SPECIAL PROVISIONS

PAVEMENT MARKING REMOVAL

TOLLWAY STANDARDS

- E1 CONSTRUCTION SIGNS
- E2 LANE CLOSURE DETAILS
- E3 SHOULDER CLOSURE DETAILS
- E6 CONTRACTOR ACCESS TO WORK AREA

PUBLIC CONVENIENCE AND SAFETY (D-1)

Effective: May 1, 2012

Revised: July 15, 2012

Add the following to the end of the fourth paragraph of Article 107.09:

“If the holiday is on a Saturday or Sunday, and is legally observed on a Friday or Monday, the length of Holiday Period for Monday or Friday shall apply.”

Add the following sentence after the Holiday Period table in the fourth paragraph of Article 107.09:

“The Length of Holiday Period for Thanksgiving shall be from 5:00 AM the Wednesday prior to 11:59 PM the Sunday After”

Delete the fifth paragraph of Article 107.09 of the Standard Specifications:

“On weekends, excluding holidays, roadways with Average Daily Traffic of 25,000 or greater, all lanes shall be open to traffic from 3:00 P.M. Friday to midnight Sunday except where structure construction or major rehabilitation makes it impractical.”

TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS) (D-1)

Effective: March 8, 1996

Revised: January 21, 2015

Description. This work shall include furnishing, installing, maintaining, replacing, relocating, and removing all traffic control devices used for the purpose of regulating, warning, or directing traffic. Traffic control and protection shall be provided as called for in the plans, applicable Highway Standards, District One Expressway details, Standards and Supplemental Specifications, these Special Provisions, or as directed by the Engineer.

General. 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 on the expressway through the construction zone. The Contractor shall arrange his operations to keep the closing of lanes and/or ramps to a minimum.

The Contractor shall be responsible for the proper location, installation, and arrangement of all traffic control devices. Special attention shall be given to existing warning signs and overhead guide signs during all 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 the motorist's view all signs which are inconsistent with lane assignment patterns.

The Contractor shall coordinate all traffic control work on this project with adjoining or overlapping projects, including barricade placement necessary to provide a uniform traffic detour pattern. When directed by the Engineer, the Contractor shall remove all traffic control devices that were furnished, installed, or maintained by him under this contract, and such devices shall remain the property of the Contractor. All traffic control devices shall remain in place until specific authorization for relocation or removal is received from the Engineer.

Additional requirements for traffic control devices shall be as follows.

- (a) Traffic Control Setup and Removal. The setting and removal of barricades for the taper portion of a lane closure shall be done under the protection of a vehicle with a truck/trailer mounted attenuator and arrow board per State Standard 701428 and the Traffic Control Setup and Removal Freeway/Expressway BDE Special Provision. Failure to meet this requirement will be subject to a Traffic Control Deficiency. The deficiency will be calculated as outlined in Article 105.03 of the Standard Specifications. Truck/trailer mounted attenuators shall comply with Article 1106.02(g) or shall meet the requirements of NCHRP 350 Test Level 3 with vehicles used in accordance with manufacturer's recommendations and requirements.

(b) Sign Requirements

- (1) Sign Maintenance. Prior to the beginning of construction operations, the Contractor will be provided a sign log of all existing signs within the limits of the construction zone. The Contractor is responsible for verifying the accuracy of the sign log. Throughout the duration of this project, all existing traffic signs shall be maintained by the Contractor. All provisions of Article 107.25 of the Standard Specifications shall apply except the third paragraph shall be revised to read: "The Contractor shall maintain, furnish, and replace at his own expense, any traffic sign or post which has been damaged or lost by the Contractor or a third party.
- (2) Work Zone Speed Limit Signs. Work zone speed limit signs shall be installed as required in Article 701.14(b) and as shown in the plans and Highway Standards. Based upon the existing posted speed limit, work zone speed limits shall be established and signed as follows.
 - a. Existing Speed Limit of 55mph or higher. The initial work zone speed limit assembly, located approximately 4200' before the closure, and shall be 55mph as shown in 701400. Additional work zone 45mph assemblies shall be used as required according to Article 701.14(b) and as shown in the Highway Standards and plans. WORK ZONE SPEED LIMIT 55 PHOTO ENFORCED assemblies may be omitted when this assembly would normally be placed within 1500 feet of the END WORK ZONE SPEED LIMIT sign. If existing speed limit is over 65mph then additional signage should be installed per 701400.
 - b. Existing Speed Limit of 45mph. The advance 55mph work zone speed limit assembly shown in 701400 shall be replaced with a 45mph assembly. Additional work zone 45mph assemblies shall be used as required according to Article 701.14(b) and as shown in the Highway Standards and plans. WORK ZONE SPEED LIMIT 55 PHOTO ENFORCED assemblies shall be eliminated in all cases. END WORK ZONE SPEED LIMIT signs are required.
- (3) Exit Signs. The exit gore signs as shown in Standard 701411 shall be a minimum size of 48 inch by 48 inch with 12 inch capital letters and a 20 inch arrow. EXIT OPEN AHEAD signs shown in Standard 701411 shall be a minimum size of 48 inch by 48 inch with 8 inch capital letters.
- (4) Uneven Lanes Signs. The Contractor shall furnish and erect "UNEVEN LANES" signs (W8-11) on both sides of the expressway, at any time when the elevation difference between adjacent lanes open to traffic equals or exceeds one inch. Signs shall be placed 500' in advance of the drop-off, within 500' of every entrance, and a minimum of every mile.

- (c) Drums/Barricades. Check barricades shall be placed in work areas perpendicular to traffic every 1000', one per lane and per shoulder, to prevent motorists from using work areas as a traveled way. Check barricades shall also be placed in advance of each open patch, or excavation, or any other hazard in the work area, the first at the edge of the open traffic lane and the second centered in the closed lane. Check barricades, either Type I or II, or drums shall be equipped with a flashing light.

To provide sufficient lane widths (10' minimum) for traffic and also working room, the Contractor shall furnish and install vertical barricades with steady burn lights, in lieu of Type II or drums, along the cold milling and asphalt paving operations. The vertical barricades shall be placed at the same spacing as the drums.

- (d) Vertical Barricades. Vertical barricades shall not be used in lane closure tapers, lane shifts, exit ramp gores, or staged construction projects lasting more than 12 hours. Also, vertical barricades shall not be used as patch barricades or check barricades. Special attention shall be given, and ballast provided per manufacture's specification, to maintain the vertical barricades in an upright position and in proper alignment.
- (e) Temporary Concrete Barrier Wall. Prismatic barrier wall reflectors shall be installed on both the face of the wall next to traffic, and the top of sections of the temporary concrete barrier wall as shown in Standard 704001. The color of these reflectors shall match the color of the edgelines (yellow on the left and crystal or white on the right). If the base of the temporary concrete barrier wall is 12 inches or less from the travel lane, then the lower slope of the wall shall also have a 6 inch wide temporary pavement marking edgeline (yellow on the left and white on the right).
- (f) Full Expressway Closures. Full Expressway Closures will only be permitted for a maximum of 15 minutes during the allowable hours listed in the Keeping the Expressway Open to Traffic Special Provision. During Full Expressway Closures, the Contractor will be required to close off all lanes except one, using Freeway Standard Closures. The Contractor will be required to provide one changeable message sign to be placed at the direction of the Engineer. The sign shall display a message as directed by the Engineer. A Maintenance of Traffic Plan shall be submitted to the District One Expressway Traffic Control Supervisor 14 days in advance of the planned work; including all stage changes. The Maintenance of Traffic Plan shall include, but not be limited to: lane and ramp closures, existing geometrics, and equipment and material location. The District One Expressway Traffic Control Supervisor (847-705-4151) shall be contacted at least 3 working days in advance of the proposed road closure and will coordinate the closure operation with police forces.

Method of Measurement. This item of work will be measured on a lump sum basis for furnishing, installing, maintaining, replacing, relocating, and removing traffic control devices required in the plans and these Special Provisions. Traffic control and protection required under IDOT Standards 701101, 701400, 701401, 701402, 701406, 701411, 701416, 701426, 701428, 701446, 701901; District details TC-8, TC-9, TC-17, TC-18 and TC-25; and Tollway Standards D4, E1, E2, E3, and E6 will be included with this item.

Basis of Payment.

- (a) This work will be paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS). This price shall be payment in full for all labor, materials, transportation, handling, and incidental work necessary to furnish, install, maintain, replace, relocate, and remove all Expressway traffic control devices required in the plans and specifications.

In the event the sum total value of all the work items for which traffic control and protection is required is increased or decreased by more than ten percent (10%), the contract bid price for TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS) will be adjusted as follows:

$$\text{Adjusted contract price} = .25P + .75P [1 \pm (X - 0.1)]$$

Where: "P" is the bid unit price for Traffic Control and Protection

Where: "X" =	$\frac{\text{Difference between original and final sum total value of all work items for which traffic control and protection is required}}{\text{Original sum total value of all work items for which traffic control and protection is required.}}$
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The value of the work items used in calculating the increase and decrease will include only items that have been added to or deducted from the contract under Article 104.02 of the Standard Specifications and only items which require use of Traffic Control and Protection.

- (b) The Engineer may require additional traffic control be installed in accordance with standards and/or designs other than those included in the plans. In such cases, the standards and/or designs will be made available to the Contractor at least one week in advance of the change in traffic control. Payment for any additional traffic control required will be in accordance with Article 109.04 of the Standard Specifications.
- (c) Revisions in the phasing of construction or maintenance operations, requested by the Contractor, may require traffic control to be installed in accordance with standards and/or designs other than those included in the plans. Revisions or modifications to the traffic control shown in the contract shall be submitted by the Contractor for approval by the Engineer. No additional payment will be made for a Contractor requested modification.
- (d) Temporary concrete barrier wall will be measured and paid for according to Section 704.
- (e) Impact attenuators, temporary bridge rail, and temporary rumble strips will be paid for separately.

- (f) Temporary pavement markings shown on the Standard will be measured and paid for according to Section 703 and Section 780.
- (g) All pavement marking removal will be measured and paid for according to Section 703 or Section 783.
- (h) Temporary pavement marking on the lower slope of the temporary concrete barrier wall will be measured and paid for as TEMPORARY PAVEMENT MARKING, 6”.
- (i) All prismatic barrier wall reflectors will be measured and paid for according to the Recurring Special Provision Guardrail and Barrier Wall Delineation.
- (j) The Changeable Message Sign required for Full Expressway Closures shall not be paid for separately.

TRAFFIC CONTROL FOR WORK ZONE AREA (D-1)

Effective: September 14, 1995

Revised: January 1, 2007

Work zone entry and exit openings shall be established daily by the Contractor with the approval of the Engineer. All vehicles including cars and pickup trucks shall exit the work zone at the exit openings. All trucks shall enter the work zone at the entry openings. These openings shall be signed in accordance with the details shown elsewhere in the plans and shall be under flagger control during working hours.

The Contractor shall plan his trucking operations into and out of the work zone as well as on to and off the expressway to maintain adequate merging distance. Merging distances to cross all lanes of traffic shall be no less than 1/2 mile. This distance is the length from where the trucks enter the expressway to where the trucks enter the work zone. It is also the length from where the trucks exit the work zone to where the trucks exit the expressway. The stopping of expressway traffic to allow trucks to change lanes and/or cross the expressway is prohibited.

Failure to comply with the above requirements will result in a Traffic Control Deficiency charge. The deficiency charge will be calculated as outlined in Article 105.03 of the Standard Specifications. The Contractor will be assessed this daily charge for each day a deficiency is documented by the Engineer.

TRAFFIC CONTROL SURVEILLANCE (EXPRESSWAYS)

Effective: October 25, 1995

Revised: January 21, 2015

The contractor shall provide a person with a vehicle to survey, inspect and maintain all temporary traffic control devices when a lane is closed to traffic, when hazards are present adjacent to or within 10 foot of the edge of pavement for more than 24 hours, or as directed by the Engineer.

The surveillance person is required to drive through the project, to inspect all temporary traffic control devices, to correct all traffic control deficiencies, if possible, or immediately contact someone else to make corrections and to assist with directing traffic until such corrections are made, at intervals not to exceed 4 hours. This person shall list every inspection on an inspection form, furnished by the Engineer, and shall return a completed form on the first working day after the inspections are made.

The Contractor shall supply a telephone staffed on a 24-hour-a-day basis to receive any notification of any deficiencies regarding traffic control and protection or receive any request for improving, correcting or modifying traffic control, installations or devices, including pavement markings. The Contractor shall dispatch additional men, materials and equipment as necessary to begin to correct, improve or modify the traffic control as directed, within one hour of notification by this surveillance person or by the Department. Upon completion of such corrections and/or revisions, the Contractor shall notify the Department's Communication Center at (847) 705-4612.

Method of Measurement.

Traffic Control Surveillance will be measured on calendar day basis. One calendar day is equal to a minimum of six (6) inspections. The inspections shall start within 4 hours after the lane is closed to traffic, a hazard exists within 10 foot from the edge of pavement, or as directed by the Engineer and shall end when the lane closure or hazard is removed or as directed by the Engineer.

Basis of Payment.

Surveillance will be paid for at the contract unit price per calendar day or fraction thereof for TRAFFIC CONTROL SURVEILLANCE (EXPRESSWAYS). The price shall include all labor and equipment necessary to provide the required inspection and maintenance on the expressway and on all cross streets which are included in the project. The cost of the materials for the maintenance of traffic control devices shall be included in the traffic control pay items.

TEMPORARY INFORMATION SIGNING (D-1)

Effective: November 13, 1996

Revised: January 2, 2007

Description.

This work shall consist of furnishing, installing, maintaining, relocating for various states of construction and eventually removing temporary informational signs. Included in this item may be ground mount signs, skid mount signs, truss mount signs, bridge mount signs, and overlay sign panels which cover portions of existing signs.

Materials.

Materials shall be according to the following Articles of Section 1000 - Materials:

	<u>Item</u>	<u>Article/Section</u>
a.)	Sign Base (Notes 1 & 2)	1090
b.)	Sign Face (Note 3)	1091
c.)	Sign Legends	1092
d.)	Sign Supports	1093
e.)	Overlay Panels (Note 4)	1090.02

Note 1. The Contractor may use 5/8 inch (16 mm) instead of 3/4 inch (19 mm) thick plywood.

Note 2. Type A sheeting can be used on the plywood base.

Note 3. All sign faces shall be Type A except all orange signs shall meet the requirements of Article 1106.01.

Note 4. The overlay panels shall be 0.08 inch (2 mm) thick.

GENERAL CONSTRUCTION REQUIREMENTS

Installation.

The sign sizes and legend sizes shall be verified by the Contractor prior to fabrication.

Signs which are placed along the roadway and/or within the construction zone shall be installed according to the requirements of Article 701.14 and Article 720.04. The signs shall be 7 ft (2.1 m) above the near edge of the pavement and shall be a minimum of 2 ft (600 mm) beyond the edge of the paved shoulder. A minimum of two (2) posts shall be used.

The attachment of temporary signs to existing sign structures or sign panels shall be approved by the Engineer. Any damage to the existing signs due to the Contractor's operations shall be repaired or signs replaced, as determined by the Engineer, at the Contractor's expense.

Signs which are placed on overhead bridge structures shall be fastened to the handrail with stainless steel bands. These signs shall rest on the concrete parapet where possible. The Contractor shall furnish mounting details for approval by the Engineer.

Method of Measurement.

This work shall be measured for payment in square feet (square meters) edge to edge (horizontally and vertically).

All hardware, posts or skids, supports, bases for ground mounted signs, connections, which are required for mounting these signs will be included as part of this pay item.

Basis Of Payment.

This work shall be paid for at the contract unit price per square foot (square meter) for TEMPORARY INFORMATION SIGNING.

WET REFLECTIVE TEMPORARY TAPE TYPE III (D-1)

Effective: February 1, 2007

Revised: February 1, 2011

Description. This work shall consist of furnishing, installing, and maintaining Type III Temporary Pavement Marking Tape for Wet Conditions.

Materials. Materials shall be according to the following.

Item	Article/Section
(a) Pavement Marking Tape	1095.06

Initial minimum reflectance values under dry and wet conditions shall be as specified in Article 1095.06. The marking tape shall maintain its reflective properties when submerged in water. The wet reflective properties will be verified by a visual inspection method performed by the Department. The surface of the material shall provide an average skid resistance of 45 BPN when tested according to ASTM E 303.

CONSTRUCTION REQUIREMENTS

Type III Temporary Tape for Wet Conditions shall meet the requirements of Article 703.03 and 703.05. Application shall follow manufacturer's recommendations.

Method of Measurement. This work will be measured for payment in place, in feet (meters).

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for WET REFLECTIVE TEMPORARY TAPE TYPE III of the line width specified, and at the contract unit price per square foot (square meter) for WET REFLECTIVE TEMPORARY TAPE TYPE III, LETTERS AND SYMBOLS.

SPEED DISPLAY TRAILER (D1)

Effective: April 1, 2015

Add the following to Article 701.15(l) of the Standard Specifications:

- “(l) Speed Display Trailer. A speed display trailer shall be utilized on freeways and expressways as part of Highway Standard 701400. The trailer shall be placed on the right hand side of the roadway adjacent to, or within 100 ft. (30 m) beyond, the first work zone speed limit sign.

Whenever the speed display trailer is not in use, it shall be considered non-operating equipment and shall be stored according to Article 701.11.”

Add the following to Article 701.20 of the Standard Specifications:

- “(k) Revised. “Speed Display Trailer will NOT be paid for by separate pay item, but it costs shall be included in the contract unit price of the various traffic control pay items.

Add the following to Article 1106.02 of the Standard Specifications:

- “(o) Speed Display Trailer. The speed display trailer shall consist of a LED speed indicator display with self-contained, one-direction radar mounted on an orange see-through trailer. The height of the display and radar shall be such that it will function and be visible when located behind concrete barrier.

The speed measurement shall be by radar and provide a minimum detection distance of 1000 ft (300 m). The radar shall have an accuracy of ± 1 mile per hour.

The speed indicator display shall face approaching traffic and shall have a sign legend of “YOUR SPEED” immediately above or below the speed display. The digital speed display shall show two digits (00 to 99) in mph. The color of the changeable message legend shall be a yellow legend on a black background. The minimum height of the numerals shall be 18 in. (450 mm), and the nominal legibility distance shall be at least 750 ft (250 m).

The speed indicator display shall be equipped with a violation alert that flashes the displayed detected speed when the posted limit is exceeded. The speed indicator shall have a maximum speed cutoff. The display shall include automatic dimming for nighttime operation.

The speed indicator measurement and display functions shall be equipped with the power supply capable of providing 24 hours of uninterrupted service.”

CLEANING OF TRAFFIC CONTROL DEVICES

All traffic control devices shall be kept clean as stated in Article 701 of the Standard Specifications. In addition, the contractor shall make sure the traffic control devices are cleaned after snowfalls or snow plowing if needed or as directed by the Engineer. This work will not be measured for payment or paid for separately and shall be included in the other contract pay items for TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS).

TRACK MONITORING

Description.

This work shall consist of providing pre-construction and post-construction track surveys and daily monitoring of the CTA tracks for vertical and horizontal movements during operations associated with the construction of the proposed west abutment, Retaining Wall 1 (NW78.60R,EB(R)), Retaining Wall 2 (NW78.70R,EB(R)), and proposed Pier 1. These operations include, but not limited to:

1. Excavation of soils for substructure construction during the entire duration that these excavations are open, up to and including backfilling for the west abutment, Retaining Walls 1 and 2, and Pier 1
2. Driving test piles for west abutment, Retaining Walls 1 and 2, and Pier 1
3. Driving piles for west abutment, Retaining Walls 1 and 2, and Pier 1
4. Place new west abutment footing
5. Place new Retaining Wall 1 and 2 footings
6. Place new Pier 1 footing

A pre-construction track survey and inspection shall be performed prior to any construction operations taking place which shall consist of the Contractor establishing a horizontal baseline and track elevations with shots taken on top of the railroad tie at the edge closest to the operation and at the centerline of the tracks closest to the operation with measurements at approximately 10' centers within the construction zone and 50' beyond the identified construction limits for a period of fourteen (14) consecutive calendar days prior to the start of the operation. The survey shall be coordinated with CTA (Abdin Carrillo, Project Manager, Construction Oversight (312) 681-3913) at least twenty-one (21) calendar days prior to any activity that precedes construction. If multiple operations are on-going concurrently, the baseline elevations shall be based off the operation that was initially started and with the furthest construction limit.

Daily monitoring shall consist of the Contractor surveying the same points taken during the pre-construction track survey, taking horizontal and vertical measurements. Daily monitoring shall only occur when the Contractor is working.

Track conditions shall be documented and tabulated for weekly submittal to Abdin Carrillo, Project Manager, Construction Oversight (312) 681-3913 for review. Any measurements exceeding $\frac{1}{4}$ " of the pre-construction track survey, the Contractor must discontinue construction operations immediately and notify IDOT and CTA to evaluate the track condition. Contractor shall perform any restorative work at his/her expense prior to resuming construction operations. If track repairs are required, the Contractor shall use a qualified contractor experienced in CTA track work, and approved by CTA, to perform corrective track repair to the satisfaction of CTA.

The Contractor shall complete a post-construction track survey and inspection after completion of the operation. The post-construction track survey shall consist of the Contractor surveying the same points taken during the pre-construction track survey, taking horizontal and vertical measurements, for a period of fourteen (14) consecutive calendar days and as accepted by the Resident Engineer. If multiple operations are on-going concurrently, the post-construction track survey shall be performed based off the operation that is completed last and with the furthest construction limit.

All pre-construction and post-construction track survey work shall be incidental and included in the cost of the daily track monitoring.

Basis of Payment.

This work will be paid for at the contract unit price per CALENDAR DAY for TRACK MONITORING.

TEMPORARY PAVEMENT (D-1)

Effective: March 1, 2003

Revised: April 10, 2008

Description. This work shall consist of constructing a temporary pavement at the locations shown on the plans or as directed by the engineer.

The contractor shall use either Portland cement concrete according to Sections 353 and 354 of the Standard Specifications or HMA according to Sections 355, 356, 406 of the Standard Specifications, and other applicable HMA special provisions as contained herein. The HMA mixtures to be used shall be specified in the plans. The thickness of the Temporary Pavement shall be as described in the plans. The contractor shall have the option of constructing either material type if both Portland cement concrete and HMA are shown in the plans.

Articles 355.08 and 406.11 of the Standard Specifications shall not apply.

The removal of the Temporary Pavement, if required, shall conform to Section 440 of the Standard Specification.

Method of Measurement. Temporary pavement will be measured in place and the area computed in square yards (square meters).

Basis of Payment. This work will be paid for at the contract unit price per square yard (square meter) for TEMPORARY PAVEMENT and TEMPORARY PAVEMENT (INTERSTATE).

Removal of temporary pavement will be paid for at the contract unit price per square yard (square meter) for PAVEMENT REMOVAL.

AGGREGATE FOR CONCRETE BARRIER (D-1)

Effective: February 11, 2004

Revised: January 24, 2008

Add the following paragraph to Article 637.02 of the Standard Specifications:

“The coarse aggregate to be used in the concrete barrier walls shall conform to the requirement for coarse aggregate used in Class BS concrete according to Article 1004.01(b), paragraph 2.”

ADJUSTMENTS AND RECONSTRUCTIONS (D-1)

Effective: March 15, 2011

Revise the first paragraph of Article 602.04 to read:

“602.04 Concrete. Cast-in-place concrete for structures shall be constructed of Class SI concrete according to the applicable portions of Section 503. Cast-in-place concrete for pavement patching around adjustments and reconstructions shall be constructed of Class PP-1 concrete, unless otherwise noted in the plans, according to the applicable portions of Section 1020.”

Revise the third, fourth and fifth sentences of the second paragraph of Article 602.11(c) to read:

“Castings shall be set to the finished pavement elevation so that no subsequent adjustment will be necessary, and the space around the casting shall be filled with Class PP-1 concrete, unless otherwise noted in the plans, to the elevation of the surface of the base course or binder course. HMA surface or binder course material shall not be allowed. The pavement may be opened to traffic according to Article 701.17(e)(3)b.”

Revise Article 603.05 to read:

“603.05 Replacement of Existing Flexible Pavement. After the castings have been adjusted, the surrounding space shall be filled with Class PP-1 concrete, unless otherwise noted in the plans, to the elevation of the surface of the base course or binder course. HMA surface or binder course material shall not be allowed. The pavement may be opened to traffic according to Article 701.17(e)(3)b.”

Revise Article 603.06 to read:

“603.06 Replacement of Existing Rigid Pavement. After the castings have been adjusted, the pavement and HMA that was removed, shall be replaced with Class PP-1 concrete, unless otherwise noted in the plans, not less than 9 in. (225 mm) thick. The pavement may be opened to traffic according to Article 701.17(e)(3)b.

The surface of the Class PP concrete shall be constructed flush with the adjacent surface.”

Revise the first sentence of Article 603.07 to read:

“603.07 Protection Under Traffic. After the casting has been adjusted and the Class PP concrete has been placed, the work shall be protected by a barricade and two lights according to Article 701.17(e)(3)b.”

AGGREGATE SUBGRADE IMPROVEMENT (D-1)

Effective: February 22, 2012

Revised: April 1, 2016

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	1004.07
(b) Reclaimed Asphalt Pavement (RAP) (Notes 1, 2 and 3)	1031

Note 1. Crushed RAP, from either full depth or single lift removal, may be mechanically blended with aggregate gradation CS 01 but shall not exceed 40 percent by weight of the total product. The top size of the Coarse RAP shall be less than 4 in. (100 mm) and well graded.

Note 2. 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 gradation CS 01 is used in lower lifts. When RAP is blended with any of the coarse aggregates, the blending shall be done with mechanically calibrated feeders. The final product shall not contain more than 40 percent by weight of RAP.

Note 3. The RAP used for aggregate subgrade improvement shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, “Reclaimed Asphalt Pavement (RAP) for Aggregate Applications”.

303.03 Equipment. The vibratory machine shall be according to Article 1101.01, or as approved by the Engineer. The calibration for the mechanical feeders shall have an accuracy of ± 2.0 percent of the actual quantity of material delivered.

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 gradation CS 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 Reclaimed Asphalt Pavement (RAP) is used, it shall be crushed and screened where 100 percent is passing the 1 1/2 in. (37.5 mm) sieve and being well graded. RAP that has been fractionated to size will not be permitted for use in capping. Capping aggregate will not be required when the aggregate subgrade improvement is used as a cubic yard pay item for undercut applications. When RAP is blended with any of the coarse aggregates, the blending shall be done with mechanically calibrated feeders.

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) 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:

“1004.07 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. The top 12 inches of the aggregate subgrade improvement shall be 3 inches of capping material and 9 inches of crushed gravel, crushed stone or crushed concrete. In applications where greater than 36 inches of subgrade material is required, rounded gravel, meeting the CS01 gradation, may be used beginning at a depth of 12 inches below the bottom of pavement.
- (b) Quality. The coarse aggregate shall consist of sound durable particles reasonably free of deleterious materials. Non-mechanically blended RAP may be allowed up to a maximum of 5.0 percent.

(c) Gradation.

- (1) The coarse aggregate gradation for total subgrade thicknesses of 12 in. (300 mm) or greater shall be CS 01.

Grad No.	COARSE AGGREGATE SUBGRADE GRADATIONS				
	Sieve Size and Percent Passing				
	8"	6"	4"	2"	#4
CS 01	100	97 ± 3	90 ± 10	45 ± 25	20 ± 20

Grad No.	COARSE AGGREGATE SUBGRADE GRADATIONS (Metric)				
	Sieve Size and Percent Passing				
	200 mm	150 mm	100 mm	50 mm	4.75 mm
CS 01	100	97 ± 3	90 ± 10	45 ± 25	20 ± 20

- (2) The 3 in. (75 mm) capping aggregate shall be gradation CA 6 or CA 10.

COARSE AGGREGATE FOR BACKFILL, TRENCH BACKFILL AND BEDDING (D-1)

Effective: November 1, 2011

Revised: November 1, 2013

This work shall be according to Section 1004.05 of the Standard Specifications except for the following:

Reclaimed Asphalt Pavement (RAP) maybe blended with gravel, crushed gravel, crushed stone crushed concrete, crushed slag, chats, crushed sand stone or wet bottom boiler slag. The RAP used shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Pavement (RAP) for Aggregate Applications". The RAP shall be uniformly graded and shall pass the 1.0 in. (25 mm) screen. When RAP is blended with any of the coarse aggregate listed above, the blending shall be done mechanically with calibrated feeders. The feeders shall have an accuracy of ± 2.0 percent of the actual quantity of material delivered. The final blended product shall not contain more than 40 percent by weight RAP.

The coarse aggregate listed above shall meet CA 6 and CA 10 gradations prior to being blended with the processed and uniformly graded RAP. Gradation deleterious count shall not exceed 10% of total RAP and 5% of other by total weight.

FRICITION AGGREGATE (D-1)

Effective: January 1, 2011

Revised: April 29, 2016

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.

Use	Mixture	Aggregates Allowed
Class A	Seal or Cover	<u>Allowed Alone or in Combination</u> ^{5/} : Gravel Crushed Gravel Carbonate Crushed Stone Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag Crushed Concrete
HMA Low ESAL	Stabilized Subbase Shoulders or	<u>Allowed Alone or in Combination</u> ^{5/} : Gravel Crushed Gravel Carbonate Crushed Stone Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag ^{1/} Crushed Concrete
HMA High ESAL Low ESAL	Binder IL-19.0 or IL-19.0L SMA Binder	<u>Allowed Alone or in Combination</u> ^{5/ 6/} : Crushed Gravel Carbonate Crushed Stone ^{2/} Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Concrete ^{3/}

HMA High ESAL Low ESAL	C Surface and Leveling Binder IL-9.5 or IL-9.5L SMA Ndesign 50 Surface	<u>Allowed Alone or in Combination</u> ^{5/} : Crushed Gravel Carbonate Crushed Stone ^{2/} Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag ^{4/} Crushed Concrete ^{3/}								
HMA High ESAL	D Surface and Leveling Binder IL-9.5 SMA Ndesign 50 Surface	<u>Allowed Alone or in Combination</u> ^{5/} : Crushed Gravel Carbonate Crushed Stone (other than Limestone) ^{2/} Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag ^{4/} Crushed Concrete ^{3/} <u>Other Combinations Allowed:</u> <table border="1"> <thead> <tr> <th><i>Up to...</i></th> <th><i>With...</i></th> </tr> </thead> <tbody> <tr> <td>25% Limestone</td> <td>Dolomite</td> </tr> <tr> <td>50% Limestone</td> <td>Any Mixture D aggregate other than Dolomite</td> </tr> <tr> <td>75% Limestone</td> <td>Crushed Slag (ACBF) or Crushed Sandstone</td> </tr> </tbody> </table>	<i>Up to...</i>	<i>With...</i>	25% Limestone	Dolomite	50% Limestone	Any Mixture D aggregate other than Dolomite	75% Limestone	Crushed Slag (ACBF) or Crushed Sandstone
<i>Up to...</i>	<i>With...</i>									
25% Limestone	Dolomite									
50% Limestone	Any Mixture D aggregate other than Dolomite									
75% Limestone	Crushed Slag (ACBF) or Crushed Sandstone									
HMA High ESAL	E Surface IL-9.5 SMA Ndesign 80 Surface	<u>Allowed Alone or in Combination</u> ^{5/ 6/} : Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag No Limestone. <u>Other Combinations Allowed:</u> <table border="1"> <thead> <tr> <th><i>Up to...</i></th> <th><i>With...</i></th> </tr> </thead> <tbody> <tr> <td>50% Dolomite^{2/}</td> <td>Any Mixture E aggregate</td> </tr> </tbody> </table>	<i>Up to...</i>	<i>With...</i>	50% Dolomite ^{2/}	Any Mixture E aggregate				
<i>Up to...</i>	<i>With...</i>									
50% Dolomite ^{2/}	Any Mixture E aggregate									

		75% Dolomite ^{2/}	Crushed Sandstone, Crushed Slag (ACBF), Crushed Steel Slag, or Crystalline Crushed Stone
		75% Crushed Gravel ^{2/} or Crushed Concrete ^{3/}	Crushed Sandstone, Crystalline Crushed Stone, Crushed Slag (ACBF), or Crushed Steel Slag
HMA High ESAL	F Surface IL-9.5 SMA Ndesign 80 Surface	<u>Allowed Alone or in Combination</u> ^{5/ 6/} :	
		Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag No Limestone.	
		<u>Other Combinations Allowed:</u>	
		<i>Up to...</i>	<i>With...</i>
		50% Crushed Gravel ^{2/} , Crushed Concrete ^{3/} , or Dolomite ^{2/}	Crushed Sandstone, Crushed Slag (ACBF), Crushed Steel Slag, or Crystalline Crushed Stone

- 1/ Crushed steel slag allowed in shoulder surface only.
- 2/ Carbonate crushed stone (limestone) and/or crushed gravel 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 combinations of aggregates are used, the blend percent measurements shall be by volume.”
- 6/ Combining different types of aggregate will not be permitted in SMA Ndesign 80.”

EMBANKMENT I (D-1)

Effective: March 1, 2011

Revised: November 1, 2013

Description. This work shall be according to Section 205 of the Standard Specifications except for the following.

Material. All material shall be approved by the District Geotechnical Engineer. The proposed material must meet the following requirements.

- a) The laboratory Standard Dry Density shall be a minimum of 90 lb/cu ft (1450 kg/cu m) when determined according to AASHTO T 99 (Method C).
- b) The organic content shall be less than ten percent determined according to AASHTO T 194 (Wet Combustion).
- c) Soils which demonstrate the following properties shall be restricted to the interior of the embankment and shall be covered on both the sides and top of the embankment by a minimum of 3 ft (900 mm) of soil not considered detrimental in terms of erosion potential or excess volume change.
 - 1) A grain size distribution with less than 35 percent passing the number 75 um (#200) sieve.
 - 2) A plasticity index (PI) of less than 12.
 - 3) A liquid limit (LL) in excess of 50.
- d) Reclaimed asphalt shall not be used within the ground water table or as a fill if ground water is present.
- e) The RAP used shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Pavement (RAP) for Aggregate Applications". Gradation deleterious count shall not exceed 10% of total RAP and 5% of other by total weight.

CONSTRUCTION REQUIREMENTS

Samples. Embankment material shall be sampled, tested, and approved before use. The contractor shall identify embankment sources, and provide equipment as the Engineer requires, for the collection of samples from those sources. Samples will be furnished to the Geotechnical Engineer a minimum of three weeks prior to use in order that laboratory tests for approval and compaction can be performed. Embankment material placement cannot begin until tests are completed and approval given.

Placing Material. In addition to Article 202.03, broken concrete, reclaimed asphalt with no expansive aggregate, or uncontaminated dirt and sand generated from construction or demolition activities shall be placed in 6 inches (150 mm) lifts and disked with the underlying lift until a uniform homogenous material is formed. This process also applies to the overlaying lifts. The disk must have a minimum blade diameter of 24 inches (600 mm).

When embankments are to be constructed on hillsides or existing slopes that are steeper than 3H:1V, steps shall be keyed into the existing slope by stepping and benching as shown in the plans or as directed by the engineer.

Compaction. Soils classification for moisture content control will be determined by the Soils Inspector using visual field examination techniques and the IDH Textural Classification Chart.

When tested for density in place each lift shall have a maximum moisture content as follows.

- a) A maximum of 110 percent of the optimum moisture for all forms of clay soils.
- b) A maximum of 105 percent of the optimum moisture for all forms of clay loam soils.

Stability. The requirement for embankment stability in Article 205.04 will be measured with a Dynamic Cone Penetrometer (DCP) according to the test method in the IDOT Geotechnical Manual. The penetration rate must be equal or less than 1.5 inches (38 mm) per blow.

Basis of Payment. This work will not be paid separately but will be considered as included in the various items of excavation.

ENGINEER'S FIELD OFFICE TYPE A (SPECIAL) (D-1)

Effective: December 1, 2011

Revised: May 1, 2013

Revise the first paragraph of Article 670.02 to read:

670.02 Engineer's Field Office Type A (Special). Type A (Special) field offices shall have a ceiling height of not less than 7 feet and a floor space of not less than 3000 square feet with a minimum of two separate offices. The office shall also have a separate storage room capable of being locked for the storage of the nuclear measuring devices. The office shall be provided with sufficient heat, natural and artificial light, and air conditioning. Doors and windows shall be equipped with locks approved by the Engineer.

Revise the first sentence of the second paragraph of Article 670.02 to read:

An electronic security system that will respond to any breach of exterior doors and windows with an on-site alarm shall be provided.

Revise the last sentence of the third paragraph of Article 670.02 to read:

Adequate all-weather parking space shall be available to accommodate a minimum of twelve vehicles.

Revise the fifth paragraph of Article 670.02 to read:

Sanitary facilities shall include hot and cold potable running water, lavatory and toilet as an integral part of the office where available. Solid waste disposal consisting of seven waste baskets and an outside trash container of sufficient size to accommodate a weekly provided pick-up service. A weekly cleaning service for the office shall be provided.

Revise subparagraph (a) of Article 670.02 to read:

(a) Twelve desks with minimum working surface 42 inch x 30 inch each and twelve non-folding chairs with upholstered seats and backs.

Revise the first sentence of subparagraph (c) of Article 670.02 to read:

(c) Two four-post drafting tables with minimum top size of 37-½ inch x 48 inch.

Revise subparagraph (d) of Article 670.02 to read:

(d) Eight free standing four-drawer legal size file cabinets with lock and an underwriters' laboratories insulated file device 350 degrees one hour rating.

Revise subparagraph (e) of Article 670.02 to read:

(e) Twenty folding chairs and two conference tables with minimum top size of 44 inch x 96 inch.

Revise subparagraph (h) of Article 670.02 to read:

(h) Three electric desk type tape printing calculator and two pocket scientific notation calculators with a 1000 hour battery life or with a portable recharger.

Revise subparagraph (i)(2) of Article 670.02 to read:

(i)(2) Telephones lines. Five separate telephone lines including one line for the fax machine, and two lines for the exclusive use of the Engineer. All telephone lines shall include long distance service and all labor and materials necessary to install the phone lines at the locations directed by the Engineer. The TELCOM company shall configure ROLL/HUNT features as specified by the engineer.

Revise subparagraph (j) of Article 670.02 to read:

- (j) Two plain paper network multi-function printer/copier/scanner machines capable of reproducing prints up to 11 inch x 17 inch within automatic feed tray capable of sorting 30 sheets of paper. Letter size and 11 inch x 17 inch paper shall be provided. The contractor shall provide the multi-function machines with IT support for setup and maintenance.

Revise subparagraph (k) of Article 670.02 to read:

- (k) One plain paper fax machine including maintenance and supplies.

Revise subparagraph (l) of Article 670.02 to read:

- (l) Six four-line telephones, with touch tone, where available, and two digital answering machines, for exclusive use by the Engineer.

Revise subparagraph (m) of Article 670.02 to read:

- (m) One electric water cooler dispenser including water service.

Add the following subparagraphs to Article 670.02:

- (s) One 4 foot x 6 foot chalkboard or dry erase board.
- (t) One 4 foot x 6 foot framed cork board.

Add the following to Article 670.07 Basis of Payment.

The building or buildings, fully equipped, will be paid for at the contract unit price per calendar month or fraction thereof for ENGINEER'S FIELD OFFICE, TYPE A (SPECIAL).

HOT MIX ASPHALT QUALITY CONTROL FOR PERFORMANCE (BMPR)

Effective: January 1, 2012

Revised: January 16, 2015

Description. This special provision describes the procedures for production, placement and payment of hot-mix asphalt (HMA). This special provision shall apply to all pay items as specified in plans. This work shall be according to the Standard Specifications except as modified herein.

Exceptions may be approved for small tonnage less than 800 (725 metric) tons and miscellaneous mixture applications as defined by the Engineer.

Delete Articles:	406.06(b)(1), 2 nd Paragraph	(Temperature requirements)
	406.06 (e), 3 rd Paragraph	(Pavers speed requirements)
	406.07(b)	(Rolling)
	406.07(c)	(Density)
	1030.05(a)(4, 5, 9)	(QC/QA Documents)
	1030.05(d)(2)a.	(Plant Tests)
	1030.05(d)(2)b.	(Dust-to-Asphalt and Moisture Content)
	1030.05(d)(2)d.	(Small Tonnage)
	1030.05(d)(2)f.	(HMA Sampling)
	1030.05(d)(3)	(Required Field Tests)
	1030.05(d)(4)	(Control Limits)
	1030.05(d)(5)	(Control Charts)
	1030.05(d)(7)	(Corrective Action for Field Tests (Density))
	1030.05(e)	(Quality Assurance by the Engineer)
	1030.05(f)	(Acceptance by the Engineer)
	1030.06(a), 3 rd paragraph	(Before start-up...)
	1030.06(a), 7 th paragraph	(After an acceptable...)
	1030.06(a), 8 th paragraph	(If a mixture...)
	1030.06(a), 9 th paragraph	(A nuclear/core...)

Definitions:

- (a) Quality Control (QC): All production and construction activities by the Contractor required to achieve the required level of quality.
- (b) Quality Assurance (QA): All monitoring and testing activities by the Engineer required to assess product quality, level of payment, and acceptability of the product.
- (c) Pay Parameters: Pay Parameters shall be field Voids in the Mineral Aggregate (VMA), voids, and density. Field VMA will be calculated using the combined aggregates bulk specific gravity (G_{sb}) from the mix design.

- (d) Mixture Lot. A lot shall begin once an acceptable test strip has been completed and the AJMF has been determined. If the test strip is waived, a subplot shall begin with the start of production. A mixture lot shall consist of four sublots unless it is the last or only lot, in which case it may consist of as few as one subplot.
- (e) Mixture Sublot. A mixture subplot for field VMA, voids, and Dust/AC will be a maximum of 1000 tons (910 metric tons).
- If the remaining quantity is greater than 200 but less than 1000 tons, a subplot will consist of that amount.
 - If the remaining quantity is less than or equal to 200 tons, the quantity shall be combined with the previous subplot.
- (f) Density Interval. Density Intervals shall be every 0.2 mile (320 m) for lift thickness equal to or less than 3 in. (75 mm) and 0.1 mile (160 m) for lift thickness greater than 3 in. (75 mm).
- (g) Density Sublot. A subplot for density shall be the average of five consecutive Density Intervals. If a Density Interval is less than 200 ft (60 m), it will be combined with the previous Density Intervals.
- If one or two Density Intervals remain outside a subplot, they shall be included in the previous subplot.
 - If three or more Density Intervals remain, they shall be considered a subplot.
- (h) Density Test: A density test consists of a core taken at a random longitudinal and random transverse offset within each Density Interval. The HMA maximum theoretical gravity (G_{mm}) will be based on the running average of four Department test results. Initial G_{mm} will be based on the average of the first four test results. If less than four G_{mm} results are available, use an average of all available Department G_{mm} test results.

The random transverse offset excludes a distance from each outer edge equal to the lift thickness or a minimum of 4 in. (100 mm). If a core is located within one foot of an unconfined edge, 2.0 percent density will be added to the density of that core.

Quality Control (QC) by the Contractor:

The Contractor’s QC plan shall include the schedule of testing for both pay parameters and non-pay parameters required to control the product such as asphalt binder content and mixture gradation. The minimum test frequency shall be according to the following table.

Minimum Quality Control Sampling and Testing Requirements

Quality Characteristic		Minimum Test Frequency
Mixture Gradation		1 per subplot
Asphalt Binder Content		
Dust/AC Ratio		
Field VMA		
Voids	G_{mb}	
	G_{mm}	

The Contractor’s splits in conjunction with other quality control tests shall be used to control production.

The Contractor shall submit split jobsite mix sample test results to the Engineer within 48 hours of the time of sampling. All QC testing shall be performed in a qualified laboratory by personnel who have successfully completed the Department’s HMA Level I training.

Quality Assurance (QA) by the Engineer:

Voids, field VMA and Dust/AC ratio: The Engineer will determine the random tonnage and the Contractor shall be responsible for obtaining the sample according to the “PFP Hot-Mix Asphalt Random Jobsite Sampling” procedure.

Density: The Engineer will identify the random locations for each density testing interval. The Contractor shall be responsible for obtaining the four inch cores within the same day and prior to opening to traffic unless otherwise approved by the Engineer according to the “PFP and QCP Random Density Procedure”. The locations will be identified after final rolling and cores shall be obtained under the supervision of the Engineer. All core holes shall be filled immediately upon completion of coring. All water shall be removed from the core holes prior to filling. All core holes shall be filled with a rapid hardening mortar or concrete which shall be mixed in a separate container prior to placement in the hole. Any depressions in the surface of the filled core holes greater than 1/4 inch at the time of final inspection will require removal of the fill material to the depth of the lift thickness and replacement.

The Engineer will witness and secure all mixture and density samples. The Contractor shall transport the secured sample to a location designated by the Engineer.

The Engineer will test one or all of the randomly selected split samples from each lot for voids, field VMA and dust/AC ratio. The Engineer will test a minimum of one sample per project. The Engineer will test all of the pavement cores for density. All QA testing will be performed in a qualified laboratory by personnel who have successfully completed the Department's HMA Level I training. QA test results will be available to the Contractor within 10 working days from receipt of secured cores and split mixture samples.

The Engineer will maintain a complete record of all Department test results and copies will be provided to the Contractor with each set of subplot results. The records will contain, as a minimum, the originals of all Department test results and raw data, random numbers used and resulting calculations for sampling locations, and quality level analysis calculations.

If the QA results do not meet the 100 % subplot pay factor limits or do not compare to QC results within the precision limits listed below, the Engineer will test all split mix samples for the lot.

Test Parameter	Limits of Precision
G _{mb}	0.030
G _{mm}	0.026
Field VMA	1.0 %

Acceptance by the Engineer: All of the Department's tests shall be within the acceptable limits listed below:

Parameter		Acceptable Limits
Field VMA		-1.0 – +3.0% ^{1/}
Voids		2.0 – 6.0%
Density:	IL-9.5, IL-19.0, IL-4.75, IL-9.5FG ^{3/}	90.0 – 98.0%
	SMA	92.0 – 98.0%
Dust / AC Ratio		0.4 – 1.6 ^{2/}

1/ Based on minimum required VMA from mix design

2/ Does not apply to SMA.

3/ Acceptable density limits for IL-9.5FG placed less than 1.25 in. shall be 89.0% - 98.0%

In addition, no visible pavement distresses shall be present such as, but not limited to, segregation, excessive coarse aggregate fracturing or flushing.

Basis of Payment: Payment will be based on the calculation of the Composite Pay Factor using QA results for each mix according to the “QCP Payment Calculation” document.

Dust / AC Ratio. A monetary deduction will be made using the pay adjustment table below for dust/AC ratios that deviate from the 0.6 to 1.2 range. If the tested subplot is outside of this range, the Department will test the remaining sublots for Dust / AC pay adjustment.

Dust / AC Pay Adjustment Table^{1/}

Range	Deduct / subplot
$0.6 \leq X \leq 1.2$	\$0
$0.5 \leq X < 0.6$ or $1.2 < X \leq 1.4$	\$1000
$0.4 \leq X < 0.5$ or $1.4 < X \leq 1.6$	\$3000
$X < 0.4$ or $X > 1.6$	Shall be removed and replaced

1/ Does not apply to SMA.

HMA MIXTURE DESIGN REQUIREMENTS (D-1)

Effective: January 1, 2013

Revised: April 1, 2016

1) Design Composition and Volumetric Requirements

Revise the table in Article 406.06(d) of the Standard Specifications to read:

"MINIMUM COMPACTED LIFT THICKNESS	
Mixture Composition	Thickness, in. (mm)
IL-4.75	3/4 (19)
SMA-9.5, IL-9.5, IL-9.5L	1 1/2 (38)
SMA-12.5	2 (50)
IL-19.0, IL-19.0L	2 1/4 (57)"

Revise the table in Article 1004.03(c) of the Standard Specifications to read:

"Use	Size/Application	Gradation No.
Class A-1, 2, & 3	3/8 in. (10 mm) Seal	CA 16
Class A-1	1/2 in. (13 mm) Seal	CA 15
Class A-2 & 3	Cover	CA 14
HMA High ESAL	IL-19.0 IL-9.5	CA 11 ^{1/} CA 16, CA 13 ^{3/}
HMA Low ESAL	IL-19.0L IL-9.5L Stabilized Subbase or Shoulders	CA 11 ^{1/} CA 16
SMA ^{2/}	1/2 in. (12.5mm) Binder & Surface IL 9.5 Surface	CA13 ^{3/} , CA14 or CA16 CA16, CA 13 ^{3/}

1/ CA 16 or CA 13 may be blended with the gradations listed.

2/ The coarse aggregates used shall be capable of being combined with stone sand, slag sand, or steel slag sand meeting the FA/FM 20 gradation and mineral filler to meet the approved mix design and the mix requirements noted herein.

3/ CA 13 shall be 100 percent passing the 1/2 in. (12.5mm) sieve.

Revise Article 1004.03(e) of the Supplemental Specifications to read:

"(e) Absorption. For SMA the coarse aggregate shall also have water absorption ≤ 2.0 percent."

Revise the last paragraph of Article 1102.01 (a) (5) of the Standard Specifications to read:

“IL-4.75 and Stone Matrix Asphalt (SMA) mixtures which contain aggregate having absorptions greater than or equal to 2.0 percent, or which contain steel slag sand, shall have minimum surge bin storage plus haul time of 1.5 hours.”

Revise the nomenclature table in Article 1030.01 of the Standard Specifications to read:

“High ESAL	IL-19.0 binder; IL-9.5 surface; IL-4.75; SMA-12.5, SMA-9.5
Low ESAL	IL-19.0L binder; IL-9.5L surface; Stabilized Subbase (HMA) ^{1/} ; HMA Shoulders ^{2/}

1/ Uses 19.0L binder mix.

2/ Uses 19.0L for lower lifts and 9.5L for surface lift.”

Revise Article 1030.02 of the Standard Specifications and Supplemental Specifications to read:

“**1030.02 Materials.** Materials shall be according to the following.

Item	Article/Section
(a) Coarse Aggregate	1004.03
(b) Fine Aggregate	1003.03
(c) RAP Material	1031
(d) Mineral Filler	1011
(e) Hydrated Lime	1012.01
(f) Slaked Quicklime (Note 1)	
(g) Performance Graded Asphalt Binder (Note 2)	1032
(h) Fibers (Note 3)	
(i) Warm Mix Asphalt (WMA) Technologies (Note 4)	

Note 1. Slaked quicklime shall be according to ASTM C 5.

Note 2. The asphalt binder shall be an SBS PG 76-28 when the SMA is used on a full-depth asphalt pavement and SBS PG 76-22 when used as an overlay, except where modified herein. The asphalt binder shall be an Elvaloy or SBS PG 76-22 for IL-4.75, except where modified herein. The elastic recovery shall be a minimum of 80.

Note 3. A stabilizing additive such as cellulose or mineral fiber shall be added to the SMA mixture according to Illinois Modified AASHTO M 325. The stabilizing additive shall meet the Fiber Quality Requirements listed in Illinois Modified AASHTO M 325. Prior to approval and use of fibers, the Contractor shall submit a notarized certification by the producer of these materials stating they meet these requirements. Reclaimed Asphalt Shingles (RAS) may be used in Stone Matrix Asphalt (SMA) mixtures designed with an SBA polymer modifier as a fiber additive if the mix design with RAS included meets AASHTO T305 requirements. The RAS shall be from a certified source that produces either Type I or Type 2. Material shall meet requirements noted herein and the actual dosage rate will be determined by the Engineer.

Note 4. Warm mix additives or foaming processes shall be selected from the current Bureau of Materials and Physical Research Approved List, "Warm Mix Asphalt Technologies".

Revise Article 1030.04(a)(1) of the Standard Specifications and the Supplemental Specifications to read:

“(1) High ESAL Mixtures. The Job Mix Formula (JMF) shall fall within the following limits.

High ESAL, MIXTURE COMPOSITION (% PASSING) ^{1/}										
Sieve Size	IL-19.0 mm		SMA ^{4/} IL-12.5 mm		SMA ^{4/} IL-9.5 mm		IL-9.5 mm		IL-4.75 mm	
	min	max	min	max	min	max	min	max	min	max
1 1/2 in. (37.5 mm)										
1 in. (25 mm)		100								
3/4 in. (19 mm)	90	100		100						
1/2 in. (12.5 mm)	75	89	80	100		100		100		100
3/8 in. (9.5 mm)				65	90	100	90	100		100
#4 (4.75 mm)	40	60	20	30	36	50	34	69	90	100
#8 (2.36 mm)	20	42	16	24 ^{5/}	16	32 ^{5/}	34 ^{6/}	52 ^{2/}	70	90
#16 (1.18 mm)	15	30					10	32	50	65
#30 (600 μm)			12	16	12	18				
#50 (300 μm)	6	15					4	15	15	30
#100 (150 μm)	4	9					3	10	10	18
#200 (75 μm)	3	6	7.0	9.0 ^{3/}	7.5	9.5 ^{3/}	4	6	7	9 ^{3/}
Ratio Dust/Asphalt Binder		1.0		1.5		1.5		1.0		1.0

1/ Based on percent of total aggregate weight.

- 2/ The mixture composition shall not exceed 44 percent passing the #8 (2.36 mm) sieve for surface courses with Ndesign = 90.
- 3/ Additional minus No. 200 (0.075 mm) material required by the mix design shall be mineral filler, unless otherwise approved by the Engineer.
- 4/ The maximum percent passing the #635 (20 µm) sieve shall be ≤ 3 percent.
- 5/ When establishing the Adjusted Job Mix Formula (AJMF) the percent passing the #8 (2.36 mm) sieve shall not be adjusted above the percentage stated on the table.
- 6/ When establishing the Adjusted Job Mix Formula (AJMF) the percent passing the #8 (2.36 mm) sieve shall not be adjusted below 34 percent.

Revise Article 1030.04(b)(1) of the Standard Specifications to read:

“(1) High ESAL Mixtures. The target value for the air voids of the HMA shall be 4.0 percent and for IL-4.75 it shall be 3.5 percent at the design number of gyrations. The VMA and VFA of the HMA design shall be based on the nominal maximum size of the aggregate in the mix, and shall conform to the following requirements.

VOLUMETRIC REQUIREMENTS High ESAL				
	Voids in the Mineral Aggregate (VMA), % minimum			Voids Filled with Asphalt Binder (VFA), %
Ndesign	IL-19.0	IL-9.5	IL-4.75 ^{1/}	
50	13.5	15.0	18.5	65 – 78 ^{2/}
70				
90				

1/ Maximum Draindown for IL-4.75 shall be 0.3 percent

2/ VFA for IL-4.75 shall be 72-85 percent”

Replace Article 1030.04(b)(3) of the Standard Specifications with the following:

“(3) SMA Mixtures.

Volumetric Requirements SMA ^{1/}			
Ndesign	Design Air Voids Target %	Voids in the Mineral Aggregate (VMA), % min.	Voids Filled with Asphalt (VFA), %
80 ^{4/}	3.5	17.0 ^{2/}	75 - 83
		16.0 ^{3/}	

- 1/ Maximum draindown shall be 0.3 percent. The draindown shall be determined at the JMF asphalt binder content at the mixing temperature plus 30 °F.
- 2/ Applies when specific gravity of coarse aggregate is ≥ 2.760 .
- 3/ Applies when specific gravity of coarse aggregate is < 2.760 .
- 4/ Blending of different types of aggregate will not be permitted. For surface course, the coarse aggregate can be crushed steel slag, crystalline crushed stone or crushed sandstone. For binder course, coarse aggregate shall be crushed stone (dolomite), crushed gravel, crystalline crushed stone, or crushed sandstone.

Add to the end of Article 1030.05 (d) (2) a. of the Standard Specifications:

“During production, the Contractor shall test SMA mixtures for draindown according to AASHTO T305 at a frequency of 1 per day of production.”

Delete last sentence of the second paragraph of Article 1102.01(a) (4) b. 2.

Add to the end of Article 1102.01 (a) (4) b. 2.:

“As an option, collected dust (baghouse) may be used in lieu of manufactured mineral filler according to the following:

- (a.) Sufficient collected dust (baghouse) is available for production of the SMA mix for the entire project.
- (b.) A mix design was prepared based on collected dust (baghouse).

2) Design Verification and Production

Revise Article 1030.04 (d) of the Standard Specifications to read:

“(d) Verification Testing. High ESAL, IL-4.75, and SMA mix designs submitted for verification will be tested to ensure that the resulting mix designs will pass the required criteria for the Hamburg Wheel Test (IL mod AASHTO T-324) and the Tensile Strength Test (IL mod AASHTO T-283). The Department will perform a verification test on gyratory specimens compacted by the Contractor. If the mix fails the Department’s verification test, the Contractor shall make the necessary changes to the mix and resubmit compacted specimens to the Department for verification. If the mix fails again, the mix design will be rejected.

All new and renewal mix designs will be required to be tested, prior to submittal for Department verification and shall meet the following requirements:

(1)Hamburg Wheel Test criteria. The maximum allowable rut depth shall be 0.5 in. (12.5 mm). The minimum number of wheel passes at the 0.5 in. (12.5 mm) rut depth criteria shall be based on the high temperature binder grade of the mix as specified in the mix requirements table of the plans.

Illinois Modified AASHTO T 324 Requirements ^{1/}

Asphalt Binder Grade	# Repetitions	Max Rut Depth (mm)
PG 70 -XX (or higher)	20,000	12.5
PG 64 -XX (or lower)	10,000	12.5

1/ When produced at temperatures of 275 ± 5 °F (135 ± 3 °C) or less, loose Warm Mix Asphalt shall be oven aged at 270 ± 5 °F (132 ± 3 °C) for two hours prior to gyratory compaction of Hamburg Wheel specimens.

Note: For SMA Designs (N-80) the maximum rut depth is 6.0 mm at 20,000 repetitions.

For IL 4.75mm Designs (N-50) the maximum rut depth is 9.0mm at 15,000 repetitions.

(2) Tensile Strength Criteria. The minimum allowable conditioned tensile strength shall be 60 psi (415 kPa) for non-polymer modified performance graded (PG) asphalt binder and 80 psi (550 kPa) for polymer modified PG asphalt binder. The maximum allowable unconditioned tensile strength shall be 200 psi (1380 kPa).”

Production Testing. Revise first paragraph of Article 1030.06(a) of the Standard Specifications to read:

“(a) High ESAL, IL-4.75, WMA, and SMA Mixtures. For each contract, a 300 ton (275 metric tons) test strip, except for SMA mixtures it will be 400 ton (363 metric ton), will be required at the beginning of HMA production for each mixture with a quantity of 3000 tons (2750 metric tons) or more according to the Manual of Test Procedures for Materials “Hot Mix Asphalt Test Strip Procedures”.

Add the following after the sixth paragraph in Article 1030.06 (a) of the Standard Specifications:

“The Hamburg Wheel test shall also be conducted on all HMA mixtures from a sample taken within the first 500 tons (450 metric tons) on the first day of production or during start up with a split reserved for the Department. The mix sample shall be tested according to the Illinois Modified AASHTO T 324 and shall meet the requirements specified herein. 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 plant produced mixture demonstrates conformance prior to start of mix production for a contract. If the mixture fails to meet the Hamburg Wheel criteria, no further mixture will be accepted until the Contractor takes such action as is necessary to furnish a mixture meeting the criteria”

Method of Measurement:

Add the following after the fourth paragraph of Article 406.13 (b):

“The plan quantities of SMA mixtures shall be adjusted using the actual approved binder and surface Mix Design’s G_{mb} .”

Basis of Payment.

Replace the fourth paragraph of Article 406.14 of the Standard Specifications with the following:

“Stone matrix asphalt will be paid for at the contract unit price per ton (metric ton) for POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, of the mixture composition and N_{design} specified; and POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, of the mixture composition and N_{design} specified.”

GROUND TIRE RUBBER (GTR) MODIFIED ASPHALT BINDER (D-1)

Effective: June 26, 2006

Revised: April 1, 2016

Add the following to the end of article 1032.05 of the Standard Specifications:

“(c) Ground Tire Rubber (GTR) Modified Asphalt Binder. A quantity of 10.0 to 14.0 percent GTR (Note 1) shall be blended by dry unit weight with a PG 64-28 to make a GTR 70-28 or a PG 58-28 to make a GTR 64-28. The base PG 64-28 and PG 58-28 asphalt binders shall meet the requirements of Article 1032.05(a). Compatible polymers may be added during production. The GTR modified asphalt binder shall meet the requirements of the following table.

Test	Asphalt Grade GTR 70-28	Asphalt Grade GTR 64-28
Flash Point (C.O.C.), AASHTO T 48, °F (°C), min.	450 (232)	450 (232)
Rotational Viscosity, AASHTO T 316 @ 275 °F (135 °C), Poises, Pa·s, max.	30 (3)	30 (3)
Softening Point, AASHTO T 53, °F (°C), min.	135 (57)	130 (54)
Elastic Recovery, ASTM D 6084, Procedure A (sieve waived) @ 77 °F, (25 °C), aged, ss, 100 mm elongation, 5 cm/min., cut immediately, %, min.	65	65

Note 1. GTR shall be produced from processing automobile and/or light truck tires by the ambient grinding method. GTR shall not exceed 1/16 in. (2 mm) in any dimension and shall contain no free metal particles or other materials. A mineral powder (such as talc) meeting the requirements of AASHTO M 17 may be added, up to a maximum of four percent by weight of GTR to reduce sticking and caking of the GTR particles. When tested in accordance with Illinois modified AASHTO T 27, a 50 g sample of the GTR shall conform to the following gradation requirements:

Sieve Size	Percent Passing
No. 16 (1.18 mm)	100
No. 30 (600 μm)	95 ± 5
No. 50 (300 μm)	> 20

Add the following to the end of Note 1. of article 1030.03 of the Standard Specifications:

“A dedicated storage tank for the Ground Tire Rubber (GTR) modified asphalt binder shall be provided. This tank must be capable of providing continuous mechanical mixing throughout by continuous agitation and recirculation of the asphalt binder to provide a uniform mixture. The tank shall be heated and capable of maintaining the temperature of the asphalt binder at 300 °F to 350 °F (149 °C to 177 °C). The asphalt binder metering systems of dryer drum plants shall be calibrated with the actual GTR modified asphalt binder material with an accuracy of ± 0.40 percent.”

Revise 1030.02(c) of the Standard Specifications to read:

“(c) RAP Materials (Note 5)1031”

Add the following note to 1030.02 of the Standard Specifications:

Note 5. When using reclaimed asphalt pavement and/or reclaimed asphalt shingles, the maximum asphalt binder replacement percentage shall be according to the most recent special provision for recycled materials.

RECLAIMED ASPHALT PAVEMENT AND RECLAIMED ASPHALT SHINGLES (D-1)

Effective: November 1, 2012

Revise: April 2, 2016

Revise Section 1031 of the Standard Specifications to read:

“SECTION 1031. RECLAIMED ASPHALT PAVEMENT AND RECLAIMED ASPHALT SHINGLES

1031.01 Description. Reclaimed asphalt pavement and reclaimed asphalt shingles shall be according to the following.

- (a) Reclaimed Asphalt Pavement (RAP). RAP is the material resulting from cold milling or crushing an existing hot-mix asphalt (HMA) pavement. RAP will be considered processed FRAP after completion of both crushing and screening to size. The Contractor shall supply written documentation that the RAP originated from routes or airfields under federal, state, or local agency jurisdiction.
- (b) Reclaimed Asphalt Shingles (RAS). Reclaimed asphalt shingles (RAS). RAS is from the processing and grinding of preconsumer or post-consumer shingles. RAS shall be a clean and uniform material with a maximum of 0.5 percent unacceptable material, 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 90 percent passing the #4 (4.75 mm) sieve. RAS shall meet the testing requirements specified herein. In addition, RAS shall meet the following Type 1 or Type 2 requirements.
 - (1) Type 1. Type 1 RAS shall be processed, preconsumer asphalt shingles salvaged from the manufacture of residential asphalt roofing shingles.
 - (2) 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).

1031.02 Stockpiles. RAP and RAS stockpiles shall be according to the following.

- (a) RAP Stockpiles. The Contractor shall construct individual, sealed RAP stockpiles meeting one of the following definitions. Additional processed RAP (FRAP) shall be stockpiled in a separate working pile, as designated in the QC Plan, and only added to the sealed stockpile when test results for the working pile are complete and are found to meet tolerances specified herein for the original sealed FRAP stockpile. Stockpiles shall be sufficiently separated to prevent intermingling at the base. All stockpiles (including unprocessed RAP and FRAP) shall be identified by signs indicating the type as listed below (i.e. "Non- Quality, FRAP -#4 or Type 2 RAS", etc...).
- (1) Fractionated RAP (FRAP). FRAP shall consist of RAP from Class I, Superpave HMA (High and Low ESAL) or equivalent 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 processed prior to testing and sized into 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 in the coarse fraction shall pass the maximum sieve size specified for the mix the FRAP will be used in.
 - (2) Restricted FRAP (B quality) stockpiles shall consist of RAP from Class I, Superpave (High ESAL), or HMA (High ESAL). If approved by the Engineer, the aggregate from a maximum 3.0 in. (75 mm) single combined pass of surface/binder milling will be classified as B quality. All millings from this application will be processed into FRAP as described previously.
 - (3) Conglomerate. Conglomerate RAP stockpiles shall consist of RAP from Class I, Superpave HMA (High and Low ESAL) or equivalent 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 (FRAP) prior to testing. Conglomerate RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.
 - (4) Conglomerate "D" Quality (DQ). Conglomerate DQ RAP stockpiles shall consist of RAP from HMA shoulders, bituminous stabilized subbases or Superpave (Low ESAL)/HMA (Low ESAL) IL-19.0L binder mixture. 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.
 - (5) Non-Quality. RAP stockpiles that do not meet the requirements of the stockpile categories listed above shall be classified as "Non-Quality".

RAP or FRAP containing contaminants, such as earth, brick, sand, concrete, sheet asphalt, bituminous surface treatment (i.e. chip seal), pavement fabric, joint sealants, plant cleanout etc., will be unacceptable unless the contaminants are removed to the satisfaction of the Engineer. Sheet asphalt shall be stockpiled separately.

- (b) RAS Stockpiles. Type 1 and Type 2 RAS shall be stockpiled separately and shall be sufficiently separated to prevent intermingling at the base. Each stockpile shall be signed indicating what type of RAS is present.

However, a RAS source may submit a written request to the Department for approval to blend mechanically a specified ratio of Type 1 RAS with Type 2 RAS. The source will not be permitted to change the ratio of the blend without the Department prior written approval. The Engineer's written approval will be required, to mechanically blend RAS with any fine aggregate produced under the AGCS, up to an equal weight of RAS, to improve workability. The fine aggregate shall be "B Quality" or better from an approved Aggregate Gradation Control System source. The fine aggregate shall be one that is approved for use in the HMA mixture and 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 three years.

1031.03 Testing. FRAP and RAS testing shall be according to the following.

- (a) FRAP Testing. When used in HMA, the FRAP shall be sampled and tested either during processing or after stockpiling. It shall also be sampled during HMA production.
- (1) During 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).
 - (2) Incoming Material. For testing as incoming material, washed extraction samples shall be run at a minimum frequency of one sample per 2000 tons (1800 metric tons) or once per week, whichever comes first.
 - (3) After Stockpiling. 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 of FRAP, 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.

(b) RAS Testing. RAS shall be sampled and tested during stockpiling according to Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Shingle (RAS) Sources". The Contractor shall also sample as incoming material at the HMA plant.

(1) 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 1000 tons (900 metric tons) thereafter. A minimum of five samples are required for stockpiles less than 1000 tons (900 metric tons). Once a ≤ 1000 ton (900 metric ton), five-sample/test stockpile has been established it shall be sealed. Additional incoming RAS shall be 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.

(2) Incoming Material. For testing as incoming material at the HMA plant, washed extraction shall be run at the minimum frequency of one sample per 250 tons (227 metric tons). A minimum of five samples are required for stockpiles less than 1000 tons (900 metric tons). The incoming material test results shall meet the tolerances specified herein.

The Contractor shall obtain and make available all test results from start of the initial stockpile sampled and tested at the shingle processing facility in accordance with the facility's QC Plan.

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 procedures. The Engineer reserves the right to test any sample (split or Department-taken) to verify Contractor test results.

1031.04 Evaluation of Tests. Evaluation of test results shall be according to the following.

(a) Evaluation of FRAP Test Results. All test results shall be compiled to include asphalt binder content, gradation and, when applicable (for slag), G_{mm} . A five test average of results from the original pile will be used in the mix designs. Individual extraction test results run thereafter, shall be compared to the average used for the mix design, and will be accepted if within the tolerances listed below.

Parameter	FRAP
No. 4 (4.75 mm)	± 6 %
No. 8 (2.36 mm)	± 5 %
No. 30 (600 μm)	± 5 %
No. 200 (75 μm)	± 2.0 %
Asphalt Binder	± 0.3 %
G_{mm}	± 0.03 ^{1/}

1/ For stockpile with slag or steel slag present as determined in the current Manual of Test Procedures Appendix B 21, "Determination of Reclaimed Asphalt Pavement Aggregate Bulk Specific Gravity".

If any individual sieve and/or asphalt binder content tests are out of the above tolerances when compared to the average used for the mix design, the FRAP stockpile shall not be used in Hot-Mix Asphalt unless the FRAP representing those tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the District for evaluation.

The Contractor shall maintain a representative moving average of five tests to be used for Hot-Mix Asphalt production.

With the approval of the Engineer, the ignition oven may be substituted for extractions according to the ITP, "Calibration of the Ignition Oven for the Purpose of Characterizing Reclaimed Asphalt Pavement (RAP)" or Illinois Modified AASHTO T-164-11, Test Method A.

- (b) Evaluation of RAS 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. A five test average of results from the original pile will be used in the mix designs. Individual test results run thereafter, when compared to the average used for the mix design, will be accepted if within the tolerances listed below.

Parameter	RAS
No. 8 (2.36 mm)	± 5 %
No. 16 (1.18 mm)	± 5 %
No. 30 (600 µm)	± 4 %
No. 200 (75 µm)	± 2.5 %
Asphalt Binder Content	± 2.0 %

If any individual sieve and/or asphalt binder content tests are out of the above tolerances when compared to the average used for the mix design, the RAS shall not be used in Hot-Mix Asphalt unless the RAS representing those tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the District for evaluation.

- (c) Quality Assurance by the Engineer. The Engineer may witness the sampling and splitting conduct assurance tests on split samples taken by the Contractor for quality control testing a minimum of once a month.

The overall testing frequency will be performed over the entire range of Contractor samples for asphalt binder content and gradation. The Engineer may select any or all split samples for assurance testing. The test results will be made available to the Contractor as soon as they become available.

The Engineer will notify the Contractor of observed deficiencies.

Differences between the Contractor's and the Engineer's split sample test results will be considered acceptable if within the following limits.

Test Parameter	Acceptable Limits of Precision	
	FRAP	RAS
% Passing: ^{1/}		
1/2 in.	5.0%	
No. 4	5.0%	
No. 8	3.0%	4.0%
No. 30	2.0%	3.0%
No. 200	2.2%	2.5%
Asphalt Binder Content	0.3%	1.0%
G _{mm}	0.030	

1/ Based on washed extraction.

In the event comparisons are outside the above acceptable limits of precision, the Engineer will immediately investigate.

- (d) Acceptance by the Engineer. Acceptable of the material will be based on the validation of the Contractor's quality control by the assurance process.

1031.05 Quality Designation of Aggregate in RAP and FRAP.

- (a) RAP. The aggregate quality of the RAP for homogeneous, 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/HMA (High ESAL), or (Low ESAL) IL-9.5L surface mixtures are designated as containing Class B quality coarse aggregate.
 - (2) RAP from Superpave/HMA (Low ESAL) IL-19.0L binder mixture is designated as Class D quality coarse aggregate.
 - (3) RAP from Class I, Superpave/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) FRAP. 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 as follows. Fractionated RAP stockpiles containing plus #4 (4.75 mm) sieve coarse aggregate shall have a maximum tonnage of 5,000 tons (4,500 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 laboratory prequalified by the Department for the specified testing. The consultant laboratory 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 Bureau of Materials and Physical Research Aggregate Lab for MicroDeval Testing, according to ITP 327. A maximum loss of 15.0 percent will be applied for all HMA applications. The fine aggregate portion of the fractionated RAP shall not be used in any HMA mixtures that require a minimum of "B" quality aggregate or better, until the coarse aggregate fraction has been determined to be acceptable thru a MicroDeval Testing.

1031.06 Use of FRAP and/or RAS in HMA. The use of FRAP and/or RAS shall be the Contractor's option when constructing HMA in all contracts.

- (a) FRAP. The use of FRAP in HMA shall be as follows.
- (1) Coarse Aggregate Size (after extraction). The coarse aggregate in all FRAP shall be equal to or less than the nominal maximum size requirement for the HMA mixture to be produced.
 - (2) Steel Slag Stockpiles. FRAP 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) mixtures regardless of lift or mix type.
 - (3) Use in HMA Surface Mixtures (High and Low ESAL). FRAP stockpiles for use in HMA surface mixtures (High and Low ESAL) shall have coarse aggregate that is Class B quality or better. FRAP shall be considered equivalent to limestone for frictional considerations unless produced/screened to minus 3/8 inch.
 - (4) Use in HMA Binder Mixtures (High and Low ESAL), HMA Base Course, and HMA Base Course Widening. FRAP stockpiles for use in HMA binder mixtures (High and Low ESAL), HMA base course, and HMA base course widening shall be FRAP in which the coarse aggregate is Class C quality or better.
 - (5) Use in Shoulders and Subbase. FRAP stockpiles for use in HMA shoulders and stabilized subbase (HMA) shall be FRAP, Restricted FRAP, conglomerate, or conglomerate DQ.

- (b) RAS. RAS meeting Type 1 or Type 2 requirements will be permitted in all HMA applications as specified herein.
- (c) FRAP and/or RAS Usage Limits. Type 1 or Type 2 RAS may be used alone or in conjunction with FRAP in HMA mixtures up to a maximum of 5.0 percent by weight of the total mix.

When FRAP is used alone or FRAP is used in conjunction with RAS, the percent of virgin asphalt binder replacement (ABR) shall not exceed the amounts indicated in the table below for a given N Design.

Max Asphalt Binder Replacement for FRAP with RAS Combination

HMA Mixtures ^{1/ 2/ 4/}	Maximum % ABR		
	Binder/Leveling Binder	Surface	Polymer Modified ^{3/}
Ndesign			
30L	50	40	30
50	40	35	30
70	40	30	30
90	40	30	30
4.75 mm N-50			40
SMA N-80			30

- 1/ For Low ESAL HMA shoulder and stabilized subbase, the percent asphalt binder replacement shall not exceed 50 % of the total asphalt binder in the mixture.
- 2/ When the binder replacement exceeds 15 % 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 % binder replacement using a virgin asphalt binder grade of PG64-22 will be reduced to a PG58-28). When constructing full depth HMA and the ABR is less than 15 %, the required virgin asphalt binder grade shall be PG64-28.
- 3/ When the ABR for SMA or IL-4.75 is 15 % or less, the required virgin asphalt binder shall be SBS PG76-22 and the elastic recovery shall be a minimum of 80. When the ABR for SMA or IL-4.75 exceeds 15%, the virgin asphalt binder grade shall be SBS PG70-28 and the elastic recovery shall be a minimum of 80.
- 4/ When FRAP or RAS is used alone, the maximum percent asphalt binder replacement designated on the table shall be reduced by 10 %.

1031.07 HMA Mix Designs. At the Contractor's option, HMA mixtures may be constructed utilizing RAP/FRAP and/or RAS material meeting the detailed requirements specified herein.

- (a) FRAP and/or RAS. FRAP and /or RAS mix designs shall be submitted for verification. If additional FRAP or RAS stockpiles are tested and found to be within tolerance, as defined under "Evaluation of Tests" herein, and meet all requirements herein, the additional FRAP or RAS stockpiles may be used in the original design at the percent previously verified.
- (b) RAS. Type 1 and Type 2 RAS are not interchangeable in a mix design. A RAS stone bulk specific gravity (Gsb) of 2.300 shall be used for mix design purposes.

1031.08 HMA Production. HMA production utilizing FRAP and/or RAS shall be as follows.

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 RAS and FRAP 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 during mix production, corrective actions fail to maintain FRAP, RAS or QC/QA test results within control tolerances or the requirements listed herein the Contractor shall cease production of the mixture containing FRAP or RAS and conduct an investigation that may require a new mix design.

- (a) RAS. 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.
- (b) HMA Plant Requirements. HMA plants utilizing FRAP and/or RAS shall be capable of automatically recording and printing the following information.

(1) Dryer Drum Plants.

- a. Date, month, year, and time to the nearest minute for each print.
- b. HMA mix number assigned by the Department.
- c. Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).

- d. Accumulated dry weight of RAS and FRAP in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).
 - e. Accumulated mineral filler in revolutions, tons (metric tons), etc. to the nearest 0.1 unit.
 - f. Accumulated asphalt binder in gallons (liters), tons (metric tons), etc. to the nearest 0.1 unit.
 - g. Residual asphalt binder in the RAS and FRAP material as a percent of the total mix to the nearest 0.1 percent.
 - h. Aggregate RAS and FRAP moisture compensators in percent as set on the control panel. (Required when accumulated or individual aggregate and RAS and FRAP are printed in wet condition.)
 - i. When producing mixtures with FRAP and/or RAS, a positive dust control system shall be utilized.
 - j. Accumulated mixture tonnage.
 - k. Dust Removed (accumulated to the nearest 0.1 ton (0.1 metric ton))
- (2) Batch Plants.
- a. Date, month, year, and time to the nearest minute for each print.
 - b. HMA mix number assigned by the Department.
 - c. Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram).
 - d. Mineral filler weight to the nearest pound (kilogram).
 - f. RAS and FRAP weight to the nearest pound (kilogram).
 - g. Virgin asphalt binder weight to the nearest pound (kilogram).
 - h. Residual asphalt binder in the RAS and 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.

1031.09 RAP in Aggregate Surface Course and Aggregate Wedge Shoulders, Type B.

The use of RAP or FRAP 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. RAP used shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, “Reclaimed Asphalt Pavement (RAP) for Aggregate Applications”.
- (b) Gradation. The RAP material shall meet the gradation requirements for CA 6 according to Article 1004.01(c), except the requirements for the minus No. 200 (75 µm) sieve shall not apply. The sample for the RAP material shall be air dried to constant weight prior to being tested for gradation.”

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES

This work shall be according to Article 669 of the Standard Specifications and the following:

Qualifications: The term environmental firm shall mean an environmental firm with at least five (5) documented leaking underground storage tank (LUST) cleanups or that is pre-qualified in hazardous waste by the Department. Documentation includes but not limited to verifying remediation and special waste operations for sites contaminated with gasoline, diesel, or waste oil in accordance with all Federal, State, or local regulatory requirements and shall be provided to the Engineer for approval. The environmental firm selected shall not be a former or current consultant or have any ties with any of the properties contained within and/or adjacent to this construction project.

General: This Special Provision will likely require the Contractor to subcontract for the execution of certain activities.

All contaminated materials shall be managed as either “uncontaminated soil” or non-special waste. This work shall include monitoring and potential sampling, analytical testing, and management of a material contaminated by regulated substances. The Environmental Firm shall continuously monitor all soil excavation for worker protection and soil contamination. Phase I Preliminary Engineering information is available through the District’s Environmental Studies Unit. Soil samples or analysis without the approval of the Engineer will be at no additional cost to the Department. The lateral distance is measured from centerline and the farthest distance is the offset distance or construction limit whichever is less.

The Contractor shall manage any excavated soils and sediment within the following areas:

ISGS Site 1102V2-9, State ROW (also referred to as Unknown Parcel No. 2)

- Station 10+00 to Station 11+70 (BL Flyover Ramp), 0 to 20 feet LT, and 0 to 20 feet RT (State ROW [also referred to as Unknown Parcel No. 2], PESA Site 1102V2-9, no address). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 11+70 to Station 13+75 (BL Flyover Ramp), 0 to 35 feet LT, and 0 to 20 feet RT (State ROW [also referred to as Unknown Parcel No. 2], PESA Site 1102V2-9, no address). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 13+75 to Station 15+50 (BL Flyover Ramp), 0 to 75 feet LT, and 0 to 20 feet RT (State ROW [also referred to as Unknown Parcel No. 2], PESA Site 1102V2-9, no address). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Lead, and Manganese.
- Station 15+50 to Station 17+60 (BL Flyover Ramp), 0 to 110 feet LT, and 0 to 20 feet RT (State ROW [also referred to as Unknown Parcel No. 2], PESA Site 1102V2-9, no address). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.

ISGS Site 1102V2-28, State ROW (also referred to as Unknown Parcel No. 1)

- Station 17+60 to Station 19+00 (BL Flyover Ramp), 0 to 30 feet LT, and 0 to 35 feet RT (State ROW [also referred to as Unknown Parcel No. 1], PESA Site 1102V2-28, I-190 Milepost 0). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Iron, Lead, and Manganese.
- Station 102+00 to Station 104+15 (BL Eastbound I-190), 0 to 130 feet RT (State ROW [also referred to as Unknown Parcel No. 1], PESA Site 1102V2-28, I-190 Milepost 0). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 104+15 to Station 105+80 (BL Eastbound I-190), 0 to 130 feet RT (State ROW [also referred to as Unknown Parcel No. 1], PESA Site 1102V2-28, I-190 Milepost 0). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Lead and Manganese.
- Station 105+80 to Station 107+60 (BL Eastbound I-190), 0 to 40 feet RT, and 0 to 10 feet LT (State ROW [also referred to as Unknown Parcel No. 1], PESA Site 1102V2-28, I-190 Milepost 0). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Iron, Lead, and Manganese.
- Station 105+80 to Station 107+60 (BL Eastbound I-190), 40 to 130 RT (State ROW [also referred to as Unknown Parcel No. 1], PESA Site 1102V2-28, I-190 Milepost 0). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Lead and Manganese.

- Station 107+60 to Station 111+50 (BL Eastbound I-190), 0 to 130 feet RT, and 0 to 15 feet LT (State ROW [also referred to as Unknown Parcel No. 1], PESA Site 1102V2-28, I-190 Milepost 0). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Lead and Manganese.

ISGS Site 2746-1, IDOT ROW

- Station 111+50 to Station 121+90 (BL Eastbound I-190), 0 to 130 feet RT, and 0 to 15 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Lead and Manganese.
- Station 502+80 to Station 504+35 (Eastbound I-190 CD Ramp), 0 to 100 feet RT, and 0 to 20 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Lead and Manganese.
- Station 504+35 to Station 508+70 (Eastbound I-190 CD Ramp), 0 to 100 feet RT, and 0 to 20 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Lead, and Manganese.
- Station 508+70 to Station 513+35 (Eastbound I-190 CD Ramp), 0 to 100 feet RT, and 0 to 25 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene and Manganese.
- Station 513+35 to Station 515+30 (Eastbound I-190 CD Ramp), 0 to 70 feet RT, and 0 to 20 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Lead and Manganese.
- Station 515+30 to Station 519+20 (Eastbound I-190 CD Ramp), 0 to 70 feet RT, and 0 to 20 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Lead, and Manganese.
- Station 519+20 to Station 521+20 (Eastbound I-190 CD Ramp), 0 to 50 feet RT, and 0 to 20 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Benzo(b)flouranthene, Lead, and Manganese.
- Station 521+20 to Station 525+20 (Eastbound I-190 CD Ramp), 0 to 50 feet RT, and 0 to 20 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Lead and Manganese.
- Station 525+20 to Station 528+20 (Eastbound I-190 CD Ramp), 0 to 40 feet RT, and 0 to 20 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90). This material meets the criteria of Article 669.09(b)(1) and shall be managed in accordance to Article 669.09.

Engineered Barrier: An engineered barrier shall be installed in storm sewer trenches to limit the exposure and control the migration of contamination from the contaminated soil that remains within the trench excavation. It shall be placed beneath the trench backfill material within the following areas:

- Station 519+20 to Station 521+20 (Eastbound I-190 CD Ramp), 0 to 50 feet RT, and 0 to 20 feet LT (IDOT ROW, PESA Site 2746-1, 7200-8900 blocks of I-90) to limit the exposure and control the migration of contamination from the contaminated soil that remains within the trench excavation. Contaminants of concern sampling parameters: Benzo(a)Pyrene, Benzo(b)fluoranthene, Lead, and Manganese. It shall be placed beneath the trench backfill material.

The engineered barrier shall consist of a geosynthetic clay liner system, geomembrane liner, or equivalent material as approved by the Engineer. A geosynthetic clay liner shall be composed of a bentonite clay liner approximately 6.4 millimeters (0.25 inches) thick. The engineered barrier shall have a permeability of less than 10^{-7} cm/sec. Installation of the geosynthetic clay liner system shall be in accordance with the manufacturer's recommendations except that all laps shall face down-slope.

The geomembrane liner shall have a minimum thickness of 30 mil. The geomembrane liner shall line the entire trench and in accordance with the manufacturer's recommendations.

No equipment will be allowed on the engineered barrier until it is covered by a minimum of 305 millimeters (1 foot) of backfill. Any damage to the engineered barrier caused by the Contractor shall be repaired at no additional expense to the Department in accordance with the manufacturer's recommendations and as directed by the Engineer.

Method of Measurement: Engineered barrier will be measured for payment in place and the area computed in square yards.

Basis of Payment: The engineered barrier will be paid for at the contract unit price per square yards for ENGINEERED BARRIER.

CONSTRUCTION AIR QUALITY – DUST CONTROL

Description. This work shall consist of developing and implementing a detailed Dust Control Plan (DCP) in accordance with Article 107.36 of the Standard Specifications. Development of a DCP is required. All construction activities shall be governed by the DCP. The nature and extent of dust generating activities, and specific control techniques appropriate to specific situations shall be discussed at the pre-construction meeting, with subsequent development of the DCP to include but not be limited to the requirements below.

General Requirements. The Contractor is responsible for the control of dust at all times during the duration of the contract, 24 hours per day, 7 days per week, including non-working hours, weekends, and holidays. This work shall be considered complete after the completion of all permanent erosion control measures required for the contract, and after all temporary and permanent seeding is established.

The DCP shall describe the plan for the implementation of control measures before, during and after conducting any dust generating operation. These controls must be in place on non-working days and after working hours, not just while work is being done on the site. The DCP must contain information specific to the project site, proposed work, and dust control measures to be implemented. A copy of the DCP must be available on the project site at all times.

The DCP must contain, at a minimum, all of the following information:

1. Name, address and phone number of the person(s) responsible for the dust generating operation and for the submittal and implementation of the DCP.
2. A drawing specifying the site boundaries of the project with the areas to be disturbed, the locations of the nearest public roads, and all planned exit and entrance locations to the site from any paved public roadways.
3. Control measures to be applied to all actual and potential fugitive dust sources before, during and after conducting any dust generating operation, including non-work hours and non-work days.
4. A contingency plan consisting of at least one contingency measure for each activity occurring on the site in case the primary control measure proves inadequate.

The Contractor shall submit two copies of the DCP that outlines in detail the measures to be implemented by the Contractor complying with this section, including prevention, cleanup, and other measures at least 14 days before beginning any dust generating activity. The Contractor shall not begin any dust generating activities until the Engineer approves the DCP in writing.

Materials.

1. Dust Suppression Agents: Water shall meet the requirements of Section 1002 of the Standard Specifications.
2. Soil stabilizers shall consist of seed and mulch meeting the requirements of Article 1081.06 (a) (2) and (3).
3. Covers for stockpiles shall be commercially available plastic tarps, or other materials approved by the Engineer.

Construction Methods. Water shall be used to provide temporary control of dust on entrances/exits to the job site, haul roads and other active work areas. Several applications per day may be necessary to control dust depending upon meteorological conditions and work activity. The Contractor shall apply water on a routine basis as necessary or as directed by the Engineer to control dust. Wet suppression consists of the application of water. Wet suppression equipment shall consist of sprinkler pipelines, tanks, tank trucks or other devices approved by the Engineer, capable of providing a regulated flow, uniform spray and positive shut off.

Haul truck cargo areas shall be securely covered during the transport of materials on public roadways that are prone to cause dust.

Public Roadway Dust Control. Trackout, including carryout and spillage of material that adheres to the exterior surfaces of or are spilled from motor vehicles and/or equipment and subsequently fall onto a paved public roadway must be controlled at all times. Cleanup of carryout and spillage is required immediately if it extends a cumulative distance of 50 feet or more on a paved public roadway. If the extent of carryout is less than 50 feet, clean up at the end of the day is permissible. Cleanup of paved surfaces shall be by wet spray power vacuum street sweeper. Dry power sweeping is prohibited.

Control of Earthwork Dust. During batch drop operations (i.e. earthwork with a front-end loader, clamshell bucket, or backhoe), the free drop height of excavated or aggregate material shall be reduced to minimum heights as necessary to perform the specified task, and to minimize the generation of dust. To prevent spills during transport, a minimum of 2 inches of freeboard space shall be maintained between the material load and the top of the truck cargo bed rail. A maximum drop height of two feet (or minimum height allowed by equipment) will be allowed, or to heights as directed by the Engineer.

Control of Dust on Stockpiles and Inactive Work Areas. The Contractor shall use the following methods to control dust and wind erosion of stockpiles and inactive areas of disturbed soil:

1. Water shall be used during active stockpile load-in, load-out, and maintenance activities.
2. Soil stabilizers (hydraulic or chemical mulch) may be applied to the surface of inactive stockpiles and other inactive areas of disturbed soil. Final grading and seeding of inactive areas shall occur immediately after construction activity is completed in an area and as directed by the Engineer.
3. Plastic tarps may be used on small stockpiles, secured with sandbags or an equivalent method approved by the Engineer, to prevent the cover from being dislodged by the wind. The Contractor shall repair or replace the covers whenever damaged or dislodged at no additional cost.

Method of Measurement. Water used as a dust suppression measure shall be measured for payment in units of 1000 Gallons of water applied. All measuring devices shall be furnished by the Contractor and approved by the Engineer. All other dust control measures will not be measured for payment.

Basis of Payment. The application of water as a dust suppression agent will be paid for at the contract unit price per unit for DUST CONTROL WATERING.

All other dust control measures, along with preparation of the DCP, will not be paid for directly but shall be considered as included in the various items involved and no additional compensation will be allowed.

DRAINAGE AND INLET PROTECTION UNDER TRAFFIC (D-1)

Effective: April 1, 2011

Revised: April 2, 2011

Add the following to Article 603.02 of the Standard Specifications:

- “(i) Temporary Hot-Mix Asphalt (HMA) Ramp (Note 1) 1030
- “(j) Temporary Rubber Ramps (Note 2)

Note 1. The HMA shall have maximum aggregate size of 3/8 in. (95 mm).

Note 2. The rubber material shall be according to the following.

Property	Test Method	Requirement
Durometer Hardness, Shore A	ASTM D 2240	75 ±15
Tensile Strength, psi (kPa)	ASTM D 412	300 (2000) min
Elongation, percent	ASTM D 412	90 min
Specific Gravity	ASTM D 792	1.0 - 1.3
Brittleness, °F (°C)	ASTM D 746	-40 (-40)”

Revise Article 603.07 of the Standard Specifications to read:

“603.07 Protection Under Traffic. After the casting has been adjusted and the Class PP concrete has been placed, the work shall be protected by a barricade and two lights according to Article 701.17(e)(3)b.

When castings are under traffic before the final surfacing operation has been started, properly sized temporary ramps shall be placed around the drainage and/or utility castings according to the following methods.

- (a) Temporary Asphalt Ramps. Temporary hot-mix asphalt ramps shall be placed around the casting, flush with its surface and decreasing to a featheredge in a distance of 2 ft (600 mm) around the entire surface of the casting.

- (b) Temporary Rubber Ramps. Temporary rubber ramps shall only be used on roadways with permanent posted speeds of 40 mph or less and when the height of the casting to be protected meets the proper sizing requirements for the rubber ramps as shown below.

Dimension	Requirement
Inside Opening	Outside dimensions of casting + 1 in. (25 mm)
Thickness at inside edge	Height of casting \pm 1/4 in. (6 mm)
Thickness at outside edge	1/4 in. (6 mm) max.
Width, measured from inside opening to outside edge	8 1/2 in. (215 mm) min

Placement shall be according to the manufacturer's specifications.

Temporary ramps for castings shall remain in place until surfacing operations are undertaken within the immediate area of the structure. Prior to placing the surface course, the temporary ramp shall be removed. Excess material shall be disposed of according to Article 202.03."

SIGN SHOP DRAWING SUBMITTAL

Effective: January 22, 2013
 720.02TS

Revised: July 1, 2015

Add the following paragraph to Article 720.03 of the Standard Specifications:

Shop drawings will be required, according to Article 105.04, for all Arterials/Expressways signs except standard highway signs covered in the MUTCD. Shop drawings shall be submitted to the Engineer for review and approval prior to fabrication. The shop drawings shall include dimensions, letter sizing, font type, colors and materials.

PROTECTION OF EXISTING DRAINAGE FACILITIES DURING CONSTRUCTION

All existing drainage structures are to be kept free of any debris resulting from construction operations. All work and material necessary to prevent accumulation of debris in the drainage structures will be considered as incidental to the contract. Any debris in the drainage structures resulting from construction operations shall be removed at the Contractor's own expense, and no extra compensation will be allowed. Any minor ditch grading, modifications to existing drainage structures to ensure proper roadway drainage, culverts under temporary drives, and any bulkheading as directed by the engineer necessary to provide for the interim drainage for construction staging will not be paid for separately but shall be included in the cost of earth excavation and erosion control. Should reconstruction or adjustment of a drainage structure be required by the Engineer in the field, the necessary work and payment shall be done in accordance with Section 602 and Article 104.02 respectively of the Standard Specifications.

During construction if the Contractor encounters or otherwise becomes aware of any sewers, underdrains or field drains within the right-of-way other than those shown on the plans, he shall so inform the Engineer who shall direct the work necessary to maintain or replace the facilities in service and to protect them from damage during construction if maintained. Existing facilities to be maintained that are damaged because of non-compliance with this provision shall be replaced at the Contractor's own expense. Should the Engineer have directed the replacement of a facility, the necessary work and payment shall be done in accordance with Sections 550 and 601 and Article 104.02 respectively of the Standard Specifications.

STORM SEWER ADJACENT TO OR CROSSING WATER MAIN

Effective: February 1, 1996

Revised: January 1, 2007

This work consists of constructing storm sewer adjacent to or crossing a water main, at the locations shown on the plans. The material and installation requirements shall be according to the latest edition of the "Standard Specifications for Water and Sewer Main Construction in Illinois", and the applicable portions of Section 550 of the Standard Specifications; which may include concrete collars and encasing pipe with seals if required.

Pipe materials shall meet the requirements of Sections 40 and 41-2.01 of the "Standard Specifications for Water and Sewer Main Construction in Illinois", except PVC pipe will not be allowed. Ductile-Iron pipe shall meet the minimum requirements for Thickness Class 50.

Encasing of standard type storm sewer, according to the details for "Water and Sewer Separation Requirements (Vertical Separation)" in the "STANDARD DRAWINGS" Division of the "Standard Specifications for Water and Sewer Main Construction in Illinois", may be used for storm sewers crossing water mains.

Basis of Payment: This work will be paid according to Article 550.10 of the Standard Specifications, except the pay item shall be STORM SEWER, WATER MAIN QUALITY PIPE, of the type and diameter specified.

DRAINAGE STRUCTURE ADJUSTMENT (SPECIAL)

Description: This work shall consist of adjusting catch basins, manholes, water valve boxes, fire hydrant auxiliary valve boxes, water service boxes and inlets with their existing frame and grate or with a new frame and grate in accordance with Section 602 of the Standard Specifications and as specified herein.

Construction Requirements: It will be the Contractor's responsibility to saw cut the area needed to do the work as specified within the contract plans. Backfill material and P.C.C. Base Course shall be incidental to the item. The Engineer shall inspect each existing frame and lid prior to final adjustment and determine which frames and lids shall be replaced.

Basis of Payment: This work will be measured and paid for at the contract unit price per each for DRAINAGE STRUCTURE ADJUSTMENT (SPECIAL). The word DRAINAGE STRUCTURE shall be understood to mean catch basin, manhole, water valve box, fire hydrant auxiliary valve box, water service box or inlet as the case may be. New frames and lids shall be included in the cost of this item.

CLASS SI CONCRETE (OUTLET), SPECIAL

Description: This work shall consist of constructing a combination concrete curb and gutter outlet.

Construction Requirements: All work shall be installed as shown and detailed in the contract plan drawings and in accordance with Section 606 of the Standard Specifications.

Method of Measurement: This work will be measured for payment in Cubic Yards.

Basis of Payment: This work will be paid for at the contract unit price per cubic yard for CLASS SI CONCRETE (OUTLET), SPECIAL.

CONCRETE BARRIER, SINGLE FACE (SPECIAL)

Description: This work shall consist of the construction of the concrete barrier, single face of the height specified in the plans and shall include the concrete barrier base and the furnishing and installing of necessary materials in conformity with the lines, dimensions, sections and details shown on the plans and in accordance with the requirements of these special provisions.

Materials: Materials and equipment for concrete barrier and integral base shall be in accordance with the requirements of Section 503 and Section 637 of the Standard Specifications.

The surface of the concrete barrier transition shall be finished according to Article 503.15 of the Standard Specifications, except all holes and honeycombs shall be patched immediately. A protective coat shall be applied to the top and vertical surfaces of the barrier transition. The protective coat shall be constructed according to Article 420.18.

Method of Measurement: Concrete Barrier, Single Face (Special) of the height specified and Concrete Barrier Transition (Special) will be measured for payment in feet along the centerline of the wall.

Basis of Payment: This work will be paid for at the contract unit price per linear foot for CONCRETE BARRIER, SINGLE FACE, 32 INCH HEIGHT (SPECIAL), CONCRETE BARRIER, SINGLE FACE, 54 INCH HEIGHT (SPECIAL) and CONCRETE BARRIER TRANSITION (SPECIAL) which shall include all labor, equipment, reinforcement bars all concrete and any other materials to complete this item.

CONCRETE STRUCTURE (SPECIAL)

Description: This work will consist of furnishing all labor, materials, tools, and equipment required to furnish and place Concrete Structures (Special) for the pier caps on the I-190 Cumberland Flyover bridge at the locations as shown on the Plans or as directed by the Engineer.

This work must be performed in accordance with the requirements of Section 503 of the Standard Specifications, except as herein modified, shown on the Plans, or as directed by the Engineer.

Materials: The concrete for the new pier caps must meet the requirements of Class SI concrete as specified in Section 1020 of the Standard Specifications, except that the Mix Design Compressive Strength shall be 4,500 psi minimum.

Construction Requirements: The concrete mix design must be performed by the Contractor and submitted to the Engineer for review and approval. However, the Engineer's approval does not relieve the Contractor of his responsibility for furnishing concrete of the required strength and other specified requirements.

Bonded construction joints must be used where new concrete is placed against existing concrete. Prior to placing the new concrete, the Contractor must prepare the surface of the existing concrete, against which it will be placed, in accordance with the requirements for Construction Joints as specified in Article 503.09 of the Standard Specifications.

The formwork must conform to the applicable portions of Article 503.06 of the Standard Specifications, and must be capable of providing a smooth and uniform finish. Forms must be mortar tight and closely fitted where they abut existing concrete surfaces to prevent leakage. The use of permanent or stay-in-place forms will not be permitted unless approved by the Engineer. The Contractor must vibrate the concrete to release entrapped air pockets using a method approved by the Engineer.

Concrete in freezing weather must conform to the requirements and provisions of Article 1020.13(d) of the Standard Specifications, or as directed by the Engineer.

Reinforcement bars must be tied securely in place prior to placing concrete. Concrete must not be placed until the reinforcement bar placement has been checked and approved by the Engineer.

New bars must be spliced sufficiently to develop the full strength of the bar. The minimum lap length must conform to the AASHTO Standard Specification for Highway Bridges Article 8.32, Splices of Reinforcement, Class C lap splice for AASHTO M31 or M42, Grade 60 bars.

The concrete curb surfaces on the proposed pedestrian structure must be finished as specified under Article 503.16 of the Standard Specifications.

Concrete curing must be done in accordance with the applicable portions of Article 1020.13 of the Standard Specifications, and as directed by the Engineer. No girders or additional load will be allowed on the new pier caps until the decks have developed a minimum compressive strength of 3,500 psi.

Method of Measurement: This work will be measured for payment in cubic yards of concrete acceptably furnished and placed within the limits shown on the Plans and as directed by the Engineer.

Reinforcement bars will be measured and paid for separately under the following respective item: REINFORCEMENT BARS, EPOXY COATED.

Basis of Payment: This work will be paid for at the contract unit price per cubic yard for CONCRETE STRUCTURE (SPECIAL), which price will include all costs of labor, materials, tools, equipment, and incidental items as specified or required to complete this item.

REMOVAL OF EXISTING SIGN LIGHTING UNIT, NO SALVAGE

Description. This item shall consist of disconnecting, completely removing and disposing of existing sign lighting as specified herein. This pay item shall also include removal of the associated conduit, wire and disconnect switch from the sign structure.

General. Luminaire removal shall be in accordance with Section 842, the cleaning and painting of sign structure caused by the removal of sign lighting and associated conduit shall be in accordance with Section 506 of the Standard Specifications for Road and Bridge Construction, current version. The power disconnect shall be coordinated with the electrical supply utility to ensure the sign lighting power source is properly de-energized for any conditions to remain.

Prior to the removal of any equipment, the Contractor shall arrange an inventory inspection with the Engineer. All equipment shall be inspected and logged as to type, size and condition. No removal work shall be permitted until approved by the Engineer.

The removal of sign luminaires shall include all associated conduit, wire up to the hand hole on the sign structure, disconnect switch and hardware. All appurtenances shall become the property of the contractor and shall be disposed of according to the Article 202.03.

Method of Measurement. The work described herein will be measured for each sign structure location where the sign lighting removal occurred, which shall include all sign luminaires and associated materials removed complete as specified herein or as directed by the Engineer.

Basis of Payment. This item shall be paid at the contract unit price per each for REMOVAL OF EXISTING SIGN LIGHTING UNIT WITH NO SALVAGE, which shall be payment in full for the removal work at each sign structure as specified herein.

HOT-MIX ASPHALT STABILIZATION 6" AT STEEL PLATE BEAM GUARD RAIL

Description: This work shall consist of the installation of Hot-Mix Asphalt Stabilization 6" at Steel Beam Guard Rail.

Construction Requirements: The installation of Hot-Mix Asphalt Stabilization 6" at Steel Plate Beam Guard Rail shall conform to the applicable portions of Section 482 and Article 630.06 of the Standard Specifications and Standard 630201-06.

Method of Measurement: The Basis of Payment for the installation of Hot-Mix Asphalt Stabilization 6" at Steel Plate Beam Guard Rail will be paid according to Article 482.08 of the Standard Specifications.

Basis of Payment: The work Hot-Mix Asphalt Stabilization 6" at Steel Plate Beam Guard Rail will be paid for at the contract unit price per square yard for HOT-MIX ASPHALT STABILIZATION 6" AT STEEL PLATE BEAM GUARD RAIL.

BRIDGE APPROACH SLAB (TOLLWAY)

Effective: August 15, 2014

Revised: April 1, 2016

Description. This work shall consist of a cast-in-place reinforced concrete bridge approach slab composed of Portland Cement Concrete, constructed on a prepared Subbase in accordance with details shown in the plans.

Except as modified herein, the work performed under this Section will conform to the applicable portions of Sections 420, 503 and 520 of the Standard Specifications.

Materials. All materials shall conform to the requirements of Sections 420, 503 and 520 of the Standard Specifications except as follows:

- a) Concrete placement for Bridge Approach Slabs shall be in accordance with Article 503.16 of the Standard Specifications.
- b) Concrete materials shall be in accordance with the Illinois Tollway special provision Performance-Related Special Provision for High Performance Concrete Mix Designs for Concrete Superstructure.
- c) Reinforcement Bars shall be in accordance with Article 1006.10 of the Standard Specifications.
- d) Granular Subbase shall be in accordance with the latest Illinois Tollway special provision for Granular Subbase Special.
- e) Expansion anchors, anchor studs, bolts, nuts, and washers shall be in accordance with Article 1006.09 of the Standard Specifications.
- f) Steel plates shall be in accordance with Article 1006.04 Grade 36 of the Standard Specifications.
- g) Dowels shall be in accordance with Article 1006.11 of the Standard Specifications.
- h) Hot-poured, low modulus polymer sealant shall meet the requirements of ASTM D6690.
- i) Steel plates, bolts, nuts and washers shall be hot-dipped galvanized in accordance with AASHTO M 111.

- j) Protective Coat shall be in accordance with Section 1023 of the Standard Specifications.
- k) The Elastomeric sheet shall be in accordance with Article 1083.02(a) of the Standard Specifications.

Equipment. Equipment shall conform to the applicable requirements of Sections 420, 503 and 520 of the Standard Specifications, except as modified herein in accordance with the construction requirements, and shall be subject to the approval of the Engineer.

CONSTRUCTION REQUIREMENTS

The bridge approach slab shall be constructed according to the details shown in the plans.

Approach Slab concrete shall be placed when the temperature is expected to rise for a minimum of 8 hours after the concrete reaches its initial set.

The granular subbase shall be constructed according to the Illinois Tollway Special Provision for Granular Subbase Special.

The preformed bonded joint seal shall be installed according to Illinois Tollway special provision for Bonded Preformed Joint Seal.

Protective Coat shall be in accordance with Article 420.18 of the Standard Specifications.

The bridge deck grooving of the Approach Slab shall be in accordance with Article 503.16(a)(3)b of the Standard Specifications. Stop bridge deck grooving 2 in. +/- 1 in. from the saw cut longitudinal and transverse joints, and formed joints between abutment and approach slab.

Method of Measurement. This work will be measured for payment in place, and the area computed in square yards. The dimensions used will not exceed those shown on the plans or ordered in writing by the Engineer.

Sealant, backer rod, polyethylene sheeting bond breaker, drilling and grouting of dowels, dowel bar assemblies, expansion anchors, mechanical couplers, granular subbase, elastomeric sheet, anchor studs, steel plates, concrete, reinforcing steel, protective coat and bridge deck grooving will not be measured for payment and will be considered included in the cost of BRIDGE APPROACH SLAB.

Basis of Payment. This work will be paid for at the contract unit price per square yard for BRIDGE APPROACH SLAB.

Pay Item Number	Designation	Unit of Measure
J1420040	BRIDGE APPROACH SLAB	SQ YD

TRANSITION APPROACH SLAB (TOLLWAY)

Effective: July 22, 2014

Revised: April 1, 2016

Description. This special provision shall consist of constructing cast-in-place concrete structures that shall include bridge deck and diaphragm elements of the superstructure constructed in one continuous operation between expansion or construction joints specified with Illinois Tollway Class HP high performance concrete. The concrete structure shall also include concrete parapets and railing elements of the superstructure that shall not be placed monolithically with the deck and shall be constructed using standard IDOT Class BS concrete. Section 503 of the Standard Specifications shall apply, except as modified herein.

Materials. Replace Article 503.02(a) of the Standard Specifications with the following:

- “(a) Portland Cement Concrete for all portions of the structure excluding the bridge deck and diaphragms shall be in accordance with Section 1020 of the Standard Specifications. High Performance Concrete for deck and diaphragms of the concrete superstructure shall be Illinois Tollway Class HP concrete designed in accordance with the Illinois Tollway’s “Performance Related Special Provision for High Performance Concrete Mix Designs for Concrete Superstructure.”

CONSTRUCTION REQUIREMENTS

Add this sentence to the end of the ninth paragraph of Article 503.06 of the Standard Specifications:

“Where stainless steel reinforcement bars are specified, all metal items to remain in the concrete structure, such as tie bars, bolts, anchorages, and metal ties, shall be fabricated with stainless steel.”

Add this sentence to the end of the first paragraph of Article 503.06(b) of the Standard Specifications to read:

“Where stainless steel reinforcement bars are specified, all metal tie rods, bolts, anchorages, brackets, and other forming hardware which is incorporated into the bridge deck shall be stainless steel.”

Revise the Second Paragraph of Article 503.06(b) of the Standard Specifications to read as follows.

“When the Contractor uses cantilever forming brackets on exterior beams or girders, additional requirements shall be as follows.”

Revise Article 503.06(b)(1) of the Standard Specifications to read as follows.

“(1) Bracket Placement. The spacing of brackets shall be per the manufacturer’s published design specifications for the size of the overhang and the construction loads anticipated. The resulting force of the leg brace of the cantilever bracket shall bear on the web within 6 inches of the bottom flange of the beam or girder.”

Revise Article 503.06(b)(2) of the Standard Specifications to read as follows.

“(2) Beam Ties. The top flange of exterior steel beams or girders supporting the cantilever forming brackets shall be tied to the bottom flange of the next interior beam. The top flange of exterior concrete beams supporting the cantilever forming brackets shall be tied to the top flange of the next interior beam. The ties shall be spaced at 4 foot centers. Permanent cross frames on steel girders may be considered a tie. Ties shall be a minimum of ½-inch diameter threaded rod with an adjusting mechanism for drawing the tie taut. The ties shall utilize hanger brackets or clips which hook onto the flange of steel beams. No welding will be permitted to the structural steel or stud shear connectors, or to reinforcement bars of concrete beams, for the installation of the tie bar system. After installation of the ties and blocking, the tie shall be drawn taut until the tie does not vary from a straight line from beam to beam. Where stainless steel reinforcement bars are specified, ties shall be a minimum of No. 4 stainless steel reinforcement bars, and steel items contained in the tie bar stabilizing system shall be fabricated with stainless steel. The tie system shall be approved by the Engineer.”

Revise Article 503.06(b)(3) of the Standard Specifications to read as follows.

“(3) Beam Blocks. Suitable beam blocks of 4 inch x 4 inch timbers or metal structural shapes of equivalent strength or better, acceptable to the Engineer, shall be wedged between the webs of the two beams tied together, within 6 inches of the bottom flange at each location where they are tied. When it is not feasible to have the resulting force from the leg brace of the cantilever brackets transmitted to the web within 6 inches of the bottom flange, then additional blocking shall be placed at each bracket to transmit the resulting force to within 6 inches of the bottom flange of the next interior beam or girder.”

Delete the last paragraph of Article 503.06(b) of the Standard Specifications.

Revise the third paragraph of Article 503.16 of the Standard Specifications to read as follows.

“Fogging equipment shall be in operation during the bridge deck placement. Fogging equipment shall be adequate to reach or cover the entire pour from behind the finishing machine or vibrating screed to the point of curing covering application, and shall be operated in a manner which shall not accumulate water on the deck until the curing covering has been placed.”

Revise the third paragraph of Article 503.16(a)(1) of the Standard Specifications to read as follows.

“At the Contractor’s option, a vibrating screed may be used in lieu of a finishing machine for superstructures with a pour width less than or equal to 24 feet. After the concrete is placed and consolidated, it shall be struck off with a vibrating screed allowing for camber, if required. The vibrating screed shall be of a type approved by the Engineer. A slight excess of concrete shall be kept in front of the cutting edge at all times during the striking off operation. After screeding, the entire surface shall be finished with hand-operated longitudinal floats having blades not less than 10 feet in length and 6 inches in width. Decks so finished need not be straightedge tested as specified in 503.16(a)(2).”

Delete the fifth paragraph of 503.16(a)(1) of the Standard Specifications.

Revise Article 503.16(a)(2) of the Standard Specifications to read as follows.

“(2) Straightedge Testing and Surface Correction. After the finishing has been completed and while the concrete is still plastic, the surface shall be tested for trueness with a 10 foot straightedge, or a hand-operated longitudinal float having blades not less than 10 feet in length and 6 inches in width. The Contractor shall furnish and use an accurate 10 foot straightedge or float which has a handle not less than 3 feet longer than one-half of the pour width. The straightedge or float shall be held in contact with the surface and passed gradually from one side of the superstructure to the other. Advance along the surface shall be in successive stages of not more than one-half the length of the straightedge or float. Any depressions found shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished.”

Revise Article 503.17 of the Standard Specifications to read as follows.

“Concrete shall be cured according to Article 1020.13 with exception to the Illinois Tollway Class HP concrete for bridge decks that will be cured in accordance with the Illinois Tollway special provision for High Performance Concrete Mix Designs for Concrete Superstructure.”

Replace the second sentence of the first paragraph of Article 1020.13(a)(5) of the Standard Specifications with the following sentences.

“Cotton mats in poor condition will not be allowed. The cotton mats shall be placed in a manner which will not create indentations greater than ¼-inch in the concrete surface. Minor marring of the surface is tolerable and is secondary to the importance of timely curing.”

Revise Article 1103.13(a) of the Standard Specifications to read as follows.

“(a) Bridge Deck. The finishing machine shall be equipped with: (1) a mechanical strike off device; (2) either a rotating cylinder(s) or a longitudinal oscillating screed which transversely finishes the surface of the concrete. The Contractor may attach other equipment to the finishing machine to enhance the final finish when approved by the Engineer. The finishing machine shall produce a deck surface of uniform texture, free from porous areas, and with the required surface smoothness.

The finishing machine shall be operated on rails or other supports that will not deflect under the applied loads. The maximum length of rail segments supported on top of beams and within the pour shall be 10 feet. The supports shall be adjustable for elevation and shall be completely in place to allow the finishing machine to be used for the full length of the area to be finished. The supports shall be approved by the Engineer before placing of the concrete is started.”

Revise Article 1103.17(k) of the Standard Specifications to read as follows.

“(k) Fogging Equipment. Fogging equipment shall be hand held fogging equipment for humidity control. The equipment shall be capable of atomizing water to produce a fog blanket by the use of pressure 2500 psi minimum and an industrial fire hose fogging nozzle or equivalent. Fogging equipment attached to the finishing machine will not be permitted.”

Method of Measurement. This work will be measured in accordance with Article 503.21 of the Standard Specifications.

Reinforcement bars will be measured for payment according to the Illinois Tollway special provision for Reinforcement Bars, and/or Article 508.07 of the Standard Specifications.

Basis of Payment. This work will be paid in accordance with Article 503.22 of the Standard Specifications except as follows:

Revise the first paragraph of Article 503.22 of the Standard Specifications to read:

“This work will be paid for at the contract unit price per cubic yard for CONCRETE STRUCTURES, CONCRETE SUPERSTRUCTURE, and HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE.”

Reinforcement bars will be paid for according to the Illinois Tollway special provision for Reinforcement Bars, and/or Article 508.10 of the Standard Specifications.

Pay Item Number	Designation	Unit of Measure
JI503010	HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE	CU YD

CONCRETE STRUCTURES (TOLLWAY GBSP)

Effective: July 22, 2014

Revised: April 1, 2016

Description. This special provision shall consist of constructing cast-in-place concrete structures that shall include bridge deck and diaphragm elements of the superstructure constructed in one continuous operation between expansion or construction joints specified with Illinois Tollway Class HP high performance concrete. The concrete structure shall also include concrete parapets and railing elements of the superstructure that shall not be placed monolithically with the deck and shall be constructed using standard IDOT Class BS concrete. Section 503 of the Standard Specifications shall apply, except as modified herein.

Materials. Replace Article 503.02(a) of the Standard Specifications with the following:

- “(a) Portland Cement Concrete for all portions of the structure excluding the bridge deck and diaphragms shall be in accordance with Section 1020 of the Standard Specifications. High Performance Concrete for deck and diaphragms of the concrete superstructure shall be Illinois Tollway Class HP concrete designed in accordance with the Illinois Tollway’s “Performance Related Special Provision for High Performance Concrete Mix Designs for Concrete Superstructure.”

CONSTRUCTION REQUIREMENTS

Add this sentence to the end of the ninth paragraph of Article 503.06 of the Standard Specifications:

“Where stainless steel reinforcement bars are specified, all metal items to remain in the concrete structure, such as tie bars, bolts, anchorages, and metal ties, shall be fabricated with stainless steel.”

Add this sentence to the end of the first paragraph of Article 503.06(b) of the Standard Specifications to read:

“Where stainless steel reinforcement bars are specified, all metal tie rods, bolts, anchorages, brackets, and other forming hardware which is incorporated into the bridge deck shall be stainless steel.”

Revise the Second Paragraph of Article 503.06(b) of the Standard Specifications to read as follows.

“When the Contractor uses cantilever forming brackets on exterior beams or girders, additional requirements shall be as follows.”

Revise Article 503.06(b)(1) of the Standard Specifications to read as follows.

“(1) Bracket Placement. The spacing of brackets shall be per the manufacturer’s published design specifications for the size of the overhang and the construction loads anticipated. The resulting force of the leg brace of the cantilever bracket shall bear on the web within 6 inches of the bottom flange of the beam or girder.”

Revise Article 503.06(b)(2) of the Standard Specifications to read as follows.

“(2) Beam Ties. The top flange of exterior steel beams or girders supporting the cantilever forming brackets shall be tied to the bottom flange of the next interior beam. The top flange of exterior concrete beams supporting the cantilever forming brackets shall be tied to the top flange of the next interior beam. The ties shall be spaced at 4 foot centers. Permanent cross frames on steel girders may be considered a tie. Ties shall be a minimum of ½-inch diameter threaded rod with an adjusting mechanism for drawing the tie taut. The ties shall utilize hanger brackets or clips which hook onto the flange of steel beams. No welding will be permitted to the structural steel or stud shear connectors, or to reinforcement bars of concrete beams, for the installation of the tie bar system. After installation of the ties and blocking, the tie shall be drawn taut until the tie does not vary from a straight line from beam to beam. Where stainless steel reinforcement bars are specified, ties shall be a minimum of No. 4 stainless steel reinforcement bars, and steel items contained in the tie bar stabilizing system shall be fabricated with stainless steel. The tie system shall be approved by the Engineer.”

Revise Article 503.06(b)(3) of the Standard Specifications to read as follows.

“(3) Beam Blocks. Suitable beam blocks of 4 inch x 4 inch timbers or metal structural shapes of equivalent strength or better, acceptable to the Engineer, shall be wedged between the webs of the two beams tied together, within 6 inches of the bottom flange at each location where they are tied. When it is not feasible to have the resulting force from the leg brace of the cantilever brackets transmitted to the web within 6 inches of the bottom flange, then additional blocking shall be placed at each bracket to transmit the resulting force to within 6 inches of the bottom flange of the next interior beam or girder.”

Delete the last paragraph of Article 503.06(b) of the Standard Specifications.

Revise the third paragraph of Article 503.16 of the Standard Specifications to read as follows.

“Fogging equipment shall be in operation during the bridge deck placement. Fogging equipment shall be adequate to reach or cover the entire pour from behind the finishing machine or vibrating screed to the point of curing covering application, and shall be operated in a manner which shall not accumulate water on the deck until the curing covering has been placed.”

Revise the third paragraph of Article 503.16(a)(1) of the Standard Specifications to read as follows.

“At the Contractor’s option, a vibrating screed may be used in lieu of a finishing machine for superstructures with a pour width less than or equal to 24 feet. After the concrete is placed and consolidated, it shall be struck off with a vibrating screed allowing for camber, if required. The vibrating screed shall be of a type approved by the Engineer. A slight excess of concrete shall be kept in front of the cutting edge at all times during the striking off operation. After screeding, the entire surface shall be finished with hand-operated longitudinal floats having blades not less than 10 feet in length and 6 inches in width. Decks so finished need not be straightedge tested as specified in 503.16(a)(2).”

Delete the fifth paragraph of 503.16(a)(1) of the Standard Specifications.

Revise Article 503.16(a)(2) of the Standard Specifications to read as follows.

“(2) Straightedge Testing and Surface Correction. After the finishing has been completed and while the concrete is still plastic, the surface shall be tested for trueness with a 10 foot straightedge, or a hand-operated longitudinal float having blades not less than 10 feet in length and 6 inches in width. The Contractor shall furnish and use an accurate 10 foot straightedge or float which has a handle not less than 3 feet longer than one-half of the pour width. The straightedge or float shall be held in contact with the surface and passed gradually from one side of the superstructure to the other. Advance along the surface shall be in successive stages of not more than one-half the length of the straightedge or float. Any depressions found shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished.”

Revise Article 503.17 of the Standard Specifications to read as follows.

“Concrete shall be cured according to Article 1020.13 with exception to the Illinois Tollway Class HP concrete for bridge decks that will be cured in accordance with the Illinois Tollway special provision for High Performance Concrete Mix Designs for Concrete Superstructure.”

Replace the second sentence of the first paragraph of Article 1020.13(a)(5) of the Standard Specifications with the following sentences.

“Cotton mats in poor condition will not be allowed. The cotton mats shall be placed in a manner which will not create indentations greater than ¼-inch in the concrete surface. Minor marring of the surface is tolerable and is secondary to the importance of timely curing.”

Revise Article 1103.13(a) of the Standard Specifications to read as follows.

“(a) Bridge Deck. The finishing machine shall be equipped with: (1) a mechanical strike off device; (2) either a rotating cylinder(s) or a longitudinal oscillating screed which transversely finishes the surface of the concrete. The Contractor may attach other equipment to the finishing machine to enhance the final finish when approved by the Engineer. The finishing machine shall produce a deck surface of uniform texture, free from porous areas, and with the required surface smoothness.

The finishing machine shall be operated on rails or other supports that will not deflect under the applied loads. The maximum length of rail segments supported on top of beams and within the pour shall be 10 feet. The supports shall be adjustable for elevation and shall be completely in place to allow the finishing machine to be used for the full length of the area to be finished. The supports shall be approved by the Engineer before placing of the concrete is started.”

Revise Article 1103.17(k) of the Standard Specifications to read as follows.

“(k) Fogging Equipment. Fogging equipment shall be hand held fogging equipment for humidity control. The equipment shall be capable of atomizing water to produce a fog blanket by the use of pressure 2500 psi minimum and an industrial fire hose fogging nozzle or equivalent. Fogging equipment attached to the finishing machine will not be permitted.”

Method of Measurement. This work will be measured in accordance with Article 503.21 of the Standard Specifications.

Reinforcement bars will be measured for payment according to the Illinois Tollway special provision for Reinforcement Bars, and/or Article 508.07 of the Standard Specifications.

Basis of Payment. This work will be paid in accordance with Article 503.22 of the Standard Specifications except as follows:

Revise the first paragraph of Article 503.22 of the Standard Specifications to read:

“This work will be paid for at the contract unit price per cubic yard for CONCRETE STRUCTURES, CONCRETE SUPERSTRUCTURE, and HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE.”

Reinforcement bars will be paid for according to the Illinois Tollway special provision for Reinforcement Bars, and/or Article 508.10 of the Standard Specifications.

Pay Item Number	Designation	Unit of Measure
JI503010	HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE	CU YD

PERFORMANCE-RELATED SPECIAL PROVISION FOR HIGH PERFORMANCE CONCRETE MIX DESIGNS FOR CONCRETE SUPERSTRUCTURE (TOLLWAY)

Effective: October 12, 2012

Revised: September 11, 2015

DESCRIPTION

This work consists of designing and furnishing high performance portland cement concrete. The objective of this performance-related special provision is to provide the Illinois Tollway with a methodology to assure high quality concrete with reduced shrinkage potential, while simultaneously allowing the Contractor the maximum freedom in deciding how to develop the mix design and place the concrete to achieve this objective. Construction of superstructures using high performance concrete shall be in accordance with Section 503 of the IDOT Standard Specifications except where modified by this special provision.

Reference Standards

Except where modified by the Illinois Department of Transportation or the Tollway, the following Standards shall apply:

Illinois Department of Transportation (IDOT)

- Standard Specifications for Road and Bridge Construction, Adopted January 1, 2012.
- Supplemental Specifications and Recurring Special Provisions, Current Edition.
- Test Procedures referenced herein, as described in the current edition of the Manual of Test Procedures for Materials, as well these test procedures:
 - AASHTO T 22 Compressive Strength of Cylindrical Concrete Test Specimens
 - AASHTO T 105 Chemical Analysis of Hydraulic Cement
 - AASHTO T 119 Standard Test Method for Slump of Hydraulic-Cement Concrete

- AASHTO T 152 Air Content of Freshly Mixed Concrete by the Pressure Method
- AASHTO T 160 Length Change of Hardened Hydraulic-Cement Mortar and Concrete
- AASHTO T 161 Standard Method of Test for Resistance of Concrete to Rapid Freezing and Thawing (Procedure A – modified)
- AASHTO T 277 Electrical Indication of Concrete’s Ability to Resist Chloride Ion Penetration
- AASHTO T 303 Potential alkali reactivity of aggregates (mortar-bar method)
- ASTM A820 Standard Specification for Steel Fibers for Fiber-Reinforced Concrete
- ASTM C94 Standard Specification for Ready-Mixed Concrete
- ASTM C457 Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete (Method B)
- ASTM C494 Standard Specification for Chemical Admixtures for Concrete
- ASTM C856 Petrographic Examination of Hardened Concrete
- ASTM C1581 Determining Age at Cracking and Induced Tensile Stress Characteristics of Mortar and Concrete under Restrained Shrinkage
- ASTM C1666 Standard Specification for Alkali Resistant (AR) Glass Fiber for GFRC and Fiber-Reinforced Concrete and Cement
- ASTM C1761 Standard Specification for Lightweight Aggregate for Internal Curing of Concrete
- ASTM D7508 Standard Specification for Polyolefin Chopped Strands for Use in Concrete

MATERIALS

Portland cement, mixing water, fine and coarse aggregates, supplementary cementitious materials, and concrete admixtures shall conform to the requirements of Section 1000 of Illinois Department of Transportation *Standard Specifications for Road and Bridge Construction*, Current Edition, with exceptions as noted. Specific references are as follows:

Material	Section
Cement (See Note 1)	1001
Mixing Water	1002
Fine Aggregates (See Note 2)	1003
Coarse Aggregates (See Note 2)	1004
Supplementary Cementitious Materials (See Note 3)	1010
Concrete Admixtures (See Note 4)	1021
Other Materials	see Notes 5 and 6

- Note 1: Portland cement shall be according to AASHTO M 85 and blended cement shall be according to AASHTO M 240 with no additional restrictions. Limestone is classified as a processing addition to Portland cement, not as a supplementary cement. The use of other cements shall require approval of the Tollway materials department.
- Note 2: Fine and coarse aggregate requirements shall be per IDOT Class BS concrete
- Note 3: Supplementary cementitious materials must have an alkali content less than 3.5 percent ($\text{Na}_2\text{O}_{\text{eq}}$).
- Note 4: Shrinkage reducing admixtures (SRA) and slump retention admixtures from a Tollway approved source may be used.
- Note 5: Fiber reinforcement shall be permitted provided the material is used in accordance with the product manufacturer's recommendations and it is demonstrated that the concrete complies with the herein established performance requirements. Steel fibers shall conform to ASTM A820, Alkali-resistant (AR) glass fibers shall conform to ASTM C1666 and synthetic fibers shall conform to ASTM D7508.
- Note 6: Saturated lightweight aggregate may be used in accordance with ASTM C1761.

MIXTURE QUALIFICATION REQUIREMENTS

Contractor shall provide a concrete mixture design according to the following performance requirements. The testing shall be performed by an AASHTO-accredited laboratory. Mixture designs not used in the current calendar year will require a current report of petrographic examination, performed in accordance with ASTM C856, using concrete produced from a trial batch witnessed by the Tollway in the current calendar year.

Slump Loss

Unless otherwise approved by the Tollway, the initial slump (measured within 10 minutes after the addition of water) shall be between 3 and 8 inches. The slump shall be no less than 3 inches for at least 45 minutes after the addition of water as measured by AASHTO T 119. The change in slump shall be no greater than 2 inches in 20 minutes and 4 inches from the initial measurement (measured within 10 minutes after the addition of water). The concrete temperature during testing shall be greater than 65°F.

Compressive Strength

Compressive strength measured in accordance with AASHTO T 22 shall not be less than 4,000 psi at 14 days. Test cylinders shall be made and cured in accordance with AASHTO T 23. The compressive strength determined in the laboratory shall be designated as f'_{target} for future acceptance of the mixture.

Time to Cracking

Net time to cracking shall not be less than 28 days when determined in accordance with ASTM C1581. Prior to batching for a test sample, all coarse aggregate particles exceeding ¾-inch shall be removed and replaced with an equal volume of minus ¾-inch graded material. This test shall be waived if the concrete mixture contains 605 lb/yd³ or less total cementitious material and a minimum dosage of 1.5 gal/yd³ of approved shrinkage reducing admixture (SRA).

Length Change

Measured shrinkage shall not be greater than 0.030 percent after 21 days of air drying when determined in accordance with AASHTO T 160. Specimens shall be wet cured for 7 days prior to air-drying. The initial reading for calculation of shrinkage shall be taken at the initiation of drying.

Freeze-Thaw Durability

Durability factor shall be no less than 80 percent after 300 cycles of freezing and thawing as determined in accordance with AASHTO T 161 (Procedure A) with the following modifications: the 14-day curing period prior to freeze-thaw cycling shall consist of 7 days immersion, in saturated lime water at 73.4 ± 3.0 °F followed by 7 days of storage in air at 73.4 ± 2.0 °F and at a relative humidity of 50 ± 4.0 %.

The concrete will possess an air-void system having the following characteristics as determined by ASTM C457 (Method B):

- Spacing factor not exceeding 0.008-in.
- Specific surface not less than $600 \text{ in}^2/\text{in}^3$
- Total air content not less than 4.0 percent

The air-void system requirements will be waived if testing in accordance with AASHTO T 161 (Tollway-modified) results in a durability factor equal to or greater than 90 percent after 300 cycles of freezing and thawing.

Freeze-thaw testing in accordance with AASHTO T 161 (Tollway-modified) may be waived at the discretion of the Tollway if the air-void system parameters are met.

Chloride Penetrability

The total charge passed shall not exceed 1250 coulombs at 28 days as determined in accordance with AASHTO T 277 using the accelerated curing procedure. Test specimens shall be made in accordance with AASHTO T 23. Specimens shall be cured for one week at 73 °F and the following three weeks at 100 °F. An interim test result can be provided at the option of the contractor. A test shall consist of three specimens.

Alkali Silica Reactivity

Each aggregate shall be evaluated individually in accordance with AASHTO T 303 and must have a measured expansion no greater than 0.10 percent after 16 days. Each aggregate shall be evaluated separately. Each aggregate that does not meet this limit when tested with portland cement alone may demonstrate acceptance using a blended cement or a combination of portland cement and supplementary cementitious materials proposed for the HPC mixture. The supplementary cementitious replacement content needed to pass the AASHTO T 303 requirement shall become the minimum required replacement percentage of the concrete mixture.

This test shall be waived if the concrete is proportioned such that the maximum total alkali content ($\text{Na}_2\text{O}_{\text{eq}}$) contributed by portland cement (as determined in accordance with AASHTO T 105) does not exceed $4.0 \text{ lb}/\text{yd}^3$.

The test shall also be waived if the aggregate has been evaluated in accordance with ASTM C1293 within the last 12 months and has an average expansion of three concrete specimens equal to or less than 0.04 % at one year.

FIELD TRIAL BATCH ACCEPTANCE

Qualification of the concrete mixture will require a field trial batch in addition to laboratory testing. The field trial must be produced at the batch plant under the supervision of the Tollway materials department and must meet the following characteristics:

- Compressive strength measured in accordance with AASHTO T 22 at 14 days (f_c) shall be within $4000 \leq f_c \leq [f_{\text{target}} + 1500]$ psi where f_{target} is defined as the 14 day strength obtained in the laboratory qualification test.
- Unless otherwise approved by the Tollway, the slump shall be between 3 and 8 inches. The slump shall be no less than 3 inches for at least 45 minutes after the addition of water as measured by AASHTO T 119. The change in slump shall be no greater than 2 inches in 20 minutes and 4 inches from the initial measurement (taken within 10 minutes after the addition of water). The concrete temperature during testing shall be greater than 70°F.
- Plastic air content measured in accordance with AASHTO T 152 shall be ± 1.5 percent from the design. The plastic air content measured at the end of slump loss testing shall be greater than 4.0 percent.. A hardened air void analysis in accordance with ASTM C457 may be submitted as an alternative.
- Water / cementitious materials ratio – Design -0.03, +0.00
- The total charge passed shall not exceed 1500 coulombs at 28 days as determined in accordance with AASHTO T 277 using the accelerated curing procedure. Test specimens shall be made in accordance with AASHTO T 23. Specimens shall be cured for one week at 73 °F and the following three weeks at 100 °F. A test shall consist of three specimens.

Mixture Qualification Submittal

Submittal shall include:

1. Mixture design, showing:
 - a. Quantities, description, sources and mill certifications of all mixture ingredients
 - b. Design water-cementitious materials ratio (w/cm)
 - c. Design Slump
 - d. Design Air content
 - e. Gradation and absorption of all aggregates
 - f. Bulk specific gravity (SSD) of all cementitious materials and aggregates
 - g. Theoretical mass and fresh density
 - h. Admixture dosage
2. A mixture qualification report demonstrating that the concrete complies with the performance requirements herein specified.
3. Report of petrographic examination of trial batch concrete, performed in accordance with ASTM C856.
4. Report of chemical analysis by X-ray Fluorescence of trial batch concrete, performed in accordance with AASHTO T 105.

MATERIAL TOLERANCES

Portland Cement or Blended Cement

Once a mixture qualification has been approved, no re-submittal shall be required under the condition that the portland cement or blended cement source complies with the following tolerances:

- Alkali content ($\text{Na}_2\text{O}_{\text{eq}}$): ± 0.20 percent. The alkali silica reactivity requirements for the mixture qualification shall be met with the new alkali content.
- Tri-calcium aluminate content: -2.0 percent, +1.0 percent

Substitution of cement from sources not meeting the above tolerances shall only be permitted at the discretion of the Tollway materials department¹.

Coarse and Fine Aggregate

Substitution of aggregates from different sources or size classifications shall only be permitted at the discretion of the Tollway materials department¹. Similar aggregate type and lithology are recommended to ensure that no change in constructability or performance occurs.

Supplementary Cementitious Materials

No change in grade, classification, or fly ash type shall be permitted without resubmittal unless approved by the Tollway materials department¹.

Concrete Admixtures and Other Materials

Contractor may change between ASTM C494 Type A and Type D admixtures as seasonal conditions warrant. No other changes in manufacturer or product shall be permitted without re-submittal unless approved by the Tollway materials department¹.

CURING AND PROTECTION

A proposed HPC mixture that complies with the specified properties defined herein shall be considered “fully optimal” if the mix contains no less than 6% (based on total weight) pre-wetted lightweight fines, contains a minimum of 35% (of total cement weight) supplementary cementing materials, shall contain a minimum dosage of 2.0 gal/yd³ of approved shrinkage reducing admixture (SRA), and has a gradation that is well optimized with a minimum of 2 fine aggregates (natural sand and lightweights) and 2 coarse aggregates blended at the production plant to fall within the following gradation band.

AGGREGATE BLEND FOR THE “FULLY OPTIMAL” CLASS HPC MIX
 Percent by weight passing

Sieve Size	% Passing
1 in.	100
¾ in.	85-98
½ in.	65-85
⅜ in.	55-77
# 4	40-60
# 8	28-45
# 16	18-35
# 30	10-25
# 50	5-17
#100	1-12
#200	0-8

Curing For Optimal HPC Mix Designs

Curing shall be in accordance with Article 1020.13(a)(5) of the standard specifications except as modified below.

Add the following paragraph to Article 1020.13(a)(5) of the standard specifications:
 “The curing period for decks built with an approved “fully optimal” HPC mix design shall be no less than 4 days.”

Curing For Other HPC Mix Designs

Curing shall be in accordance with Article 1020.13(a)(5) for a 7 day period.

For All HPC Mix Designs

Low air temperature protection methods shall be in accordance with Articles 1020.13(d)(1)(2) of the Standard Specifications except as modified below:

Replace the first sentence of Article 1020.13(d)(1) of the standard specifications with the following:

“When the official National Weather Service forecast for the construction area predicts a low below 45°F, or if the actual temperature drops below 45°F, concrete less than 72 hours old shall be provided protection. When protection is required, the temperature of water for curing shall be no less than 45°F.”

The temperature of the curing water shall not be more than 20 °F cooler than the surface temperature of the concrete at the time the water and concrete come in contact. The curing water temperature shall be measured in the storage tank. The surface temperature of the concrete shall be measured under the cotton mats placed for curing. Measuring the temperatures of the curing water and concrete surface, and any required heating or cooling of the curing water, shall be the responsibility of the contractor. Water shall be potable, meet the requirements of ASTM C 94, and be free of materials that have the potential to stain concrete.

Use black or dark colored plastic sheets when the daily high ambient temperature is below 60 °F. Use white or similarly reflective plastic sheets when the daily high ambient temperature is above 85°F. Use any color or transparency of plastic sheet at temperatures between 60 and 85 °F.

TEMPERATURE CONTROL FOR PLACEMENT

Temperature control for concrete placement shall be according to Article 1020.14 of the standard specifications except as modified below:

Replace Article 1020.14(b) of the standard specifications with the following:

“Concrete in structures may be placed when the ambient air temperature is 40°F and rising, and concrete placement shall stop when the falling temperature reaches 45°F or below, unless otherwise approved by the Engineer. The temperature of the surfaces to receive concrete shall not be less than 40°F.

The temperature of the concrete at the point of placement shall not be less than 60°F for ternary mixtures or for any concrete with more than 20% fly ash or 35% slag replacement of Portland cement, and shall not be less than 45°F for all other mixtures, and shall not be more than 90°F for any mixture. The use of non-chloride accelerating admixture conforming to ASTM C494 Type C or E is allowed during cold weather placements when air temperatures below 45°F are anticipated before the expiration of the specified curing period, provided the accelerator is included in the original mixture qualification. When insulated forms are used, the maximum temperature of the concrete mixture shall be 80°F. High performance concrete mixtures shall not be placed when the ambient air temperature exceeds 90°F without approval of the Engineer. The maximum concrete temperature shall be 85°F for the cast-in-place high performance concrete mixtures at the point of placement, except when placement operations are conducted at night, when the maximum concrete temperature shall be 90°F. The difference in temperature of the forms and concrete shall be <10°F at time of placement.”

QUALITY MANAGEMENT PLAN

At least 14 days prior to the first concrete placement, the Contractor shall submit a Quality Management Plan (QMP), for materials and construction in accordance with the Illinois Tollway recurring Special Provision for Contractor's Quality Program. Minimum job-site testing procedures shall be per the IDOT QC/QA Special Provision. Contractor personnel performing testing shall be IDOT certified Level I PCC Technician or higher.

PRODUCTION FACILITY AND TRANSPORTATION EQUIPMENT

The production facility and transportation equipment shall conform to the certification requirements of the Illinois Department of Transportation.

FIELD ACCEPTANCE

Acceptance to this specification shall be based on the following characteristics:

- Compressive strength measured in accordance with AASHTO T 22 at 14 days (f_c) shall be within $4000 \leq f_c \leq [f_{\text{target}} + 1500]$ psi where f_{target} is defined as the 14 day strength obtained in the laboratory qualification test.
- Unless otherwise approved by the Tollway, the slump shall be between 3 and 8 inches when delivered to the project site.
- Plastic air content measured in accordance with AASHTO T 152 shall be ± 1.5 percent from the design, with a minimum of 4.0 percent. A hardened air void analysis in accordance with ASTM C457 may be submitted as an alternative.
- Water / cementitious materials ratio – Design -0.03, +0.00

Other quality assurance testing required by the Tollway, but not included as a basis for payment shall consist of:

- The total charge passed shall not exceed 1500 coulombs at 28 days as determined in accordance with AASHTO T 277 using the accelerated curing procedure. Test specimens shall be made in accordance with AASHTO T 23 at the same frequency as compressive strength testing. A minimum of two tests shall be required for each bridge deck placement where each test consists of three specimens. Specimens shall be cured for one week at 73 °F and the following three weeks at 100 °F.
- A petrographic examination in accordance with ASTM C856 and chemical analysis according to AASHTO T 105 may be used at the discretion of the Tollway to screen for changes in composition.

BRIDGE FORM LINER AND FORM LINER MOCKUP (TOLLWAY)

Effective: October 3, 2013

Revised: April 1, 2016

Description. This work shall consist of designing, developing, furnishing and installing form liners and forming concrete using reusable, high-strength urethane form liners to achieve the various concrete treatments as shown in the drawings and specifications. Form lined surfaces shall include areas of parapets and wing walls as shown in details in the plans. This work shall also include furnishing and installing reveal and bevel strips. All work shall be performed in accordance with applicable portions of Section 503 of the Standard Specifications and as specified herein.

Fabricator Requirements. The following form liner manufacturers have been pre-approved to provide patterned form liners. All manufacturers of form liners shall adhere to the provisions listed herein and in the plans.

Form Liners for Parapets and Wing Walls

1. Custom Rock International, St. Paul, MN (Jim Rogers; 651-699-1345)
2. American Formliners, Inc., Naperville, IL (John Kwiatkowski; 618-918-8002)
3. Fast Formliners, Inc., St. Clair, MO (Kevin Pangilinan; 636-322-0080)

Parapet and wing wall patterns shall consist of a fractured granite texture with a maximum 1/4" relief (Custom Rock Texture #T307 Fractured Granite 1/4", or approved equal), modified to include horizontal and vertical reveals as detailed in the plans. The base form liner texture is to be as shown below:



Shop Drawings. Shop drawings of the concrete facing patterns shall be submitted for each area of textured concrete. Shop drawing submittals shall include:

1. Individual form liner pattern descriptions, dimensions, and sequencing of form liner sections. Include details showing all that apply: typical cross sections, joints, corners, step footings, stone relief, stone size, pitch/working line, mortar joint and bed depths, joint locations, edge treatments, and any other special conditions.
2. Elevation views of the form liner panel layouts for the specified texture pattern showing the full length and height of the structure with each form liner panel outlined. The arrangement of the form liner panels shall provide a continuous pattern of desired textures with no interruption of the pattern made at the panel joints.

To minimize the possibility of preparing an unsatisfactory Cast Concrete Mockup as described herein, the Contractor may elect to provide shop drawings prior to the construction of the Mockup(s).

Materials. Form liners shall be of high quality, highly reusable and capable of withstanding anticipated concrete pour pressures without causing leakage or causing physical defects. Form liners shall attach easily to pour-in-place forms and be removable without causing concrete surface damage or weakness in the substrate. Liners used for the specified texture pattern shall be made from high-strength elastomeric urethane material which shall not compress more than 0.02 feet when poured at a rate of 10 vertical feet per hour. Form release agents shall be non-staining, non-residual, non-reactive and shall not contribute to the degradation of the form liner material. Forms for smooth faced surfaces shall be plastic coated or metal to provide a smooth surface free of any impression or pattern.

If the Contractor elects to use form ties for concrete forming, only fiberglass form ties will be permitted. Use of removable metallic form ties will not be allowed.

Deliver materials in original and sealed containers, clearly marked with the manufacturer's name, brand name, type of material, batch number, and date of manufacture.

Qualifications of Contractor. The Contractor shall submit evidence of appropriate experience, job listings, and project photographs from previous work.

Cast Concrete Mockup. The Contractor shall provide a cast concrete mockup containing the specified texture patterned form liner surface. The form liner manufacturer's technical representative shall be on-site for technical supervision during the installation and removal operations.

Purpose of the mockup is to select and verify the specified texture pattern to be used.

1. Locate mockup on-site as directed by the Engineer.
2. The mockup shall be a minimum of one full panel (approximately 16 ft. long) x parapet height x 6 in. thick.
3. Include examples of each condition required for construction i.e. liner joints, construction joints, expansion joints, steps, corners, and special conditions due to topography or manmade elements, etc.
4. Upon receipt of comments from inspection of the mockup, adjustments or corrections shall be made to the molds where imperfections are found. If required, additional mockups shall be prepared when the initial mockup is found to be unsatisfactory.

Installation.

Form liners shall be installed in accordance with the manufacturers' recommendations to achieve the highest quality concrete appearance possible. Form liners shall withstand concrete placement pressures without leakage causing physical or visual defects. A form release agent shall be applied to all surfaces of the liner which will come in contact with concrete as per the manufacturer's recommendations. After each use, liners shall be cleaned and made free of build-up prior to the next placement, and visually inspected for blemishes or tears. If necessary, the form liners shall be repaired in accordance with the manufacturer's recommendations. All form liner panels that will not perform as intended or are no longer repairable shall be replaced. An on-site inventory of each panel type shall be established based on the approved form liner shop drawings and anticipated useful life for each form liner type.

The liner shall be securely attached to the forms according to the manufacturer's recommendations. Liners shall be attached to each other with flush seams and seams filled as necessary to eliminate visible evidence of seams in cast concrete. Liner butt joints shall be blended into the pattern so as to create no visible vertical or horizontal seams or conspicuous form butt joint marks. Liner joints must fall within pattern joints or reveals. Finished textures shall be continuous without visual disruption and properly aligned over adjacent and multiple liner panels. Continuous or single liner panels shall be used where liner joints may interrupt the intended pattern. Panel remnants shall not be pieced together.

The Contractor shall coordinate concrete pours to prevent visible differences between individual pours or batches. Concrete pours shall be continuous between construction or expansion joints. Cold joints shall not occur within continuous form liner pattern fields. Wall ties shall be coordinated with the liner and form to achieve the least visible result. Liners shall be stripped between 12 and 24 hours as recommended by the manufacturer. Curing methods shall be compatible with the desired aesthetic result. Use of curing compounds will not be allowed. Concrete slump requirements shall meet the form liner manufacturers' recommendations for optimizing the concrete finish, as well as the Illinois Tollway's material specifications and special provisions.

With the use of standard Portland cement concrete mixtures, the Contractor shall employ proper consolidation methods to ensure the highest quality finish. Internal vibration shall be achieved with a vibrator of appropriate size, the highest frequency and low to moderate amplitude. Internal vibrator operation shall be at appropriate intervals and depths and withdrawn slowly enough to assure a minimal amount of surface air voids and the best possible finish without causing segregation. External form vibrators may be required to assure the proper results. Any use of external form vibrators must be approved by the form liner manufacturer and the Illinois Tollway. The use of internal or external vibratory action shall not be allowed with the use of self-consolidating concrete mixtures. It is the intention of this specification that no rubbing of flat areas or other repairs shall be required after form removal. The finished exposed formed concrete surfaces shall be free of visible vertical seams, horizontal seams, and butt joint marks. Grinding and chipping of finished formed surfaces shall be avoided.

Guidelines for Use of Form Liners. Form liners are being used on this project to achieve very specific architectural results. The Contractor shall not deviate from the guidelines contained herein unless authorized by the Illinois Tollway in writing.

Method of Measurement. This work shall be measured and paid for in place and the area computed in square feet of projected concrete surface area formed with bevels and concrete form liners and colored as specified herein. The pay limits of form lined concrete surface shall be as follows.

Parapets and Wing Walls: The pay area for FORM LINER shall be the projected area from outside edge to outside edge of the bevels, including the raised reveals, measured in square feet. The cost of the typical reveals shall be included in this pay item but shall not be measured separately for payment.

Cast concrete form liner mockups will be measured for payment on a lump sum basis. Required adjustments or corrections needed to address mockup comments and the cost of additional mockups, if required, will not be paid for separately, but shall be included in the lump sum price for this item.

Basis of Payment. The form lined surfaces will be paid for at the contract unit price per square feet for FORM LINER. Cast concrete form liner mockups will be paid for at the contract lump sum price for FORM LINER MOCKUP.

Pay Item Number	Description	Unit of Measure
JT599032	FORM LINER MOCKUP	L SUM
JT599034	FORM LINER	SQ FT

FENCE REMOVAL

Description: This work shall consist of the removal and satisfactory disposal of existing chain link fence of variable height as shown on the plans.

General: Post foundations shall be removed to at least 1 foot below the proposed grade elevation of subgrade or ground surface. All holes left by the removal of the fence posts and post foundations shall be filled with crushed stone screenings.

All removed items shall be disposed in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement: This work will be measured for payment in feet, along the top of the fence, including the length occupied by gates.

Basis of Payment: This work will be paid for at the contract unit price per foot for FENCE REMOVAL. The unit price per foot shall include the chain link fabric, barbed wire, posts, gates, post foundations, and all accessories.

TEMPORARY SEDIMENT BASIN

This work shall be according to Section 280 of the Standard Specifications and the following:

Add the following to Article 280.01:

This work shall also include implementation and management of the approved Erosion and Sediment Control Schedules, method of operation weekly co-inspections, inspection following rainfalls, and preparation and adherence to the Erosion and Sediment Control Schedule. Removal of erosion and sediment control items will be by others in the future where shown on the Plans or as directed by the Engineer.

Add the following to Article 280.02:

- (m) Course Aggregate Gradation CA-3.....Article 1004.01
- (n) Geotextile Fabric.....Article 1080.02
- (o) Seeding Class 2A.....Article 250.07 & 1081.04
- (p) Excelsior Blanket.....Article 1081.10 (a)
- (q) Riprap, Gradation 3..... Article 1005.01

Delete Article 280.04 (d) and replace with:

- (d) Sediment Basins. This work consists of furnishing of the equipment, labor and materials required to install a sediment basin with a sediment basin dewatering device or a sediment basin aggregate berm as shown in the plans. Also included shall be all of the work necessary to maintain the device and to remove all materials when directed by the engineer at the end of construction. Sediment basins are to be used to collect and filter sediment laden water while allowing sediment to settle out of the contaminated water. Runoff areas include both on-site and off-site tributary areas. Sediment basin aggregate berm is to be used when existing or proposed detention basin or infield area is used for a sediment basin. Provide 3,600 cubic feet of storage per acre of runoff. In restrictive right of way areas, the trap can be designed for 1,800 cubic feet of storage per acre of runoff with more frequent cleanout of sediment.

Revise Article 280.07 (a) to read:

- (a) Temporary Sediment Basins. This work will be measured for payment as individual items and the unit of measurement will be each.

Revise Article 280.08 (a) to read:

- (a) Temporary Sediment Basins will be paid for at the contract unit price per each for TEMPORARY SEDIMENT BASIN.

SLOTTED DRAIN (D-1)

Effective: September 30, 1985

Revised: January 1, 2007

This work consists of furnishing and installing slotted drains at the locations shown in the plans.

Slotted drain shall be corrugated steel pipe conforming with the applicable requirements of Section 542 of the Standard Specifications, the details shown in the plans and as described herein.

The pipe shall be cut along the longitudinal axis and reinforced with a grate of solid spacer bars. The grate assembly shall be made from structural steel suitably welded to form the open slot and shall be hot-dip galvanized to meet the provisions of AASHTO M 111. The slot depth shall be as shown in the plans. The slot width shall be 1-3/4 inches. Spacer bars shall be 3/16 inch solid web spacers on 6 inch (150 mm) centers for the full depth of the grating.

Joints and couplers for slotted drain shall provide ring compression capability across the full width of the joint. The band coupler shall butt up against the grating. A single band bolt shall be provided for band tensioning.

The slotted drain shall be installed in a trench excavated to the required grade, wide enough to accommodate the drain pipe. If the trench is excavated too deep, the additional depth shall be filled with approved fine aggregate and compacted to the satisfaction of the Engineer. The slotted drain must be properly positioned in the trench prior to backfilling. The upper end of the drain shall be capped as directed by the Engineer.

After the slotted drain has been leveled to grade a lean grout shall be used as backfill. The grout backfill shall extend upward one half the diameter of the drain pipe. The rest of the backfill may be aggregate base course material Type B meeting the requirements of Article 351.05(b) of the Standard Specifications and shall be placed and compacted as directed by the Engineer. This backfill material shall extend upward to the top of the subgrade. Once the slotted drain is backfilled it should be covered prior to placing the final surfacing.

Method of Measurement: This work will be measured in feet in place.

Basis of Payment: This work will be paid for at the contract unit price per foot for SLOTTED DRAIN 12" WITH 2 1/2" SLOT which price shall include all accessories required for connecting the slotted drain pipes and connections to drainage structures where necessary.

FILL EXISTING STORM SEWERS

Description: This work shall consist of plugging and filling existing storm sewers as required to construct the pipe abandonment as shown on the plans.

The ends of the pipe shall be securely sealed as described in Section 605.

The ends of the storm sewer shall be excavated, if necessary, to the bottom flow line and to a minimum of 6 inches inside the barrel of the pipe. The inside of the storm sewer at the excavated ends shall be cleaned of all earth and debris to the satisfaction of the Engineer.

The Contractor shall construct a suitable plug at the opening of the storm sewer consisting of mortared concrete masonry blocks or a Class SI Concrete plug.

The cost of cleaning and plugging pipe ends will not be paid for separately but will be considered as included in the contract unit price for **FILL EXISTING STORM SEWERS**, of the diameter specified.

The controlled low-strength material used to fill the storm sewer and the filling operation will be in accordance with Section 593 of the Standard Specifications.

Method of Measurement: This work will be measured in place and the volume computed in cubic yards.

Basis of Payment: This work will be paid for at the contract unit price per cubic yard for **FILL EXISTING STORM SEWERS**.

PROPOSED STORM SEWER CONNECTION TO EXISTING STORM SEWER

Description: This work shall consist of connecting proposed storm sewers to existing storm sewers at locations as shown on the plans or as directed by the Engineer, in accordance with the applicable portions of Section 550 of the Standard Specifications and IDOT District 1 Standard BD-7 (Detail of Storm Sewer Connection to Existing Sewer). The work shall include storm sewer replacement with prefabricated "T" or "Y" sections and proposed lateral connection to existing sewer as specified in the plans and details.

Basis of Payment: This work will be paid for at the contract unit price per each for **PROPOSED STORM SEWER CONNECTION TO EXISTING STORM SEWER**, which price shall be payment in full for all labor, equipment and materials necessary to complete the work as specified herein.

MANHOLES, WITH RESTRICTOR PLATE

Description: This work shall consist of installing manholes of the size specified with a restrictor plate at the locations specified in the plans in accordance with the applicable portions of Section 602 of the Standard Specifications and as detailed in District One standard BD-12.

The inlet and outlet pipes to and from the structure shall have a Mastic Joint Sealer for Pipe applied between the wall of the structure and the pipe, placed in accordance to and meeting the material requirements of Section 1055 of the Standard Specification.

Basis of Payment: This work will be paid for at the contract unit price each for MANHOLES, TYPE A, 6'-DIAMETER, TYPE 1 FRAME, CLOSE LID, RESTRICTOR PLATE, which price shall be payment in full for all labor, equipment, and materials necessary to complete the work as specified herein.

STABLIZED CONSTRUCTION ENTRANCE

Description. This work shall consist of the furnishing, installation, maintenance and removal of all stabilized construction entrances which are used to reduce or eliminate the tracking of sediment onto public right-of-ways or streets. Construction entrances shall be used in conjunction with the stabilization of construction roads and other exposed areas.

Materials. All materials shall conform to the applicable requirements of Materials, Division 1000 and specific references as follows:

- Coarse Aggregate, CA3Article 1004.01
- Filter FabricArticle 1080.03

Construction Requirements. The Contractor shall maintain continuous surveillance and shall continuously maintain, realign, or repair all stabilized construction entrances shown on the plans or directed by the Engineer that are displaced or damaged by water, traffic, Contractor operations or any other cause. This may require periodic top dressing with additional aggregate as directed by the Engineer. Aggregate used for top dressing will be not be measured for payment.

The final 4 inches of the entrance shall be constructed in accordance with the applicable requirements of Section 351 using CA-3. After the stabilized construction entrance is no longer required, all of the materials used in its construction shall be removed and disposed of.

Method of Measurement: STABILIZED CONSTRUCTION ENTRANCE will be measured for payment and the area calculated in square yards. Aggregate used for maintenance of the entrance shall be considered as included in the contract unit price for STABILIZED CONSTRUCTION ENTRANCE.

Basis of Payment: Payment for STABILIZED CONSTRUCTION ENTRANCE will be made at the contract unit price per square yard, measured as specified, which payment shall constitute full compensation for furnishing, transporting and placing the materials specified, including all overhangs, cutting and trimming.

DUCTILE IRON WATER MAIN

Description. This work will consist of the installation of water main at the size specified, including all bends, fittings and all other appurtenances including proposed sleeves, connections, and pitometers in valve basin with test taps. Reinstallation of existing sleeves to be used is included within this item.

Water main shall be installed according to Article 561 of the "Standard Specifications" and in conformance with City of Chicago Department of Water Management Standards and Technical Specifications.

The Contractor is advised that the work will be performed on a potable water system owned and operated by the Chicago Department of Water Management (CDWM). As such, all operations shall be performed in such a way as to avoid contamination of the water system through the introduction of contaminants or the process of the work. All work will require the review and approval of the CDWM prior to the commencement of work operations.

The water main shutdown required to perform the Work will only be allowed based upon scheduling by CDWM. The Work must be substantially complete in order to place the water main back into service prior to the start-up date established in coordination with the CDWM. The construction schedule must clearly indicate when testing of the new water main items will be made and for the water main to be inspected by CDWM.

The Contractor shall be aware that there are active services on the water mains and shutdown durations will be limited. Prior to beginning work, the contractor must coordinate with CDWM on the allowable shutdown durations.

Construction Requirements. The furnishing and installation of ductile iron water main, fittings, and other appurtenances for the installation of the water main shall conform to the Contract and the applicable sections of the Chicago Department of Water Management's Technical Specifications for Water Main Construction shown below and included as part of this special provision.

Ductile Iron Pipe and Fittings	Section 33 11 13
Water Main Control Valves	Section 33 12 16
Thrust Restraint for Water Main Piping	Section 33 11 15
Fire Hydrants	Section 33 12 19
Hydrostatic Testing and Disinfecting Water Mains	Section 33 13 00

All temporary and proposed work required to connect to and transition from existing water main, including temporary caps, plugs, and all work to install temporary fire hydrants are included under this item.

Testing and disinfecting as required by the City of Chicago Department of Water Management is included under this item.

Any temporary support or bracing of existing utilities must be coordinated with the affected utilities.

Any water main dewatering required during the installation of water main pipe shall be considered included as part of the successful installation of the water main.

Method of Measurement. This work shall be measured for payment according to Art. 561.04 of the "Standard Specifications".

Excavation in rock will be measured for payment according to Article 502.12.

Trench backfill shall be constructed in accordance with Article 208.01 and 208.02.

Basis of Payment. This work will be paid for at the contract unit price per foot for DUCTILE IRON WATER MAIN of the size specified, and includes all required transitions between existing and proposed water main, including the reuse of existing sleeves. TRENCH BACKFILL will be paid for separately.

Excavation in rock will be paid for according to Article 502.13

Trench backfill will be paid for according to Article 208.04.

Removal and replacement of unsuitable material below plan bedding grade will be paid for according to Article 109.04.

WATER VALVES

Description: This work shall consist of furnishing and installing new valves, at locations specified on the contract plans. Work under this item shall be performed in accordance with the Chicago Department Of Water Management Standard Specifications listed herein, and include, but not be limited to, furnishing all labor, equipment, and material necessary to complete the work as specified, shown on the Plans, or as directed by the Commissioner:

Work of the following Specification Sections are referenced under this Item.

Section 31 23 10 – Excavation, Trenching and Backfilling.

Section 31 23 19 – Dewatering Excavation.

Section 33 11 13 – Ductile Iron Pipe Fittings.

Section 33 11 15 – Thrust Restraint for Water Main Piping.

Section 33 12 16 – Water Main Control Valves.

Section 32 12 17 – Water Main Tapping Connections and Valves

Section 33 12 20 – Water Main Valve Basins & Meter Vaults

Section 33 13 00 – Disinfection and Testing of Water Mains.

Measurement for Payment: Measurement for payment to furnish and install valves (size) will be on a per EACH basis. Payment will be based upon actual quantity, of each valve furnished and installed, in accordance with the requirements of the Contract Documents. Payment will constitute full compensation for all Work necessary to install the valves, including, but not limited to, the purchase, delivery to the work site, on-site storage, delivery to the work areas, surface preparation, placement, and cleanup includes the following:

- a) Saw cutting to full pavement depth.
- b) Removal and disposal of existing surface features.
- c) Furnishing, placing and removing excavation protection systems.
- d) Dewatering excavations.
- e) Furnishing and installing valve, two (2) 1-Inch test taps, gaskets, polyethylene encasement, thrust restraint and appurtenances.
- f) Furnishing and installing valve basin, frame and lid.
- g) Furnishing, placing and compacting trench backfill and bedding.

Basis of Payment. This work will be measured and paid for at the contract unit price per EACH for WATER VALVES, WATER MAIN LINE STOP, and TAPPING VALVES AND SLEEVES of the diameters specified.

STEEL CASING PIPE, BORED AND JACKED

Description. This work shall consist of constructing bored and jacked casing pipes at locations shown on the Plans. All installation of mains, pipes, conduits, etc., under State pavements shall be done by approved Pipe Boring and Jacking methods contained herein.

Chicago Department of Water Management's Technical Specifications for Water Main Construction shown below and included as part of this special provision.

Section 31 23 10 – Excavation, Trenching and Backfilling.

Section 31 23 19 – Dewatering Excavations.

Section 33 05 21 – Utility Pipe Jacking.

Section 33 11 13 – Ductile Iron Pipe and Fittings.

Measurement for Payment: STEEL CASING PIPE, BORED AND JACKED will be measured as LINEAR FOOT. Payment will constitute full compensation for all Work necessary for a complete installation including, but not limited to, labor, materials and supplies, and equipment required for the handling and installation of the casing and carrier pipe, augering or jacking the casing pipe, construction of access and receiving shaft, shaft support, shoring and bracing removal, groundwater control, annular space fill, spacers, casing end plugs and other associated materials and surface settlement monitoring, on-site storage, delivery to work areas, site preparation and restoration and clean-up.

Jacking pit size limit for measurement purposes will be ten (10) feet wide by forty (40) feet long to a depth as indicated on the plans, for Work which includes:

- a) Saw cutting to full pavement depth, removal and disposal of existing surface features.
- b) Excavation and disposal of spoils.
- c) Providing excavation protection system.
- d) Dewatering excavations.
- e) Providing a Class SI concrete "mud" slab on jacking pit floor.
- f) Furnishing, placing and compacting trench backfill and bedding.
- g) Finish grading.

Receiving pit size limit for measurement purposes will be ten (10) feet wide by ten (10) feet long to a depth as indicated on the plans, for Work which includes:

- a) Saw cutting to full pavement depth, removal and disposal of existing surface features.
- b) Excavation and disposal of spoils.
- c) Providing excavation protection system.
- d) Dewatering excavations.
- e) Furnishing, placing and compacting trench backfill and bedding.
- f) Finish grading.

Basis of Payment. This work will be paid for at the contract unit price per foot for STEEL CASING PIPE, BORED AND JACKED of the diameters specified.

ABANDON EXISTING WATER MAIN, FILL WITH CLSM

Description. Work under this item be performed in accordance with section 561 of the Standard Specifications and Chicago Department Of Water Management Standard Specifications, and includes, but is not limited to, furnishing all labor, equipment, and material necessary to complete the work as specified, shown on the Plans, or as directed by the Engineer, and includes the following.

This work shall consist of plugging and filling existing water mains as shown on the plans and as directed by the Engineer.

This work shall be completed in accordance with applicable portions of Sections 593 of the Standard Specifications

Material. Material for filling abandoned water mains shall be Controlled Low-Strength Material (CLSM) in conformance with the applicable portions of Section 593 of the Standard Specifications.

Method of Measurement. Work under this item will be measured per linear foot of existing water main cut and capped, each fitting plugged, and per each fitting removed, and the existing pipe to be filled with CLSM according to the plans, as determined by the Engineer.

Basis of Payment. This work will be measured and paid for at the contract unit price per linear foot for WATER MAIN TO BE ABANDONED (FILL WITH CLSM), which prices shall include all labor, equipment and materials necessary to complete the work as shown on the plans.

WATER METER IN VAULT, 8 INCH

Description. This work shall consist of furnishing and installing new compound meter with check valve in vault, at locations specified on the contract plans. Work under this item shall be performed in accordance with **All Chicago Department Of Water Management (CDWM) Requirements and Specifications** including, but not limited to, furnishing all labor, equipment, and material necessary to complete the work as specified, shown on the Plans, or as directed by the Commissioner:

The water meter type and brand shall be in accordance with the Chicago Department of Water Management Requirements, Standards, and Specifications and AWWA C700. The selected water meter shall be submitted prior to purchase for approval by CDWM.

Chicago Department of Water Management's Technical Specifications for Water Main Construction shown below and included, but not limited to, as part of this special provision.

Section 31 23 10 – Excavation, Trenching and Backfilling.
Section 31 23 19 – Dewatering Excavation.
Section 33 11 13 – Ductile Iron Pipe Fittings.
Section 33 12 16 – Water Main Control Valves.
Section 33 12 20 – Water Main Valve Basins & Meter Vault

Method of Measurement. Water Meter in Vault, 8 Inch will be measured on a per each basis. Payment will be based upon actual quantity, of each water meter in vault furnished and installed, in accordance with the requirements of the Contract Documents. Payment will constitute full compensation for all Work necessary to install the water meter in vault, including, but not limited to, the purchase, delivery to the work site, on-site storage, delivery to the work areas, surface preparation, placement, and cleanup includes the following:

- a) Saw cutting to full pavement depth.
- b) Removal and disposal of existing surface features.
- c) Furnishing, placing and removing excavation protection systems.
- d) Dewatering excavations.
- e) Furnishing and installing meter vault, frame and lid.
- f) Approved Combo Meter Lead-Free Bronze Alloy, Size 8" meeting or exceeding AWWA Standard C700 and NSF/ANSI Standards 61 and 372 including stainless steel spool with bypass port, turbine measuring chamber, check valve with bypass piping, and disc measuring chamber.
- g) Furnishing and installing valves, test tap, gaskets, flanges and sleeve with link seal.
- h) Furnishing, placing and compacting trench backfill and bedding.

Basis of Payment. This work will be measured and paid for at the contract unit price per each for WATER METER IN VAULT, 8 INCH, which prices shall include all labor, equipment and materials necessary to complete the work as shown on the plans.

REMOVE EXISTING VALVE AND VAULT

Description. Work under this item will include the complete removal of existing water main valves and vault structures as part of the work shown on the Plans. After the removal of the cast iron frame and lid and the removal of all pipe, valves, fittings, taps and other water main elements, the brick or concrete structure must be broken down with the void in the affected area filled to grade as shown in the Plans and described in these special provisions. The work to remove existing valve and vaults shall conform to Article 605. The Contractor is advised that the work will be performed on a water system owned and operated by the Chicago Transit Authority (CTA) that connects to a potable water system owned and operated by the Chicago Department of Water Management (CDWM). As such, all operations shall be performed in such a way as to avoid contamination of the water system through the introduction of contaminants or the process of the work. All work will require a B-Permit be obtained from CDWM-Plumbing Section.

Construction Requirements. No work shall proceed prior to the shutdown of any water main passing through or adjacent to the vault structure to be removed. This work will consist of removing the frame and cover of an existing vault structure, removal of valves, fittings, taps and other elements of the water system within the vault, breaking down the structure walls, removing large debris, and backfilling the hole as required. If the vault is in a parkway, the hole must be filled level to the existing grade. The top six inches of fill must be of an approved soil mixture. Trench backfill must be utilized to fill the void if pavement is proposed. If proposed structures, including water main vaults or sewer structures, or water main or sewer pipe are planned for the same location as the structure to be removed, the Contractor may elect to utilize the void from the vault removal as excavation for proposed work. In this case, no backfill is necessary and any backfill for the proposed work will be considered part of those proposed items. Any frames, lids, valves, fittings, taps or other water main elements that are salvaged in reasonable condition in the opinion of the Engineer shall be offered to the Chicago Transit Authority. Any debris, including the frame, lid, valves, fittings, taps or other items must be disposed of off-site in an approved manner. The Contractor will pay for all disposal fees.

Method of Measurement. This work will be paid for per each vault removed including all existing water main pipe, valves, fittings, taps or other water main items. All backfill will be considered as part of the vault removal unless otherwise included within items that are placed within the area of the removed structure.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE EXISTING VALVE AND VAULT which price will be payment in full for all labor, equipment and materials necessary to complete the work as described. Salvaging of any materials will be considered incidental to this item. Trench backfill will be paid for separately in accordance with Article 208.04.

ASPHALT STABILIZED SUBBASE (TOLLWAY BDE)

Effective: September 21, 2011

Revised: April 1, 2016

Description. This work shall consist of constructing Stabilized Subbase Hot Mix Asphalt (HMA) or Warm Mix Asphalt (WMA) according to Section 312 of the Standard Specifications except as modified herein. When Stabilized Subbase WMA is required by design, Stabilized Subbase HMA may be utilized for special or low tonnage applications in lieu of Stabilized Subbase WMA upon approval by the Engineer at no additional cost to the Illinois Tollway. When Stabilized Subbase HMA is required by design, Stabilized Subbase WMA may be utilized for special or low tonnage application in lieu of HMA mixtures upon approval by the Engineer at no additional cost to the Illinois Tollway.

Revise Article 312.03 of the Standard Specifications to read as follows:

312.03 Materials. Materials shall be according to Section 1030 of the standard specifications except at modified herein.

“Reclaimed Asphalt Shingles (RAS) used in any mixture shall be according to the Illinois Tollway special provision for RECLAIMED ASPHALT SHINGLES.

For construction or resurfacing projects when the WMA binder and surface course mixtures are used, the WMA mix designs, production and placement shall be in accordance with the Illinois Tollway special provision for ASPHALT BINDER AND SURFACE COURSE MIXTURES.”

Add Article 1030.04(a)(4) of the Standard Specifications to read as follows:

“(4) All Other Mixtures. The Job Mix Formula (JMF) shall fall within the following limits.

All Other, MIXTURE COMPOSITION, % by Dry Weight			
Without RAP		With RAP	
Virgin Aggregate	93.0 to 96.0	Virgin Aggregate	46.0 to 96.0
		RAP Materials	0 to 50
		Mineral Filler (If required)	0 to 5.0
Asphalt Binder	4.0 to 7.0	Asphalt Binder	4.0 to 7.0
Ratio Dust/Asphalt Binder	1.4 (max)	Ratio Dust/Asphalt Binder	1.2 (max)

Add Article 1030.04(b)(4) of the Standard Specifications to read as follows:

“(4) All Other Mixtures.

VOLUMETRIC REQUIREMENTS			
All Other			
Mixture Composition	Design Compactive Effort	Design Air Voids Target%	Design VMA, %, minimum
All Other	N _{DES} = 50	2.0	11.0

Revise Article 1030.05(d)(2)b. of the Standard Specifications to read as follows:

“b. Dust-to-Asphalt and Moisture Content. During production, the dust-to-asphalt binder ratio and the moisture content of the mixture at discharge from the mixer shall meet the following.

Parameter	High ESAL Mixture Low ESAL Mixture	All Other Mixtures
Ratio Dust/Asphalt Binder	0.6 to 1.2	0.6 to 1.4
Moisture	0.3 %	0.3 %

If at any time the dust-to-asphalt binder ratio or moisture content of the mixture falls outside the stated limits, production of the HMA shall cease. The cause shall be determined and corrective action satisfactory to the Engineer shall be initiated prior to resuming production.”

Revise Article 1030.05(d)(4) of the Standard Specifications to read as follows:

“(4) Control Limits. Target values shall be determined by applying adjustment factors to the AJMF where applicable. The target values shall be plotted on the control charts within the following control limits.

CONTROL LIMITS			
Parameter	High ESAL Low ESAL	High ESAL Low ESAL	All Other
	Individual Test	Moving Avg. of 4	Individual Test
% Passing: ^{1/}			
1/2 in. (12.5 mm)	± 6 %	± 4 %	± 15 %
No. 4 (4.75 mm)	± 5 %	± 4 %	± 10 %
No. 8 (2.36 mm)	± 5 %	± 3 %	
No. 30 (600 µm)	± 4 %	± 2.5 %	
Total Dust Content No. 200 (75 µm)	± 1.5 %	± 1.0 %	± 2.5 %
Asphalt Binder Content	± 0.3 %	± 0.2 %	± 0.5 %
Voids	± 1.2 %	± 1.0 %	± 1.2 %

1/ Based on washed ignition oven

DENSITY CONTROL LIMITS		
Mixture Composition	Parameter	Individual Test
IL-9.5, IL-12.5	N _{design} ≥ 90	92.0 – 96.0 %
IL-9.5, IL-9.5L, IL-12.5	N _{design} < 90	92.5 – 97.4 %
IL-19.0, IL-25.0	N _{design} ≥ 90	93.0 – 96.0 %
IL-19.0, IL-19.0L, IL-25.0	N _{design} < 90	93.0 – 97.4 %
All Other	N _{design} = 50	95.0 ^{1/} - 97.4 %

1/ 92.0 % when placed as first lift on an unimproved subgrade.”

Method of Measurement. This work shall be measured in accordance with Article 312.15 of the Standard Specifications.

Basis of Payment. This work shall be paid for in accordance with Article 312.16 of the Standard Specifications except as modified herein:

Add the following to Article 312.16 of the Standard Specifications:

“STABILIZED SUBBASE HMA and STABILIZED SUBBASE WMA will be paid for under its respective item. If permissive use of an HMA mixture in place of a specified WMA mixture is granted by the Engineer, a new pay item will be established for the HMA with the same unit price. If permissive use of a WMA mixture in place of a specified HMA mixture is granted by the Engineer, a new pay item will be established for the WMA with the same unit price.”

Pay Item Number	Designation	Unit of Measure
J1312010	STABILIZED SUBBASE 3”	SQ YD
J1312020	STABILIZED SUBBASE – HMA, 3”	SQ YD
J1312021	STABILIZED SUBBASE – WMA, 2”	SQ YD
J1312022	STABILIZED SUBBASE – WMA, 3”	SQ YD

AGGREGATE SHOULDERS (TOLLWAY RECURRING)

Effective: October 23, 2006

Revised : September 27, 2011

Revise Section 481 of the Standard Specifications to read:

“SECTION 481. AGGREGATE SHOULDERS

481.01 Description. This work shall consist of the furnishing and placing filter fabric (for new shoulders where specified) furnishing, placing, shaping and compacting aggregate on a prepared subgrade adjacent to the edges of the completed pavement structure or stabilized shoulder.

481.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Coarse Aggregate (Note 1).....	1004.04
(b) RAP Material (Note 2)	1031
(c) Filter Fabric (Note 3)	1080.02

Note 1. Grading shall be CA-6 with aggregate shoulders Type A and B, and CA-1 for aggregate shoulders special, Type C.

Note 2. Reclaimed asphalt pavement (RAP) may be used as aggregate wedge shoulders Type B and Aggregate Shoulders, Type B.

Note 3. Filter fabric shall meet the requirements of Article 1080.02 for ground stabilization.

481.03 Equipment. Equipment shall be according to the following.

Item	Article/Section
(a) Tamping Rollers	1101.01
(b) Pneumatic-Tired Rollers	1101.01
(c) Three-Wheel Rollers (Note 1)	1101.01
(d) Tandem Rollers (Note 1)	1101.01
(e) Vibratory Machine (Note 2)	
(f) Aggregate Spreaders	1102.04

Note 1. Three-wheel or tandem rollers shall weigh from 6 to 10 tons and not less than 200 lb/in. nor more than 325 lb/in. of width of roller.

Note 2. The vibratory machine shall meet the approval of the Engineer.

CONSTRUCTION REQUIREMENTS

481.04 Subgrade Preparation. The subgrade shall be prepared in a manner approved by the Engineer and any required filter fabric shall be placed.

481.05 Moisture Content. Prior to being placed on the subgrade, the aggregate shall contain sufficient moisture to provide satisfactory compaction.

For Type A shoulders, the water and aggregate shall be mixed through a controlled aggregate mixing system. The system shall consist of a mechanical mixing device and aggregate and water measuring devices, meeting the approval of the Engineer. Wetting the aggregate in cars, bins, stockpiles, or trucks will not be permitted.

481.06 Aggregate Shoulders With and Without Filter Fabric, Type A and Type B. The shoulders shall be constructed in lifts of not more than 6 in. thick when compacted, except that if tests indicate the desired results are being obtained, the compacted thickness of any lift may be increased to a maximum of 8 in. . The aggregate shall be placed with a spreader.

Each lift of material shall be compacted with a tamping roller, a pneumatic-tired roller, a vibratory machine, or a combination of any of the three, until the compaction has been approved by the Engineer. If the moisture content of the material is not such as to permit satisfactory compaction during the compacting operations, water shall be added in such quantity that satisfactory compaction can be obtained. The top lift shall be given a final rolling with a three-wheel or tandem roller.

If any subgrade material is worked into the aggregate during the compacting or finishing operation, all granular material within the affected area shall be removed and replaced with new aggregate.

The shoulders shall be constructed to the thicknesses shown on the plans. Thickness determinations shall be made at such points as the Engineer may select. When the constructed thicknesses are less than 90 percent of the thicknesses shown on the plans, aggregate shall be added to obtain the required thicknesses; however, the surface elevation of the completed shoulders shall not exceed by more than 1/8 in. the surface elevation shown on the plans or authorized by the Engineer.

481.07 Aggregate Wedge Shoulders, Type B. Prior to placing the aggregate wedge shoulder, Type B, the weeds and grass on the area to be covered shall be cut. The aggregate shall be deposited in its final position with a spreader and compacted to the satisfaction of the Engineer. If the moisture content of the aggregate is not such as to permit satisfactory compaction during the rolling operations, water shall be added in such quantity that satisfactory compaction can be obtained.

481.08 Aggregate Shoulders Special, Type C. The aggregate shoulder special, Type C, shall be placed along the edge of paved shoulders or as a backfill behind curbs constructed at the edge of shoulder only where there is to be existing or new guardrail at the completion of the The Work or in other specific locations such as large wash-outs at the edge of shoulders.

Before any aggregate is placed, weeds, grass, and miscellaneous vegetation shall be removed from the area in a manner acceptable to the Engineer. The Contractor shall give the Engineer at least 48 hours notice that an area will be prepared to receive treatment, prior to the placement of the aggregate.

The aggregate shall be placed along the existing pavement or behind the existing curb in sufficient quantity and in such a manner that after compaction the aggregate shall have the configuration shown on the Plans. If any subgrade material is worked into the aggregate during the compacting or finishing operation, all granular material within the affected area shall be removed and replaced with new aggregate.

Aggregate containing free water at the time of delivery will be rejected by the Engineer and shall not be incorporated in the work.

481.08 Opening to Traffic. The road shall be open to traffic according to Article 701.07.

481.09 Method of Measurement. This work will be measured for payment in tons, cubic yards or square yards according to Article 311.08, except payment will not be made for aggregate outside the plan width.

481.10 Basis of Payment. This work will be paid for at the contract unit price per ton or per cubic yard for AGGREGATE SHOULDERS, TYPE A, AGGREGATE SHOULDERS, TYPE B, AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE A, or AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B; at the contract unit price per ton for AGGREGATE WEDGE SHOULDER, TYPE B, or AGGREGATE SHOULDERS SPECIAL, TYPE C; or at the contract unit price per square yard for AGGREGATE SHOULDERS, TYPE A, AGGREGATE SHOULDERS, TYPE B, AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE A, or AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B of the thickness specified.”

ASPHALT SHOULDERS (TOLLWAY)

Effective: March 26, 2010

Revised: August 14, 2014

Description. This work shall consist of constructing Asphalt Shoulders using hot mix asphalt (HMA) or warm mix asphalt (WMA) according to Section 482, of the Standard Specifications except as modified herein. When WMA mixtures are required by design, a HMA mixture may be utilized for special or low tonnage applications in lieu of WMA mixtures upon approval by the Engineer at no additional cost to the Tollway. When HMA mixtures are required by design, a WMA mix may be utilized for special or low tonnage application in lieu of HMA mixtures upon approval by the Engineer at no additional cost to the Tollway.

Revise Article 482.02 of the Standard Specifications to read:

482.02 Materials. Materials shall be according to Section 406 and Section 1030 of the standard specifications except at modified herein.

“For construction or resurfacing projects when the HMA or WMA binder and surface course mixtures option is used, the asphalt cement used in the top lift shall not be increased above the amount required in the mix design.

Reclaimed Asphalt Shingles (RAS) used in any mixture shall be according to the Tollway special provision for RECLAIMED ASPHALT SHINGLES.

For construction or resurfacing projects when the WMA binder and surface course mixtures are used, the WMA mix designs, production and placement shall be in accordance with the special provision for ASPHALT BINDER AND SURFACE COURSE MIXTURES. However, the Hamburg testing requirements for shoulders mixtures using WMA technology do not apply.”

Revise Note 2 of Article 1030.02 of the Standard Specifications to read as follows:

“Note 2. The Contractor shall use the asphalt binder as shown on the plans“

Revise Article 1030.04(a)(3) of the Standard Specifications to read as follows:

Add the following to Article 1030.04 (b) of the Standard Specifications:

“(4) HMA and WMA N50 Binder

VOLUMETRIC REQUIREMENTS Tollway Shoulder Binder			
Ndesign	Design Air Voids Target%	Design Voids in the Mineral Aggregate (VMA), % minimum	Design Voids Filled with Asphalt Binder (VFA), %
50	3.0	12.5	65-78

DENSITY CONTROL LIMITS		
Mixture Composition	Parameter	Individual Test
IL-9.5, IL-12.5	Ndesign ≥ 90	92.0 – 96.0 %
IL-9.5, IL-9.5L, IL-12.5	Ndesign < 90	92.5 – 97.4 %
IL-19.0, IL-25.0	Ndesign ≥ 90	93.0 – 96.0 %
IL-19.0, IL-19.0L, IL-25.0	Ndesign ≥ 70 & < 90	93.0 – 97.4 %
IL-19.0, IL-19.0L, IL-25.0	Ndesign = 50	94.0 – 98.4%

1/ 92.0 % when placed as first lift on an unimproved subgrade.”

Method of Measurement. This work will be measured for payment in accordance with Article 482.07 of the Standard Specifications.

Basis of Payment. This work will be paid for in accordance with Article 482.08 of the Standard Specifications except as modified herein.

Add the following to Article 482.08 of the Standard Specifications:

HOT-MIX ASPHALT SHOULDERS or WARM-MIX ASPHALT SHOULDERS of the specified thickness will be paid for under its respective item. If permissive use of an HMA mixture in place of a specified WMA mixture is granted by the Engineer, a new pay item will be established for the HMA with the same unit price. If permissive use of a WMA mixture in place of a specified HMA mixture is granted by the Engineer, a new pay item will be established for the WMA with the same unit price.”

BONDED PREFORMED JOINT SEAL (TOLLWAY GBSP)

Effective: May 24, 2006

Revised: April 1, 2016

Description. This work shall consist of furnishing all labor, equipment, technical assistance and materials necessary to install the bonded preformed joint seal as shown on the plans and as specified herein.

When specified, an elastomeric concrete nosing compatible with the preformed seal as required by the sealant manufacturer shall be installed. The minimum dimensions for a polymer concrete nosing cross section are 1 1/2 in. deep by 3 1/2 in. wide. The elastomeric concrete shall be furnished and installed according to the Illinois Tollway Special Provision for "Bridge Expansion Joints, Replacement and Reconstruction, with Bonded Preformed Seals and Elastomeric Concrete".

Materials. Joint seals used for the replacement and reconstruction of the existing seals shall consist of the pre-formed neoprene pressurized seals of the JEENE Joint Seal System as manufactured by Watson, Bowman, Acme, Corp., and/or of the pre-formed neoprene compression seals of the J-Series Joint Seal System as manufactured by D. S. Brown Company. Only the following materials supplied by Watson, Bowman, Acme or D. S. Brown shall be used to install the joint seal systems.

- (1) Alternate "A": JEENE Joint System. A polychloroprene (neoprene) elastomer seal, preformed by extrusion and vulcanized into its definitive shape, which is supplied in several configurations and dimensions, ranging from 1/4" to 5" shall be required for use. The preformed seal shall have the following properties:

PROPERTY	ASTM METHOD	REQUIREMENT
Tensile Strength, min.	D-412	2000 psi (13.8 Mpa)
Elongation at Break, min.	D-412	250%
Hardness, Shore A	D-2240	65 ± 5
Oven Aging, 70 hrs. at 212°F Tensile Strength, max. loss Elongation at Break, max. loss Change in Hardness	D-573	20% 20% 0 – 10 points
Oil Swell, 70 hrs. at 212°F Weight Change, max.	D-471	45%
Ozone Resistance, 70 hrs. at 104°F	D-1149	No Cracks
Low Temperature Stiffing, 7 days at 14°F Change in Hardness	D-2240	0 – 15 points

A two-component, thixotropic, epoxy-based adhesive, which is mixed at the job site and supplied by the joint seal manufacturer, shall be required for use with the JEENE Joint Seal System. The adhesive shall have the following properties:

Note: If the ambient air temperature is between 40°F and 60°F, an alternate cold weather epoxy shall be utilized.

(2)

PROPERTY	ASTM METHOD	REQUIREMENT
Tensile Strength	D-638	4,000 psi
Axial Compression	D-638	8,000 psi
Pot Life at 68°F	N/A	40 minutes
Flash Point	N/A	> 200°F
Initial Cure at 68°F	N/A	24 hours
Full Cure at 68°F	N/A	7 days

Alternate "B": J-Series Joint Seal System. A polychloroprene (neoprene) elastomeric seal preformed by extrusion and vulcanized into its definitive shape, ranging from 1" to 4" shall be required for use. The preformed seal shall have the following properties:

PROPERTY	ASTM METHOD	REQUIREMENT
Tensile Strength, min.	D-412	2000 psi
Elongation at Break, min.	D-412	250%
Hardness, Shore A	D-2240	55 ± 5
Oven Aging, 70 hrs. @ 212°F Tensile Strength, max. loss Elongation at Break, max. loss Change in Hardness, Shore A		20% 20% 0 – 10 points
Oil Swell, 70 hrs at 212°F Weight Change, max.	D-471	45%
Ozone Resistance, 20% strain, 70 hrs aging, D573, 3 ppm in air	D-1149	No Cracks

A two-component modified epoxy-based adhesive, which is mixed at the job site and supplied by the joint seal manufacturer, shall be required for use with the J-Series Joint Seal System. The adhesive shall have the following properties:

PROPERTY	ASTM METHOD	REQUIREMENT
Tensile Strength, min.	D-638	4,500psi, min.
Axial Compression	D-638	8,775 psi, min.
Pot Life at 68°F	N/A	45 minutes
Flash Point	N/A	>200°F
Non-Volatile content		100% reactive
Initial cure @ 70°F	N/A	24 hours

CONSTRUCTION REQUIREMENTS

General. Technical assistance provided by the manufacturer during surface preparation and installation shall be furnished at no additional cost to the Illinois Tollway. The Contractor shall furnish the Engineer with the manufacturer's written product information, installation procedures, and instructional video at least two weeks prior to installation. The Contractor, the manufacturer's representative, and the Engineer shall meet to review and clarify installation procedures, and requirements prior to starting the work. A technical representative must be present for the start of surface preparations and installation for at least one day. The Contractor shall contact the manufacturer at least two weeks prior to installation.

Installation. When placing the bonded preformed joint seal against concrete, the concrete surface shall be dry. For newly placed concrete, the concrete shall be fully cured and allowed to dry out a minimum of 7 additional days prior to placement of the bonded preformed joint seal. Cold, wet, inclement weather will require an extended drying time.

Joint Seal System Installations. Joint seal installations shall be as follows.

- (1) JEENE Joint Seal System Installation. After the elastomeric concrete or Portland cement nosing material has cured and the joint opening form has been removed, (and after the Engineer verifies that work done under other subsections meets requirements,) the pre-formed neoprene pressurized seal shall be installed. Before installation of the seal, the entire formed joint opening shall be cleaned with all foreign materials totally removed from the gap. The environment should be free of dust, oil, grease, wax, moisture, and frost. The elastomeric concrete heads must first be cleaned out by disc grinding or sandblasting using black beauty sand and then vacuumed or blown with dry, oil free, compressed air before the two component epoxy adhesive is mixed and applied. No installation may be performed in rainy weather, or when rain is expected within one hour before installation. All surfaces must be completely dry prior to applying adhesive.

The pre-formed neoprene pressurized seals shall be of the size and shape shown on the Plans. Ambient temperature shall not be lower than 40°F during installation. Note that gap size will change with cold and hot temperature extremes. Gap measurement should optimally be carried out at the mid-point of the average temperature range for the area of installation. The pre-formed seal shall be cut to the correct length of the appropriate gap for installation, without pulling or exerting excess tension. After the seal length is determined and required cut-outs are completed, both ends of the seal shall be plugged (air tight) and the air valves installed. All end plugs in the seal shall be tested for air tightness and integrity by careful inspection and water submergence prior to seal installation in the joint opening. Deflate and dry off the pre-formed seal before installation.

Clean and abrade the sides of the pre-formed seal per the manufacturer's instructions before the epoxy adhesive is applied. Mix adhesive according to manufacturer's directions only after all preparation of the joint openings in all lanes and for the pre-formed seal are complete. The adhesive shall be applied to the inner faces of the joint opening in an even manner, without leaving blank spots. In the same even manner, the adhesive shall be applied to the outer rigid side walls of the pre-formed seal. As the adhesive is applied to the seal walls (on both sides), the seal should be gradually inserted into the gap, without stress or compression. The contractor should maintain the profile at the depth desired, by hand or by any convenient means. The seals shall be installed at all times with the top of the seal placed below the top of the seal placed below the top of the adjoining pavement slabs as shown on the Plans. Any excess adhesive shall be removed.

Pressurization should be done through the air valve with a heavy pump. Pressurization should be applied slowly so as not to cause the joint to squeeze adhesive out of the flanges on the sides of the joint. Following pressurization, immediately clean all excess adhesive around the edges and top of the joint with a trowel or scraping tool, allow the epoxy adhesive to cure approximately 24 hours, and then remove the air valve to bleed off air pressure.

- (2) J-Series Joint Seal System Installation. After the elastomeric concrete or Portland cement nosing material has cured and the joint opening form has been removed (and after the Engineer verifies that work done under other subsections meets requirements), the pre-formed neoprene compression seal shall be installed. Before installation of the seal, the entire formed joint opening shall be cleaned with all foreign materials totally removed from the gap. The environment should be free of dust, oil, grease, wax, moisture, and frost. The elastomeric concrete heads must first be cleaned using a stiff bristled brush or sandblasting using black beauty sand and then vacuumed or blown with dry, oil free, compressed air before the two component epoxy adhesive is mixed and applied. No installation may be performed in rainy weather, or when rain is expected within one hour before installation. Clean the concrete surfaces with alcohol cleaner and all surfaces must be completely dry prior to applying adhesive.

The pre-formed neoprene compression seals shall be of the size and shape shown on the Plans. Uncoil the seal and allow it to relax. Apply seal conditioner, scrubbing vigorously into the ribs of the seal using a wire brush or wire wheel on the sidewalls. The surface must be abraded and tacky to the touch. This roughened, dull finish is needed for an aggressive bond. Continued scrubbing with a stiff nylon brush and new conditioner will clean the surface. Do this in two separate passes, and then rinse the profile with cleaner.

Apply the adhesive to the joint surfaces and into the ribs of the profile using a margin trowel. The ribs must be completely filled. Using a vacuum hooked up to one end of the seal length, draw down the seal enough to insert into the opening. One placed and leveled, turn off vacuum pump and allow the seal to expand and push against the concrete. A small amount of adhesive should be visible above the ribbed area. Remove any additional adhesive using organic solvents. Allow the adhesive to cure for 24 hours.

Method of Measurement. This work will be measured in place, in feet along the centerline of the joint.

Basis of Payment. This work will be paid for at the contract unit price per foot for BONDED PREFORMED JOINT SEAL, of the size specified. The size is defined as the joint opening at 50°F. When an elastomeric concrete nosing is specified it shall not be included in this item but will be paid for according to the Illinois Tollway Special Provision for "Bridge Expansion Joints, Replacement and Reconstruction, with Bonded Preformed Seals and Elastomeric Concrete".

Pay Item Number	Designation	Unit of Measure
JT525125	BONDED PREFORMED JOINT SEAL, 2 IN.	FOOT
JT525130	BONDED PREFORMED JOINT SEAL, 3 IN.	FOOT
JT525135	BONDED PREFORMED JOINT SEAL, 4 IN.	FOOT

SUBGRADE AGGREGATE (TOLLWAY RECURRING)

Effective: September 8, 2006

Revised: April 1, 2016

Description. This work shall consist of the furnishing, transporting, placing, compacting and finishing of an aggregate subgrade of porous granular embankment material capped with 3 inches of a CA-6 grade aggregate constructed on the finished subgrade in accordance with this special provision and to the lines, dimensions, and cross sections shown on the Plans, and as required by the Engineer.

Materials. The materials used for SUBGRADE AGGREGATE, (12 In.) shall consist of coarse aggregate for porous granular embankment in accordance with Article 1004.05 of the Standard Specifications except as follows:

1. Crushed Stone, Crushed Blast Furnace Slag, and Crushed Concrete* will be permitted. Virgin steel slag and other expansive materials as determined through testing by the Illinois Tollway will not be permitted.

<u>Sieve Size</u>	<u>Percent Passing With all Materials Processed Through a Stationary Crusher</u>	<u>Percent Passing With Recycled Concrete Processed Through a Mobile Crusher</u>
6 inches (150 mm)	97±3	97±3
4 inches (100 mm)	90±10	90±10
2 inches (50 mm)	45±25	40±20
#4 (4.75 mm)	-	15±10
#200 (75 µm)	5±5	5±5

2. Gravel, Crushed Gravel, and Pit Run Gravel

<u>Sieve Size</u>	<u>Percent Passing</u>
6 inches (150 mm)	97±3
4 inches (100 mm)	90±10
2 inches (50 mm)	55±25
#4 (4.75 mm)	30±20
#200 (75 µm)	5±5

3. Crushed Concrete* with Reclaimed Asphalt Pavement (RAP) **

<u>Sieve Size</u>	<u>Percent Passing</u>
6 inches (150 mm)	97±3
4 inches (100 mm)	90±10
2 inches (50 mm)	45±25
#4 (4.75 mm)	20±20
#200 (75 µm)	5±5

- * The production of crushed concrete shall be through mechanical means that complies with the current IDOT Bureau of Materials and Physical Research Policy Memorandum, "Recycling Portland Cement Concrete Into Aggregate". The Engineer shall approve the concrete removal method prior to crushing. Stockpile pads shall be provided at the crushing location to assure that acceptable material is not contaminated prior to use. Existing subbase aggregates shall not be intermixed with the recycled concrete either when picking up the broken concrete, feeding the concrete into the crusher, or when stockpiling the recycled aggregate.
- ** The RAP shall be separated and mechanically blended with the crushed concrete so that the bituminous material does not exceed 40% of the final product. The top size of the RAP in the final product shall be less than 4 inches.

The capping aggregate shall have a gradation of CA-6 for processed material from an approved source with the Contractor having the option to use RAP from an approved source. The RAP shall meet the requirements of the Illinois Tollway special provision for Reclaimed Asphalt Pavement and have 100% passing the 1.5 inch sieve and well graded down through fines.

The source of subgrade aggregate materials shall be optional to the Contractor unless otherwise noted on the Plans.

CONSTRUCTION REQUIREMENTS

The aggregate subgrade shall be placed in two lifts consisting of a 9 inch nominal thickness lower lift and a 3 inch variable nominal thickness top lift of capping aggregate which has 100% passing the 3 inch (75 mm) sieve and be well graded down through the fines. With the placement of all lifts, the material shall be spread uniformly free from segregation. The thickness of the capping aggregate under asphalt shoulders will vary as a result of shoulder pavement thicknesses and shoulder surface or shoulder subgrade slope requirements as shown on the Plans. If used as the capping aggregate, the RAP shall be separated and stockpiled before use. A vibratory roller meeting the requirements of Article 1101.01(g) of the IDOT Standard Specifications shall be used to roll each lift of material to obtain the desired keying or interlock and necessary compaction. The Engineer will verify that adequate keying has been obtained.

When a recommended remedial treatment for unstable subgrades is included in the contract, the lower lift of Subgrade Aggregate may be placed simultaneously with the material for Porous Granular Embankment, Subgrade when the total thickness to be placed is 2 feet (600 mm) or less.

Method of Measurement.

- (a) Contract Quantities. When a project is to be constructed essentially to the lines, grades, or dimensions shown on the plans and the Contractor and the Engineer have agreed in writing that the plan quantities are accurate, no further measurement will be required, and 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.

- (b) Measured Quantities. SUBGRADE AGGREGATE, (12 In.) will not be measured for payment, but will be computed in cubic yards for the various thicknesses from the Plan cross-sections and dimensions when completed essentially to the lines and dimensions shown in the Plans and as directed by the Engineer for undercuts as defined herein.

Should the Engineer direct a change in the Plan limits, that volume of material involved in the change shall be measured for adjustment to the calculated quantity. The volumes involved in the change shall be computed in cubic yards from cross-sections taken before and after placement and compaction of the material to the revised limits.

Basis of Payment. This work will be paid at the contract unit price per cubic yard for SUBGRADE AGGREGATE (12 In.).

Pay Item Number	Designation	Unit of Measure
JT211A11	SUBGRADE AGGREGATE 12 IN.	CU YD

PAVEMENT MARKINGS (TOLLWAY)

Effective: July 26, 2007

Revise the fourth paragraph of Article 1095.02(b) of the Standard Specifications to read:

“The following Standard Formulas shall be the basis for the paint. The finished products shall conform on a weight basis to the composition requirements of these formulas. No variations will be permitted, except for the replacement of volatile lost in processing. Amounts are shown in pounds (kilograms) of material. Amounts are shown in pounds (kilograms) of material.

	White / Black lb (kg)	Yellow lb (kg)
C.I, Pigment Yellow 65	---	32 (14.52)
Titanium Dioxide, Rutile, Type II	100 (45.36)	21 (9.53)
Calcium Carbonate, Type PC	150 (68.04)	150 (68.04)
Calcium Carbonate, Type GC	430 (195.05)	465 (210.92)
Rheology Modifier	0.5 (0.23)	0.5 (0.23)
Acrylic Emulsion, 50% Solids	541 (245.40)	535 (242.68)
Coalescent	24 (10.89)	23 (10.43)
Defoamer	5 (2.27)	5 (2.27)
Dispersant	8 (3.63)	9 (4.08)
Surfactant	2 (0.91)	2 (0.91)
Methyl Alcohol	29 (13.15)	28 (12.70)
Preservative	1.5 (0.68)	1.5 (0.68)
Water	10 (4.54)	10 (4.54)
Total	1301 (590.15)	1282 (581.53)

Revise Article 1095.02(c)(8) of the Standard Specifications to read:

“(8) Color And Directional Reflectance. The paint, applied at a wet film thickness of 15 mils (0.38 mm) and allowed to dry 24 hours, shall meet the following requirements for daylight reflectance and color, when tested, using a color spectrophotometer with 45 degrees circumferential/zero degree geometry, illuminant C, and 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. No requirements for daylight reflectance shall apply to black paint markings.

White: Daylight Reflectance (Y) 85 percent minimum

Yellow*: Daylight Reflectance (Y) 50 percent minimum

*Shall match Federal 595 Color No. 33538 and chromaticity limits as follows.

X	0.490	0.475	0.485	0.530
y	0.470	0.438	0.425	0.456

PORTLAND CEMENT CONCRETE PAVEMENT (TOLLWAY)

Effective: November 20, 2013

Revised: October 15, 2014

DESCRIPTION

This work consists of:

1. Furnishing, mixing, and placing ternary concrete mixes to portland cement concrete pavements (jointed) as shown and described on the Drawings and in this Special Provision;
2. Supplying and installing all specified reinforcement;
3. Developing concrete mix design(s) that meets the performance requirements for the intended pavement;
4. Constructing the concrete pavement on a prepared subgrade, or subbase, without forms.
5. Verifying dowel bar alignment with periodic magnetic particle scans of joints using a magnetic imaging tomography (MIT) device.

Ternary concrete mix refers to concrete that incorporates portland cement, ground granulated blast furnace slag, fly ash, and other supplementary cementitious materials (SCM) to produce a mix with at least three constituent materials. A Type IT blended ternary cement in accordance with AASHTO M 240 shall be acceptable. A Type IP or IS blended cement in accordance with AASHTO M 240 may be used with ternary mixes when an SCM is combined as a third constituent material to produce a ternary mix. Slag, fly ash, and any other SCM's combined as constituent materials in a mix or as part of a blended cement may consist of no less than 35% and no more than 50% of the total cementitious material in any ternary mix design.

Reference Standards

Except where modified by the Illinois Department of Transportation or the Tollway, the following Standards shall apply:

Illinois Department of Transportation (IDOT)

- Standard Specifications for Road and Bridge Construction, Adopted January 1, 2012.
- Supplemental Specifications and Recurring Special Provisions, Current Edition.
- Tollway Supplemental Specifications to the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Current Edition.

MATERIALS

Materials shall be according to Article 420.02 of the Standard Specifications except as modified herein:

Concrete supplied for the concrete pavement under this special provision will be a Tollway Class TL mix designed in accordance with the Performance Related Special Provision for Ternary Concrete Mix Designs for Portland Cement Concrete Pavement. The coarse aggregate used in the mix design shall be from sources that are certified by IDOT as 30 year life aggregates.

EQUIPMENT

Equipment shall be according to Article 420.03 of the Standard Specifications except as modified herein.

Add the following to Article 420.03 of the Standard Specifications:

“(k) MIT-Scan-2. Tollway QA shall use a MIT-Scan-2 device which is manufactured by MIT GmbH to measure dowel bar alignment following concrete placement. The device shall be validated on the Tollway’s approved MIT Scan validation system for the specific dowel bar size or load transfer device being placed, and should be operated within the manufacturer’s tolerances.”

CONSTRUCTION METHODS

The Portland Cement Concrete Pavement shall be constructed as a Jointed Plain Concrete Pavement according to Articles 420.04 through 420.18 of the Standard Specifications except as modified herein.

Replace Article 420.05(c)(2) of the Standard Specifications with the Following:

- (2) Dowel Bar Assemblies/Insertions. When dowel bars are specified in the Contract, they shall be installed with the dowel bars parallel to the proposed pavement surface and to each other. Installation shall be within the tolerances specified. The bar size, grade, and spacing shall be as specified. Dowel bars shall be furnished in a rigid welded assembly or placed by a dowel bar insertion (DBI) machine. With placements using a dowel bar assembly, the assembly shall be at right angles to the centerline of pavement. Prior to placing concrete, any deviation for the dowel bars from the correct horizontal or vertical alignment greater than 3/8 inch in 12 inches shall be corrected and a light coating of oil shall be uniformly applied to the dowel bars.

The dowel bar assembly, if used, shall act as a rigid unit with each component securely held in position relative to the other members of the assembly. Horizontal support wires or shipping tie wires shall be non-deformed bars or wires with a diameter less than or equal to 0.3249 inches (gauge 0 wire). The number of horizontal support wires or shipping tie wires shall be limited to five per assembly. The entire assembly shall be held securely in place by means of nails which shall penetrate the stabilized subbase. At least ten nails shall be used for each 10, 11, or 12 foot section of assembly. Bearing plates shall be punched to receive the nails. When bearing plates are omitted on stabilized subbase, other methods for securing the assembly with nails shall be provided.

Metal stakes shall be used instead of nails, with soil or granular subbase, to secure the dowel bar assembly. The stakes shall loop over or attach to the top parallel spacer bar of the assembly and penetrate the subgrade or subbase at least 12 inches.

The horizontal support wires or shipping tie wires of the dowel bar assembly shall be cut near the welds and removed prior to concrete placement. At the location of each dowel bar assembly, the subgrade or subbase shall be reshaped and re-tamped when necessary.

A dowel bar inserter (DBI) used with a slip-form paver meeting the requirements of Article 1103.16 may be used in lieu of the dowel bar assemblies specified above. When a dowel bar inserter is used to install dowel bars, space the bars according to design requirements. Dowel bar inserters shall insert dowel bars into the top of the plastic concrete which has been placed and consolidated to full depth. The bars shall be inserted ahead of the finishing beam or screed and the installing device shall so consolidate the concrete that no voids exist around the dowel bars. The forward movement of the finishing beam or screed shall not be interrupted by the inserting of the dowel bars.

When a DBI is used, the Contractor shall submit details and specifications of the proposed slip-form paver and DBI to the Engineer a minimum of 14 calendar days prior to the concrete pavement pre-paving meeting. The Contractor shall detail his methodology for ensuring correct marking of dowel bar insertion points and correct sawing of the joints. The Contractor shall ensure that the slip-form paver is compatible with the DBI.

Add the following to Article 420.05(c) of the Standard Specifications:

“(3) Verification of Dowel Bar Alignment.

- a. Dowel Alignment Tolerances. Dowel placement tolerances for 18 inch dowel bars shall be as follows:

A weighted-score system will be used to conduct a joint-by-joint evaluation of rotational misalignments of the dowel bars. The Joint Score, as defined in this evaluation, is a measure of the combined effects of rotational misaligned dowel bars at a transverse joint between any two longitudinal joints or between a longitudinal joint and edge of pavement. A Joint Score is determined by summing the product of the weights (given in the table below) and the number of bars in each misalignment category and adding 1. For example, if a joint has four misaligned bars in the 0.6 to 0.8 inch range, the joint score is 9; if a joint has one misaligned bar in the 0.6 to 0.8 inch range and one bar in the 1 to 1.5 inch range, the score is 8. A joint score of 12, irrespective of the number of dowel bars at the joint, is the critical level, above which the risk of joint locking is considered high.

Range of Rotational Misalignment	Weight
0.4 in. < d < 0.6 in.	0
0.6 in < d < 0.8 in.	2
0.8 in. < d < 1 in.	4
1 in. < d < 1.5 in.	5

An individual dowel bar or joint may be rejected based on the Rejection Criteria.

Rejection Criteria:

Horizontal and Vertical Rotational Alignment –

- Five or more consecutive joints with joints scores greater than 12.
- Any individual bars with misalignment greater than 1.5 inches.

Longitudinal (side) Shift –

- For joints with bars only in the wheel paths, any joints with fewer than three bars in each wheel path with a minimum embedment length of 6.0 inches.
- For joints with dowels fully across the joint, any joint where the first ten bars from the right travel lane edge contains fewer than six bars with a minimum embedment length of 6.0 inches.

Depth –

- Any bar with the concrete cover above the bar less than 4.0 inches from the concrete surface.
- Any bar that has been cut during the joint saw cutting operation.
- For joints with bars only in the wheel paths, any joint with more than two bars closer than 3.0 inches from the bottom of the slab.
- For joints with dowels fully across the joint, any joint where the first ten bars from the right travel lane edge contain more than four bars closer than 3.0 inches from the bottom of the slab.

Corrective Measures:

The following corrective measures will be considered for the bars or joints that fail to meet the minimum standard as described by the Rejection Criteria. The Contractor shall submit his method of repair to the Engineer for approval. All repair materials and techniques shall be preapproved.

Joint Score -

- Saw cut one or more misaligned bars, perform dowel bar retrofit, or install Class B patch at one or more joints so that there are no more than four consecutive joints with a Joint Score greater than 12.

Individual Bar Rejection –

- Saw cut any bar with horizontal or vertical rotational alignment greater than 1.5 inches.

Depth –

- Remove any bar with concrete cover above the bar less than 4.0 inches from the concrete surface. Removal shall be done using the dowel bar retrofit procedure in accordance with the Tollway special provision for Dowel Bar Retrofit except the maximum width of the opening in the pavement shall be 4.0 inches centered on the bar. If the bar is unable to be removed using the method described above, replace the joint with a Class B patch.

For all rejection issues, ensure that a minimum of three bars per wheel path are acceptable for joints with bars only in the wheel paths. For joints with dowels fully across the joint, ensure that a minimum of six bars out of the first ten bars from the right travel lane edge are acceptable. Corrective measures can be Class B patching or dowel bar retrofits.

Regardless of the dowel bar placement method used, the Contractor shall demonstrate their ability to place dowel bars in conformance with the specifications.”

Add the following to Article 420.07 of the Standard Specifications:

“When the surface temperature, as measured with a device as approved by the Engineer, of the Stabilized Subbase is 115 °F or greater the Contractor shall spray the Stabilized Subbase with a water mist with equipment that meets the approval of the Engineer. The Stabilized Subbase shall be cooled below 115 °F prior to paving on top. The water spray shall not produce excessive water runoff or leave puddles on the Stabilized Subbase at the time of paving. All cooling shall be completed a minimum of 10 minutes prior to paving. The surface temperature shall be monitored during the paving operation to determine if the Stabilized Subbase requires re-spraying. The water used shall meet the requirements of Section 1002 of the Standard Specifications.

- (a) Procedures for Verification of Dowel Bar Alignment During Production. When using either dowel bar assemblies or an automatic dowel bar inserter, the Tollway shall use the calibrated MIT-Scan-2 to verify the position and alignment of the dowel bars during production. The Contractor shall ensure that the surface to be tested is clear of any loose stone or other debris. All joints to be scanned must be cleaned by the Contractor within 24 hours of placement. To facilitate data analysis, all joints evaluated shall be scanned by the Tollway with the MIT-Scan-2 device moving in the same direction as concrete placement or as directed by the Engineer.

During production, dowel bar placement testing frequency by the Tollway shall be a minimum of one location of each continuous traffic lane or ramp lane paved each day. Sections of mainline designed to be greater than 150 linear feet and less than 1,250 linear feet during a day of placement require a minimum of one test location. Testing locations shall be determined by a random procedure so that each area has a randomly selected transverse joint location. At each location, ten consecutive joints shall be tested by Tollway QA using the MIT-Scan-2 device. If a joint is rejected on the basis of the Joint Score or of the individual bar criteria, then additional joints adjacent to the ten original joints are tested until at least five consecutive joints meet all acceptance criteria. Satisfactory control is considered to have been established when no rejectable dowel bars have been identified during three consecutive days of concrete paving. Once satisfactory control is established, a minimum of one location (ten joints) within every three days of production shall be selected by the Engineer for evaluation. If a joint rejection then occurs, Tollway QA will conduct daily MIT Scan analysis until satisfactory control is re-established.

Sections of continuous pavement constructed by the project less than 150 linear feet will not require dowel bar placement testing.

All delays or costs associated with proposed equipment, materials, or processes being rejected for use by the Engineer will not be paid for by the Tollway.

For each week of production, the Tollway shall prepare a report from the measurements obtained. All data shall be submitted in the manufacturer's native file format, along with the calibration files. The Tollway shall submit a standard report generated using MagnoProof or approved equivalent software (electronic Excel report) to the Engineer at the start of each work week during production for the previous week's work.

The electronic report shall include the following:

- a. Contract number, date, highway number and direction of traffic.
- b. Joint number, lane number and station.
- c. Bar number and x-location of dowel bar.
- d. Horizontal and vertical misalignment in inches.
- e. Side shift in inches.
- f. Depth to center of dowel bar in inches.
- g. Depth to the top end of the dowel bar in inches.
- h. Joint Score.
- i. All out-of-tolerance readings shall be highlighted in red.

If the Tollway determines that the measurement data for a dowel bar is affected by magnetic interference, then the dowel bar shall be evaluated using other means. If the magnetic interference occurs at a longitudinal joint, the Contractor shall verify proper tie bar placement and remediate the longitudinal joint to the satisfaction of the Engineer.

Revise Article 420.09(e)(1) of the Standard Specifications to read:

"Type A. Texturing of the top of plastic concrete shall be obtained by the use of an artificial turf drag followed immediately by a mechanically operated metal comb longitudinal tining device. Hand finishing methods will be permitted only in the event of breakdown of the mechanical equipment or for confined locations where the mechanical equipment cannot be operated. Hand methods may be used to strike off, consolidate, and finish the concrete only in the confined locations and where the concrete has already been deposited on the grade when the breakdown occurs.

The artificial turf shall be made of molded polyethylene with synthetic turf blades approximately 0.85 inches long and contain approximately 7,200 individual blades per square foot. The drag shall be suitably attached to an approved device that will permit control of the time and rate of texturing. The artificial turf shall be full pavement width and of sufficient size that during the finishing operation; approximately 2 feet. of the turf parallel to the pavement centerline will be in contact with the pavement surface. The drag shall be operated in a longitudinal direction so as to produce a uniform appearing finish meeting the approval of the Engineer. If necessary for maintaining intimate contact with the pavement surface, the drag may be weighted using lumber, rebar, or other suitable material.

The metal comb shall consist of a single line of tempered spring steel tines spaced at 0.75-inch centers and securely mounted in a suitable head. The tines shall be flat and of a size and stiffness sufficient to produce a groove of the specified dimensions in the plastic concrete without tearing of the pavement edge or surface. The Contractor shall modify the equipment or operations if an acceptable pavement edge or surface is not produced. The mechanically operated metal comb shall be attached to an exclusive piece of equipment which is mechanically self-propelled.

The tining device shall be operated so as to produce a relatively uniform pattern of grooves parallel to the pavement centerline spaced at approximately 0.75-inch centers, 0.13 to 0.19 inch deep, and 0.13 inch wide. Longitudinal tining shall stop at the edge of travel lanes. Tining devices shall be maintained clean and free from encrusted mortar and debris to ensure uniform groove dimensions. The tining finish shall not be performed too soon after pavement placement whereby the grooves may close up. The tining grooves shall be neat in appearance, parallel with the longitudinal joint, uniform in depth and in accordance with these specifications.

Hand tining or tining with a mechanically operated comb combined with the curing equipment specified in Article 1101.09 of the Standard Specifications will be permitted where the specifications permit hand finishing or vibratory screeds, one lane construction up to 16 ft. wide, gaps, projects with a net length of ½ mile or less, and where the production rate on any paving day will be less than 1,500 cubic yards per day. A foot bridge shall be provided for the hand tining operation for all pavements over 12 ft. wide, unless it can be demonstrated to the satisfaction of the Engineer that an alternate texturing operation produces satisfactory results.”

SURFACE TESTS

Replace Article 420.10 of the Standard Specifications with the following:

The Contractor shall perform pavement smoothness testing for all mainline and ramp pavements in accordance with the Tollway Special Provision for Surface Smoothness Testing, except where modified herein. The requirement for surface testing according to the IDOT BDE Special Provisions for Surface Testing of Pavements shall be removed and replaced in the Tollway Special Provision for Profile Diamond Grinding with the Tollway Special Provision for Surface Smoothness Testing.

Pavement smoothness testing shall be performed by the Contractor just prior to any change in maintenance of traffic stages, before opening the pavement to public traffic, and only after any corrective actions / grinding is performed by the Contractor. The smoothness measurements shall be reported for each mainline paving section per roadway lane. The smoothness measurements shall be reported for each ramp paving section per paving lane. The Contractor shall ensure that the pavement is clear of debris and equipment prior to smoothness testing. Smoothness measurements shall be reported to the Engineer within two days of testing.

- (a) Evaluation. Surface testing of the finished pavement surface shall consist of profile measurement according to the Tollway Special Provision for Surface Smoothness Testing. Each lane tested shall be evaluated and reported separately.

- (b) Acceptable Smoothness Limits. The finished concrete pavement surface shall be evaluated for acceptance based on the following smoothness threshold:

Location	Maximum IRI (in/mi)	Standard Deviation
Mainline	80	10
Ramp	90	10

- (c) Corrective Work. If any segment of the finished concrete pavement does not meet the specified smoothness criteria, then the nonconforming pavement shall be profiled to meet the criteria by diamond grinding in accordance with the Tollway Special Provision for Profile Diamond Grinding at the Contractor's expense. The finished concrete pavement shall be retested for surface smoothness following any corrective action.

METHOD OF MEASUREMENT

This work will be measured for payment in accordance with Article 420.19 of the Standard Specifications.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per square yard for PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED), of the total thickness specified.

Protective coat will be paid for at the contract unit price per square yard for PROTECTIVE COAT.

Removing and replacing curing and protective cover, when required, will be paid for according to Article 109.04 of the Tollway Supplemental specifications.

CONCRETE FLUME

DESCRIPTION

This work shall consist of constructing CONCRETE FLUME at the locations shown on the Plans.

CONSTRUCTION REQUIREMENTS

This work shall be completed in conformance with the applicable articles of Section 606 of the Standard Specifications and as shown in the Tollway Standard B5.

METHOD OF MEASUREMENT

This work will be measured for payment in feet of concrete flume constructed in place.

BASIS OF PAYMENT

This work will be paid at the contract unit price per foot for CONCRETE FLUME, which shall be payment in full for all labor, equipment, and materials necessary to complete the work.

Pay Item Number	Designation	Unit of Measure
JI606040	CONCRETE FLUME	FOOT

**FINE AGGREGATE FOR PORTLAND CEMENT CONCRETE PAVEMENT MIXTURES
(TOLLWAY)**

Effective: October 9, 2013

Revised: April 1, 2016

Fine aggregate materials for portland cement concrete pavement mixtures shall be in accordance with Section 1003 of the Standard Specifications except as modified herein.

Revise Article 1003.01(a)(3) of the Standard Specifications to read:

“(3) Stone Sand. Stone sand shall consist of either processed or unprocessed material.

- a. Processed stone sand shall be produced by screening, washing, or processing by air separation, the fine materials resulting from crushing rock quarried from undisturbed, consolidated deposits, or crushing gravel that produces an FA 20, FA 21, or FA 6 gradation. The acceptance and use of crushed gravel stone sand shall be according to the current IDOT Bureau of Materials and Physical Research’s Policy Memorandum, “Crushed Gravel Producer Self-Testing Program”.
- b. Unprocessed stone sand shall be the resultant fine materials from crushing carbonate rock quarried from undisturbed and consolidated deposits that produces an FA 5 gradation with exception to the percent passing the No. 200 sieve to be 12 ± 12 .”

Add the following to Article 1003.01(b) of the Standard Specifications:

Unprocessed stone sand shall meet the quality requirements of Article 1003.01(b) of the Standard Specifications for "A" quality aggregate, or each aggregate must meet the quality requirements as outlined in the following table with all tests conducted within 12 months of submittal date by IDOT or by an independent AMRL or CMEC certified lab.

Quality Test Specifications for Unprocessed Stone Sand

QUALITY TEST	LIMIT
Sodium Sulfate Soundness - AASHTO T103 (Illinois Modified)	Max 10% Loss
Deleterious	
Shale	3% Maximum
Clay Lumps	1% Maximum
Coal and Lignite	1% Maximum
Other Deleterious	3% Maximum
Total Deleterious	3% Maximum

Add the following to Article 1003.01(c) of the Standard Specifications:

“Gradation specifications for the applicable processed and unprocessed stone sand products to be used in concrete mixes are shown in the following Table.

Stone Sand Gradation Limits

Gradation Number	Fine Aggregate Gradations							
	Sieve Size and Percent Passing							
	3/8 in.	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200 ¹
FA 05 ²	100	92 ± 8					20 ± 20	12 ± 12
FA 06	100	92 ± 8					20 ± 20	6 ± 6
FA 20	100	97 ± 3	80 ± 20	50 ± 15		19 ± 11	10 ± 7	4 ± 4
FA 21	100	97 ± 3	80 ± 20	57 ± 18		30 ± 10	20 ± 10	9 ± 9

1. When use in PCC the producer shall set the midpoint percent passing the No. 200 sieve and the target band will have a range of +/- 5% for gradation FA 05, and FA 21.
2. FA 5 stockpiles must be certified for use by the Illinois Tollway.

Specification bands may be modified under the Aggregate Gradation Control System (AGCS) to reflect customer needs or production/process requirements. Changes can be made on all sieves except the top and bottom sizes. Specification tolerances must be maintained on all modified sieves. Modified products will be denoted as FM rather than FA.”

Revise Article 1003.01(e) of the Standard Specifications to read:

“(e)Storage of Fine Aggregate. The storage of all fine aggregate shall be according to the following.

- (1) Sites for storage of all fine aggregates including unprocessed stone sand shall be grubbed and cleaned prior to storing the material.

Stockpiles shall be built according to the current IDOT Bureau of Materials and Physical Research’s Policy Memorandum, “Aggregate Gradation Control System” and the following.

- a. Fine aggregate of various gradations and from different sources shall be stockpiled separately.

- b. Stockpiles shall be separated to prevent intermingling at the base. If partitions are used, they shall be of sufficient height to prevent intermingling.
- c. Fine aggregates for portland cement concrete and Asphalt shall be handled in and out of the stockpiles in such a manner that will prevent contamination, segregation, and degradation.

At the time of use, the fine aggregate shall be free from frozen material, material used to caulk rail cars, and all foreign materials which may have become mixed during transportation and handling.

- (2) Sites for storage of processed or unprocessed carbonate stone sand to be used in portland cement concrete pavement mixes shall be in accordance with Article 1003.01(e)(1) and the following.

- a. Current Production Stockpiles. Production carbonate fines currently established under AGCS requirements are approved for Illinois Tollway use. FA 21 (FM 21), FA 20 (FM 20), and FA 5, and FA 6 will be accepted provided the aggregate quality meets or exceeds the requirements listed in the aforementioned Table for Stone Sand Gradation Limits and quality test specifications.
- b. Newly Produced Materials. Newly produced carbonate fines that have not been previously approved by IDOT or the Illinois Tollway would be sampled and tested in accordance with the IDOT current AGCS policy. Once tested, the material shall be sampled, tested and stockpiled per the current AGCS policy. This may include carbonate screenings products that do not comply with an IDOT standard specification requirement, but still demonstrate consistency based on test results. Frequency of testing is as follows:

Startup Production – 3 @ 1,000 tons

Normal Production – 1 @ every 5,000 tons, 2 per day max., 1 per week min.

Stockpile / Load out – 1 per week min.

- c. Recently Stockpiled Materials. Carbonate fines that were recently stockpiled using the same production techniques as newly produced fines (and separately stockpiled) can be used if previous production testing is provided. Materials will be tested at load out at a minimum rate of 1 gradation test per 1,000 tons. If previous production testing is not available, then the stockpile must be tested as if it were an existing stockpile as outlined in the AGCS program.”

Revise Article 1003.02 of the Standard Specifications to read:

“1003.02 Fine Aggregate for Portland Cement Concrete and Mortar. The aggregate shall be according to Article 1003.01 and the following.

- (a) Description. The fine aggregate shall consist of washed sand, processed stone sand, or a blend of washed sand and processed stone sand as approved by the Engineer. The use of unprocessed stone sand or a blend of washed sand and unprocessed stone sand as approved by the Engineer shall be allowed only for concrete pavement mixtures per the intended pavement application.
- (b) Quality. The fine aggregate for portland cement concrete shall meet Class A Quality, except that the minus No. 200 sieve Illinois Modified AASHTO T 11 requirement in the Fine Aggregate Quality Table shall not apply to washed stone sand, unprocessed stone sand, any blend of washed stone sand and washed sand, and to any blend of unprocessed stone sand and washed sand approved by the Engineer.
- (c) Gradation. The washed sand for portland cement concrete shall be Gradation FA 1 or FA 2. Processed stone sand for portland cement concrete, which includes any blend with washed sand, shall be Gradation FA 1, FA 2, FA 6, FA 20 (FM-20), or FA 21 (FM 21). Unprocessed stone sand for portland cement concrete, which includes any blend with washed sand, shall be Gradation FA 5 with exception to the percent passing the 200 sieve to be 12% ± 12.
- (d) Use of Fine Aggregates. The blending, alternate use, and/or substitution of fine aggregates from different sources for use in portland cement concrete will not be permitted without the approval of the Engineer. Any blending shall be by interlocked mechanical feeders at the aggregate source or concrete plant. The blending shall be uniform, and the equipment shall be approved by the Engineer. With the use of unprocessed stone sand with the production of concrete pavement mixes, the plant bins and feed lines shall be modified to prevent caking of the sand and disruption of production. The stockpiles of unprocessed stone sand at any concrete production plant shall be protected from rain by reasonable means to prevent clumping and caking of fines.”

GALVANIZED STEEL PLATE BEAM GUARDRAIL (TOLLWAY RECURRING)

Effective: October 1, 2009

Revised: April 1, 2016

Description. This work shall consist of furnishing and erecting steel plate beam guardrail and posts in accordance with the details shown on the Plans.

Materials. Materials shall be according to Article 630.02 of the Standard Specifications and as modified herein.

General Requirements. General requirements for steel plate beam guardrail and posts shall be according to the following Article 630.03 of the Standard Specifications, except as modified herein:

Add the following to Article 630.03 of the Standard Specifications: The rail elements shall be of uniform section. Warped or deformed elements will be rejected. The edges of the elements shall be rolled or rounded so that they present no sharp edges. All connections and splices shall be made with button head bolts with oval shoulders in such a manner that there will be no appreciable projection on the road side of the guard rail.

When guardrail posts are to be placed within concrete or asphalt, a leave-out area shall be provided as shown on the Illinois Tollway Standard Drawing C1. The construction of the leave-out shall be considered to be included in the work under this item.

Fabrication. Fabrication of plates for the rail element shall be according to Article 630.04 of the Standard Specifications, except as modified herein:

Revise the last paragraph to read: Rail elements shall be furnished in lengths of 12.5 feet

Erection. Materials or hardware, including posts, on which the galvanizing has been damaged, shall be replaced with new materials having properly galvanized surfaces, except that, subject to the approval of the Engineer, minor damage to galvanized surfaces may be repaired by field galvanizing in accordance with the recommendations of the American Hot Dip Galvanizers Association.

The rail and post elements shall be erected to the required elevation. The top of the rail shall be visually straight in horizontal alignment and shall be continuously parallel to the roadway profile grade in vertical alignment. If insufficient adjustment is available in the holes, posts shall be reset, at no additional cost to the Illinois Tollway, until the guard rail is properly aligned. The brackets may be loosely bolted to the posts and, after erection of rail elements, the rail shall be carefully aligned and the bolts then fully tightened. Nuts shall be drawn up tight on all bolts.

Posts. All posts shall be steel. Steel posts may be driven by hand or mechanical methods provided they are protected by a suitable driving cap and the earth around the posts compacted, if necessary, after driving. When steel posts are driven to incorrect alignment or grade, they shall be removed and set according to Article 634.05 of the Standard Specifications. The 9'-0" posts shall be marked with the number "9" to ensure permanent identification. The steel posts shall be stamped prior to galvanizing. The character shall be a minimum 2 inches in height and located on each side of the post web near the top.

Block-outs. All block-outs shall be wooden, either southern pine or Douglas fir (coast region), Grade No. 1 structural. Plastic and/or steel block-outs shall not be permitted.

Post Spacing. Posts for Type A and B shall be spaced as indicated on Illinois Tollway Standard Drawing C1. Type C posts shall be spaced at 1'-6 3/4" .

Contractor's Responsibility for Underground Facilities. It shall be the Contractor's responsibility to ascertain in advance of any work, by any and all possible means, the presence of underground electrical or telecommunications cables in or near the vicinity of the work. It shall be the Contractor's further responsibility to notify the Engineer at least ten days in advance of setting new posts when working near underground electrical or telecommunications cables. The Illinois Tollway or its representative will then locate any such cables which may be in jeopardy. It shall be the Contractor's responsibility to preserve cable location markings and all information relating thereto given to him/her, and to effectively communicate such information to his/her workers. If the Contractor cuts or damages any such cables, either through carelessness or failure to follow the foregoing procedures, he/she will then be held responsible for repairing all damages or replacing the cable without splicing, at the Illinois Tollway's option, and all at no additional cost to the Illinois Tollway or cause for the Contractor claiming delay.

Such repair or replacement shall include the immediate installation by the Contractor, without further notice to him/her, of temporary cables satisfactory to the Engineer, the temporary cables to remain in service until the directed repairs or replacements are made. Stringing temporary cables on the ground will not be allowed in any circumstances. Temporary cables shall be:

(a) Suitable for direct burial installation, acceptable to the Engineer, and shall be buried to a depth not less than 12 inches;

or

(b) Weather-proof cable, acceptable to the Engineer, and shall be suspended not less than 8 feet above the highest point of terrain between supports, unless otherwise directed by the Engineer. Suspended temporary cables may be attached to existing poles, or, in their absence, shall be attached to supports acceptable to the Engineer, furnished and installed by the Contractor.

Any posts that are to be located near or over any buried cable shall be installed by first digging a hole by hand, and then installing the post and backfilling the hole. No posts shall be driven under such conditions. Care shall be taken while digging by hand so as not to damage the cable.

All efforts on the Illinois Tollway's part to advise the Contractor as to the locations of underground cables notwithstanding, it shall be understood that such locations are at best approximate, may be in error, and that such efforts by the Illinois Tollway shall not relieve the Contractor of any responsibility for restoring damage resulting from the activities of any employee, Subcontractor, agent, or representative of the Contractor.

The Contractor shall also be responsible for notifying owners of other cables and underground facilities which may be jeopardized by the Contractor's operations in the same manner as required for notice to the Illinois Tollway.

Method of Measurement. This work will be measured for payment, complete in place, in feet. The length shall be the overall length of installed rail, measured along the top edge of the top rail element from end to end of the total rail.

Basis of Payment. This work will be paid for at the contract unit price per foot, for GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE A, 6 FOOT POSTS; GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE A, 9 FOOT POSTS; GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE B, 6 FOOT POSTS; GALVANIZED STEELPLATE BEAM GUARDRAIL, TYPE B, 9 FOOT POSTS GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE C, 6 FOOT POSTS; or GALVANIZED STEELPLATE BEAM GUARDRAIL, TYPE C, 9 FOOT POSTS.

Pay Item Number	Designation	Unit of Measure
JI630002	GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE A, 6 FOOT POSTS	FOOT
JI630004	GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE A, 9 FOOT POSTS	FOOT
JI630007	GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE B, 6 FOOT POSTS	FOOT
JI630009	GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE B, 9 FOOT POSTS	FOOT
JI630012	GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE C, 6 FOOT POSTS	FOOT
JI630014	GALVANIZED STEEL PLATE BEAM GUARDRAIL, TYPE C, 9 FOOT POSTS	FOOT

RECLAIMED ASPHALT PAVEMENT (RAP) (TOLLWAY)

Effective: October 6, 2011

Revised: April 1, 2016

Revise Section 1031 of the Standard Specifications to read:

“SECTION 1031. RECLAIMED ASPHALT PAVEMENT

1031.01 Description. Reclaimed asphalt pavement (RAP) is reclaimed asphalt pavement resulting from cold milling or crushing of an existing dense graded 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. This special provision provides the option for the use of screened fractionated RAP. Fractionated RAP (FRAP) consists of the fine aggregate portion (material passing the #4 screen) and the coarse aggregate portion, controlled with one-or-more larger screens.

1031.02 Stockpiles. The Contractor shall construct individual, sealed RAP stockpiles meeting one of the definitions for both non-fractionated and fractionated RAP described in the following subsections. 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 of non-fractionated RAP as listed below (i.e. “Homogeneous Surface”), and by signs indicating the category and size of fractionated RAP (i.e. “Category 1, fine portion – 0 to #4”).

(1) When using Non-Fractionated RAP

Prior to milling, the Contractor shall request the IDOT or the Illinois Tollway to provide verification of the quality of the RAP to clarify appropriate stockpile.

- (a) Homogeneous. Homogeneous RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent 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.
- (b) Conglomerate 5/8. Conglomerate 5/8 RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent 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 conglomerates 5/8 RAP shall be processed prior to testing by crushing to where all RAP shall pass the 5/8 in. or smaller screen. Conglomerate 5/8 RAP stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway or IDOT.

- (c) Conglomerate 3/8. Conglomerate 3/8 RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent 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 B quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate 3/8 RAP shall be processed prior to testing by crushing to where all RAP shall pass the 3/8 in. or smaller screen. Conglomerate 3/8 RAP stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway or IDOT.
- (d) Conglomerate "D" Quality (DQ). Conglomerate DQ RAP stockpiles shall consist of RAP from Class I, Superpave (High or Low ESAL), HMA (High or Low ESAL), or equivalent 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 Illinois Tollway or IDOT.
- (e) Non-Quality. RAP stockpiles that do not meet the requirements of the stockpile categories listed above shall be classified as "Non-Quality".

(2) When using Fractionated RAP (mechanical separation of RAP materials into appropriate sizes using an approved separation device)

The Contractor is required to have a QC plan approved by the Illinois Tollway Materials Engineer, a fractionation device approved the Illinois Tollway Materials Engineer, and sufficient cold feed bins. Fractionated RAP shall be separated by source (category 1 and 2) and size (fine and coarse portions). Separate calibrated cold feed bins are required for each size of fractionated RAP.

Ensure that the fractionated RAP source meets one of the following source categories:

Category 1: Milled Mainline/Ramp RAP – asphalt material milled from mainline pavements or ramps under Illinois Tollway jurisdiction.

Category 2: Non-Mainline/Ramp RAP – milled, crushed and screened material removed from Illinois Tollway shoulders or from other routes or airfields under federal, state or local agency jurisdiction.

Ensure that the fractionated RAP sizes comply with the following:

Fine Portion: The fine portion of fractionated RAP is the portion of the processed material passing the No. 4 screen. The fine portion of category 1 fractionated RAP that contains steel slag or other expansive material as determined by the Illinois Tollway shall be stockpiled separately and may be used under this special provision as fractionated RAP in surface friction course mixes or SMA surface mixes.

Coarse Portion: The coarse portion of fractionated RAP is one or more of the coarse portions of the processed material larger than the No. 4 screen. The coarse portion of the fractionated RAP that contains steel slag as determined by the Illinois Tollway shall be from Category 1 sources only and stockpiled separately for potential use as fractionated RAP in surface friction course mixes. The maximum top size of the coarse portion of fractionated RAP may not exceed the following:

Nominal Asphalt Mix Designation	Maximum FRAP Screen Size 100% Passing
25.0 mm	1.5 inch
19.0 mm	1 inch
12.5 mm	3/4 inch
9.5 mm	1/2 inch

Prior to milling for fractionated RAP, the Contractor shall request the Illinois Tollway to provide verification of the quality of the RAP to clarify the appropriate category and size (identification) of the fractionated RAP stockpile as detailed below.

- (a) Category 1 fine portion without steel slag. Category 1 fine portion RAP shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures milled from Illinois Tollway mainline and ramp pavements. The fine aggregate in this RAP shall be manufactured sand and may represent more than one aggregate type. All category 1 fine portion RAP shall be processed prior to testing by screening to where all RAP shall pass the No. 4 screen. Category 1 fine portion without steel slag stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway.
- (b) Category 1 fine portion with steel slag. Category 1 fine portion with steel slag RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures milled from Illinois Tollway mainline or ramp surface friction course pavements. The fine aggregate in this RAP shall be manufactured sand and may represent more than one aggregate type. The coarse aggregate in this processed RAP shall be crushed aggregate including steel slag sources. All category 1 fine aggregate with steel slag RAP shall be processed prior to testing by screening to where all RAP shall pass the No. 4 screen.
- (c) Category 2 fine portion. Category 2 fine portion RAP shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures removed from Illinois Tollway shoulders or from other routes or airfields under federal, state or local agency jurisdiction. The fine aggregate in this RAP shall be manufactured or natural sand and may represent more than one aggregate type. All category 2 fine portion RAP shall be processed prior to testing by screening to where all RAP shall pass the No. 4 screen. Category 2 fine portion stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway.

- (d) Category 1 coarse portion without steel slag. Category 1 coarse portion RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures milled from Illinois Tollway mainline or ramp pavements. 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 B quality. All category 1 coarse aggregate RAP shall be processed prior to testing by screening to where all RAP shall be retained on the No. 4 or larger screen. Category 1 coarse portion RAP stockpiles shall not contain steel slag or other expansive material as determined by the Illinois Tollway.
- (e) Category 1 coarse portion with steel slag. Category 1 coarse portion with steel slag RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures milled from Illinois Tollway mainline or ramp surface friction course pavements. The coarse aggregate in this RAP shall be crushed aggregate including steel slag sources. All category 1 coarse aggregate with steel slag RAP shall be processed prior to testing by screening to where all RAP shall be retained on the No. 4 or larger screen.
- (f) Category 2 coarse portion. Category 2 coarse portion RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures removed from Illinois Tollway shoulders or from other routes or airfields under federal, state or local agency jurisdiction. The coarse aggregate in this RAP may be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least C quality. All category 2 coarse aggregate RAP shall be processed prior to testing by screening to where all RAP shall be retained on the No. 4 or larger screen. Category 2 coarse portion RAP stockpiles shall not contain steel slag or other expansive material and shall not contain uncrushed gravel as determined by the Illinois Tollway.

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 asphalt mixtures, 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 for the first 2000 tons and one sample per 2000 tons thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons.

For testing after stockpiling, the Contractor shall submit a plan for approval to the IDOT District or to the Illinois Tollway 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 Illinois Tollway use. The Contractor shall extract the other test sample according to IDOT procedure. The Engineer reserves the right to test any sample (split or Department/ Illinois Tollway-taken) to verify Contractor test results.

- (a) Testing Conglomerate 3/8. In addition to the requirements above, conglomerate 3/8 RAP shall be tested for maximum theoretical specific gravity (G_{mm}) at a frequency of one sample per 500 tons for the first 2000 tons and one sample per 2000 tons thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons.
- (b) 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	Homogeneous / Conglomerate	Conglomerate "D" Quality	Fractionated – Fine Portion	Fractionated – Coarse Portion
1 in. (25 mm)		± 5 %		
1/2 in. (12.5 mm)	± 8 %	± 15 %		± 8 %
No. 4 (4.75 mm)	± 6 %	± 13 %		± 6 %
No. 8 (2.36 mm)	± 5 %		± 5 %	
No. 16 (1.18 mm)		± 15 %		
No. 30 (600 μm)	± 5 %		± 5 %	
No. 200 (75 μm)	± 2.0 %	± 4.0 %	± 2.0 %	
Asphalt Binder	± 0.4 % ^{1/}	± 0.5 %	± 0.3 %	± 0.3 %
G_{mm}	± 0.02 ^{2/}			

1/ The tolerance for conglomerate 3/8 shall be ± 0.3 %.

2/ Applies only to conglomerate 3/8. When variation of the G_{mm} exceeds the ± 0.02 % tolerance, a new conglomerate 3/8 stockpile shall be created which will also require an additional mix design.

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 shall not be used in asphalt mixtures unless the RAP representing the failing tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the IDOT or the Illinois Tollway 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), or HMA (High ESAL) surface mixtures are designated as containing Class B quality coarse aggregate.
 - (2) RAP from Superpave (Low ESAL)/HMA (Low ESAL) IL-19.0L binder and IL-9.5L surface mixtures are 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) For Category 2 FRAP taken from a Illinois Tollway location, 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) For Category 2 FRAP taken from other routes or airfields under federal, state or local agency jurisdiction, the quality shall be determined according to Article 1031.04(b)(2).
 - (3) Category 1 FRAP taken from a Illinois Tollway Class I, Superpave mainline (high ESAL) surface or binder mixtures is designated as containing Class B quality coarse aggregate.

1031.05 Use of RAP in Asphalt Mixtures.

- (1) Use of Non-Fractionated RAP in asphalt mixtures. The use of RAP in asphalt mixtures 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 asphalt mixture to be produced.
 - (b) Steel Slag Stockpiles. RAP stockpiles containing steel slag or other expansive material, as determined by the IDOT or the Illinois Tollway, shall be homogeneous and will be approved for use in High ESAL and Low ESAL surface mixtures only.
 - (c) Use in Asphalt Surface Mixtures (High and Low ESAL). RAP stockpiles for use in asphalt surface mixtures (High and Low ESAL) shall be either homogeneous or conglomerate 3/8, in which the coarse aggregate is Class B quality or better.

- (d) Use in Asphalt Binder Mixtures (High and Low ESAL), Asphalt Base Course, and Asphalt Base Course Widening. RAP stockpiles for use in asphalt binder mixtures (High and Low ESAL), asphalt base course, and asphalt base course widening shall be homogeneous, conglomerate 5/8, or conglomerate 3/8, in which the coarse aggregate is Class C quality or better.
- (e) Use in Shoulders and Subbase. RAP stockpiles for use in asphalt shoulders and asphalt stabilized subbase shall be homogeneous, conglomerate 5/8, conglomerate 3/8, or conglomerate DQ.
- (f) The use of RAP shall be a contractor's option when constructing asphalt mixtures in all contracts. When the contractor chooses the RAP option, the percentage of RAP shall not exceed the amounts indicated in the table for a given N Design.

Maximum RAP Percentage Using Non-Fractionated RAP

Asphalt Mixtures ^{1/}	Maximum %, Non-Fractionated RAP		
	Ndesign	Binder/Leveling Binder	Surface
50	30 / 50	15	10
70	25 / 40	10	10
90	25	10	10
105	25	10	10

1/ 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 PG 64-22 to be reduced to a PG 58-28).

- (2) Use of Fractionated RAP in Asphalt Mixtures. The use of fractionated RAP in asphalt mixtures shall be as follows.
 - (a) Coarse Aggregate Size. The coarse aggregate in the coarse portion of fractionated RAP shall be equal to or less than the nominal maximum size requirement for the asphalt mixture to be produced.
 - (b) Steel Slag Stockpiles. Fractionated RAP stockpiles containing steel slag or other expansive material, as determined by the Illinois Tollway, shall be approved for use in High ESAL surface mixtures only.
 - (c) Use in Asphalt Surface and Asphalt Binder Mixtures (High ESAL). Fractionated RAP for use in asphalt surface mixtures (High ESAL) shall be Category 1 or 2 fractionated RAP, in which the coarse aggregate is Class B quality or better.
 - (d) Use in Asphalt Surface Mixtures (Low ESAL). Fractionated RAP for use in asphalt surface mixtures (Low ESAL) shall be Category 1 or 2 fractionated RAP, in which the coarse aggregate is Class C quality or better.

- (e) Use in Asphalt Binder Mixtures (Low ESAL) and Asphalt Base Course. Fractionated RAP for use in asphalt binder mixtures (Low ESAL) and asphalt base course mixtures shall be Category 1 or 2 fractionated RAP, in which the coarse aggregate is Class C quality or better.
- (f) Use in Asphalt Shoulders and Asphalt Stabilized Subbase. Fractionated RAP for use in asphalt shoulder mixtures or asphalt stabilized subbase mixtures shall be Category 1 or 2 fractionated RAP.
- (g) Use in SMA Mixtures. Fractionated RAP for use in SMA surface course and SMA binder course mixtures shall be the fine portion of Category 1 fractionated RAP, in which the fine aggregate is manufactured sand only.
- (h) The use of fractionated RAP shall be a contractor's option when constructing asphalt mixtures in all contracts. When the contractor chooses the fractionated RAP option, the percentage of fractionated RAP shall not exceed the amounts indicated in the following tables for a given Ndesign. The percentage amounts of fractionated RAP for any given mix design shall be a combination of both fine and coarse portion FRAP.

Maximum RAP Percentage Using Category 1 Fractionated RAP

Asphalt Mixtures Ndesign	Maximum %, Category 1 Fractionated RAP ^{2/}	
	Binder/Leveling Binder ^{1/}	Surface ^{4/}
50	45/50	35
70	45	35
90	40	30 ^{3/}
105	40	30 ^{3/}

- 1/ For Asphalt Shoulder Binder Course N50, the amount of FRAP shall not exceed 40 percent, and for Asphalt Base Course N50, the amount of FRAP shall not exceed 50 percent of the mixture.
- 2/ When FRAP exceeds 20 percent the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 30 percent FRAP would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).
- 3/ Category 1 coarse portion fractionated RAP containing steel slag may be blended with virgin steel slag aggregate to obtain the specified properties in asphalt surface friction course mixes.
- 4/ Includes polymer modified surface course mixtures.

Maximum RAP Percentage Using Category 2 Fractionated RAP

Asphalt Mixtures Ndesign	Maximum %, Category 2 Fractionated RAP ^{2/}	
	Binder/Leveling Binder ^{1/}	Surface
50	40/50	30
70	40	30
90	30	15
105	30	15

- 1/ For Asphalt Shoulder Binder Course N50, the amount of FRAP shall not exceed 40%, and for Asphalt Base Course N50, the amount of FRAP shall not exceed 50% of the mixture.
- 2/ When FRAP exceeds 20 percent, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 30 percent RAP would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).

Maximum RAP Percentage Using Category 1 Fractionated RAP

SMA Mixtures ^{1/}	Maximum %, Category 1 Fine Portion Fractionated RAP ^{2/}	Maximum % Category 1 Coarse Portion Fractionated RAP ^{2/}
Binder	20	10
Surface	20	10

- 1/ Positive dust control must be used in the production of SMA mixtures.
- 2/ When total FRAP exceeds 20 percent in an SMA mix, 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 PG 76-22 to be reduced to a PG 70-28 in a polymerized mix or require a virgin asphalt binder grade of PG 64-22 GTR-12 to be reduced to a PG 58-28 GTR-12 in a GTR mix).

1031.06 Asphalt Mix Designs. At the Contractor’s option, asphalt mixtures may be constructed utilizing RAP/FRAP material meeting the above detailed requirements.

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 asphalt 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.

With approval of the Engineer, for asphalt plants using positive dust control, the mix designer may choose to develop the mix design with less than 1.0 percent mineral filler added in the laboratory.

The Contractor's mix design shall use a bulk aggregate specific gravity (G_{sb}) of the RAP/FRAP equal to 2.660. As an option, the Contractor may have the Illinois Tollway conduct G_{sb} of the RAP/FRAP stockpile(s), for possible use in the mix design. If the Contractor chooses this option, the following procedure will be used for determining G_{sb} :

1. Provide the Illinois Tollway with a 20,000 gram representative sample of each RAP/FRAP material.
2. The RAP/FRAP will be heated to 230°F, and the RAP/FRAP agglomerations broken down, as if conducting a maximum specific gravity test.
3. The asphalt content will be determined on a 1,000 – 1,500 gram sample of the RAP/FRAP.
4. A 3,000 gram sample of the RAP/FRAP will be dried to a constant weight. One percent virgin asphalt binder will be added to the RAP/FRAP and mixed thoroughly. The sample will be split into two parts, and the maximum specific gravity (G_{mm}) of each sample determined.
5. The G_{se} of each sample will be calculated and averaged.
6. If historical mix data or the mix design of the RAP/FRAP source is available, the asphalt absorption from that information will be used to calculate the G_{sb} of the RAP/FRAP. If no information is available on the RAP/FRAP source, an asphalt absorption of 1.0 percent will be used to calculate the G_{sb} of the RAP/FRAP.

1031.07 Asphalt Mixture Production. The coarse aggregate in all RAP/FRAP used shall be equal to or less than the nominal maximum size requirement for the asphalt mixture being produced.

To remove or reduce agglomerated material, a scalping screen, crushing unit, or comparable sizing device approved by the Engineer shall be used in the RAP/FRAP 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. When producing SMA mixtures or mixtures containing conglomerate 3/8 RAP, a positive dust control system shall be utilized.

Asphalt mixture 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) Asphalt mix number assigned by IDOT or Illinois Tollway.
- (3) Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) to the nearest 0.1 ton.
- (4) Accumulated dry weight of RAP/FRAP in tons to the nearest 0.1 ton.
- (5) Accumulated mineral filler in revolutions, tons, etc. to the nearest 0.1 unit.
- (6) Accumulated asphalt binder in gallons, 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) Asphalt mix number assigned by IDOT or Illinois Tollway.
- (3) Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram).
- (4) Mineral filler weight to the nearest pound.
- (5) RAP/FRAP weight to the nearest pound.
- (6) Virgin asphalt binder weight to the nearest pound.
- (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. 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."

1031.09 Use of RAP in Porous Granular Embankment. The use of RAP in porous granular embankment, as outlined in the Illinois Tollway Special Provision "Subgrade Aggregate, Special" shall be as follows:

- (a) Stockpiles and Testing. RAP stockpiles may be any of those listed in Article 1031.02, except "Conglomerate 5/8," "Conglomerate 3/8," and "FRAP." The testing requirements of Article 1031.03 shall not apply.
- (b) Gradation. One hundred percent of the RAP material shall pass the 4 in. sieve. The RAP gradation shall be such that the "Crushed Concrete with Crushed RAP Materials" gradation requirements in the Illinois Tollway Special Provision "Subgrade Aggregate, Special" are achieved.

RECLAIMED ASPHALT SHINGLES (RAS) (TOLLWAY)

Effective: November 6, 2011

Revised: April 1, 2016

Description. Reclaimed asphalt shingles (RAS) meeting Type 1 or Type 2 requirements used as an asphalt binder and fine aggregate source, may be included in both shoulder and mainline wearing surface course and non-wearing binder / leveling course asphalt mixtures produced in accordance with Section 406 of the Standard Specifications and applicable contract special provisions when shown on the plans and approved by the Engineer; however, the use of Type 1 RAS may be restricted when shown on the plans. Type 1 or Type 2 RAS used as a fiber reinforcement substitution, may be included in mainline surface and non-wearing binder course Stone Matrix Asphalt (SMA) mixtures. Type 1 or Type 2 RAS used as an asphalt binder source, may be used in Asphalt stabilized subbase produced in accordance with Section 312 of the Standard Specifications. Type 1 and Type 2 RAS shall not be blended in any asphalt mixture.

Definitions. RAS shall meet either Type 1 or Type 2 requirements as specified herein.

- (a) Type 1. Type 1 RAS shall be processed, pre-consumer asphalt shingles salvaged from the manufacturer of asphalt roof shingles.
- (b) Type 2. Type 2 RAS shall be processed post-consumer shingles only, salvaged from residential dwellings of four units or less, that are not subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP).

Materials. All RAS materials shall be processed by certified producers such that the following gradation requirements are met:

Gradation	
Sieve	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	93 - 100

The final product shall have no particle exceeding the maximum aggregate size allowed for the specific mixture as defined by contract specifications. To conduct the gradation testing, a 500 – 700 gram sample of processed shingle material is air dried and then dry sieved over the 3/8” and No. 4 sieves and weighed.

The RAS producer may mechanically blend sand (FM 01, FM 02, FM 20 or FM 22) or fine, processed reclaimed asphalt pavement (RAP) up to an equal weight of processed RAS will be permitted. The process and procedures to incorporate sand or RAP shall be included in the producers QC Plan. The sand shall be “B Quality” or better from an approved Aggregate Gradation Control System source.

RAS asphalt binder content is to be determined by chemical extraction in accordance with Illinois Method AASHTO T164.

Before a mix design containing RAS for a particular mixture is authorized, the following shall be submitted with the mix design for volumetric verification:

Certification by the IEPA permitted post-consumer or IDOT approved pre-consumer processor of the RAS material, as to the RAS content and source. Certification forms are located at the back of this special provision and also available from the Illinois Tollway Materials Office.

With approval of the Engineer, for asphalt plants using positive dust control, the mix designer may choose to develop the mix design with less than 1.0 percent mineral filler added in the laboratory.

Deleterious Materials. Processed Type 1 or Type 2 RAS materials shall not contain more than 0.5% deleterious materials. Deleterious materials including, but not limited to, asbestos, metals, glass, rubber, nails, soil, brick, tars, paper, wood, and plastics, shall not exceed 0.5% by weight as determined on material retained on the 4.75 mm (No. 4) sieve. To conduct deleterious material testing, a 500 – 700 gram sample of processed RAS material is sieved on the No. 4 sieve and any deleterious material is picked and weighed.

Type 2 RAS from post-consumer sources shall contain less than the maximum percentage of asbestos fibers based on testing procedures and frequencies established by the Illinois Tollway, state or federal environmental regulatory agencies.

QUALITY CONTROL REQUIREMENTS

RAS stockpiles shall be sampled and tested by the processor or their accredited lab for gradation, asphalt content, and deleterious material content as follows:

- a. Sampling. Washed extraction samples for binder content and gradation, and dry gradation samples for deleterious content shall be obtained at the minimum frequency of one sample per 200 tons for the first 1000 tons and one sample per 1000 tons thereafter. A minimum of 5 sets of samples shall be required for stockpiles less than 1000 tons to establish an average gradation and asphalt cement content of the RAS for use in an asphalt mix design.
- b. Extraction / Gradation. 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 agency use. The processor shall extract the other test sample according to Illinois Method AASHTO T164 for solvent extraction to determine binder content and gradation. With the approval of the Engineer, the ignition oven may be substituted for extractions according to the IDOT test procedure, "Calibration of the Ignition Oven for the Purpose of Characterizing Reclaimed Asphalt Pavement (RAP)". The agency reserves the right to test any sample (split or agency-taken) to verify the processors' test results.

- c. **Specific Gravity.** For asphalt mix designs that contain RAS that has not been mechanically blended with any other product, a bulk specific gravity (G_{sb}) of 2.300 shall be used for RAS in the design. Blended RAS products may have other specific gravity values for use in asphalt mix design but shall be verified by the Illinois Tollway. When the blended RAS product is approved by the Illinois Tollway an approval letter will be sent to the supplier with the approved gradation and specific gravity assignment.
- d. **Deleterious Content.** 500 to 700 grams of the RAS samples shall be air dried and dry sieved on the No. 4 sieve and any deleterious material shall be removed and weighed. The agency reserves the right to test any sample (split or agency-taken) to verify the processors' test results.
- e. **Evaluation of Results.** All of the extraction and deleterious content results shall be compiled and averaged for asphalt binder content, gradation, and deleterious content. Individual extraction test results, when compared to the averages, will be accepted if within the tolerances listed below.

Parameter	RAS Sample
No. 8 (2.36 mm)	±5%
No. 16 (1.18 mm)	±5%
No. 30 (600 µm)	±4%
No. 200 (75 µm)	±2.0%
Asphalt Binder	±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 test results fall outside the appropriate tolerances, the RAS source will no longer be allowed for use in asphalt mixtures.

Processed RAS materials from Type 1 or Type 2 RAS sources shall be stockpiled separately from other recycled materials. Blending of RAS materials in a stockpile with other recycled materials from other sources is prohibited.

Use of RAS in asphalt mixtures. Type 1 or Type 2 RAS may be used in all asphalt mixtures as follows:

- (a) SMA and N90 & N105 Surface Mixes:
 - (1) The maximum allowable RAS usage in SMA and in N90 or N105 surface mixtures (Mixes D & F) shall be as follows:
 - a. RAS shall not exceed 5.0 percent by weight of the total mix.
 - b. RAS shall not be used in conjunction with standard Reclaimed Asphalt Pavement (RAP) or Category 2 Fractionated Reclaimed Asphalt Pavement (FRAP).

- c. If used in conjunction with Category 1 FRAP the contribution of asphalt binder from the RAS and FRAP combined in any HMA mixture shall not exceed 35 percent of the total asphalt binder content in the mix design, or in any WMA mixture shall not exceed 40 percent of the total asphalt binder content in the mix design.

(2) The virgin asphalt binder grade shall be as follows:

<u>Mix Type</u>	Percent RAS/Category 1 FRAP Asphalt Binder Replacement	
	< 20%	20 – 35%
SMA, and N90/N105 Surface Mixes	Reduce high temperature by one grade ^{1/}	Reduce high & low temperature by one grade ^{1/}

1/ One asphalt binder grade bump represents a change of 6°C.

(b) N70 Shoulder Surface Mixes:

- (1) The maximum allowable RAS usage in N70 shoulder surface mixtures (Mix D) shall be as follows:
 - a. RAS shall not exceed 5.0 percent by weight of the total mix.
 - b. If used in conjunction with standard RAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 20 percent of the total asphalt binder content in the mix design.
 - c. If used in conjunction with Category 1 or 2 FRAP the contribution of asphalt binder from the RAS and FRAP combined shall not exceed 40 percent of the total asphalt binder content in the mix design.

(2) The virgin asphalt binder grade shall be as follows:

Percent RAS/Standard RAP Asphalt Binder Replacement	
<u>Mix Type</u>	< 20%
N70 Shoulder Surface Mixes	No grade bump ^{1/}

Percent RAS/FRAP Asphalt Binder Replacement		
<u>Mix Type</u>	< 20%	25 – 40%
N70 Shoulder Surface Mixes	No grade bump ^{1/}	Reduce high & low temperature by one grade ^{1/}

^{1/} One asphalt binder grade bump represents a change of 6°C.

(c) N70/N90/N105 Binder and Leveling Binder Mixes, and 4.75 mm Leveling Binder Mixes:

(1) The maximum allowable RAS usage in N90/N105 Binder and IL 4.75 or IL-19 Leveling Binder Mixes shall be as follows:

- a. RAS shall not exceed 5.0 percent by weight of the total mix.
- b. If used in conjunction with Standard RAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 30 percent of the total asphalt binder content in the mix design.
- c. If used in conjunction with Category 1 FRAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 45 percent of the total asphalt binder content in the mix design.
- d. If used in conjunction with Category 2 FRAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 35 percent of the total asphalt binder content in the mix design.

(2) Virgin asphalt binder grade shall be as follows:

Percent RAS/Standard RAP Asphalt Binder Replacement		
<u>Mix Type</u>	< 20%	20 – 30%
N90/N105 Binder or Leveling Binder	No grade bump ^{1/}	Reduce high & low temperature by one grade ^{1/}

Percent RAS/Category 1 FRAP Asphalt Binder Replacement		
<u>Mix Type</u>	< 20%	20 – 45%
N90/N105 Binder or Leveling Binder	No grade bump ^{1/}	Reduce high & low temperature by one grade ^{1/}

Percent RAS/Category 2 FRAP Asphalt Binder Replacement		
<u>Mix Type</u>	< 20%	20 – 35%
N90/N105 Binder or Leveling Binder	No grade bump ^{1/}	Reduce high & low temperature by one grade ^{1/}

^{1/} One asphalt binder grade bump represents a change of 6°C.

(d) N50 Asphalt Shoulder Binder Mixes:

(1) The maximum allowable RAS usage in N50 Shoulder Binder Mixes shall be as follows:

- a. RAS shall not exceed 5.0 percent by total weight of mix.
- b. If used in conjunction with standard RAP the contribution of asphalt binder from the RAS and RAP combined shall not exceed 40 percent of the total asphalt binder content in the mix design.
- c. If used in conjunction with Category 1 or 2 FRAP the contribution of asphalt binder from the RAS and FRAP combined shall not exceed 50 percent of the total asphalt binder content in the mix design.

(2) Virgin asphalt binder grade shall be as follows:

Percent RAS/Standard RAP Asphalt Binder Replacement		
<u>Mix Type</u>	< 20%	20 – 40%
N50 Binder or Base Course	No grade bump ^{1/}	Reduce high and low temperature by one grade ^{1/}

Percent RAS/ FRAP Asphalt Binder Replacement		
<u>Mix Type</u>	< 20%	20 – 50%
N50 Binder or Base Course	No grade bump ^{1/}	Reduce high & low temperature by one grade ^{1/}

^{1/} One asphalt binder grade bump represents a change of 6°C.

(e) Asphalt Stabilized Subbase Mixes:

- (3) The maximum allowable RAS usage in Asphalt Stabilized Subbase Mixes shall be as follows:
- a. RAS shall not exceed 5.0 percent by total weight of mix.
 - b. If used in conjunction with Category 1 or 2 FRAP the contribution of asphalt binder from the RAS and FRAP combined shall not exceed 65 percent of the total asphalt binder content in the mix design.

(4) Virgin asphalt binder grade shall be as follows:

Percent RAS/Standard RAP Asphalt Binder Replacement		
<u>Mix Type</u>	< 20%	20 – 50%
Asphalt Stabilized Subbase	No grade bump ^{1/}	Reduce high & low temperature by one grade ^{1/}

Percent RAS/ FRAP Asphalt Binder Replacement		
<u>Mix Type</u>	< 20%	20 – 65%
Asphalt Stabilized Subbase	No grade bump ^{1/}	Reduce high & low temperature by one grade ^{1/}

^{1/} One asphalt binder grade bump represents a change of 6°C.

Asphalt Mix Production. RAS shall be incorporated into the asphalt 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. While an auger-feed system is preferred, any system must provide a consistent, even flow of material and be approved by the Illinois Tollway. 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 mixture production is halted when RAS flow is interrupted.

When producing asphalt mixtures containing RAS, a positive dust control system shall be utilized, and the incoming RAS material shall be sampled and tested weekly by chemical extraction in accordance with Illinois Method AASHTO T164, as a check for compliance with the RAS producer’s master band.

Asphalt mixture 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) Asphalt mix number assigned by the Agency.
- (3) Accumulated weight of dry aggregate (combined or individual) in tons to the nearest 0.1 ton.

- (4) Accumulated dry weight of RAS in tons to the nearest 0.1 ton.
- (5) Accumulated mineral filler in revolutions, tons, etc. to the nearest 0.1 unit.
- (6) Accumulated asphalt binder in gallons, 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 conditions).

(b) Batch Plants.

- (1) Date, month, year, and time to the nearest minute for each print.
- (2) Asphalt mix number assigned by the Agency.
- (3) Individual virgin aggregate hot bin batch weights to the nearest pound.
- (4) Mineral filler weight to the nearest pound.
- (5) RAS weight to the nearest pound.
- (6) Virgin asphalt binder weight to the nearest pound.
- (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 system will be inspected by the Engineer prior to production and verified at the beginning of each construction season thereafter.

Approved Asphalt Shingle Recycling Facility
Quality Control / Quality Assurance Certification Form
Delivered Recycled Asphalt Shingles

Asphalt Shingle Recycling Facility: _____

Address: _____

Contact: _____

Phone: _____

Approved Facility No: _____

We the undersigned certify the delivered product meets the following specifications:

1. RAS is ground to 3/8" minus.
2. The material does not contain more than 1.5% deleterious material by weight.
3. **Supply Certification Forms** were completed and are on file at _____ (recycling facility).

Note: Deleterious material is defined as paper, plastic, wood or other material that is not part of the asphalt shingle (i.e. fibers, aggregate etc).

RAS **Delivered** **to:**

Company Name: _____

Address: _____

Contact: _____

Tonnage of RAS Delivered: _____

Record keeping: Copies of these forms shall be maintained by the Asphalt Shingle Recycling Facility and Hot Mix Asphalt Plant for a minimum period of 3 years, and made available to state agencies upon request.

Asphalt Shingle Recycling Facility (signature) Date _____

Hot Mix Asphalt Plant (signature) Date _____

SURFACE SMOOTHNESS TESTING FOR PAVEMENT (TOLLWAY)

Effective: August 22, 2014

Revised: April 1, 2016

Description. This work consists of measuring the smoothness of a final concrete or asphalt pavement surface. The Illinois Tollway shall be responsible to perform the work when measurement is of concrete pavements constructed in accordance with the Illinois Tollway special provision Performance Related Special Provision for Portland Cement Concrete Pavement, Jointed. The Contractor shall be responsible to perform the work when pavements are constructed using other specifications or concrete pavement is rehabilitated using diamond grinding.

Definitions.

1. Smoothness. Pavement smoothness shall mean the average International Roughness Index (IRI) value of the pavement wheel paths per 0.1 mi (0.16 km) lane segment.

References

Except where modified by the Illinois Department of Transportation or the Illinois Tollway, the following Standards shall apply:

American Society of Testing and Materials (ASTM) Standards

- ASTM E950 – Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with an Accelerometer Established Inertial Profiling Reference.
- ASTM E1926 – Standard Practice for Computing International Roughness Index of Roads from Longitudinal Profile Measurements.

National Cooperative Highway Research Program (NCHRP)

NCHRP Report 228 – Roughness Measurement and Analysis.

EQUIPMENT REQUIREMENTS

1. Inertial Profiler (IP)

The responsible party for smoothness measurement shall furnish a properly certified, calibrated and documented IP. The IP shall conform to the Class I requirements of the most recent revision of ASTM E950. The IP shall be outfitted with Wide Spot or RoLine lasers. The Contractor shall provide equipment certification documentation to the Engineer prior to the IP being used on the project. (Certification shall be obtained through the IDOT Profile Equipment Verification (PEV) process).

Daily calibration and verification of the IP shall be performed according to the manufacturer's recommendations. In addition, the accuracy and precision of the smoothness values and distance measurements need to be verified. The IP shall be calibrated in advance at a location established by the Engineer. If the Engineer requests, arrangements shall be made to have the Engineer observe the calibration and operation of the IP. The responsible party shall maintain records of all calibration activities, and provide the records to the Engineer upon request.

The responsible party for measurement shall furnish an operator trained in the operation of the particular IP to be used on the project. The operator shall be knowledgeable in the use of an industry-accepted software platform that performs analysis of profile data. Documentation of operator training/certification shall be submitted to the Engineer.

2. IRI Calculation Software

Any computer software package used to calculate the IRI statistic shall follow the procedure developed by the World Bank as described in ASTM E1926. The software shall report the IRI values in units of inches per mile rounded to one decimal place. The preferred software program for IRI calculation is the FHWA's Profile Viewing and Analysis (ProVAL) software.

Pavement surface testing

The smoothness data for each lane will be computed by obtaining the IRI values for the left and right wheel paths in each tested lane after any corrective work is performed that the Contractor feels is necessary based on the contractor's initial measurements. The calculated IRI value reported to the Engineer shall be the average IRI for both wheel paths. During collection high-pass and low-pass filters shall be set to zero.

Collection of profile data used to calculate IRI values will occur after the Contractor elects to perform any corrective work on measured pavements and not less than 7 days prior to opening a concrete pavement to traffic or not less than 24 hours prior to opening an asphalt pavement or diamond grinded pavement to traffic. In the event that more than one set of profile data are collected, the latest data will be considered the smoothness value for the pavement section.

Run the IP in the direction of traffic. Make each pass continuously, regardless of length. Measure profiles in the left and right wheel paths of each lane. Test and evaluate each lane separately. The Engineer will determine the length in miles (kilometers) of each mainline traffic lane. Operate the IP at the optimum speed as recommended by the manufacturer. Avoid harsh braking or large speed variations to maintain the optimum speed. Separate each mainline lane into segments 0.1 mi [0.16 km] in length. Evaluate the remainder segment less than 0.1 mi [0.16 km] in each mainline lane as an independent segment. The testing length for ramp paving shall be the length of each continuous individual paving lane not exceeding 0.2 miles. Ramp paving lanes exceeding 0.2 miles shall be reported in 0.1 mile segments. Any remaining paving lane length following 0.1 mile segmentation shall be reported as a separate segment. Toll plaza paving, and the associated pavement 50 feet prior to and following toll plaza paving, shall be considered as individual paving segments for either mainline or ramp paving.

Calculation

Obtain Smoothness values in an individual lane using the ProVAL “Smoothness Assurance” analysis with the 250 mm filter or equivalent method demonstrated to provide the same result.

Reporting

Prior to performing any smoothness testing, the responsible party for measurement will submit all documentation of IP calibration. All smoothness testing results shall be reported to the Engineer within two working days of completing testing, or the Engineer may require re-profiling of the tested pavement section.

All files shall be saved in separate directories for each day. Produce filenames in the format shown below:

File Naming Convention for IRI Reporting	
YYMMDD-N-D-L-Q-B-E	
Abr.	Definition
YY	Year (two digit)
MM	Month (two digit)
DD	Day (two digit)
N	Route Name
D	Direction of travel
L	Lane Number
Q	Unique identifier for the particular stretch of road in a lane and direction
B	Begin Station
E	End Station

**COARSE AGGREGATE FOR PORTLAND CEMENT CONCRETE PAVEMENT MIXTURES
(TOLLWAY)**

Effective: October 9, 2013

Revised: April 1, 2016

Coarse aggregate for portland cement concrete pavement mixtures shall be in accordance with Section 1004 of the Standard Specifications except as modified below.

Revise footnote 6/ of Article 1004.01(b) of the Standard Specifications to read as follows:

“6/ For crushed aggregate, if the material finer than the No. 200 sieve consists of the dust from fracture, essentially free from clay or silt, this percentage may be increased to 3.5.”

Add the following to Article 1004.02 of the Standard Specifications:

“(h) **Recycled Coarse Aggregate.** If recycled coarse aggregate is specified for use in a concrete mix design, the recycled coarse aggregate will be generated from an Illinois Tollway approved source of existing concrete pavement. The recycled coarse aggregate may be processed from a non-AGCS certified location. The processing of recycled coarse aggregates for reuse in hydraulic cement concrete shall be as follows:

- (1) **Recycled Concrete Aggregate (RCA).** Coarse RCA used in Class TL concrete mixes. Concrete pavement or structural concrete for recycled coarse aggregate from an approved source shall be broken with a guillotine (or similar) crusher, removed, and transported to a crushing location at a central recycling plant and be processed in accordance with IDOT’s policy memo for Recycling Portland Cement concrete into Aggregate except as follows.
 - a. Removed concrete shall be crushed with an impact type crusher operating at less than full capacity to minimize the production of fines. Up to 5 percent of the recycled coarse aggregate from Portland cement concrete pavement sources may consist of asphalt containing particles.
 - b. Washing of the crushed concrete coarse aggregate is required. The extra absorptivity of the recycled concrete aggregates shall be accommodated by keeping the stockpiled aggregates wet and at the batching plant by controlling the appropriate amount of water to the concrete mix to achieve the desired water to cement ratio.

Processed RCA taken from unknown sources can only be considered for approval by the Engineer for reuse in concrete if the coarse aggregate has been processed and all physical properties are in compliance with AASHTO Standard MP 16.

PERFORMANCE RELATED SPECIAL PROVISION FOR TERNARY CONCRETE MIX DESIGNS FOR COMPOSITE PAVEMENTS (TOLLWAY)

Effective: July 15, 2014

Revised: April 1, 2016

DESCRIPTION

This work consists of designing and furnishing ternary Illinois Tollway Class TL portland cement concrete for concrete pavements. The objective of this performance related special provision is to provide the Illinois Tollway with a methodology to assure high quality concrete, while simultaneously allowing the Contractor the maximum freedom in deciding how to develop the mix design and place the concrete.

Ternary concrete incorporates hydraulic portland cement, GGBF slag, fly ash and other supplementary cementitious materials (SCM) to produce a mix with three cementitious constituent materials. A Type IT blended cement in accordance with AASHTO M 240 shall be acceptable. A Type IP or IS blended cement in accordance with AASHTO M 240 may be used with ternary mixes when an SCM is combined as a third constituent material to produce a ternary mix. Slag, fly ash, and any other SCM's combined as constituent materials in a ternary mix or as part of a blended cement may consist of no less than 35% and no more than 50% of the total cementitious material.

Reference Standards

Except where modified by the Illinois Department of Transportation or the Illinois Tollway, the following Standards shall apply:

Illinois Department of Transportation (IDOT)

- Standard Specifications for Road and Bridge Construction, Adopted April 1, 2016.
- Supplemental Specifications and Recurring Special Provisions, Current Edition.
- Illinois Tollway Supplemental Specifications to the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Current Edition.
- Test Procedures referenced herein, as described in the current edition of the Manual of Test Procedures for Materials, as well these test procedures:
 - AASHTO T 105 Chemical Analysis of Hydraulic Cement
 - AASHTO T 196 Air Content of Freshly Mixed Concrete by the Volumetric Method
 - ASTM C 457 Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete
 - ASTM C 856 Petrographic Examination of Hardened Concrete
 - ASTM C 1293 Determination of Length Change of Concrete Due to Alkali-Silica Reaction
 - AASHTO T 161 Procedure A Modified Resistance of Concrete to Rapid Freezing and Thawing

REQUIREMENTS FOR ILLINOIS TOLLWAY CLASS TL MIX DESIGNS

Contractor shall provide a concrete mix design according to the following performance requirements for Illinois Tollway Class TL concrete. The testing shall be performed by an AASHTO-accredited laboratory.

Laboratory trials shall initially be performed by the Contractor to determine the basic strength, slump and air content properties of a mix. Once mixture proportions are determined through laboratory trials, a plant trial batch of the proposed mix design shall be required, and the trial mix shall be sampled and tested to confirm that the required properties listed below are obtained. The Contractor is required to contact the Engineer a minimum of 2 days prior to any plant trial batch mixing so that a Illinois Tollway representative can observe the process. The same 2-day notification is required prior to any physical testing on hardened concrete samples.

Compressive Strength

Interim compressive strength for Illinois Tollway Class TL concrete shall be a minimum of 2,500 psi (425 psi flexural) as tested in accordance with AASHTO T22 at no less than 3 days age for all construction traffic. No construction traffic shall travel within a 1 foot distance of any free edge of pavement until a 5 day age.

Interim compressive strength for Illinois Tollway Class TL concrete to public traffic shall be a minimum of 3,500 psi at no less than 7 days age.

Ultimate compressive strength shall not be less than 3,500 psi at 14 days and when the Illinois Tollway Class TL mix design is for application to pavements to be constructed in accordance with the special provision for Performance Related Portland Cement Concrete Pavement, Jointed, then the compressive strengths greater than a specified maximum quality level (MQL) at 28 days are not desired, and therefore strengths greater than the specified MQL level at 28 days may reduce the quality pay factors. Test cylinders shall be made and cured in accordance with AASHTO T 23. Test results will also be presented at 7 and 14 days.

Flexural Strength

Ultimate flexural strength using AASHTO T 97 for third point loading shall be a minimum of 650 psi at 14 days.

Plastic Air Content

Plastic Air Content determined using AASHTO T 152 test method shall be from 5.5 to 8.0 percent for slip form placements, and 5.0 to 8.0 percent for manual placement.

Hardened Air Content

Air-void system having the following characteristics as determined by ASTM C 457:

- Spacing factor not exceeding 0.008-in.
- Specific surface not less than 600 in²/in³
- Total air content not less than 4.0 percent

Slump

For slipform concrete pavement placement, place the concrete with a slump value that optimizes placement, except ensure the concrete does not slough or slump and is adequately consolidated and meets all other requirements. Maintain the concrete at a uniform consistency.

Slump range for formed or manual placement shall be 2 to 4 inch.

Alkali – Silica Reaction

Concrete shall be proportioned such that the maximum total alkali content contributed by Portland cement (as determined in accordance with AASHTO T 105) shall not exceed 5 lb/yd³.

MATERIALS

(a) Portland Cement. The portland cement used in any mix or as a part of any blended cement shall conform to the requirements of Section 1001 of the Standard Specifications.

(b) Supplementary Cementitious Materials. Fly ash and GGBF Slag used in any mix shall conform to the requirements of Section 1010 of the Standard Specifications. Blended cements with a percentage of supplementary cementitious materials differing by more than 5% shall be considered different cementitious materials. If a blended cement is used in a mix, a certification of compliance shall be provided and include a statement signed by the blended cement supplier that indicates the actual percentage by weight of supplementary cementitious materials in the blend. No more than 15% by weight of a cement shall consist of any processing addition. No more than 15% by weight of a cement shall consist of ground limestone. Limestone is classified as a processing addition, not as supplementary cement.

(c) Fine Aggregates. The fine aggregate shall be in accordance with the Illinois Tollway special provision for Fine Aggregate for Portland Cement Concrete Pavement Mixtures.

(d) Coarse Aggregates. The coarse aggregate for Illinois Tollway Class TL concrete shall be in accordance with Section 1004 of the Standard Specifications in addition to the following:

All Coarse Aggregate shall be in accordance with the Illinois Tollway special provisions for Coarse Aggregate for Portland Concrete Pavement Mixtures. All virgin coarse aggregate used in the mix design shall be from sources that are certified by IDOT as 30 year life aggregates

(e) Mixing Water. Water used with cement in concrete shall be in accordance with Section 1002 of the Standard Specifications and the Illinois Tollway special provision for Reclaimed Concrete Production Water.

(f) Concrete Admixtures. Concrete admixtures for Illinois Tollway Class TL concrete shall be in accordance with Section 1021 of the Standard Specifications.

(g) Fiber Reinforcement. Fibrous reinforcement shall be permitted provided the material is used in accordance with the product manufacturer's recommendations and it is demonstrated that the concrete complies with the herein established performance requirements.

MIX GRADATION

Virgin fine aggregate sources used in the mix shall be in accordance with the Illinois Tollway special provision for Fine Aggregate for Portland Cement Concrete Pavement Mixtures. Any blending of fine aggregates shall be by interlocked mechanical feeders at the aggregate source or concrete plant. As much as 75% of the fine aggregate may be from an unprocessed stone sand source as approved by the Engineer if proportions and admixtures in the mix can maintain sufficient workability and finishing capabilities of the placed pavement.

Virgin coarse aggregate sources used in the mix shall be in accordance with the Illinois Tollway special provision for Coarse Aggregate for Portland Cement Concrete Pavement Mixtures, and shall be a combination of any two or more gradations specified in Article 1004.1(c) of the Standard Specifications needed to obtain the desired blended aggregate gradation. The coarse aggregates shall be blended at the concrete plant to produce a combined coarse aggregate gradation.

The total aggregates used in the Illinois Tollway Class TL mixture shall be blended at the concrete plant to produce a combined optimized aggregate gradation that complies with the following:

AGGREGATE BLEND FOR THE ILLINOIS TOLLWAY CLASS TL MIX
 Percent by weight passing

Sieve Size	% Passing
1 in.	100
¾ in.	85-98
½ in.	65-85
⅜ in.	55-77
# 4	40-60
# 8	28-45
# 16	18-35
# 30	10-25
# 50	5-17
#100	1-12
#200	0-8

MIX SUBMITTAL

Submittal for any Illinois Tollway Class TL mix design shall include:

5. Mix design, showing:
 - a. Quantities, description, sources and mill certifications of all mix ingredients
 - b. Design water-cementitious materials ratio (w/cm)
 - c. Design Slump
 - d. Design Air content
 - e. Gradation and absorption of all aggregates
 - f. Bulk specific gravity (SSD) of all cementitious materials and aggregates
 - g. Theoretical mass and fresh density
 - h. Admixture dosage
6. A trial batch report demonstrating that the concrete complies with the performance requirements herein specified.

The proportions of any Illinois Tollway Class TL mix design previously approved for use with the Illinois Tollway special provision for Performance Related Portland Cement Concrete, Jointed may be adjusted through a Illinois Tollway witnessed trial batch that verifies that the specified plastic properties are met, with 3 and 7 day lab cured and 3 day field cured test specimen compressive strengths obtained that suggest that the minimum interim, ultimate, and possible target quality strengths will be obtained after the adjustments. The adjusted mix design shall then be approved as a new mix design.

MATERIAL TOLERANCES

Portland Cement

No re-submittal shall be required under the condition that the Portland cement (AASHTO M 85 and M 240) source complies with the following tolerances:

Acceptable tolerance for alkali content ($\text{Na}_2\text{O}_{\text{eq}}$): ± 0.10 percent.

Acceptable tolerance for tri-calcium aluminate content: - 2.0 percent, + 1.0 percent.

Acceptable tolerance for supplementary cementitious materials in a blended cement: $\pm 2\%$.

Fine Aggregate

Substitution of fine aggregates from different sources shall not be permitted without re-submittal.

Acceptable tolerance for fineness modulus: ± 0.20 .

Coarse Aggregate

Substitution of coarse aggregate from different sources or different size classification shall not be permitted without re-submittal.

Supplementary Cementitious Materials

No change in type or classification shall be permitted without resubmittal.

Concrete Admixtures

Contractor may change between Type A and Type D admixtures as seasonal conditions warrant. With cold weather placements, the use of an accelerating admixture conforming to ASTM C 494, Type C or E will be allowed without the need for a re-submittal.

Other Materials

No change in brand or type shall be permitted without re-submittal.

TEMPERATURE CONTROL FOR PLACEMENT

The ambient air temperature during concrete placement and the temperature of surfaces to receive ternary concrete shall not be less than 40°F. The concrete temperature when placed shall not be less than 60°F for ternary mixtures of any concrete with more than 20% fly ash or 35% slag replacement of Portland cement. Heating of the mixing water or aggregates will be required to regulate the concrete placing temperature with cold weather placements. The use of accelerating admixtures conforming to ASTM C 494, Type C or E is allowed.

QUALITY MANAGEMENT PLAN

At least 14 days prior to the first concrete placement, the Contractor shall submit a Quality Management Plan (QMP), for materials and construction in accordance with the Illinois Tollway special provision for Contractor's Quality Program.

Production Facility and Transportation Equipment

The production facility and transportation equipment shall conform to the certification requirements of the Illinois Department of Transportation.

FIELD ACCEPTANCE

Acceptance to this specification shall be based on the following key characteristics:

- Compressive Strength
 - Interim
 - Ultimate
- Plastic air content – 5.0 to 8.0 percent (5.5 to 8.0 percent for slipform placement)
- Slump (Formed Placement) – 2 to 4 inches
- Slump (Slipform Placement) - Maintain the concrete at a uniform consistency. The Engineer will not allow an edge slump greater than ½ inch where no additional concrete work is to be constructed immediately adjacent to the pavement being placed. The Engineer will not allow an edge slump greater than ¼ inch where additional concrete work is to be constructed immediately adjacent to the pavement being placed.
- Water / cementitious materials ratio – Design -0.03, +0.00

TRAFFIC BARRIER TERMINAL, TYPE T2 (TOLLWAY RECURRING)

Effective: October 1, 2009

Revised: April 1, 2016

Description: This work shall consist of furnishing and erecting traffic barrier terminal as shown in the Plans and/or directed by the Engineer.

Materials: Materials shall be in accordance with Article 631.02 of the Standard Specifications.

Construction Requirements.

General. General requirements for traffic barrier terminal shall be according to the following Article 631.03 of the Standard Specifications, except as modified herein:

Add the following to Article 631.03 of the Standard Specifications. The rail elements shall be of uniform section. Warped or deformed elements will be rejected. The edges of the elements shall be rolled or rounded so that they present no sharp edges. All connections and splices shall be made with button head bolts with oval shoulders in such a manner that there will be no appreciable projection on the road side of the guard rail.

Traffic Barrier Terminal, Type T2. The terminal shall conform to the individual manufacturer's specifications and shall be installed according to the manufacturer's instructions. The terminal shall include all necessary transitions between the terminal and the item to which it is attached.

Fabrication. The plates for the rail element shall be blanked to proper shape, fabricated, and ready for assembly when received. No punching, drilling, cutting, or welding will be permitted in the field.

Plates in lap splices shall make contact throughout the entire area of the splice.

Erection. Materials or hardware, on which the galvanizing has been damaged shall be replaced with new materials having properly galvanized surfaces, except that, subject to the approval of the Engineer, minor damage to galvanized surfaces may be repaired by field galvanizing in accordance with the recommendations of the American Hot Dip Galvanizers Association.

The rail and post elements shall be erected to the required elevation. The top of the rail shall be visually straight in horizontal alignment and shall be continuously parallel to the roadway profile grade in vertical alignment. If insufficient adjustment is available in the holes, posts shall be reset, at no additional cost to the Illinois Tollway, until the traffic barrier terminal is properly aligned. The brackets may be loosely bolted to the posts and, after erection of rail elements, the rail shall be carefully aligned and the bolts then fully tightened. Nuts shall be drawn up tight on all bolts.

Posts. Terminal posts shall be wood, either southern pine or Douglas fir (coast region), Grade No. 1 structural. Wood posts shall be treated. The posts shall be cut to the proper dimensions before treatment. No cutting of the posts will be permitted after treatment. Posts shall be erected according to Article 634.05 of the Standard Specifications.

Block-outs. When the terminal is installed behind a gutter, blockouts are required. All block-outs shall be wooden, either southern pine or Douglas fir (coast region), Grade No. 1 structural. Plastic and/or steel block-outs shall not be permitted.

Foundation Tubes. Foundation tubes shall be steel and installed at post locations per manufacturer's specifications. The top of the foundation tube shall not project more than 4" above the ground line when measured along a 5' cord, in compliance with AASHTO specifications.

Contractor's Responsibility For Underground Facilities. It shall be the Contractor's responsibility to ascertain in advance of any work, by any and all possible means, the presence of underground electrical or telecommunications cables in or near the vicinity of the work. It shall be the Contractor's further responsibility to notify the Engineer at least ten days in advance of setting new posts when working near underground electrical or telecommunications cables. The Illinois Tollway or its representative will then locate any such cables which may be in jeopardy. It shall be the Contractor's responsibility to preserve cable location markings and all information relating thereto given to him/her, and to effectively communicate such information to his/her workers. If the Contractor cuts or damages any such cables, either through carelessness or failure to follow the foregoing procedures, he/she shall be responsible for repairing all damages or replacing the cable without splicing, at the Illinois Tollway's option, and all at no additional cost to the Illinois Tollway and without cause for the Contractor claiming delay.

Such repair or replacement shall include the immediate installation by the Contractor, without further notice to him/her, of temporary cables satisfactory to the Engineer, the temporary cables to remain in service until the directed repairs or replacements are made. Stringing temporary cables on the ground shall not be allowed in any circumstances. Temporary cables shall be:

(a) Suitable for direct burial installation, acceptable to the Engineer, and shall be buried to a depth not less than 12 inches;

or

(b) Weather-proof cable, acceptable to the Engineer, and shall be suspended not less than 8 feet above the highest point of terrain between supports, unless otherwise directed by the Illinois Tollway. Suspended temporary cables may be attached to existing poles, or, in their absence, shall be attached to supports acceptable to the Engineer, furnished and installed by the Contractor.

Any posts that are to be located near or over any buried cable shall be installed by first digging a hole by hand, and then installing the post and backfilling the hole. No posts shall be driven under such conditions. Care shall be taken while digging by hand so as not to damage the cable.

All efforts on the Illinois Tollway's part to advise the Contractor as to the locations of underground cables notwithstanding, it shall be understood that such locations are at best approximate, may be in error, and that such efforts by the Illinois Tollway shall not relieve the Contractor of any responsibility for restoring damage resulting from the activities of any employee, Subcontractor, agent, or representative of the Contractor.

The Contractor shall also be responsible for notifying owners of other cables and underground facilities which may be jeopardized by the Contractor's operations in the same manner as required for notice to the Illinois Tollway.

Method of Measurement: This work will be measured for payment, complete in place, in units of each.

The pay limits between the traffic barrier terminal and the adjacent guardrail shall be as shown on Illinois Tollway Standard Drawing C7.

Basis of Payment: This work will be paid for at the contract unit price per each, for TRAFFIC BARRIER TERMINAL, TYPE T2.

Pay Item Number	Designation	Unit of Measure
J1631120	TRAFFIC BARRIER TERMINAL, TYPE T2	EACH

TRAFFIC BARRIER TERMINAL, TYPE T6B (TOLLWAY RECURRING)

Effective: October 1, 2009

Revised: April 1, 2016

Description: This work shall consist of furnishing and erecting traffic barrier terminal as shown in the Plans and/or directed by the Engineer.

Materials: Materials shall be in accordance with Article 631.02 of the Standard Specifications

Construction Requirements.

General. General requirements for traffic barrier terminal shall be according to the following Article 631.03 of the Standard Specifications, except as modified herein:

Add the following to Article 631.03 of the Standard Specifications. The rail elements shall be of uniform section. Warped or deformed elements will be rejected. The edges of the elements shall be rolled or rounded so that they present no sharp edges. All connections and splices shall be made with button head bolts with oval shoulders in such a manner that there will be no appreciable projection on the road side of the guard rail.

Traffic Barrier Terminal, Type T6B. The terminal shall include all necessary transitions between the terminal and the item to which it is attached.

When attaching the end shoe to concrete, constructed with forms and with a thickness of 12 in. or less, the holes may be formed, core drilled, or an approved 3/4 in. cast-in-place insert may be used.

When attaching the end shoe to concrete, constructed with forms and with a thickness greater than 12 in. an approved 3/4 in. bolt shall be anchored into core drilled or formed holes using a chemical adhesive.

When attaching the end shoe to concrete constructed by slipforming, the holes shall be core drilled.

Fabrication. The plates for the rail element shall be blanked to proper shape, fabricated, and ready for assembly when received. No punching, drilling, cutting, or welding will be permitted in the field.

Plates in lap splices shall make contact throughout the entire area of the splice.

Erection. Materials or hardware, on which the galvanizing has been damaged shall be replaced with new materials having properly galvanized surfaces, except that, subject to the approval of the Engineer, minor damage to galvanized surfaces may be repaired by field galvanizing in accordance with the recommendations of the American Hot Dip Galvanizers Association.

The rail and post elements shall be erected to the required elevation. The top of the rail shall be visually straight in horizontal alignment and shall be continuously parallel to the roadway profile grade in vertical alignment. If insufficient adjustment is available in the holes, posts shall be reset, at no additional cost to the Illinois Tollway, until the traffic barrier terminal is properly aligned. The brackets may be loosely bolted to the posts and, after erection of rail elements, the rail shall be carefully aligned and the bolts then fully tightened. Nuts shall be drawn up tight on all bolts.

Posts. Posts shall be steel. Steel posts may be driven by hand or mechanical methods provided they are protected by a suitable driving cap and the earth around the posts compacted, if necessary, after driving. When steel posts are driven to incorrect alignment or grade, they shall be removed and set according to Article 634.05 of the Standard Specifications.

Block-outs. All block-outs shall be wooden, either southern pine or Douglas fir (coast region), Grade No. 1 structural. Plastic and/or steel block-outs shall not be permitted.

Contractor's Responsibility For Underground Facilities. It shall be the Contractor's responsibility to ascertain in advance of any work, by any and all possible means, the presence of underground electrical or telecommunications cables in or near the vicinity of the work. It shall be the Contractor's further responsibility to notify the Engineer at least ten days in advance of setting new posts when working near underground electrical or telecommunications cables. The Illinois Tollway or its representative will then locate any such cables which may be in jeopardy. It shall be the Contractor's responsibility to preserve cable location markings and all information relating thereto given to him/her, and to effectively communicate such information to his/her workers. If the Contractor cuts or damages any such cables, either through carelessness or failure to follow the foregoing procedures, he/she shall be responsible for repairing all damages or replacing the cable without splicing, at the Illinois Tollway's option, and all at no additional cost to the Illinois Tollway and without cause for the Contractor claiming delay.

Such repair or replacement shall include the immediate installation by the Contractor, without further notice to him/her, of temporary cables satisfactory to the Engineer, the temporary cables to remain in service until the directed repairs or replacements are made. Stringing temporary cables on the ground shall not be allowed in any circumstances. Temporary cables shall be:

(a) Suitable for direct burial installation, acceptable to the Engineer, and shall be buried to a depth not less than 12 inches;

or

(b) Weather-proof cable, acceptable to the Engineer, and shall be suspended not less than 8 feet above the highest point of terrain between supports, unless otherwise directed by the Engineer. Suspended temporary cables may be attached to existing poles, or, in their absence, shall be attached to supports acceptable to the Engineer, furnished and installed by the Contractor.

Any posts that are to be located near or over any buried cable shall be installed by first digging a hole by hand, and then installing the post and backfilling the hole. No posts shall be driven under such conditions. Care shall be taken while digging by hand so as not to damage the cable.

All efforts on the Illinois Tollway's part to advise the Contractor as to the locations of underground cables notwithstanding, it shall be understood that such locations are at best approximate, may be in error, and that such efforts by the Illinois Tollway shall not relieve the Contractor of any responsibility for restoring damage resulting from the activities of any employee, Subcontractor, agent, or representative of the Contractor.

The Contractor shall also be responsible for notifying owners of other cables and underground facilities which may be jeopardized by the Contractor's operations in the same manner as required for notice to the Illinois Tollway.

Method of Measurement: This work will be measured for payment, complete in place, in units of each.

The pay limits between the traffic barrier terminal and the adjacent guardrail shall be as shown on Illinois Tollway Standard Drawing C10.

Basis of Payment: This work will be paid for at the contract unit price per each, for TRAFFIC BARRIER TERMINAL, TYPE T6B.

Pay Item Number	Designation	Unit of Measure
J1631135	TRAFFIC BARRIER TERMINAL, TYPE T6B	EACH

TRAFFIC BARRIER TERMINAL, TYPE T10 (TOLLWAY RECURRING)

Effective: October 1, 2009

Revised: April 1, 2016

Description: This work shall consist of furnishing and erecting traffic barrier terminal as shown in the Plans and/or directed by the Engineer.

Materials: Materials shall be in accordance with Article 631.02 of the Standard Specifications

Construction Requirements.

General. General requirements for traffic barrier terminal shall be according to the following Article 631.03 of the Standard Specifications, except as modified herein:

Add the following to Article 631.03 of the Standard Specifications. The rail elements shall be of uniform section. Warped or deformed elements will be rejected. The edges of the elements shall be rolled or rounded so that they present no sharp edges. All connections and splices shall be made with button head bolts with oval shoulders in such a manner that there will be no appreciable projection on the road side of the guard rail.

Traffic Barrier Terminal, Type T10. The terminal shall include all necessary transitions between the terminal and the item to which it is attached.

If any portion of the existing name plate of the bridge will be covered by the end shoe, the name plate shall be moved to an adjacent area along the rail or end post before the end shoe is installed.

When attaching the end shoe to concrete, constructed with forms and with a thickness of 12 in. or less, the holes may be formed or core drilled.. The anchor cone shall be set flush with the surface of the concrete. Externally threaded studs protruding from the surface of the concrete will not be permitted. The standard end shoe shall be placed between the splice plate and the rail element.

The distance between any anchor and the edge of existing concrete shall be 1'-6" minimum.

When a bridge expansion joint exists between the end shoe and the first post, all splice bolts at the end shoe shall be fitted with a lock nut or double nuts and tightened only to a point that will allow guardrail movement.

When attaching the end shoe to concrete, constructed with forms and with a thickness greater than 18 in. or not accessible to the back side, an approved 3/4 in. bolt shall be anchored into core drilled or formed holes using a chemical adhesive.

Fabrication. The plates for the rail element shall be blanked to proper shape, fabricated, and ready for assembly when received. No punching, drilling, cutting, or welding will be permitted in the field.

Plates in lap splices shall make contact throughout the entire area of the splice.

Erection. Materials or hardware, on which the galvanizing has been damaged shall be replaced with new materials having properly galvanized surfaces, except that, subject to the approval of the Engineer, minor damage to galvanized surfaces may be repaired by field galvanizing in accordance with the recommendations of the American Hot Dip Galvanizers Association.

The rail and post elements shall be erected to the required elevation. The top of the rail shall be visually straight in horizontal alignment and shall be continuously parallel to the roadway profile grade in vertical alignment. If insufficient adjustment is available in the holes, posts shall be reset, at no additional cost to the Illinois Tollway, until the traffic barrier terminal is properly aligned. The brackets may be loosely bolted to the posts and, after erection of rail elements, the rail shall be carefully aligned and the bolts then fully tightened. Nuts shall be drawn up tight on all bolts.

Posts. Posts shall be steel. Steel posts may be driven by hand or mechanical methods provided they are protected by a suitable driving cap and the earth around the posts compacted, if necessary, after driving. When steel posts are driven to incorrect alignment or grade, they shall be removed and set according to Article 634.05.

Block-outs. All block-outs shall be wooden, either southern pine or Douglas fir (coast region), Grade No. 1 structural. Plastic and/or steel block-outs shall not be permitted.

Contractor's Responsibility For Underground Facilities. It shall be the Contractor's responsibility to ascertain in advance of any work, by any and all possible means, the presence of underground electrical or telecommunications cables in or near the vicinity of the work. It shall be the Contractor's further responsibility to notify the Engineer at least ten days in advance of setting new posts when working near underground electrical or telecommunications cables. The Illinois Tollway or its representative will then locate any such cables which may be in jeopardy. It shall be the Contractor's responsibility to preserve cable location markings and all information relating thereto given to him/her, and to effectively communicate such information to his/her workers. If the Contractor cuts or damages any such cables, either through carelessness or failure to follow the foregoing procedures, he/she shall be responsible for repairing all damages or replacing the cable without splicing, at the Illinois Tollway's option, and all at no additional cost to the Illinois Tollway and without cause for the Contractor claiming delay.

Such repair or replacement shall include the immediate installation by the Contractor, without further notice to him/her, of temporary cables satisfactory to the Engineer, the temporary cables to remain in service until the directed repairs or replacements are made. Stringing temporary cables on the ground shall not be allowed in any circumstances. Temporary cables shall be:

- (a) Suitable for direct burial installation, acceptable to the Engineer, and shall be buried to a depth not less than 12 inches;
- or
- (b) Weather-proof cable, acceptable to the Engineer, and shall be suspended not less than 8 feet above the highest point of terrain between supports, unless otherwise directed by the Engineer. Suspended temporary cables may be attached to existing poles, or, in their absence, shall be attached to supports acceptable to the Engineer, furnished and installed by the Contractor.

Any posts that are to be located near or over any buried cable shall be installed by first digging a hole by hand, and then installing the post and backfilling the hole. No posts shall be driven under such conditions. Care shall be taken while digging by hand so as not to damage the cable.

All efforts on the Illinois Tollway's part to advise the Contractor as to the locations of underground cables notwithstanding, it shall be understood that such locations are at best approximate, may be in error, and that such efforts by the Illinois Tollway shall not relieve the Contractor of any responsibility for restoring damage resulting from the activities of any employee, Subcontractor, agent, or representative of the Contractor.

The Contractor shall also be responsible for notifying owners of other cables and underground facilities which may be jeopardized by the Contractor's operations in the same manner as required for notice to the Illinois Tollway.

Method of Measurement: This work will be measured for payment, complete in place, in units of each.

The pay limits between the traffic barrier terminal and the adjacent guardrail shall be as shown on Illinois Tollway Standard Drawing C11.

Basis of Payment: This work will be paid for at the contract unit price per each, for TRAFFIC BARRIER TERMINAL, TYPE T10.

Pay Item Number	Designation	Unit of Measure
JI631140	TRAFFIC BARRIER TERMINAL, TYPE T10	EACH

BARRIER WALL REFLECTORS, TYPE C (TOLLWAY)

Effective: April 1, 2016

Description. This work shall consist of furnishing and installing barrier wall reflectors, Type C on concrete barrier wall and temporary concrete barrier as shown in the Plans and/or as directed by the Engineer.

Materials. Materials for barrier wall reflectors, Type C shall be in accordance with Section 1097 of the Standard Specifications, except as modified herein.

The reflector reflective face shall be fabricated from either methyl methacrylate (acrylic) plastic or a high-performance retroreflective sheeting material.

The plastic prismatic barrier reflectors shall be according to minimum specific intensities per Article 1097.02 of the Standard Specifications.

The flexible reflective sheeting face fabricated of a high-performance retroreflective sheeting according to Article 1091.03 of the Standard Specifications.

CONSTRUCTION REQUIREMENTS.

Reflectors. The direct applied barrier wall reflectors shall be rectangular in shape, mono-directional, and have a minimum of 9.0 sq in. of effective reflective area in accordance with Plans.

The Contractor shall furnish written documentation from the sheeting manufacturer stating that the reflector unit conforms to these specification requirements. The reflectors shall be furnished in either amber or crystal as specified and shall be ready for mounting. The base assembly of the reflector units shall be free of cracks and checks, and fabrication shall be accomplished in a uniform and professional manner.

The manufacturer's name, model and date of manufacture shall be clearly identified on the base of the reflectors so that it is visible after installation.

For qualification purposes only, ten (10) samples required for tests set forth in these Specifications shall be submitted by the Contractor. In addition, the Engineer will have the right to select 10 samples at random from each shipment for acceptance purposes.

Installation. Barrier wall reflectors, Type C shall be installed at the spacing and elevations shown in the Plans or as directed by the Engineer.

Only the Tollway's specified type of reflector and geometric shape will be permitted within the limits of a contract.

The surface of the barrier to which the unit is to be applied shall be free of foreign matter and any material which would adversely affect the bond of the adhesive. Cleaning of the surfaces shall be to the satisfaction of the Engineer.

Barrier wall reflectors, Type C shall be installed using an adhesive meeting the reflector unit manufacturer's specifications. The adhesive shall be placed either on the surface of the barrier or the bottom of the unit in sufficient quantity to ensure complete coverage of the contact area with no voids present and with a slight excess after the unit is pressed firmly in place.

The Contractor shall exercise care that the reflectors are placed in a satisfactory and uniform alignment both horizontally and vertically. Acceptance of the reflectors installation will include, in addition to ordinary inspection, a night inspection shall be made by the Engineer and Contractor from an automobile. Reflectors not having satisfactory and uniform night appearance shall be moved and adjusted or replaced as required at the Contractor's expense until they do conform to the requirements herein and are found to be acceptable to the Engineer.

Method of Measurement. This work will be measured for payment in place in units of each.

Basis of Payment. This work will be paid for at the contract unit price per each, for BARRIER WALL REFLECTORS, TYPE C.

Pay Item Number	Designation	Unit of Measure
J1782022	BARRIER WALL REFLECTORS, TYPE C	EACH

RAISED PAVEMENT LANE MARKER (TOLLWAY RECURRING)

Effective: July 1, 2009

Revised: April 1, 2016

Description. This work shall consist of furnishing and installing plowable prismatic reflector type pavement markers on pavement and/or concrete bridge decks as shown in the Plans, or as directed by the Engineer.

This work shall include necessary pavement and/or deck preparation for the raised pavement marker installation.

Materials. All materials for raised pavement lane markers shall meet the following specifications:

(a) The markers shall be low profile units consisting of an iron casting according to ASTM A 536-84, Grade 72-45-05 hardened to 52-54RC to which is attached a replaceable prismatic retro-reflector for reflecting light from one direction as specified. The casting shall be shaped to deflect a snowplow blade upward, thus preventing damage to the reflectors. The bottom of the casting shall incorporate two parallel keels and a bow shaped web designed to fit into a grooved road surface. The casting shall have leveling tabs to ensure proper embedment and shall be fastened to the road surface using an epoxy adhesive. The casting shall be designed for one directional plowing. The casting shall be marked with the manufacturer's name and the model number of the marker shall be visible after installation.

(b) The overall dimensions for pavement raised reflective pavement markers shall be approximately 10 inches long by 5.5 inches wide and a maximum of 1.76 inches high. The overall dimensions for bridge raised pavement lane markers shall be approximately 9.25 inches long by 5.86 inches wide and a maximum of 1.25 inches high. The surface of the keel and web shall be free of scale, dirt, rust, oil, grease, or any other contaminant which may reduce bond.

(c) The reflector shall be of the prismatic type consisting of a methyl methacrylate or suitably compounded acrylonitrile butadiene styrene (ABS) shell filled with a mixture of an inert thermosetting compound and filler material. The exterior surface of the shell shall be smooth and contain one (monodirectional) methyl methacrylate prismatic reflector face of the color specified. The shell shall be fabricated in a manner that will provide a mechanical interlock between the thermosetting compound and the shell. The thermosetting compound shall bond directly to the backside of the metalized lens surface. The manufacturer's trademark shall be molded in the face of the reflector lens or on the reflector body so as to be visible after installation.

(d) The reflector lens shall be high-intensive type corner cube prismatic and shall provide total internal reflection of the light entering the lens face. The reflector shall be 4 in. long x 2 in. wide x 0.44 in. high and fit securely into a recessed area on the upper surface of the marker casting web. The reflective surface shall be a minimum of 1.6 sq in. in area. The reflector shall have an abrasion resistant reflective surface.

(e) The specific intensity of the reflective surface at 0.2 degrees divergence angle shall be as follows when the incident light is parallel to the base of the marker.

Minimum Specific Intensity (candelas/foot candle)		
Color	Incidence Angle	
	0°	20°
Crystal	3.0	1.2

Construction Requirements. It shall be the Contractor's responsibility to determine the location of any traffic control devices installed in the pavement and/or deck before beginning work, and shall conduct work to avoid damage to these devices. Any damage to these devices caused by the Contractor's operation shall be repaired at no additional cost to the Illinois Tollway.

The pavement and/or deck to which the marker is to be applied shall be accurately cut to the marker manufacturer's specifications. The depression shall be clean and dry prior to the installation of the marker.

The pavement shall be cut to match the bottom contour of the marker using a concrete saw fitted with 18 and 20-inch diameter blades. The bridge deck shall be cut to match the bottom contour of the marker using a concrete saw fitted with 18 and 19-inch diameter blades. Diamond blades shall be used on portland cement concrete pavement. The entire cut shall be made in a single plunge. Single blade cutting shall not be used. The cut shall be clean and completely dry prior to pouring the epoxy. After the cut is cleaned, the configuration shall be checked using a pavement marker. The marker shall fit easily within the cut with the leveling tabs resting on the pavement. If any force is required to place or remove the marker or if the leveling tabs do not rest on the pavement surface, the cut shall be enlarged as necessary. Installations on crowned pavements and/or decks, superelevations, or ramps shall be cut deeper than those on level pavements if necessary to get proper marker fit. A rapid setting (hard in one hour) epoxy meeting the requirements of AASHTO M 237 shall be poured into the cut to within 3/8 inch of the pavement surface. The installed height for the reflective pavement markers shall be approximately 0.3 in. above the road surface.

The marker shall then be placed into the epoxy-filled cut. After placement of the marker, epoxy should be flush with the pavement and/or deck surface. The leveling tabs shall rest on the pavement surface and the marker tips shall be slightly below the pavement surface when properly installed. There shall be no epoxy on the reflective lens. The epoxy, when properly mixed, shall be hard cured in 30-45 minutes. If after one hour, a screwdriver or other pointed instrument can be pushed into the epoxy, the marker and the uncured epoxy shall be removed, the marker shall be cleaned and the unit reinstalled.

The pavement and/or deck surface temperature and the ambient air temperature shall be at or above 50 °F at the time of installation of the marker for the epoxy adhesive to properly cure.

The reflectors may be attached to the castings prior to or after the placement of the markers. The depression in the web shall be clean and dry. The reflector shall be laminated to an elastomeric pad and adhesively attached to the casting. A primer meeting the marker manufacturer's specifications shall be applied to the web surface. The protective paper or plastic film covering the adhesive pad shall be removed immediately prior to placing the reflector on the casting. Once the film covering is removed, extreme care shall be taken to avoid contamination of the exposed pad surface.

In lieu of an adhesive pad, an adhesive meeting the marker manufacturer's specification should be used. The adhesive shall be placed either on the reflector or on the web in sufficient quantity so as to ensure complete coverage of the contact area with no voids present and with a slight excess after the reflector is pressed in place. The reflector shall be placed on the casting with sufficient pressure to firmly seat it in place.

The raised pavement lane marker shall be in accordance with the Manufacturer's details and specifications. The raised reflective pavement markers shall not be laid directly over a longitudinal or transverse crack or joint. The raised reflective markers shall be placed in line with the permanent pavement markings with edge of the marker offset, toward traffic, a minimum distance of 2 in. from any joint (longitudinal or transverse) or crack in the pavement surface.

Reflector.

Where only the raised pavement lane marker reflector is specified in the Plans, the remaining portions of the existing raised pavement lane marker shall be cleaned by sandblasting or other methods approved by the Engineer. The contractor shall make certain the casting surface is dry and free of dirt and rust prior to placing the reflector on the casting.

Raised Pavement Lane Markers Inspection.

The permanent raised pavement lane marker will be inspected following installation, but no later than November 30. In addition, they will be inspected following a winter performance period that will extend 180 days from November 30.

Within 15 calendar days after the end of the winter performance period, a final performance inspection will be made. If this inspection discloses any work which is not visibly intact and serviceable, the Contractor shall, within 30 calendar days, completely repair or replace such work to the satisfaction of the Engineer.

Measured in its entirety, the work shall be 97 percent intact.

Upon completion of the final performance inspection or after satisfactory completion of any necessary corrections, the Engineer shall notify the Contractor in writing of the date of such final performance inspection and release him/her from further performance responsibility.

Method of Measurement. This work will be measured for payment, complete in place, in units of each.

Basis of Payment. This work will be paid for at the contract unit price per each, for RAISED PAVEMENT LANE MARKER, RAISED PAVEMENT LANE MARKER, BRIDGE, RAISED PAVEMENT LANE MARKER REFLECTOR.

Pay Item Number	Designation	Unit of Measure
JI781000	RAISED PAVEMENT LANE MARKER	EACH
JI781005	RAISED PAVEMENT LANE MARKER, BRIDGE	EACH
JI781010	RAISED PAVEMENT LANE MARKER REFLECTOR	EACH

ROADWAY DELINEATORS (TOLLWAY RECURRING)

Effective: January 12, 2010

Revised: April 1, 2016

Description: This work shall consist of furnishing, installing, removing, and reinstalling roadway delineator assemblies as shown in the Plans.

Materials: Materials for roadway delineators shall be in accordance with Article 635.02 of the Standard Specifications, except as modified herein.

Revise the title of Article 1097.03(d) of the Standard Specifications to read:
 "Housings. Only Type B housing shall be used."

Construction Requirements.

General. Roadway delineators shall be installed in the configurations, locations and spacing shown in the Plans.

Installing New Delineator Posts and Reflectors. Only the Illinois Tollway's specified type of reflector and geometric shape shall be permitted within the limits of a contract.

For qualification purposes only, ten (10) samples required for tests set forth in these Specifications shall be submitted by the Contractor. In addition, the Engineer will have the right to select 10 samples at random from each shipment for acceptance purposes.

The posts to which the delineator reflectors are fastened shall be vertical and oriented so that the face of the reflector shall be at 90 degrees to the adjacent pavement.

Delineator posts shall be driven to the prescribed depth by either hand or mechanical devices, using a suitable driving cap. Driven posts shall be firm and plumb above the ground. Any posts found battered, bent or damaged after driving or otherwise found not acceptable by the Engineer, shall be removed and replaced by the Contractor at no additional cost to the Illinois Tollway.

Delineator reflectors shall be fastened to the posts with vandal-proof fasteners approved by the Engineer.

The Contractor shall exercise care that the delineators are placed in a satisfactory and uniform alignment both horizontally and vertically. In addition to ordinary inspection, a night inspection shall be made by the Engineer and Contractor from an automobile. Delineators not having satisfactory and uniform night appearance shall be moved and adjusted by the Contractor until acceptable to the Engineer.

Removing and Reinstalling Existing Delineator Posts and Reflectors. Existing delineator posts and reflectors shall be removed and reinstalled according to Article 635.05 of the Standard Specifications.

Method of Measurement. This work will be measured for payment, complete in place, in units of each.

Basis of Payment. The work of furnishing and installing new roadway delineator posts and reflectors will be paid for at the contract unit price per each, for ROADWAY DELINEATORS.

The work of removing and reinstalling existing delineator posts and reflectors will be paid for at the contract unit price per each for REMOVE AND REINSTALL ROADWAY DELINEATORS.

Pay Item Number	Designation	Unit of Measure
JI635010	ROADWAY DELINEATORS	EACH
JI635012	REMOVE AND REINSTALL ROADWAY DELINEATORS	EACH

MULTI-POLYMER PAVEMENT MARKINGS (TOLLWAY)

Effective: October 20, 2008

Revised: April 1, 2016

Description. This work shall consist of the furnishing and application of a durable, long life multi-polymer pavement marking system. The binder portion of the system is to be applied to the road surface at 20 mils \pm 1 mil in thickness on concrete/asphalt pavements and 25 mils \pm 1 mil on open grade pavement (or according to Engineers and manufacturers recommendation); and into which reflective media is applied by means of pressurized applicator in accordance with the requirements stated in this specification.

Materials. All materials used to formulate a system for hot-spray applications of permanent multi-polymer pavement markings shall conform to the requirements specified herein.

A. Multi-Polymer Resins

a) Physical Properties of the Mixed Compound:

The multi-polymer pavement marking material shall consist of a 100 percent solid two part system formulated and designed to provide a simple volumetric mixing ratio of two components (must be two volume(s) of Component A and one volume(s) of Component B). No volatile solvents or fillers will be allowed. The multi-polymer resin shall be as follows:

- **Multi-Polymer Content (Component A).** The multi-polymer content of the multi-polymer resin shall be tested according to ASTM D 1652 and calculated as the weight per multi-polymer equivalent (WPE) for both white and yellow. The multi-polymer content shall be determined on a pigment free basis and shall meet the target value provided by the manufacturer's certification and approved by the Illinois Tollway Materials Group. A tolerance of plus or minus 50 of WPE will be applied to the target value to establish the acceptance range.
- **Amine Value (Component B).** The amine value of the curing agent shall be determined according to ERF-25-68. The total amine value shall be less than 530.

The system shall be formulated as a Long Life Pavement Marking System capable of providing an average of 6 years performance. The Long Life Pavement Marking System shall be free of TMPTA (trimethylolpropane-triacrylate), free of toxic heavy metal (lead, chromium, cadmium, and other toxic heavy metals as defined by the U.S. EPA), and free of other such multi functional monomers.

Material composition of the mixed compound shall be as follows:

Material Requirements	
Tests	Requirements
Density (Gallon Weight)	±0.10 lb./gal
Viscosity (Krebs-Stormer)	±7 KU
Viscosity (Cone & Plate)	±0.5 Poises
Grind	Not Less than the Standard
% Non-Volatile Matter	±1.0%
% Pigment (white)	±3.0%
% Volume Non-Volatile Matter	±3.0%
Infrared Spectrum	Both component A and component B shall be analyzed to verify for control purposes that materials submitted for use are of an identical formulation as originally approved. Deviations as determined by comparison with the original sample shall be cause for rejection.
Trifunctional or Multifunctional Monomers	0%
Isocyanate	0%

b) Pigmentation:

The pigment composition shall be as follows:

Pigment Composition	Percent by Weight	
	Minimum	Maximum
White:		
Titanium Dioxide Rutile (94% minimum purity, ASTM D 476, Type III)	18.0	25.0
Multi-Polymer Resin	75.0	86.0
Yellow:		
Organic Non-Lead Yellow	10.0	15.0
Titanium Dioxide (ASTM D 476, Type III)	4.0	9.0
Multi-Polymer Resin	75.0	86.0

The entire pigment composition shall consist of titanium dioxide.

c) Toxicity:

Upon heating to application temperature, the material shall not exude fumes which are toxic or injurious to persons or property. Upon curing the materials should be completely inert with all components fully reacted and environmentally safe.

d) Daylight Reflectance:

Chromaticity and reflectance requirements shall be as follows:

Federal 595 Color		Chromaticity Coordinates								Daylight directional reflectance (Y)
		1		2		3		4		
		x	y	x	y	x	y	x	y	
White	17855	.302	.344	.325	.344	.302	.320	.325	.320	80 min.
Yellow	33538	.543	.472	.475	.472	.543	.425	.475	.425	50 min.

e) Weathering Resistance:

The multi-polymer compound, both white and yellow, must be applied to 2 sets of 3"x 6" aluminum panels at 20 ± 1 mil in thickness, one set with no glass spheres and one set with glass spheres as specified herein (must ensure 50/50 distribution of Type A and Type B beads for this will impact the results of this test) and expose the prepared samples in a Q.U.V. Environmental Testing Chamber, as described in ASTM G-53, and they shall conform to the following requirements. (The test shall be conducted for 75 hours at 122°F, 4 hours humidity and 4 hours U.V., in alternating cycles. The prepared panels shall be cured at 77°F for 72 hours prior to exposure.) The color of the white multi-polymer material shall not be darker than Federal Standard No. 595A-17855. The color of the yellow multi-polymer material shall be reasonably close to Federal Standard No. 595A-13415.

f) Dry Time:

The multi-polymer resin compounds, when properly applied with the required gradations and bead application rates per gallon, shall cure to a no-track condition, when tested in accordance with ASTM D 711, within 240 minutes at 40 degrees F and not more than 35 minutes at temperature 70 degrees F.

g) Adhesion to Pavement (Concrete and Asphalt):

The multi-polymer system markings must perform for an average of 6 years. The cured pavement marking materials, when tested according to ACI Method 503, shall have such a higher degree of adhesion to the specified concrete (compressive strength, 4,000 psi minimum) or asphalt surface such that there shall be a 100% substrate failure in the performance of this test. The prepared specimens shall be conditioned at room temperature (75°F ± 2°F) for a minimum of 24 hours and a maximum of 72 hours prior to the performance of the tests indicated.

h) Hardness:

The multi-polymer paint pavement marking material, when tested according to ASTM D 2240, shall have a Shore D Hardness from 75 to 95. The samples shall be allowed to cure at room temperature (75 ± 2 degrees F) for a minimum of 24 hours and a maximum of 72 hours prior to performing the indicated tests.

i) Abrasion:

The abrasion resistance shall be evaluated on a Taber Abrader with a 1,000 gram load and CS-17 wheels. The duration of the test shall be 1,000 cycles. The wear index shall be calculated based on ASTM C 501, and the wear index for the dual component material shall not be more than 100 milligrams. The test shall be performed on cured samples of material which have been applied, without glass beads, at a film thickness of 0.020 ± 0.0005 inches to code S-16 stainless steel plates. The samples shall be allowed to cure at room temperature (75 ± 2 degrees F) for a minimum of 24 hours and a maximum of 72 hours prior to performing the indicated tests.

j) Accelerated Life-Cycle Aging Test: The material must not show any evidence of blistering, bubbling, or delaminating when submitted to test method ATR-931. Results of the test shall be provided by the manufacturer during the approval process.

k) Thermal compatibility:

The mixed hybridized polymer system must have thermal compatibility and tensile strength requirements of 4500-6500 psi, such that, it is compatible with asphalt and Portland cement concrete under all weather conditions.

l) Delineation profile:

To enhance better profile of the marking by minimizing splattering and improved bead embedment the viscosity of the mixed Component A and Component B of the hybridized polymer system shall be greater than 4500cP at 75°F.

m) Reflective Media. The reflective media shall meet the following requirements:

1) Type A – The glass beads shall meet the requirements of Article 1095.07 of the Standard Specifications and the following requirements:

i) First Drop Glass Beads. The first drop glass beads shall be tested by the standard visual method of large glass spheres adopted by the Illinois Department of Transportation. The beads shall have a silane coating and meet the following sieve requirements:

U.S. Standard Sieve Number	Sieve Size	% Passing By Weight (mass)
12	1.70 mm	95-100
14	1.40 mm	75-95
16	1.18 mm	10-47
18	1.00 mm	0-7
20	850 µm	0-5

ii) Second Drop Glass Beads. The second drop glass beads shall meet the requirements of Article 1095.07 of the Standard Specifications for Type B.

n) Packaging:

Glass beads shall be delivered in approved moisture proof bags or weather resistant bulk boxes. Each carton shall be legibly marked with the manufacturer, specifications and type, lot number, and the month and year the glass beads were packaged. The letters and numbers used in the stencils shall be a minimum of ½ in. in height.

- a. Moisture Proof Bags. Moisture proof bags shall consist of at least five ply paper construction unless otherwise specified. Each bag shall contain 50 lb net.
- b. Bulk Weather Resistance Boxes. Bulk weather resistance boxes shall conform to the Federal Specification PPP-8-640D Class II or latest revision. Boxes are to be weather resistant, triple wall, fluted, corrugated-fiber board. Cartons shall be strapped with two metal straps. Straps shall surround the outside perimeter of the carton. The first strap shall be located approximately 2 in. from the bottom of the carton and the second strap shall be placed approximately in the middle of the carton. All cartons shall be shrink wrapped for protection from moisture. Cartons shall be lined with a minimum 4 mil polyester bag and meet Interstate Commerce Commission requirements. Cartons shall be approximately 38 x 38 in., contain 2000 lb of glass beads and be supported on a wooden pallet with fiber straps.

The material shall be shipped to the job site 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.

o) Verification:

Prior to approval and use of the multi-polymer pavement marking materials, the manufacturer shall submit 1 – quart samples and/or 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 the multi-polymer and date of manufacture. In addition, all multi-polymer components shall be pre-approved for use on the project under the following conditions:

- Documentation of acceptable performance as certified by a Department of Transportation of surface-applied field performance of 100,000 ADT for 6 consecutive years to the standards of this specification.
- Any changes in formulation, physical or chemical properties of the approved multi-polymer resin needed to be explained in writing and submit to the Illinois Tollway within 30 days for reevaluation and approval process. The documentation shall include the Material Safety Data Sheets (MSDS).

Equipment. Application crew and equipment for the placement of reflectorized pavement marking shall be approved by the Pavement Marking Material Manufacturer to perform such operations.

In general, the applying equipment shall be mobile, truck mounted and self contained pavement marking machine, specifically designed to apply resin materials and reflective glass spheres in continuous and skip line patterns. The applying equipment shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. In addition, the truck mounted unit shall be provided with accessories to allow for the marking of legends, symbols, crosswalks and other special patterns.

The mobile applicator shall include the following features:

1. The mobile applicator shall provide individual material reservoirs, or space, for the storage of Component A and Component B of the resin composition.
2. The applicator shall be equipped with heating equipment of sufficient capacity to maintain the individual resin components at the manufacturer's recommended temperature and produce the required amount of heat at the mixing head & gun tip and maintain those temperatures with the tolerances recommended by the resin manufacturer for spray application.
3. The applicator shall be equipped with adequate individual tanks for the storage and dispensing of Size I and Size II glass spheres and black aggregate.
4. The applicator shall be equipped with individual dispensers for the simultaneous application of Type A and Type B glass beads respectively. Each dispenser shall be capable of applying beads at a minimum rate of 20 pounds per gallon of the resin composition. The applied combined total of both types of beads should be a maximum of 25 lbs./gal. (12 to 13 lbs. of each type).

5. The applicator shall be equipped with individual metering devices or pressure gauges, on the proportioning pumps (one indicator per pump) as well as stroke counters to monitor gallon usage. All such devices shall be visible to the Engineer.
6. The applicator shall be equipped with all the necessary spray equipment, mixers, compressors and other appurtenances to allow for the placement of reflectorized pavement marking system in a simultaneous sequence of operations.
7. Each application equipment must have a proven mixing system for proper mixing of the two components.
8. Each mobile applicator must be equipped with a completely enclosed flush and purge system to clean the lines and the guns without exuding any of the solution into the environment.

The Contractor shall provide an accurate temperature-measuring device(s) that shall be capable of measuring the pavement temperature prior to application of the material, the material temperature at the gun tip and the material temperature prior to mixing.

INSTALLATION REQUIREMENTS

A. Surface Preparation:

Clean the surface by a method approved by the Engineer to remove all dirt, grease, debris, glaze, laitance and any other contaminants that may hinder the adhesion of the system to the surface with minimum or no damage to the pavement surface. New Portland cement concrete pavements shall be water, shot or sand blasted clean to remove all laitance. New pavements shall be grooved where required by design in accordance with the special provision for grooving for recessed pavement markings followed by blast cleaning. Whenever grinding/grooving, scarifying, sandblasting, shot blasting or other operations are performed, the debris generated must be contained through vacuum type equipment or equivalent and the work shall be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that will mislead or misdirect the motorist.

When these operations are completed the pavement surface shall first be power broomed and then blown off with compressed air to remove residue and debris resulting from the cleaning work. All such debris must be properly contained especially when removing yellow paint lines and disposed of in the appropriate manner.

Removal and cleaning work shall be a continuous moving operation and conducted in such a manner as to control and minimize airborne dust, and similar debris so as to prevent a hazard to motor vehicle operation or nuisance to property.

Care shall be taken on bituminous and portland cement concrete surface when performing removal and cleaning work to prevent damage or transverse and longitudinal joint sealers.

B. Limits of Work:

Cleaning and surface preparation work shall be confined to the surface area specified for the application of pavement marking materials; or the surface area of existing pavement markings that are specified for removal on the plans, or as directed by the Engineer.

Surface preparation work includes cleaning for lines or cleaning for letters and symbols. Lines will be meant to include: Solid lines, broken lines, dotted lines, channelizing lines, barrier lines, stop lines, crosswalk lines and crossbars.

When lines are cleaned, the area of preparation will be the width of the new pavement marking, or existing line, plus one (1) inch on each side. When letters and symbols are cleaned the area of preparation will be sufficiently large to accommodate the new marking, or to remove the existing marking. Markings shall be applied to the cleaned surfaces on the same calendar day. If this cannot be accomplished, the surface shall be re-cleaned prior to applying the markings. No new marking, line or symbols shall be applied on any pavement that has not been properly prepared as per this specification and until the Engineer approves the cleaning.

C. Removal of Concrete Curing Compounds:

On new portland cement concrete pavements, cleaning operations shall not begin until a minimum of 10 days after the placement of concrete. The extent of the blasting work and/or grooving shall be to clean and prepare the concrete surface such that:

- a. There is not visible evidence of curing compound on the peaks of the textured concrete surface.
- b. There are no heavy puddled deposits of curing compound in the valleys of the textured concrete surface.
- c. All remaining curing compound is intact; all loose and flaking material is removed.
- d. The peaks of the textured pavement surface are rounded in profile and free of sharp edges and irregularities.
- e. The extent of the removal should be as such to insure the laitance is removed on both old as well as new concrete.

D. Removal of Existing Pavement Markings:

Existing pavement marking shall be cleaned for the purpose of:

- a. Preparing the pavement surface for the application of a new multi-polymer pavement marking in the same location as the existing markings of a different type.
- b. To remove existing markings that are in good condition which, if allowed to remain, will interfere with or otherwise conflict with newly applied marking patterns.

It shall be understood that in this context cleaning means the removal of an existing marking. It is not intended that all deteriorated existing pavement markings be removed. Example: If a new marking is applied to an unmarked "gap" in a broken line and the existing broken line pattern is worn or deteriorated, as determined by the Engineer, to the extent that it is not misleading or confusing to the motorist, the existing markings do not require removal.

Existing pavement markings that are to be totally replaced with a multi-polymer marking shall be cleaned to the extent that 95% to 100% of the existing marking is removed. Removal operations shall be conducted in such a manner that no more than moderate color and/or surface texture change results on the surrounding pavement surface.

The determination of acceptable removal will be made by judgment of the Engineer.

- c. Existing multi-polymer pavement markings to be recapped shall be cleaned via approved light grinding or blasting operations to the extent that all loose/flaky marking materials are removed as well as oil, dirt, etc. that may contaminate the application of the new marking material. A complete removal of the existing multi-polymer pavement markings is not necessary provided that it has been established to the Engineers' satisfaction that the existing markings are well bonded to the substrate and will not compromise the new markings. Recapping of existing markings will be limited to application over only long-life markings (TMPTA or other multifunctional monomer free systems) after verification with manufacturer and limited to one recapping event. A minimum of 20 mil of the liquid multi-polymer material is required for recapping before application of the glass beads.

E. Remove excess oils on asphalt pavements:

Removal of excess oils on SBR Latex, SBS, and SMA polymer/GTR modified asphalts shall require the following procedure (for any other type of polymer modified asphalts contact the pavement marking manufacturer for recommendations):

Remove excess oils exposing the top of the aggregates using approved light grinding or blast cleaning operations. Care shall be taken when performing this work to prevent gouging of the pavement and damage to the transverse and longitudinal joints.

F. Application:

The pavement marking system shall be applied through special machinery designed to precisely meter the two components in the ratio of proportion recommended by the material manufacturer. This equipment shall also comply with the previous specifications. The application of and combination of reflective media (glass beads and/or reflective elements) shall be applied at a rate specified by the manufacturer.

The edge of the center line or lane line shall be offset a minimum distance of 2 in. (50 mm) from a longitudinal crack or joint. Edge lines shall be approximately 2 in. (50 mm) from the edge of pavement. The finished center and lane lines shall be straight, with lateral deviation of any 10 ft. line not to exceed 1 in..

G. Atmospheric Conditions:

The pavement marking shall only be applied during conditions of dry weather and on subsequently dry pavement surfaces at the specified minimum uniform wet thickness according to the manufacturer's installation instructions. At the time of installation, the pavement surface temperature and the ambient temperature shall be above 45°F. For application at temperatures below 50°F, the hybridized polymer manufacturer shall be contacted for guidance. The Engineer shall determine the atmospheric conditions and pavement surface conditions that produce satisfactory results.

H. Application Temperatures:

Both components shall be brought to the temperature condition recommended by the manufacturer prior to mixing and spraying.

At any time throughout the duration of the project, the Contractor shall provide free access to his/her applying equipment for inspection by the Engineer, his/her authorized representative, or the materials representative.

Notification. The Contractor shall notify the Engineer 72 hours prior to the placement of the markings in order that he/she can be present during the operation. At the time of notification, the Contractor shall provide the Engineer the manufacturer and lot numbers of multi-polymer material and reflective media that will be used.

Inspection. The multi-polymer pavement markings will be inspected following installation according to Article 780.10 of the Standard Specifications, except, no later than October 15, and inspected following a winter performance period that extends 180 days from November 1. Any request for exception to the date of October 15 for final installation shall be submitted for approval to both the pavement marking manufacturer and the Engineer.

Packaging and Shipment. The pavement marking materials shall be shipped to the jobsite in strong substantial containers. Individual containers shall be plainly marked with the following information:

- a. Name of Product
- b. Lot Number
- c. Batch Number
- d. Date of Manufacture
- e. Quantity
- f. Mixing proportions
- g. Safety information
- h. Manufacturer's Name and Address

Reflective media shall be shipped in moisture resistant bags. Each bag shall be marked with name and address of the manufacture and the name and net weight of the material with a clear indication of what type of coating is present on the beads.

Sampling and Acceptance.

- A. Certification of Compliance:
The material manufacturer shall furnish a notarized certification that the material complies with the provisions of this specification. It shall not be inferred that the provisions of a certification of compliance waives Illinois Tollway inspection, sampling or testing.
- B. Laboratory Samples: Promptly after execution of the contract, the contractor shall notify the Engineer of the sources of material he/she expects to use. The material manufacturer shall furnish samples of the hybridized polymer materials as may be required by the Engineer, a minimum of ten days before the date of intended use of these materials.
- C. Infrared Spectra: A copy of the infrared spectra of each component on each lot number shall be supplied by the manufacturer along with the certification papers. This infrared spectra will be on record with the Illinois Tollway to serve as a quality control measure for the future supply of this system to the Illinois Tollway.

Qualification.

A. Qualifying a Manufacturer:

The Manufacturer must have expertise providing a pavement marking material that meets this specification with a documented performance history to include:

- a. Verifiable installations: proof of successful installations of at least 6 years old covering a minimum of 200,000 feet in 4 states in North America inclusive of climates having high UV exposure and high snow fall/plowing (seasonal snow fall >36 inches). Documentation of installations of similar climatic and traffic conditions shall be provided to the Illinois Tollway for material approval.
- b. The manufacturer will have demonstrated field performance in the locale of proposed application for a minimum of 12 months.
- c. Production facilities; 2 geographically separate locations minimum
- d. Compliance with EPA regulations
- e. A Verifiable ISO 9001 certified Q.C. Program

B. Qualifying a Contractor:

Multi-polymer pavement markings shall only be applied by Contractors on the IDOT list of Approved Contractors maintained by the Engineer of Operations and in effect on the date of advertisement for bids.

In order for an installer of such pavement marking material to be approved, the following document must be submitted:

- a. A certificate from a pre-approved manufacturer of such pavement marking materials, certifying that such a contractor has functional, appropriate equipment to install the pavement marking material of choice. The certification must be submitted to the Illinois Tollway for review and approval prior to the installation of the pavement marking.

Performance and Warranty Requirements.

After one year from the date of installation, the pavement markings shall provide effective delineation, presence, and retroreflectivity as noted below. During this period, the Engineer will make such observations as necessary to determine conformance with these performance requirements.

- A. The pavement markings shall meet the following Minimum Retroreflectivity Requirements:

Performance Retroreflectivity Criteria mcd/m ² /lux	
White	Yellow
400	350

Retroreflectivity requirements shall be the average retroreflectance, over a 0.1 mile section. Any 0.1 mile section that does not meet this requirement shall be replaced within 30 days, weather permitting.

- B. The pavement markings shall meet or exceed 95% present and intact. Evaluation of presence and intact shall be made on 25' sections and averaged for 0.1 mile sections. Any 0.1 mile section that does not meet this requirement shall be replaced within 30 days, weather permitting.

Method of Measurement. Lines will be measured for payment in place, in feet of multi-polymer pavement marking lines applied and accepted, measured in place.

Measurement of the multi-polymer letters, numbers, and symbols conforming to the sizes and dimensions specified will be the total area in square feet (square meter) calculated from the following unit areas

LETTERS SQ. FT. (SQ. M.)									
SIZE	A	B	C	D	E	F	G	H	I
6 ft	3.1	4.0	2.7	3.4	3.3	2.6	3.3	3.4	1.5
(1.8 m)	(.28)	(.37)	(.25)	(.31)	(.31)	(.24)	(.31)	(.31)	(.14)
8 ft	5.5	7.1	4.8	6.1	5.9	4.7	5.8	6.0	2.6
(2.4 m)	(.51)	(.66)	(.45)	(.57)	(.55)	(.44)	(.54)	(.56)	(.24)
SIZE	J	K	L	M	N	O	P	Q	R
6 ft	2.1	3.1	2.2	4.2	4.0	3.4	3.0	3.6	3.6
(1.8 m)	(.20)	(.28)	(.20)	(.39)	(.37)	(.31)	(.28)	(.33)	(.33)
8 ft	3.7	5.7	3.8	7.4	7.1	6.0	5.3	6.3	6.3
(2.4 m)	(.34)	(.53)	(.45)	(.69)	(.65)	(.56)	(.49)	(.59)	(.59)
SIZE	S	T	U	V	W	X	Y	Z	
6 ft	3.2	2.2	3.2	2.7	4.2	2.7	2.2	2.9	
(1.8 m)	(.30)	(.20)	(.30)	(.25)	(.39)	(.25)	(.20)	(.26)	
8 ft	5.7	3.8	5.6	4.8	7.3	4.8	3.9	5.1	
(2.4 m)	(.53)	(.35)	(.52)	(.45)	(.68)	(.45)	(.36)	(.47)	

NUMBERS SQ. FT. (SQ. M.)					
SIZE	1	2	3	4	5
6 ft (1.8 m)	1.5 (0.14)	3.3 (0.31)	3.3 (0.31)	2.9 (0.26)	3.5 (0.33)
8 ft (2.4 m)	2.6 (0.24)	5.8 (0.54)	5.8 (0.54)	5.1 (0.47)	6.1 (0.57)
SIZE	6	7	8	9	0
6 ft (1.8 m)	3.5 (0.33)	2.2 (0.20)	3.8 (0.35)	3.5 (0.33)	3.4 (0.31)
8 ft (2.4 m)	6.2 (0.58)	3.8 (0.35)	6.7 (0.62)	6.1 (0.58)	6.0 (0.56)

SYMBOLS SQ. FT. (SQ. M.)	LARGE SIZE	SMALL SIZE
Through Arrow	11.5 (1.07)	6.5 (0.60)
Left or Right Arrow	15.6 (1.47)	8.8 (0.82)
Combination Left or Right and Through Arrow	26.0 (2.42)	14.7 (1.37)
Railroad "X" 20 feet (6.1 m)	54.0 (5.02)	--

Basis of Payment. Payment for this work will be made at the contract unit price per foot of applied line width for MULTI-POLYMER PAVEMENT MARKING – LINE, and per square foot for MULTI-POLYMER PAVEMENT MARKING, LETTERS AND SYMBOLS.

Pay Item Number	Designation	Unit of Measure
JT780300	MULTI-POLYMER PAVEMENT MARKING – LINE 4”	FOOT
JT780310	MULTI-POLYMER PAVEMENT MARKING – LINE 6”	FOOT
JT780320	MULTI-POLYMER PAVEMENT MARKING – LINE 10”	FOOT
JT780325	MULTI-POLYMER PAVEMENT MARKING – LINE 12”	FOOT
JT780340	MULTI-POLYMER PAVEMENT MARKING – LETTERS (8 FT)	FOOT
JT780355	MULTI-POLYMER PAVEMENT MARKING – SYMBOLS (LARGE)	SQ FT

GROOVING FOR RECESSED PAVEMENT MARKING (TOLLWAY RECURRING)

Effective: May 18, 2006

Revised: April 1, 2016

Description. This work shall consist of initial grooving of the existing pavements in preparation to furnishing and applying recessed pavement marking lines.

Equipment. The grooving equipment shall be equipped with a free-floating cutting or grinding head to provide a consistent groove depth over irregular pavement surfaces. The grinding or cutting head shall be equipped with diamond saw blades, steel star cutters and/or carbide tipped star cutters. A grinder head configuration shall be used on bituminous asphalt surfaces to achieve a rough surface texture in the bottom of the groove. Diamond saw blades shall be used on the cutting head when a smooth surface in the bottom of the groove is specified by the Engineer or specifications.

CONSTRUCTION REQUIREMENTS

- a) Pavement Grooving Methods. Using the specified grooving equipment, the grooves for recessed pavement markings shall be constructed using the following methods:
- 1) Wet Saw Blade Operation. When water is required or used to cool the saw blades, such as during a continuous edge line grooving operation, the groove shall be flushed with high pressure water immediately following the cut to avoid build up and hardening of slurry in the groove. The pavement surface shall be allowed to dry for 24 hours prior to the application of the pavement markings following a wet saw blade operation.
 - 2) Dry Saw Blade Operation. If the grooving is done with dry saw blades, the groove shall be flushed with high-pressure air to remove debris and dust generated during the cutting operation.
- b) Pavement Grooving. Grooves shall be cut into the pavement prior to the application of the lane and edge pavement marking. The grooves shall be cut such that the width is 1 inch wider than that of the line to be placed. The position of the edge of the grooves shall be a minimum of 2 in. from the edge of concrete joints or asphalt paving seams along edge or centerlines. The depth of the groove shall be 50 mils, plus/minus 5 mils

On new bituminous concrete surfaces the Engineer shall determine if the new asphalt has achieved the necessary strength and hardness to support grooving prior to the start of a grooving operation. Some asphalt mixes may require 14 or more days to achieve adequate hardness to support a grooving operation. On existing bituminous concrete surfaces some existing asphalt pavements may not be strong enough to support a grooving operation. For all existing asphalt pavements the Engineer shall determine if the existing asphalt has the necessary strength and hardness to support grooving prior to the start of a grooving operation.

All waste materials resulting from grooving operations shall be disposed of in accordance with Article 202.03 of the Standard Specifications.

- c) Cleaning. When water has been used to cool the saw blades during the grooving operation, the Contractor shall allow 24 hours for the pavement to dry prior to the application of the markings. Immediately prior to the application of the pavement markings the groove shall be cleaned with high-pressure air blast.

Method of Measurement. This work will be measured for payment in place, in feet of the pavement marking lines applied and accepted, for the groove width specified.

Basis of Payment. This work will be paid at the contract unit price per foot for GROOVING FOR RECESSED PAVEMENT MARKING LINES of the groove width specified.

Pay Item Number	Designation	Unit of Measure
JT780JA1	GROOVING FOR RECESSED PAVEMENT MARKING LINES, 5" GROOVE	FOOT
JT780JC1	GROOVING FOR RECESSED PAVEMENT MARKING LINES, 7" GROOVE	FOOT
JT780JE1	GROOVING FOR RECESSED PAVEMENT MARKING LINES, 11" GROOVE	FOOT
JT780JF1	GROOVING FOR RECESSED PAVEMENT MARKING LINES, 13" GROOVE	FOOT
JT780JG1	GROOVING FOR RECESSED PAVEMENT MARKING LINES, 25" GROOVE	FOOT
JT780JH1	GROOVING FOR RECESSED PAVEMENT MARKINGS, LETTERS, NUMBERS AND SYMBOLS – TYPE I	SQ FT

GUARDRAIL BARRIER REFLECTORS, TYPE B (TOLLWAY)

Effective: April 1, 2016

Description: This work shall consist of furnishing and installing guardrail barrier reflectors, Type B on guardrail as shown in the Plans and/or as directed by the Engineer.

Materials: Materials for guardrail barrier reflectors, Type B shall be in accordance with Section 1097 of the Standard Specifications, except as modified herein.

Construction Requirements

Prismatic Barrier Reflector. Reflectors shall be according to minimum specific intensities per Article 1097.02 of the Standard Specifications.

The Contractor shall furnish, when requested to do so, a certification from the manufacturer stating that all reflectors conform to these requirements. The reflectors shall be furnished in either amber or crystal as specified and shall be ready for mounting. The plastic reflector units shall be free of cracks and checks, and fabrication shall be accomplished in a uniform and professional manner.

The direct applied guardrail barrier reflectors shall be mono-directional, molded of methyl methacrylate (acrylic) plastic into the following shape in accordance with Illinois Tollway Standard Drawing D4.

- Guardrail Barrier Reflectors, Type B lens shall be circular in shape.

The mounting bracket base material shall be fabricated from high impact thermoplastic, lexan, nylon, or other approved material which shall not shatter or crack under impact at temperatures of -30 °F. The bracket shall be white in color.

The rear surface of the lens shall provide reflectivity by a prismatic configuration such that it will affect total retrodirective internal reflection of light incident to the lens surface without the necessity of any plating or separate reflector.

The manufacturer's trademark shall be molded in the face of the lens or on the reflector body so it is visible after installation.

The back side of the reflector shall be protected by a plastic back fused to the lens under heat and pressure around the entire perimeter to form a unit permanently sealed against dust, water, and water vapor.

For qualification purposes only, ten (10) samples required for tests set forth in these Specifications shall be submitted by the Contractor. In addition, the Engineer will have the right to select 10 samples at random from each shipment for acceptance purposes.

Testing. The reflector unit shall meet the requirements for sealing and heat resistance per Article 1097.01(a) and Article 1097.01(b) of the Standard Specifications.

Installation. Guardrail barrier reflectors, Type B shall be installed at the spacing and elevations shown in the Plans or as directed by the Engineer. The face of the unit shall be vertical and oriented so the reflector face shall be at 90 degrees to the centerline of the guardrail web.

Only the Illinois Tollway's specified type of reflector and geometric shape will be permitted within the limits of a contract.

Guardrail barrier reflectors, Type B shall be installed using an adhesive.

The surface of the guardrail to which the unit is to be applied shall be free of foreign matter and any material which would adversely affect the bond of the adhesive. Cleaning of the surfaces shall be to the satisfaction of the Engineer.

An adhesive meeting the reflector unit manufacturer's specifications shall be placed either on the surface or the bottom of the unit in sufficient quantity to ensure complete coverage of the contact area with no voids present and with a slight excess after the unit is pressed firmly in place.

The Contractor shall exercise care that the reflectors are placed in a satisfactory and uniform alignment both horizontally and vertically. Acceptance of the reflectors installation will include, in addition to ordinary inspection, a night inspection shall be made by the Engineer and Contractor from an automobile. Reflectors not having satisfactory and uniform night appearance shall be moved and adjusted or replaced as required at no additional cost to the Illinois Tollway until they do conform to the requirements herein and are found to be acceptable to the Engineer.

Method of Measurement. This work will be measured for payment in place in units of each.

Basis of Payment. This work will be paid for at the contract unit price per each, for GUARDRAIL BARRIER REFLECTORS, TYPE B.

Pay Item Number	Designation	Unit of Measure
J1782014	GUARDRAIL BARRIER REFLECTORS, TYPE B	EACH

CATCH BASIN, TYPE G-2

Description: This item shall consist of constructing and installing a catch basin special as shown and detailed on the plans and in accordance with the applicable portions of Sections 602 and 604 of the Standard Specification. This catch basin shall be in accordance with the Illinois Tollway detail for Catch Basin Type M-2 Modified (Standard B8-05).

Basis of Payment: This work will be paid for at the contract unit price each for CATCH BASIN, TYPE G-2 which price shall be payment in full for all labor, equipment and materials necessary to complete the work as specified herein.

GUTTER, TYPE G-2, MODIFIED

Description: This work shall consist of the construction of a Portland cement concrete gutter, including inlets, outlets, and transitions as shown in the plans, in accordance with Section 606 of the Standard Specifications.

General: The gutter shall be in accordance with Section 606 of the Standard Specifications, and Standard B1-06 ("Gutter and Curb Details") as shown in the plans.

Method of Measurement: GUTTER, TYPE G-2, MODIFIED shall be measured in feet along the flow line of the gutter.

Basis of Payment: This work will be paid for at the contract unit price per foot for GUTTER, TYPE G-2, MODIFIED, which price shall be payment in full for all labor, tools, equipment and materials necessary to install the gutter.

SLOPED HEADWALL

Description: This work shall consist of the construction of concrete headwalls for pipe underdrains (special) as shown in the plans, in accordance with Section 601 of the Standard Specifications.

General: The gutter shall be in accordance with Section 606 of the Standard Specifications, and Standard B1-06 ("Gutter and Curb Details") as shown in the plans.

Basis of Payment: Concrete headwalls for pipe underdrains (special) will be paid for at the unit price per each for SLOPED HEADWALL TYPE III, 6", 1:3.

LIGHT POLES (BDE)

Effective: July 1, 2016

Revise the second paragraph of Article 1069.01 of the Standard Specifications to read:

“The detailed design and fabrication of the pole shaft, arms, tenons, and attachments shall be according to AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” current at the time the project is advertised. Light poles shall be designed for ADT > 10,000 and Risk Category Typical. If Fatigue design is required, light poles shall be designed for Importance Category I.”

Revise the fifth paragraph of Article 1069.01(a) of the Standard Specifications to read:

“Deflection of the pole top as caused by the combined effect of deadload referenced above and wind speed prescribed by AASHTO shall be as required by AASHTO. Pole deflection and loading compliance, certified by the manufacturer, shall be noted on the pole submittal.”

GENERAL ELECTRICAL REQUIREMENTS (D-1)

Effective: April 1, 2016

This special provision replaces Articles 801.01 – 801.07, 801.09 – 801-16 of the Standard Specifications.

Definition. Codes, standards, and industry specifications cited for electrical work shall be by definition the latest adopted version thereof, unless indicated otherwise.

Materials by definition shall include electrical equipment, fittings, devices, motors, appliances, fixtures, apparatus, all hardware and appurtenances, and the like, used as part of, or in connection with, electrical installation.

Standards of Installation. Materials shall be installed according to the manufacturer’s recommendations, the NEC, OSHA, the NESC, and AASHTO’s Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

All like materials shall be from the same manufacturer. Listed and labeled materials shall be used whenever possible. The listing shall be according to UL or an approved equivalent.

Safety and Protection. Safety and protection requirements shall be as follows.

Safety. Electrical systems shall not be left in an exposed or otherwise hazardous condition. All electrical boxes, cabinets, pole handholes, etc. which contain wiring, either energized or non-energized, shall be closed or shall have covers in place and be locked when possible, during nonworking hours.

Protection. Electrical raceway or duct openings shall be capped or otherwise sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

Equipment Grounding Conductor. All electrical systems, materials, and appurtenances shall be grounded. Good ground continuity throughout the electrical system shall be assured, even though every detail of the requirements is not specified or shown. Electrical circuits shall have a continuous insulated equipment grounding conductor. When metallic conduit is used, it shall be bonded to the equipment grounding conductor, but shall not be used as the equipment grounding conductor.

Detector loop lead-in circuits, circuits under 50 volts, and runs of fiber optic cable will not require an equipment grounding conductor.

Where connections are made to painted surfaces, the paint shall be scraped to fully expose metal at the connection point. After the connection is completed, the paint system shall be repaired to the satisfaction of the Engineer.

Bonding of all boxes and other metallic enclosures throughout the wiring system to the equipment grounding conductor shall be made using a splice and pigtail connection. Mechanical connectors shall have a serrated washer at the contact surface.

All connections to structural steel or fencing shall be made with exothermic welds. Care shall be taken not to weaken load carrying members. Where connections are made to epoxy coated reinforcing steel, the epoxy coating shall be sufficiently removed to facilitate a mechanical connection. The epoxy coating shall be repaired to the satisfaction of the Engineer. Where connections are made to insulated conductors, the connection shall be wrapped with at least four layers of electrical tape extended 6 in. (150 mm) onto the conductor insulation.

Submittals. At the preconstruction meeting, the Contractor shall submit a written listing of manufacturers for all major electrical and mechanical items. The list of manufacturers shall be binding, except by written request from the Contractor and approval by the Engineer. The request shall include acceptable reasons and documentation for the change.

Major items shall include, but not limited to the following:

Type of Work (discipline)	Item
All Electrical Work	Electric Service Metering Emergency Standby System Transformers Cable Unit Duct Splices Conduit Surge Suppression System
Lighting	Tower Pole Luminaire Foundation Breakaway Device Controllers Control Cabinet and Peripherals
ITS	Controller Cabinet and Peripherals CCTV Cameras Camera Structures Ethernet Switches Detectors Detector Loop Fiber Optic Cable

Within 30 calendar days after contract execution, the Contractor shall submit, for approval, one copy each of the manufacturer's product data (for standard products and components) and detailed shop drawings (for fabricated items). Submittals for the materials for each individual pay item shall be complete in every respect. Submittals which include multiple pay items shall have all submittal material for each item or group of items covered by a particular specification, grouped together and the applicable pay item identified. Various submittals shall, when taken together, form a complete coordinated package. A partial submittal will be returned without review unless prior written permission is obtained from the Engineer.

The submittal shall be properly identified by route, section, county, and contract number.

The Contractor shall have reviewed the submittal material and affixed his/her stamp of approval, with date and signature, for each individual item. In case of subcontractor submittal, both the subcontractor and the Contractor shall review, sign, and stamp their approval on the submittal.

Illegible print, incompleteness, inaccuracy, or lack of coordination will be grounds for rejection.

Items from multiple disciplines shall not be combined on a single submittal and transmittal. Items for lighting, signals, surveillance and CCTV must be in separate submittals since they may be reviewed by various personnel in various locations.

The Engineer will review the submittals for conformance with the design concept of the project according to Article 105.04 and the following. The Engineer will stamp the drawings indicating their status as "Approved", "Approved as Noted", "Disapproved", or "Information Only". Since the Engineer's review is for conformance with the design concept only, it shall be the Contractor's responsibility to coordinate the various items into a working system as specified. The Contractor shall not be relieved from responsibility for errors or omissions in the shop, working, or layout drawings by the Engineer's approval thereof. The Contractor shall still be in full compliance with contract and specification requirements.

All submitted items reviewed and marked "Disapproved" or "Approved as Noted" shall be resubmitted by the Contractor in their entirety, unless otherwise indicated within the submittal comments.

Work shall not begin until the Engineer has approved the submittal. Material installed prior to approval by the Engineer, will be subject to removal and replacement at no additional cost to the Department.

Unless otherwise approved by the Engineer, all of the above items shall be submitted to the Engineer at the same time. Each item shall be properly identified by route, section, and contract number.

Certifications. When certifications are specified and are available prior to material manufacture, the certification shall be included in the submittal information. When specified and only available after manufacture, the submittal shall include a statement of intent to furnish certification. All certificates shall be complete with all appropriate test dates and data.

Authorized Project Delay. See Article 801.08

Maintenance transfer and Preconstruction Inspection:

General. Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall request a maintenance transfer and preconstruction site inspection, to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of any lighting and/or traffic control systems which may be affected by the work. The request for the maintenance transfer and preconstruction inspection shall be made no less than seven (7) calendar days prior to the desired inspection date. The maintenance transfer and preconstruction inspection shall:

Establish the procedures for formal transfer of maintenance responsibility required for the construction period.

Establish the approximate location and operating condition of lighting and/or traffic control systems which may be affected by the work

Marking of Existing Cable Systems. The party responsible for maintenance of any existing lighting and/or traffic control systems at the project site will, at the Contractor's request, mark and/or stake, once per location, all underground cable routes owned or maintained by the State. A project may involve multiple "locations" where separated electrical systems are involved (i.e. different controllers). The markings shall be taken to have a horizontal tolerance of at least 304.8 mm (one (1) foot) to either side.. The request for the cable locations and marking shall be made at the same time the request for the maintenance transfer and preconstruction inspection is made. The Contractor shall exercise extreme caution where existing buried cable runs are involved. The markings of existing systems are made strictly for assistance to the Contractor and this does not relieve the Contractor of responsibility for the repair or replacement of any cable run damaged in the course of his work, as specified elsewhere herein. Note that the contractor shall be entitled to only one request for location marking of existing systems and that multiple requests may only be honored at the contractor's expense. No locates will be made after maintenance is transferred, unless it is at the contractor's expense.

Condition of Existing Systems. The Contractor shall conduct an inventory of all existing electrical system equipment within the project limits, which may be affected by the work, making note of any parts which are found broken or missing, defective or malfunctioning. Megger and load readings shall be taken for all existing circuits which will remain in place or be modified. If a circuit is to be taken out in its entirety, then readings do not have to be taken. The inventory and test data shall be reviewed with and approved by the Engineer and a record of the inventory shall be submitted to the Engineer for the record. Without such a record, all systems transferred to the Contractor for maintenance during construction shall be returned at the end of construction in complete, fully operating condition.”

Marking Proposed Locations for Highway Lighting System. The Contractor shall mark or stake the proposed locations of all poles, cabinets, junction boxes, pull boxes, handholes, cable routes, pavement crossings, and other items pertinent to the work. A proposed location inspection by the Engineer shall be requested prior to any excavation, construction, or installation work after all proposed installation locations are marked. Any work installed without location approval is subject to corrective action at no additional cost to the Department.

Inspection of electrical work. Inspection of electrical work shall be according to Article 105.12 and the following.

Before any splice, tap, or electrical connection is covered in handholes, junction boxes, light poles, or other enclosures, the Contractor shall notify and make available such wiring for the Engineer's inspection.

Maintenance and Responsibility During Construction.

Lighting Operation and Maintenance Responsibility. The scope of work shall include the assumption of responsibility for the continuing operation and maintenance of the existing, proposed, temporary, sign and navigation lighting, or other lighting systems and all appurtenances affected by the work as specified elsewhere herein. Maintenance of lighting systems is specified elsewhere and will be paid for separately

The proposed lighting system must be operational prior to opening the roadway to traffic unless temporary lighting exists which is designed and installed to properly illuminate the roadway.

Energy and Demand Charges. The payment of basic energy and demand charges by the electric utility for existing lighting which remains in service will continue as a responsibility of the Owner, unless otherwise indicated. Unless otherwise indicated or required by the Engineer duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously at the Owner's expense and lighting systems shall not be kept in operation during long daytime periods at the Owner's expense. Upon written authorization from the Engineer to place a proposed new lighting system in service, whether the system has passed final acceptance or not, (such as to allow temporary lighting to be removed), the Owner will accept responsibility for energy and demand charges for such lighting, effective the date of authorization. All other energy and demand payments to the utility shall be the responsibility of the Contractor until final acceptance.

Damage to Electrical Systems. Should damage occur to any existing electrical systems through the Contractor's operations, the Engineer will designate the repairs as emergency or non-emergency in nature.

Emergency repairs shall be made by the Contractor, or as determined by the Engineer, the Department, or its agent. Non-emergency repairs shall be performed by the Contractor within six working days following discovery or notification. All repairs shall be performed in an expeditious manner to assure all electrical systems are operational as soon as possible. The repairs shall be performed at no additional cost to the Department.

Lighting. An outage will be considered an emergency when three or more lights on a circuit or three successive lights are not operational. Knocked down materials, which result in a danger to the motoring public, will be considered an emergency repair.

Temporary aerial multi-conductor cable, with grounded messenger cable, will be permitted if it does not interfere with traffic or other operations, and if the Engineer determines it does not require unacceptable modification to existing installations.

Testing. Before final inspection, the electrical work shall be tested. Tests may be made progressively as parts of the work are completed, or may be made when the work is complete. Tests shall be made in the presence of the Engineer. Items which fail to test satisfactorily shall be repaired or replaced. Tests shall include checks of control operation, system voltages, cable insulation, and ground resistance and continuity.

The forms for recording test readings will be available from the Engineer in electronic format. The Contractor shall provide the Engineer with a written report of all test data including the following:

- Voltage Tests
- Amperage Tests
- Insulation Resistance Tests
- Continuity tests
- Detector Loop Tests

Lighting systems. The following tests shall be made.

- (1) Voltage Measurements. Voltages in the cabinet from phase to phase and phase to neutral, at no load and at full load, shall be measured and recorded. Voltage readings at the last termination of each circuit shall be measured and recorded.
- (2) Insulation Resistance. Insulation resistance to ground of each circuit at the cabinet, with all loads connected, shall be measured and recorded.

On tests of new cable runs, the readings shall exceed 50 megohms for phase and neutral conductors with a connected load over 20 A, and shall exceed 100 megohms for conductors with a connected load of 20 A or less.

On tests of cable runs which include cables which were existing in service prior to this contract, the resistance readings shall be the same or better than the readings recorded at the maintenance transfer at the beginning of the contract. Measurements shall be taken with a megohm meter approved by the Engineer.

- (3) Loads. The current of each circuit, phase main, and neutral shall be measured and recorded. The Engineer may direct reasonable circuit rearrangement. The current readings shall be within ten percent of the connected load based on material ratings.
- (4) Ground Continuity. Resistance of the system ground as taken from the farthest extension of each circuit run from the controller (i.e. check of equipment ground continuity for each circuit) shall be measured and recorded. Readings shall not exceed 2.0 ohms, regardless of the length of the circuit.
- (5) Resistance of Grounding Electrodes. Resistance to ground of all grounding electrodes shall be measured and recorded. Measurements shall be made with a ground tester during dry soil conditions as approved by the Engineer. Resistance to ground shall not exceed 10 ohms.

ITS. The following test shall be made in addition to the lighting system test above.

Detector Loops. Before and after permanently securing the loop in the pavement, the resistance, inductance, resistance to ground, and quality factor for each loop and lead-in circuit shall be tested. The loop and lead-in circuit shall have an inductance between 20 and 2500 microhenries. The resistance to ground shall be a minimum of 50 megohms under any conditions of weather or moisture. The quality factor (Q) shall be 5 or greater.

Fiber Optic Systems. Fiber optic testing shall be performed as required in the fiber optic cable special provision and the fiber optic splice special provision.

All test results shall be furnished to the Engineer seven working days before the date the inspection is scheduled.

Contract Guarantee. The Contractor shall provide a written guarantee for all electrical work provided under the contract for a period of six months after the date of acceptance with the following warranties and guarantees.

- (a) The manufacturer's standard written warranty for each piece of electrical material or apparatus furnished under the contract. The warranty for light emitting diode (LED) modules, including the maintained minimum luminance, shall cover a minimum of 60 months from the date of delivery.
- (b) The Contractor's written guarantee that, for a period of six months after the date of final acceptance of the work, all necessary repairs to or replacement of said warranted material or apparatus for reasons not proven to have been caused by negligence on the part of the user or acts of a third party shall be made by the Contractor at no additional cost to the Department.
- (c) The Contractor's written guarantee for satisfactory operation of all electrical systems furnished and constructed under the contract for a period of six months after final acceptance of the work.

The warranty for an uninterruptable power supply (UPS) shall cover a minimum of two years from date the equipment is placed in operation; however, the batteries of the UPS shall be warranted for full replacement for a minimum of five years.

Record Drawings. Alterations and additions to the electrical installation made during the execution of the work shall be neatly and plainly marked in red by the Contractor on the full-size set of record drawings kept at the Engineer's field office for the project. These drawings shall be updated on a daily basis and shall be available for inspection by the Engineer during the course of the work. The record drawings shall include the following:

- Cover Sheet
- Summary of Quantities, electrical items only
- Legends, Schedules and Notes
- Plan Sheet
- Pertinent Details
- Single Line Diagram
- Other useful information useful to locate and maintain the systems.

Any modifications to the details shall be indicated. Final quantities used shall be indicated on the Summary of Quantities. Foundation depths used shall also be listed.

As part of the record drawings, the Contractor shall inventory all materials, new or existing, on the project and record information on inventory sheets provided by the Engineer.

The inventory shall include:

- Location of Equipment, including rack, chassis, slot as applicable.
- Designation of Equipment
- Equipment manufacturer
- Equipment model number
- Equipment Version Number
- Equipment Configuration
 - Addressing, IP or other
 - Settings, hardware or programmed
- Equipment Serial Number

The following electronic inventory forms are available from the Engineer:

- Lighting Controller Inventory
- Lighting Inventory
- Light Tower Inspection Checklist
- ITS Location Inventory

The information shall be entered in the forms; handwritten entries will not be acceptable; except for signatures. Electronic file shall also be included in the documentation.

When the work is complete, and seven days before the request for a final inspection, the set of contract drawings, stamped "**RECORD DRAWINGS**", shall be submitted to the Engineer for review and approval and shall be stamped with the date and the signature of the Contractor's supervising Engineer or electrician. The record drawings shall be submitted in PDF format on CDROM as well as hardcopy's for review and approval.

In addition to the record drawings, PDF copies of the final catalog cuts which have been Approved and Approved as Noted with applicable follow-up shall be submitted along with the record drawings. The PDF files shall clearly indicate either by filename or PDF table of contents the respective pay item number. Specific part or model numbers of items which have been selected shall be clearly visible. Hard copies of the catalog are not required with this submittal.

The Contractor shall provide two sets of electronically produced drawings in a moisture proof pouch to be kept on the inside door of the controller cabinet or other location approved by the Engineer. These drawings shall show the final as-built circuit orientation(s) of the project in the form of a single line diagram with all luminaires numbered and clearly identified for each circuit.

Final documentation shall be submitted as a complete submittal package, i.e. record drawings, test results, inventory, etc. shall be submitted at the same time. Partial piecemeal submittals will be rejected without review. A total of five hardcopies and CDROMs of the final documentation shall be submitted.

GPS Documentation. In addition to the specified record drawings, the Contactor shall record GPS coordinates of the following electrical components being installed, modified or being affected in other ways by this contract:

- All light poles and light towers.
- Handholes and vaults.
- Conduit roadway crossings.
- Controllers.
- Control Buildings.
- Structures with electrical connections, i.e. DMS, lighted signs.
- Electric Service locations.
- CCTV Camera installations.
- Roadway Surveillance installations.
- Fiber Optic Splice Locations.
- All fiber optic slack locations shall be identified with quantity of slack cable included. When sequential cable markings are available, those markings shall be documented as cable marking into enclosure and marking out of enclosure.

Datum to be used shall be North American 1983.

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

1. District
2. Description of item
3. Designation
4. Use
5. Approximate station
6. Contract Number
7. Date
8. Owner
9. Latitude
10. Longitude
11. Comments

A spreadsheet template will be available from the Engineer for use by the Contractor.

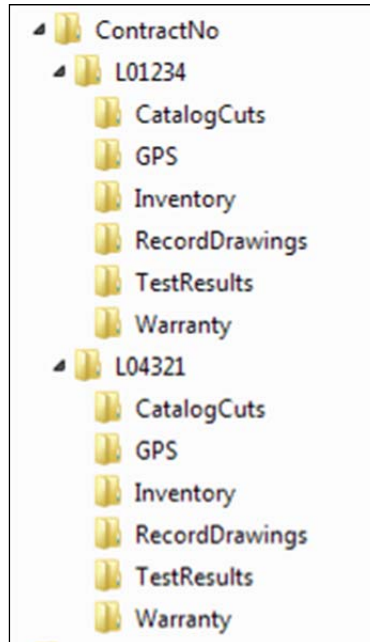
Prior to the collection of data, the contractor shall provide a sample data collection of at least six data points of known locations to be reviewed and verified by the Engineer to be accurate within 20 feet. Upon verification, data collection can begin. Data collection can be made as construction progresses, or can be collected after all items are installed. If the data is unacceptable the contractor shall make corrections to the data collection equipment and or process and submit the data for review and approval as specified. **Data collection prior to the submittal and review of the sample data of existing data points will be unacceptable and rejected.**

Accuracy. Data collected is to be mapping grade. A handheld mapping grade GPS device shall be used for the data collection. The receiver shall support differential correction and data shall have minimum 5 meter accuracy after post processing.

GPS receivers integrated into cellular communication devices, recreational and automotive GPS devices are not acceptable.

The GPS shall be the product of an established major GPS manufacturer having been in the business for a minimum of 6 years.”

The documents on the CD shall be organized by the Electrical Maintenance Contract Management System (EMCMS) location designation. If multiple EMCMS locations are within the contract, separate folders shall be utilized for each location as follows:



Extraneous information not pertaining to the specific EMCMS location shall not be included in that particular folder and sub-folder.

The inspection will not be made until after the delivery of acceptable record drawings, specified certifications, and the required guarantees.

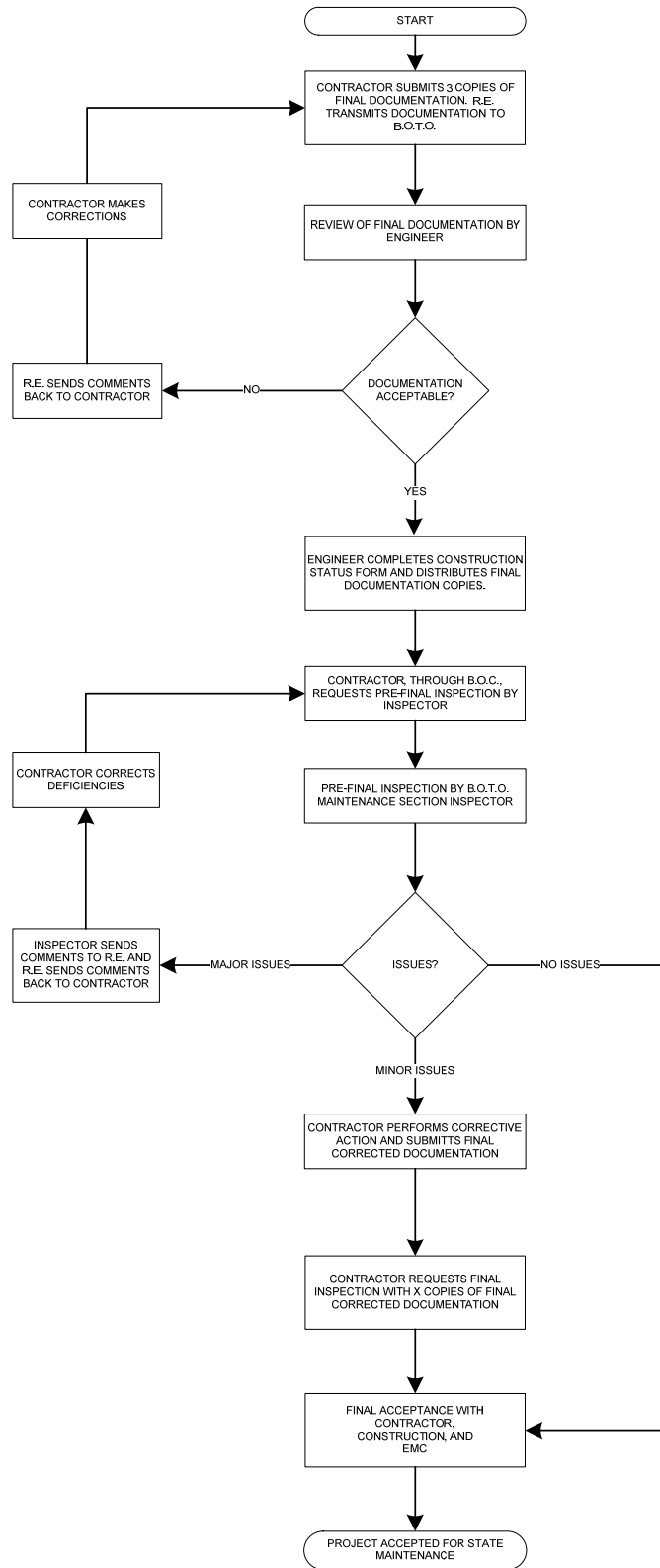
The Final Acceptance Documentation Checklist shall be completed and is contained elsewhere herein.

All CD's shall be labeled as illustrated in the CD Label Template contained herein.

Acceptance. Acceptance of electrical work will be given at the time when the Department assumes the responsibility to protect and maintain the work according to Article 107.30 or at the time of final inspection.

When the electrical work is complete, tested, and fully operational, the Contractor shall schedule an inspection for acceptance with the Engineer no less than seven working days prior to the desired inspection date. The Contractor shall furnish the necessary labor and equipment to make the inspection.

A written record of the test readings taken by the Contractor according to Article 801.13 shall be furnished to the Engineer seven working days before the date the inspection is scheduled. Inspection will not be made until after the delivery of acceptable record drawings, specified certifications, and the required guarantees.



Final Acceptance Documentation Checklist

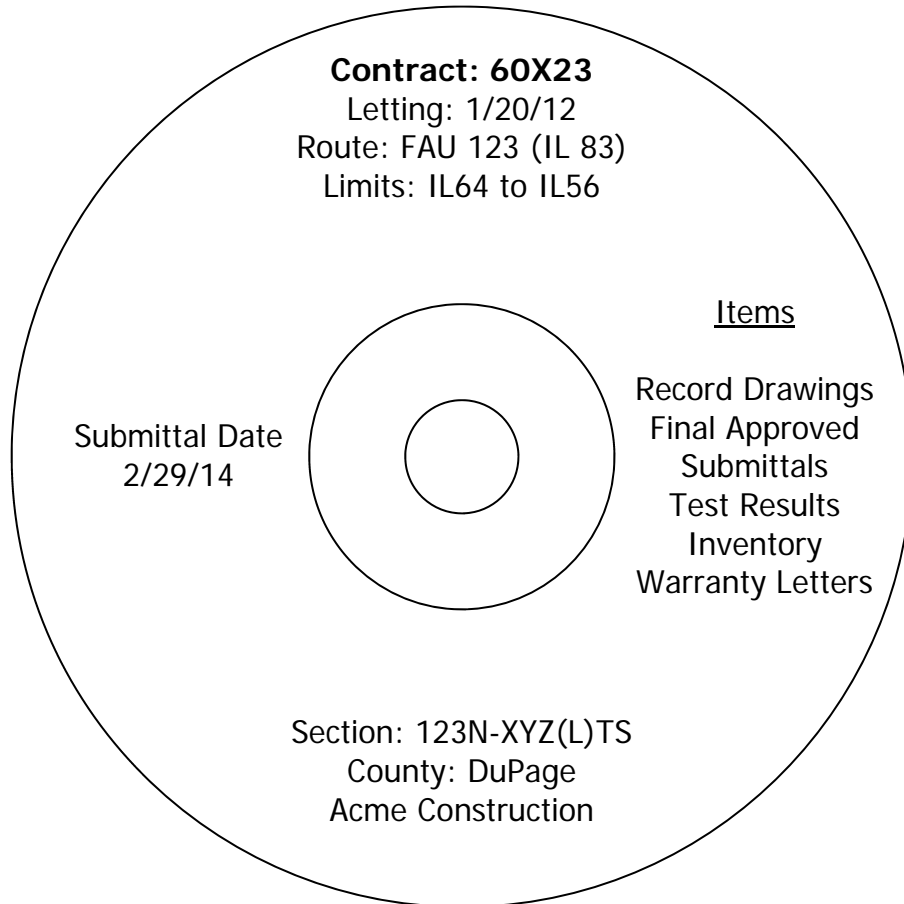
LOCATION	
Route	Common Name
Limits	Section
Contract #	County
Controller Designation(s)	EMC Database Location Number(s)

ITEM	Contractor (Verify)	Resident Engineer (Verify)
Record Drawings		
-Five hardcopies (11" x 17")	<input type="checkbox"/>	<input type="checkbox"/>
-Scanned to Five CD-ROMs	<input type="checkbox"/>	<input type="checkbox"/>
Field Inspection Tests		
-Voltage	<input type="checkbox"/>	<input type="checkbox"/>
-Amperage	<input type="checkbox"/>	<input type="checkbox"/>
-Cable Insulation Resistance	<input type="checkbox"/>	<input type="checkbox"/>
-Continuity	<input type="checkbox"/>	<input type="checkbox"/>
-Controller Ground Rod Resistance	<input type="checkbox"/>	<input type="checkbox"/>
GPS Coordinates		
-Excel file	<input type="checkbox"/>	<input type="checkbox"/>
Job Warranty Letter	<input type="checkbox"/>	<input type="checkbox"/>
Catalog Cut Submittals		
-Approved & Approved as Noted	<input type="checkbox"/>	<input type="checkbox"/>
Lighting Inventory Form	<input type="checkbox"/>	<input type="checkbox"/>
Lighting Controller Inventory Form	<input type="checkbox"/>	<input type="checkbox"/>
Light Tower Inspection Form (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>

Four Hardcopies & scanned to four CD's shall be submitted for all items above. The CD ROM shall be labeled as shown in the example contained herein.

CD LABEL FORMAT TEMPLATE.

Label must be printed; hand written labels are unacceptable and will be rejected.



MAINTENANCE OF LIGHTING SYSTEMS (D-1)

Effective: January 1, 2012

Replace Article 801.11 and 801.12 of the Standard Specifications with the following:

Effective the date the Contractor's activities (electrical or otherwise) at the job site begin, the Contractor shall be responsible for the proper operation and maintenance of all existing and proposed lighting systems which are part of, or which may be affected by the work until final acceptance or as otherwise determined by the Engineer.

Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall initiate a request for a maintenance transfer and preconstruction inspection, as specified elsewhere herein, to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of any lighting systems which may be affected by the work. The request for the maintenance preconstruction inspection shall be made no less than seven (7) calendar days prior to the desired inspection date.

Existing lighting systems, when depicted on the plans, are intended only to indicate the general equipment installation of the systems involved 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 condition of the electrical equipment and systems to be maintained.

Maintenance of Existing Lighting Systems

Existing lighting systems. Existing lighting systems shall be defined as any lighting system or part of a lighting system in service at the time of contract Letting. The contract drawings indicate the general extent of any existing lighting, but whether indicated or not, it remains the Contractor's responsibility to ascertain the extent of effort required for compliance with these specifications and failure to do so will not be justification for extra payment or reduced responsibilities.

Extent of Maintenance.

Partial Maintenance. Unless otherwise indicated, if the number of circuits affected by the contract is equal to or less than 40% of the total number of circuits in a given controller and the controller is not part of the contract work, the Contractor needs only to maintain the affected circuits. The affected circuits shall be isolated by means of in-line waterproof fuse holders as specified elsewhere and as approved by the Engineer.

Full Maintenance. If the number of circuits affected by the contract is greater than 40% of the total number of circuits in a given controller, or if the controller is modified in any way under the contract work, the Contractor shall maintain the entire controller and all associated circuits.

Maintenance of Proposed Lighting Systems

Proposed Lighting Systems. Proposed lighting systems shall be defined as any lighting system or part of a lighting system, temporary or permanent, which is to be constructed under this contract.

The Contractor shall be fully responsible for maintenance of all items installed under this contract. Maintenance shall include, but not be limited to, any equipment failures or malfunctions as well as equipment damage either by the motoring public, Contractor operations, vandalism, or other means. The potential cost of replacing or repairing any malfunctioning, damaged, or vandalized equipment shall be included in the bid price of this item and will not be paid for separately.

Lighting System Maintenance Operations

The Contractor's responsibility shall include all applicable responsibilities of the Electrical Maintenance Contract, State of Illinois, Department of Transportation, Division of Highways, District One. These responsibilities shall include the maintenance of lighting units (including sign lighting), cable runs and lighting controls. In the case of a pole knockdown or sign light damage, the Contractor shall promptly clear the lighting unit and circuit discontinuity and restore the system to service. The equipment shall then be re-set by the contractor within the time limits specified herein.

If the equipment damaged by normal vehicular traffic, not contractor operations, is beyond repair and cannot be re-set, the contractor shall replace the equipment in kind with payment made for such equipment under Article 109.04. If the equipment damaged by any construction operations, not normal vehicular traffic, is beyond repair and cannot be re-set, the contractor shall replace the equipment in kind and the cost of the equipment shall be included in the cost of this pay item and shall not be paid for separately.

Responsibilities shall also include weekly night-time patrol of the lighting system, with patrol reports filed immediately with the Engineer and with deficiencies corrected within 24 hours of the patrol. Patrol reports shall be presented on standard forms as designated by the Engineer. Uncorrected deficiencies may be designated by the Engineer as necessitating emergency repairs as described elsewhere herein.

The following chart lists the maximum response, service restoration, and permanent repair time the Contractor will be allowed to perform corrective action on specific lighting system equipment.

INCIDENT OR PROBLEM	SERVICE RESPONSE TIME	SERVICE RESTORATION TIME	PERMANENT REPAIR TIME
Control cabinet out	1 hour	4 hours	7 Calendar days
Hanging mast arm	1 hour to clear	na	7 Calendar days
Radio problem	1 hour	4 hours	7 Calendar days
Motorist caused damage or leaning light pole 10 degrees or more	1 hour to clear	4 hours	7 Calendar days
Circuit out – Needs to reset breaker	1 hour	4 hours	na
Circuit out – Cable trouble	1 hour	24 hours	21 Calendar days
Outage of 3 or more successive lights	1 hour	4 hours	na
Outage of 75% of lights on one tower	1 hour	4 hours	na
Outage of light nearest RR crossing approach, Islands and gores	1 hour	4 hours	na
Outage (single or multiple) found on night outage survey or reported to EMC	na	na	7 Calendar days
Navigation light outage	na	na	24 hours

- **Service Response Time** -- amount of time from the initial notification to the Contractor until a patrolman physically arrives at the location.
- **Service Restoration Time** – amount of time from the initial notification to the Contractor until the time the system is fully operational again (In cases of motorist caused damage the undamaged portions of the system are operational.)
- **Permanent Repair Time** – amount of time from initial notification to the Contractor until the time permanent repairs are made if the Contractor was required to make temporary repairs to meet the service restoration requirement.

Failure to provide this service will result in liquidated damages of \$500 per day per occurrence. In addition, the Department reserves the right to assign any work not completed within this timeframe to the Electrical Maintenance Contractor. All costs associated to repair this uncompleted work shall be the responsibility of the Contractor. Failure to pay these costs to the Electrical Maintenance Contractor within one month after the incident will result in additional liquidated damages of \$500 per month per occurrence. Unpaid bills will be deducted from any monies owed to the Contractor. Repeated failures and/or a gross failure of maintenance shall result in the State's Electrical Maintenance Contractor being directed to correct all deficiencies and the resulting costs deducted from any monies owed the contractor.

Damage caused by the Contractor's operations shall be repaired at no additional cost to the Contract.

Operation of Lighting

The lighting shall be operational every night, dusk to dawn. Duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously. Lighting systems shall not be kept in operation during long daytime periods.

Method of Measurement

The contractor shall demonstrate to the satisfaction of the Engineer that the lighting system is fully operational prior to submitting a pay request. Failure to do so will be grounds for denying the pay request. Months in which the lighting systems are not maintained and not operational will not be paid for. Payment shall not be made retroactively for months in which lighting systems were not operational.

Basis of Payment. Maintenance of lighting systems shall be paid for at the contract unit price per calendar month for MAINTENANCE OF LIGHTING SYSTEM, which shall include all work as described herein.

ELECTRIC UTILITY SERVICE CONNECTION (COMED) (D-1)

Effective: January 1, 2012

Description.

This item shall consist of payment for work performed by ComEd in providing or modifying electric service as indicated. THIS MAY INVOLVE WORK AT MORE THAN ONE ELECTRIC SERVICE. For summary of the Electrical Service Drop Locations see the schedule contained elsewhere herein.

CONSTRUCTION REQUIREMENTS

General.

It shall be the Contractor's responsibility to contact ComEd. The Contractor shall coordinate his work fully with the ComEd both as to the work required and the timing of the installation. No additional compensation will be granted under this or any other item for extra work caused by failure to meet this requirement. **Please contact ComEd, New Business Center Call Center, at 866 NEW ELECTRIC (1-866-639-3532) to begin the service connection process. The Call Center Representatives will create a work order for the service connection. The representative will ask the requestor for information specific to the request. The representative will assign the request based upon the location of project.**

The Contractor should make particular note of the need for the earliest attention to arrangements with ComEd for service. In the event of delay by ComEd, no extension of time will be considered applicable for the delay unless the Contractor can produce written evidence of a request for electric service within 30 days of execution.

Method of Payment.

The Contractor will be reimbursed to the exact amount of money as billed by ComEd for its services. Work provided by the Contractor for electric service will be paid separately as described under ELECTRICAL SERVICE DISCONNECT. No extra compensation shall be paid to the Contractor for any incidental materials and labor required to fulfill the requirements as shown on the plans and specified herein.

For bidding purposes, this item shall be estimated as \$20,000

Basis of Payment.

This work will be paid for at the contract lump sum price for ELECTRIC UTILITY SERVICE CONNECTION which shall be reimbursement in full for electric utility service charges.

EXPOSED RACEWAYS (D-1)

Effective: January 1, 2012

Revise the first paragraph of Article 811.03(a) of the Standard Specifications to read:

“General. Rigid metal conduit installation shall be according to Article 810.05(a). Conduits terminating in junction and pull boxes shall be terminated with insulated and gasketed watertight threaded NEMA 4X conduit hubs. The hubs shall be Listed under UL 514B. The insulated throat shall be rated up to 105° C. When PVC coated conduit is utilized, the aforementioned hubs shall also be PVC coated.”

Add the following to Article 811.03(b) of the Standard Specifications:

“Where PVC coated conduit is utilized, all conduit fittings, couplings and clamps shall be PVC coated. All other mounting hardware and appurtenances shall be stainless steel.”

“The personnel installing the PVC coated conduit must be trained and certified by the PVC coated conduit Manufacturer or Manufacturer’s representative to install PVC coated conduit. Documentation demonstrating this requirement must be submitted for review and approval.”

Add the following to Article 1088.01(a) of the Standard Specifications:

All iron and steel products, which are to be incorporated into the work, including conduit and all conduit fittings, shall be domestically manufactured or produced and fabricated as specified in Article 106.”

Revise Article 1088.01(a)(3) of the Standard Specifications to read:

“a. PVC Coated Steel Conduit. The PVC coated rigid metal conduit shall be UL Listed (UL 6). The PVC coating must have been investigated by UL as providing the primary corrosion protection for the rigid metal conduit. Ferrous fittings for general service locations shall be UL Listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to plastic coating shall be UL listed.

- b. The PVC coating shall have the following characteristics:

Hardness:	85+ Shore A Durometer
Dielectric Strength:	400V/mil @ 60 Hz
Aging:	1,000 Hours Atlas Weatherometer
Temperature	The PVC compound shall conform at 0° F. to Federal Specifications PL-406b, Method 2051, Amendment 1 of 25 September 1952 (ASTM D 746)
Elongation:	200%

- c. The exterior and interior galvanized conduit surface shall be chemically treated to enhance PVC coating adhesion and shall also be coated with a primer before the PVC coating to ensure a bond between the zinc substrate and the PVC coating. The bond strength created shall be greater than the tensile strength of the plastic coating.
- d. The nominal thickness of the PVC coating shall be 1 mm (40 mils). The PVC exterior and urethane interior coatings applied to the conduit shall afford sufficient flexibility to permit field bending without cracking or flaking at temperatures above -1°C (30°F).
- e. An interior urethane coating shall be uniformly and consistently applied to the interior of all conduit and fittings. This internal coating shall be a nominal 2 mil thickness. The interior coating shall be applied in a manner so there are no runs, drips, or pinholes at any point. The coating shall not peel, flake, or chip off after a cut is made in the conduit or a scratch is made in the coating.
- f. Conduit bodies shall have a tongue-in-groove gasket for maximum sealing capability. The design shall incorporate a positive placement feature to assure proper installation. Certified test results confirming seal performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours shall be submitted for review when requested by the Engineer.
- g. The PVC conduit shall pass the following tests:

Exterior PVC Bond test RN1:

Two parallel cuts 13 mm (1/2 inch) apart and 40 mm (1 1/2 inches) in length shall be made with a sharp knife along the longitudinal axis. A third cut shall be made perpendicular to and crossing the longitudinal cuts at one end. The knife shall then be worked under the PVC coating for 13 mm (1/2 inch) to free the coating from the metal.

Using pliers, the freed PVC tab shall be pulled with a force applied vertically and away from the conduit. The PVC tab shall tear rather than cause any additional PVC coating to separate from the substrate.

Boil Test:

Acceptable conduit coating bonds (exterior and interior) shall be confirmed if there is no disbondment after a minimum average of 200 hours in boiling water or exposure to steam vapor at one atmosphere. Certified test results from a national recognized independent testing laboratory shall be submitted for review and approval. The RN1 Bond Test and the Standard Method for Measuring Adhesion by Tape Test shall be utilized.

Exterior Adhesion. In accordance with ASTM D870, a 6" length of conduit test specimen shall be placed in boiling water. The specimen shall be periodically removed, cooled to ambient temperature and immediately tested according to the bond test (RN1). When the PVC coating separates from the substrate, the boil time to failure in hours shall be recorded.

Interior Adhesion. In accordance with ASTM D3359, a 6" conduit test specimen shall be cut in half longitudinally and placed in boiling water or directly above boiling water with the urethane surface facing down. The specimen shall be periodically removed, cooled to ambient temperature and tested in accordance with the Standard Method of Adhesion by Tape Test (ASTM D3359). When the coating disbonds, the time to failure in hours shall be recorded.

Heat/Humidity Test:

Acceptable conduit coating bonds shall be confirmed by a minimum average of 30 days in the Heat and Humidity Test. The RN1 Bond Test and the Standard Method for Measuring Adhesion by Tape Test shall be utilized.

Exterior Adhesion. In accordance with ASTM D1151, D1735, D2247 and D4585, conduit specimens shall be placed in a heat and humidity environment where the temperature is maintained at 150°F (66°C) and 95% relative humidity. The specimens shall be periodically removed and a bond test (RN1) performed. When the PVC coating separates from the substrate, the exposure time to failure in days shall be recorded.

Interior Adhesion. In accordance with ASTM D3359, conduit specimens shall be placed in a heat and humidity environment where the temperature is maintained at 150°F (66°C) and 95% relative humidity. When the coating disbonds, the time to failure in hours shall be recorded.

Add the following to Article 1088.01(a)(4) of the Standard Specifications:

“All liquid tight flexible metal conduit fittings shall have an insulated throat to prevent abrasion of the conductors and shall have a captive sealing O-ring gasket. The fittings shall be Listed under UL 514B. The insulated throat shall be rated up to 105° C.”

Revise the second paragraph of Article 811.04 of the Standard Specifications to read:

“Expansion fittings and LFNC will not be measured for payment.”

Revise Article 811.05 of the Standard Specifications to read:

“811.05 Basis of Payment. This work will be paid for at the contract unit price per meter (foot) for **CONDUIT ATTACHED TO STRUCTURE**, of the diameter specified, **RIGID GALVANIZED STEEL, PVC COATED.**”

UNDERGROUND RACEWAYS (D-1)

Effective: March 1, 2015

Revise Article 810.04 of the Standard Specifications to read:

“Installation. All underground conduits shall have a minimum depth of 30-inches (700 mm) below the finished grade.”

Add the following to Article 810.04 of the Standard Specifications:

“All metal conduit installed underground shall be Rigid Steel Conduit unless otherwise indicated on the plans.”

Add the following to Article 810.04 of the Standard Specifications:

“All raceways which extend outside of a structure or duct bank but are not terminated in a cabinet, junction box, pull box, handhole, post, pole, or pedestal shall extend a minimum of 300 mm (12”) or the length shown on the plans beyond the structure or duct bank. The end of this extension shall be capped and sealed with a cap designed for the conduit to be capped.

The ends of rigid metal conduit to be capped shall be threaded, the threads protected with full galvanizing, and capped with a threaded galvanized steel cap.

The ends of rigid nonmetallic conduit and coilable nonmetallic conduit shall be capped with a rigid PVC cap of not less than 3 mm (0.125”) thick. The cap shall be sealed to the conduit using a room-temperature-vulcanizing (RTV) sealant compatible with the material of both the cap and the conduit. A washer or similar metal ring shall be glued to the inside center of the cap with epoxy, and the pull cord shall be tied to this ring.”

UNIT DUCT (D-1)

Effective: January 1, 2012

Revise the first paragraph of Article 810.04 to read:

“The unit duct shall be installed at a minimum depth of 30-inches (760 mm) unless otherwise directed by the Engineer.”

Revise Article 1088.01(c) to read:

“(c) Coilable Nonmetallic Conduit.

General:

The duct shall be a plastic duct which is intended for underground use and which can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance. The duct shall be a plastic duct which is intended for underground use and can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance.

The duct shall be made of high density polyethylene which shall meet the requirements of ASTM D 2447, for schedule 40. The duct shall be composed of black high density polyethylene meeting the requirements of ASTM D 3350, Class C, Grade P33. The wall thickness shall be in accordance with Table 2 for ASTM D 2447.

The duct shall be UL Listed per 651-B for continuous length HDPE coiled conduit. The duct shall also comply with NEC Article 354.100 and 354.120.

Submittal information shall demonstrate compliance with the details of these requirements.

Dimensions:

Duct dimensions shall conform to the standards listed in ASTM D2447. Submittal information shall demonstrate compliance with these requirements.

Nominal Size		Nominal I.D.		Nominal O.D.		Minimum Wall	
mm	in	mm	in	mm	in	mm	in
31.75	1.25	35.05	1.380	42.16	1.660	3.556 +0.51	0.140 +0.020
38.1	1.50	40.89	1.610	48.26	1.900	3.683 +0.51	0.145 +0.020

Nominal Size		Pulled Tensile	
mm	in	N	lbs
31.75	1.25	3322	747
38.1	1.50	3972	893

Marking:

As specified in NEMA Standard Publication No. TC-7, the duct shall be clearly and durably marked at least every 3.05 meters (10 feet) with the material designation (HDPE for high density polyethylene), nominal size of the duct and the name and/or trademark of the manufacturer.

Performance Tests:

Polyethylene Duct testing procedures and test results shall meet the requirements of UL 651. Certified copies of the test report shall be submitted to the Engineer prior to the installation of the duct. Duct crush test results shall meet or exceed the following requirements:

Duct Diameter		Min. force required to deform sample 50%	
mm	in	N	lbs
35	1.25	4937	1110
41	1.5	4559	1025

WIRE AND CABLE (D-1)

Effective: January 1, 2012

Add the following to the first paragraph of Article 1066.02(a):

“The cable shall be rated at a minimum of 90°C dry and 75°C wet and shall be suitable for installation in wet and dry locations, and shall be resistant to oils and chemicals.”

Revise the Aerial Electric Cable Properties table of Article 1066.03(a)(3) to read:

Aerial Electric Cable Properties

Phase Conductor		Messenger wire			
Size AWG	Stranding	Average Insulation Thickness		Minimum Size AWG	Stranding
		mm	mils		
6	7	1.1	(45)	6	6/1
4	7	1.1	(45)	4	6/1
2	7	1.1	(45)	2	6/1
1/0	19	1.5	(60)	1/0	6/1
2/0	19	1.5	(60)	2/0	6/1
3/0	19	1.5	(60)	3/0	6/1
4/0	19	1.5	(60)	4/0	6/1

Add the following to Article 1066.03(b) of the Standard Specifications:

“Cable sized No. 2 AWG and smaller shall be U.L. listed Type RHH/RHW and may be Type RHH/RHW/USE. Cable sized larger than No. 2 AWG shall be U.L. listed Type RHH/RHW/USE.”

Revise Article 1066.04 to read:

“Aerial Cable Assembly. The aerial cable shall be an assembly of insulated aluminum conductors according to Section 1066.02 and 1066.03. Unless otherwise indicated, the cable assembly shall be composed of three insulated conductors and a steel reinforced bare aluminum conductor (ACSR) to be used as the ground conductor. Unless otherwise indicated, the code word designation of this cable assembly is “Palomino”. The steel reinforced aluminum conductor shall conform to ASTM B-232. The cable shall be assembled according to ANSI/ICEA S-76-474.”

Revise the second paragraph of Article 1066.05 to read:

“The tape shall have reinforced metallic detection capabilities consisting of a woven reinforced polyethylene tape with a metallic core or backing.”

LUMINAIRE (D-1)

Effective: January 1, 2012

Add the following to first paragraph of Article 1067(c) of the Standard Specifications:

“The reflector shall not be altered by paint or other opaque coatings which would cover or coat the reflecting surface. Control of the light distribution by any method other than the reflecting material and the aforementioned clear protective coating that will alter the reflective properties of the reflecting surface is unacceptable”

Add the following to Article 1067(f) of the Standard Specifications:

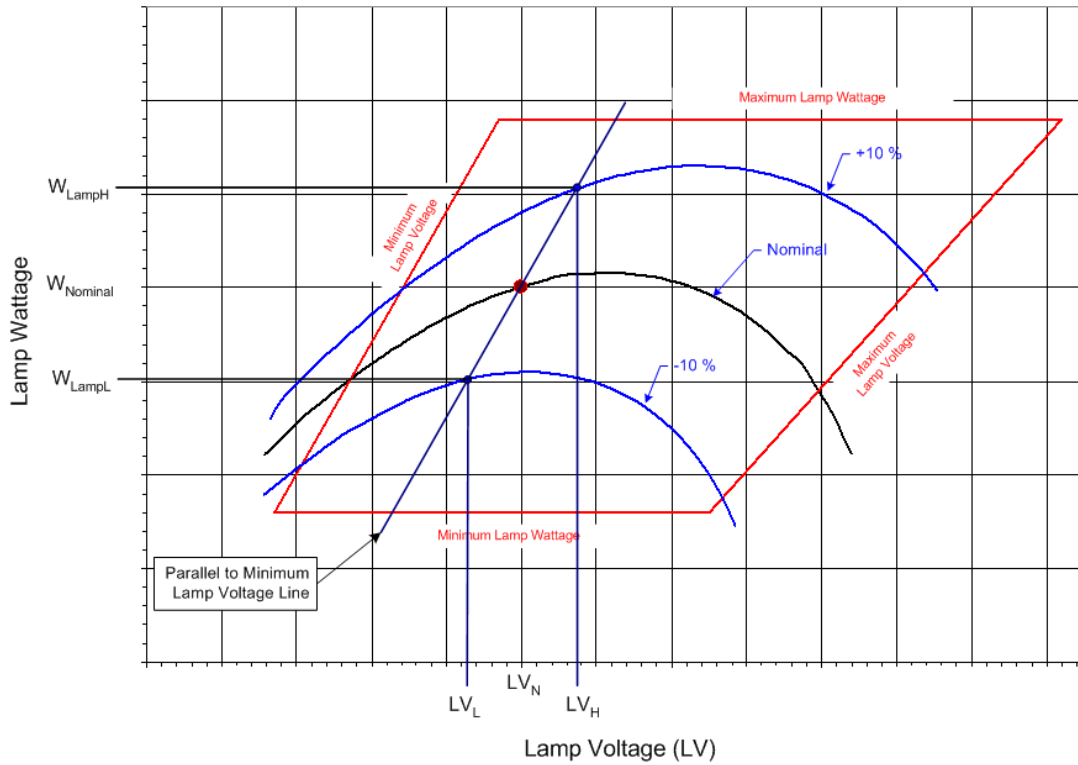
“The ballast shall be a High Pressure Sodium, high power factor, constant wattage auto-regulator, lead type (CWA) for operation on a nominal 240 volt system.”

Revise Article 1067(f)(1) of the Standard Specifications to read:

“The high pressure sodium, auto-regulator, lead type (CWA) ballast shall be designed to ANSI Standards and shall be designed and rated for operation on a nominal 240 volt system. The ballast shall provide positive lamp ignition at the input voltage of 216 volts. It shall operate the lamp over a range of input voltages from 216 to 264 volts without damage to the ballast. It shall provide lamp operation within lamp specifications for rated lamp life at input design voltage range. Operating characteristics shall produce output regulation not exceeding the following values:

Nominal Ballast Wattage	Maximum Ballast Regulation
750	25%
400	26%
310	26%
250	26%
150	24%
70	18%

For this measure, regulation shall be defined as the ratio of the lamp watt difference between the upper and lower operating curves to the nominal lamp watts; with the lamp watt difference taken within the ANSI trapezoid at the nominal lamp operating voltage point parallel to the minimum lamp volt line:



$$\text{Ballast Regulation} = \frac{W_{LampH} - W_{LampL}}{W_{LampN}} \times 100$$

where:

W_{LampH} = lamp watts at +10% line voltage when Lamp voltage = LV_H

W_{LampL} = lamp watts at - 10% line voltage when lamp voltage = LV_L

W_{LampN} = lamp watts at nominal lamp operating voltage = LV_N

Wattage	Nominal Lamp Voltage, LV _N	LV _L	LV _H
750	120v	115v	125v
400	100v	95v	105v
310	100v	95v	105v
250	100v	95v	105v
150	55v	50v	60v
70	52v	47v	57v

Ballast losses, based on cold bench tests, shall not exceed the following values:

Nominal Ballast Wattage	Maximum Ballast Losses
750	15%
400	20%
310	21%
250	24%
150	26%
70	34%

Ballast losses shall be calculated based on input watts and lamp watts at nominal system voltage as indicated in the following equation:

$$\text{Ballast Losses} = \frac{W_{Line} - W_{Lamp}}{W_{Lamp}} \times 100$$

where:

W_{line} = line watts at nominal system voltage

W_{lamp} = lamp watts at nominal system voltage

Ballast output to lamp. At nominal system voltage and nominal lamp voltage, the ballast shall deliver lamp wattage with the variation specified in the following table.

Nominal Ballast Wattage	Output to lamp variation
750	± 7.5%
400	± 7.5%
310	± 7.5%
250	± 7.5%
150	± 7.5%
70	± 7.5%

Example: For a 400w luminaire, the ballast shall deliver 400 watts ±7.5% at a lamp voltage of 100v for the nominal system voltage of 240v which is the range of 370w to 430w.

Ballast output over lamp life. Over the life of the lamp the ballast shall produce average output wattage of the nominal lamp rating as specified in the following table. Lamp wattage readings shall be taken at 5-volt increments throughout the ballast trapezoid. Reading shall begin at the lamp voltage (L_V) specified in the table and continue at 5 volt increments until the right side of the trapezoid is reached. The lamp wattage values shall then be averaged and shall be within the specified value of the nominal ballast rating. Submittal documents shall include a tabulation of the lamp wattage vs. lamp voltage readings.

Nominal Ballast Wattage	LV Readings begin at	Maximum Wattage Variation
750	110v	± 7.5%
400	90v	± 7.5%
310	90v	± 7.5%
250	90v	± 7.5%
150	50v	± 7.5%
70	45v	± 7.5%

Example: *For a 400w luminaire, the averaged lamp wattage reading shall not exceed the range of ±7.5% which is 370w to 430w*

Add the following to Article 1067(h) of the Standard Specifications:

“Independent Testing. Independent testing of luminaires shall be required whenever the pay item quantity of luminaires of a given pay item, as indicated on the plans, is 50 or more. For each luminaire type to be so tested, one luminaire plus one luminaire for each 50 luminaires shall be tested. Example: *A plan pay item quantity of 75 luminaires for a specific pay item would dictate that 2 be tested; 135 luminaires would dictate that three be tested.*” If the luminaire performance table is missing from the contract documents, the luminaire(s) shall be tested and the test results shall be evaluated against the manufacturer’s data as provided in the approved material submittal. The test luminaire(s) results shall be equal to or better than the published data. If the test results indicated performance not meeting the published data, the test luminaire will be designated as failed and corrective action as described herein shall be performed.

The Contractor shall be responsible for all costs associated with the specified testing, including but not limited to shipping, travel and lodging costs as well as the costs of the tests themselves, all as part of the bid unit price for this item. Travel, lodging and other associated costs for travel by the Engineer shall be direct-billed to or shall be pre-paid by the Contractor, requiring no direct reimbursement to the Engineer or the independent witness, as applicable”

The Contractor shall select one of the following options for the required testing with the Engineer's approval:

- a. **Engineer Factory Selection for Independent Lab:** The Contractor may select this option if the luminaire manufacturing facility is within the state of Illinois. The Contractor shall propose an independent test laboratory for approval by the Engineer. The selected luminaires shall be marked by the Engineer and shipped to the independent laboratory for tests.
- b. **Engineer Witness of Independent Lab Test:** The Contractor may select this option if the independent testing laboratory is within the state of Illinois. The Engineer shall select, from the project luminaires at the manufacturer's facility or at the Contractor's storage facility, luminaires for testing by the independent laboratory.
- c. **Independent Witness of Manufacturer Testing:** The independent witness shall select from the project luminaires at the manufacturers facility or at the Contractor's storage facility, the luminaires for testing. The Contractor shall propose a qualified independent agent, familiar with the luminaire requirements and test procedures, for approval by the Engineer, to witness the required tests as performed by the luminaire manufacturer.

The independent witness shall as a minimum meet the following requirements:

- ▶ Have been involved with roadway lighting design for at least 15 years.
- ▶ Not have been the employee of a luminaire or ballast manufacturer within the last 5 years.
- ▶ Not associated in any way (plan preparation, construction or supply) with the particular project being tested.
- ▶ Be a member of IESNA in good standing.
- ▶ Provide a list of professional references.

This list is not an all-inclusive list and the Engineer will make the final determination as to the acceptability of the proposed independent witness.

- d. **Engineer Factory Selection and Witness of Manufacturer Testing:** The Contractor may select this option if the luminaire manufacturing facility is within the state of Illinois. At the Manufacturer's facility, the Engineer shall select the luminaires to be tested and shall be present during the testing process. The Contractor shall schedule travel by the Engineer to and from the Manufacturer's laboratory to witness the performance of the required tests.

Should any of the tested luminaires fail to satisfy the specifications and perform according to approved submittal information, the luminaire shall be unacceptable and be replaced by alternate equipment meeting the specifications with the submittal and testing process repeated in their entirety; or corrections made to achieve required performance. In the case of corrections, the Contractor shall advise the Engineer of corrections 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; i.e. if three luminaires were tested originally, one, two or three failed, another three must be tested after corrective action is taken.

Revise Article 1067.06(a)(1) of the Standard Specifications to read:

“The lamps shall be of the clear type and shall have a color of 1900° to 2200° Kelvin.”

Add the following table(s) to Article 1067 of the Standard Specifications:

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 I-90 EB Lighting – 7 Lanes**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	See Sketch
	Number of Lanes	See Sketch
	Median Width	See Sketch
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	120 (ft)
	Mast Arm Length	6 (ft)
	Pole Set-Back From Edge of Pavement	See Sketch
LUMINAIRE DATA	Lamp Type	HPS
	Lamp Lumens	50000
	I.E.S. Vertical Distribution	Medium
	I.E.S. Control Of Distribution	Cutoff
	I.E.S. Lateral Distribution	III
	Total Light Loss Factor	0.7
LAYOUT DATA	Spacing	See Sketch
	Configuration	Single Sided
	Luminaire Overhang over edge of pavement	0 (ft)

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

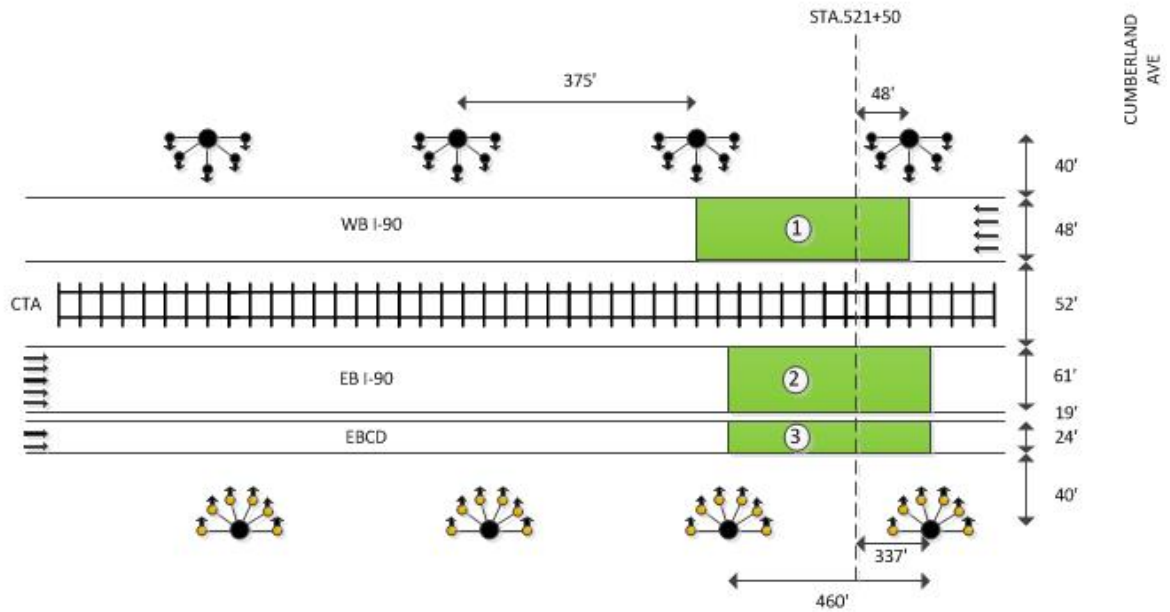
PERFORMANCE REQUIREMENTS		
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NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

LUMINANCE	Average Luminance, L_{AVE}	0.8 Cd/m ²
	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0 (Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3 (Max)



IDOT DISTRICT 1 LUMINAIRE PERFORMANCE DETAIL
I-90 EB Lighting – 7 lanes



Cumberland Ave to I-190/I-90 Interchange

LEGEND



PROPOSED LIGHT TOWER WITH MC-III,
 (6)400W HPS, CUT OFF, 120' MH, 6FT MA, 50,000
 LUMENS



PHOTOMETRIC CALCULATION GRID & ID



EXISTING LIGHT TOWER WITH MC-III,
 (5)400W HPS, CUT OFF, 120' MH, 6FT MA, 50,000
 LUMENS

TEMPORARY LUMINAIRE (D-1)

Effective: January 1, 2012

Add the following to first paragraph of Article 1067(c) of the Standard Specifications:

“The reflector shall not be altered by paint or other opaque coatings which would cover or coat the reflecting surface. Control of the light distribution by any method other than the reflecting material and the aforementioned clear protective coating that will alter the reflective properties of the reflecting surface is unacceptable”

Add the following to Article 1067(f) of the Standard Specifications:

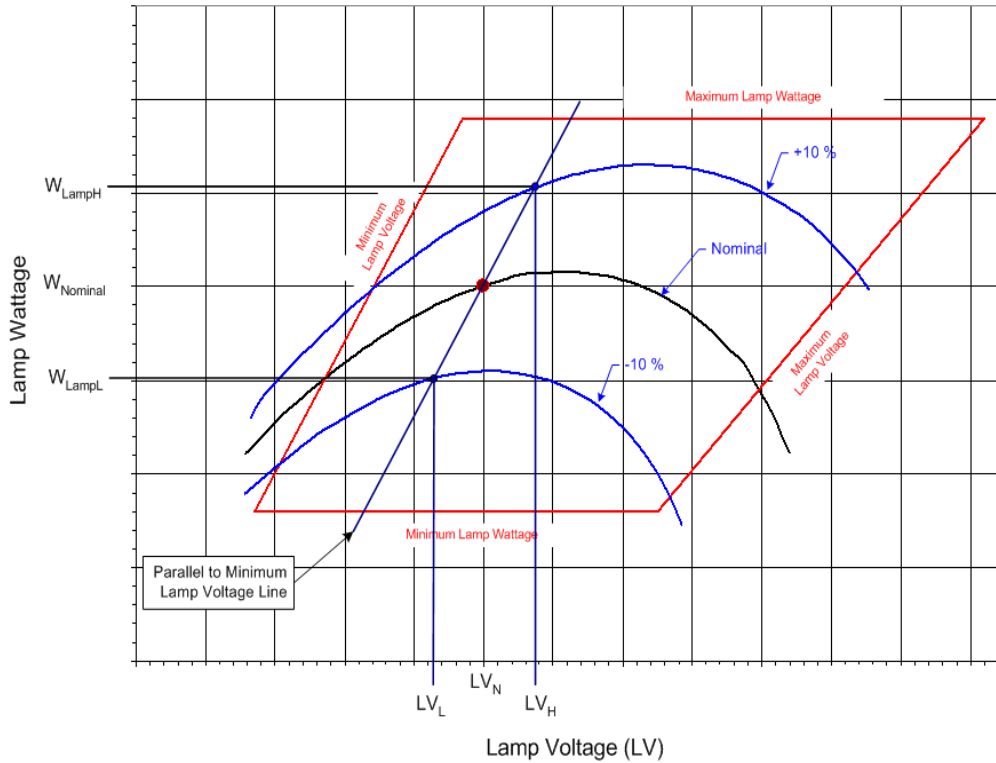
“The ballast shall be a High Pressure Sodium, high power factor, constant wattage auto-regulator, lead type (CWA) for operation on a nominal 240 volt system.”

Revise Article 1067(f)(1) of the Standard Specifications to read:

“The high pressure sodium, auto-regulator, lead type (CWA) ballast shall be designed to ANSI Standards and shall be designed and rated for operation on a nominal 240 volt system. The ballast shall provide positive lamp ignition at the input voltage of 216 volts. It shall operate the lamp over a range of input voltages from 216 to 264 volts without damage to the ballast. It shall provide lamp operation within lamp specifications for rated lamp life at input design voltage range. Operating characteristics shall produce output regulation not exceeding the following values:

Nominal Ballast Wattage	Maximum Ballast Regulation
1000	25%
750	25%
400	26%
310	26%
250	26%
150	24%
70	18%

For this measure, regulation shall be defined as the ratio of the lamp watt difference between the upper and lower operating curves to the nominal lamp watts; with the lamp watt difference taken within the ANSI trapezoid at the nominal lamp operating voltage point parallel to the minimum lamp volt line:



$$\text{Ballast Regulation} = \frac{W_{LampH} - W_{LampL}}{W_{LampN}} \times 100$$

where:

W_{LampH} = lamp watts at +10% line voltage when Lamp voltage = LV_H

W_{LampL} = lamp watts at - 10% line voltage when lamp voltage = LV_L

W_{lampN} = lamp watts at nominal lamp operating voltage = LV_N

Wattage	Nominal Lamp Voltage, LV _N	LV _L	LV _H
1000	120v	115v	125v
750	120v	115v	125v
400	100v	95v	105v
310	100v	95v	105v
250	100v	95v	105v
150	55v	50v	60v
70	52v	47v	57v

Ballast losses, based on cold bench tests, shall not exceed the following values:

Nominal Ballast Wattage	Maximum Ballast Losses
750	15%
750	15%
400	20%
310	21%
250	24%
150	26%
70	34%

Ballast losses shall be calculated based on input watts and lamp watts at nominal system voltage as indicated in the following equation:

$$\text{Ballast Losses} = \frac{W_{Line} - W_{Lamp}}{W_{Lamp}} \times 100$$

where:

W_{line} = line watts at nominal system voltage

W_{lamp} = lamp watts at nominal system voltage

Ballast output to lamp. At nominal system voltage and nominal lamp voltage, the ballast shall deliver lamp wattage with the variation specified in the following table.

Nominal Ballast Wattage	Output to lamp variation
750	± 7.5%
750	± 7.5%
400	± 7.5%
310	± 7.5%
250	± 7.5%
150	± 7.5%
70	± 7.5%

Example: For a 400w luminaire, the ballast shall deliver 400 watts ±7.5% at a lamp voltage of 100v for the nominal system voltage of 240v which is the range of 370w to 430w.

Ballast output over lamp life. Over the life of the lamp the ballast shall produce average output wattage of the nominal lamp rating as specified in the following table. Lamp wattage readings shall be taken at 5-volt increments throughout the ballast trapezoid. Reading shall begin at the lamp voltage (L_v) specified in the table and continue at 5 volt increments until the right side of the trapezoid is reached. The lamp wattage values shall then be averaged and shall be within the specified value of the nominal ballast rating. Submittal documents shall include a tabulation of the lamp wattage vs. lamp voltage readings.

Nominal Ballast Wattage	LV Readings begin at	Maximum Wattage Variation
750	110v	± 7.5%
750	110v	± 7.5%
400	90v	± 7.5%
310	90v	± 7.5%
250	90v	± 7.5%
150	50v	± 7.5%
70	45v	± 7.5%

Example: For a 400w luminaire, the averaged lamp wattage reading shall not exceed the range of ±7.5% which is 370w to 430w

Add the following to Article 821.08 of the Standard Specifications:

“This work will be paid for at the contract unit price per each for TEMPORARY LUMINAIRE, of the lamp type, mount type, and wattage specified.

Revise Article 1067.06(a)(1) of the Standard Specifications to read:

“The lamps shall be of the clear type and shall have a color of 1900° to 2200° Kelvin.”

Add the following table(s) to Article 1067 of the Standard Specifications:

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 I-90 EB Temporary Lighting – 5 Lanes (Typical)**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	See Sketch
	Number of Lanes	See Sketch
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height *	See Sketch
	Mast Arm Length *	See Sketch
	Pole Set-Back From Edge of Pavement	See Sketch
	<i>* Typical data, see plans for other configurations</i>	
LUMINAIRE DATA	Lamp Type	HPS
	Lamp Lumens	See Sketch
	I.E.S. Vertical Distribution	Medium
	I.E.S. Control Of Distribution	Cutoff
	I.E.S. Lateral Distribution	See Sketch
	Total Light Loss Factor	0.7
LAYOUT DATA	Spacing	See Sketch
	Configuration	See Sketch
	Luminaire Overhang over edge of pavement	0 (ft)

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

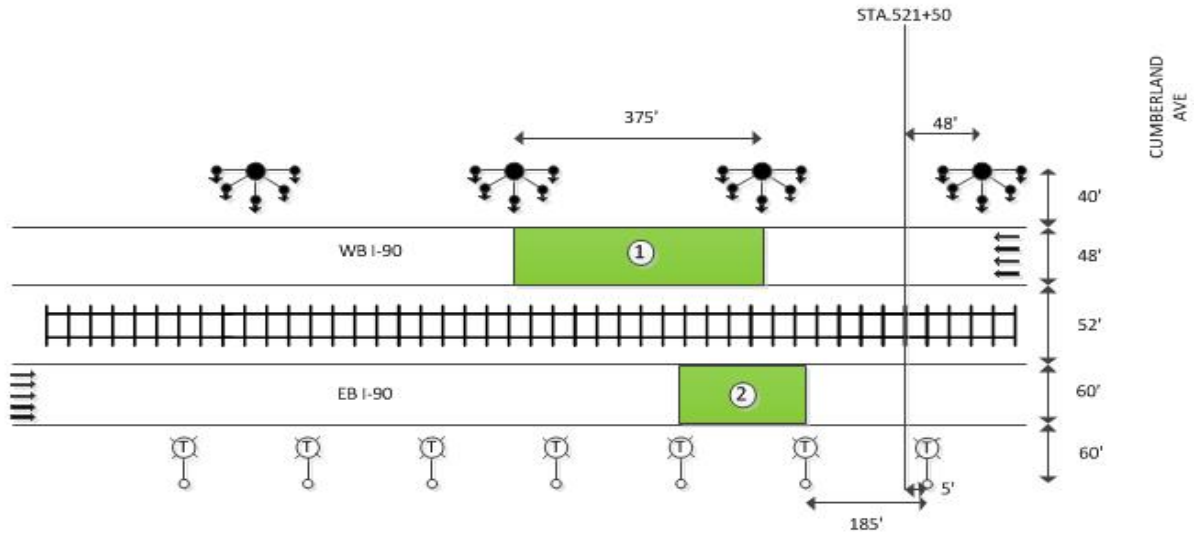
PERFORMANCE REQUIREMENTS		
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NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

LUMINANCE	Average Luminance, L_{AVE}	0.8 Cd/m ²
	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0 (Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3 (Max)



IDOT DISTRICT 1 LUMINAIRE PERFORMANCE DETAIL
I-90 EB Temporary Lighting – 5 lanes (Typical Section)



Cumberland Ave to I-190/I-90 Interchange

LEGEND



PROPOSED TEMPORARY LIGHT POLE
 1000W, MC-II HPS, FULL CUT OFF,
 130,000 LUMENS, 15 FT MA, 80 FT MH



PHOTOMETRIC CALCULATION GRID & ID



EXISTING LIGHT TOWER WITH MC-III,
 (5)400W HPS, 120' MH, CUT OFF, 6FT MA, 50,000 LUMENS

NOT TO SCALE

UNDERPASS LUMINAIRE, HPS, STAINLESS STEEL HOUSING (D-1)

Effective: January 1, 2007

Revised: January 1, 2012

1. **Description.** This item shall consist of furnishing, testing as required, and installing a luminaire suitable for roadway underpasses as specified herein.
2. **General.**
 - 2.1 The luminaire shall be optically sealed, mechanically strong and easy to maintain.
 - 2.2 All wiring within the fixture shall have a minimum temperature rating of 125° C. In addition, the unit shall be designed to allow for a maximum supply wire rating of 90° C.
 - 2.3 All hardware of the housing, reflector, and ballast assembly shall be captive
 - 2.4 The luminaire shall be UL Listed for Wet Locations.
 - 2.5 The underpass luminaire shall be suitable for lighting a roadway underpass at approximate mounting height of 16 feet from a position suspended directly above the roadway.
 - 2.6 The luminaire shall be certified by the U.L. testing laboratory to meet the IP66 criteria of the International Electro technical Commission Standard 529.
3. **Housing.**
 - 3.1 The housing shall be stainless steel and be made of 16 gauge minimum thickness stainless steel, Type 304, #2B finish.
 - 3.2 Since the installed location of the luminaires has severe space limitations that prohibit servicing the luminaire from the top or side of the fixture, the luminaire must be serviceable from the bottom of the housing when in the installed position. Both ballast and optical compartments must be serviceable from the bottom of the fixture. Fixtures which open from the top or sides are not acceptable.
 - 3.3 The housing shall have a maximum width of 13"
 - 3.4 All internal and external hardware, unless specifically specified otherwise, shall be made of stainless steel.

3.5 Stainless Steel Housing

- 3.5.1 The stainless steel housing, and lens frame shall be made of 16 gauge minimum thickness stainless steel, Type 304 #2B.
- 3.5.2 All housing and frame components shall be cut within with a laser with a positioning accuracy of +/- .004" for assembly accuracy and machine welded to minimize irregularities in the weld joint.
- 3.5.3 All seams in the housing enclosure shall be welded by continuous welding. Stainless steel weld wire shall be used for all welds. A sample weld shall be submitted for review and approval.
- 3.5.4 The luminaire lens shall be flush, within 3.1 mm (0.122"), of the lens frame.
- 3.5.5 The lens frame shall be flat and the frame and luminaire housing shall not have any protruding flanges.
- 3.5.6 The lens frame assembly shall consist of a one-piece 16 gauge 304 stainless steel external frame with the lens facing toward the housing and a 16 gauge 304 stainless internal frame with the legs facing away from the housing. The internal frame shall have seam welded corners for added strength. The two panels will sandwich the glass lens and be fastened together with the use of no less than 10 #10 stainless steel fasteners.
- 3.5.7 The lens frame and the door frame shall each be secured through the use of two stainless steel draw latches secured to the fixture housing.
- 3.5.8 When in open position, it shall be possible to un-hinge and remove the lens frame for maintenance. The lens frame hinge shall be stainless steel and designed so that there must be a conscious action of the maintenance personnel to remove the lens frame. The frame hinging method shall not be designed so that bumping the frame accidentally could allow the frame to fall to the roadway surface. The removal method must be accomplished without the use of tools or hardware. The hinge pin shall be a minimum of 6.35 mm (0.250") in diameter. The pin shall be spring loaded and retractable with a safety catch to hold the pin in the retracted position for ease of maintenance.
- 3.5.9 The suspended housing shall be divided into two compartments, one for the ballast and optical assembly, the other for wire connections. The optical chamber shall be sealed from the environment. The wire portal between compartments shall be sealed so as to prevent air exchange through the portal. There shall be an internally mounted breather mechanism to allow internal and external air pressure to equalize without permitting dust or water into the unit.

3.5.10 The ballast and all electrical equipment shall be mounted to a removable aluminum chassis with a minimum thickness of 3.175, (0.125"). The chassis shall be held in place with captive stainless steel hardware. The hardware shall include a bracket that can be loosened and shifted to allow the chassis to pivot away from fastened position for removal. The splice box shall include a heavy-duty 3 pole terminal block to accommodate #6 conductors and a KTK 2 amp fuse with HPC fuse holder or approved equal. Quick-connect power distribution terminal blocks shall be a molded thermoset plastic, rated 70A, 600V and have 3 poles, each with (4) .250 quick connect terminals. Operating temperature rating to be 150° C. Input wire size shall accommodate #2-#14 AWG. Torque rating shall be 45 in./lb. Maximum. Agency approvals shall be UL E62622; CSA LR15364.

3.5.11 Ballast compartment surfaces shall be deburred and free of sharp edges, points or corners that may come in contact with installers or service personnel.

4. **Gasketing:**

4.1 The junction between the lens frame and the ballast housing door and the housing shall be sealed with a one-piece vulcanized or molded high temperature solid silicone rubber gasket with the equivalent of a 60 Shore A durometer rating. The gasket between the lens frame and the luminaire housing shall be securely attached by mechanical means, such a retaining lip to prevent the movement of the gasket. The gasket may not be secured by adhesive means exclusively. The lens and ballast housing doors shall be designed and constructed so they seal to the gasket on a flat surface. The frame shall not seal to the gasket using the edge of leg on a doorframe. The lens shall be sealed inside of the lens frame with the use of a one-piece solid silicone rubber gasket with ribbed flanges and a rating of 60 Shore A Durometer

4.2 The junction between conduit connections to the luminaire and the lens frame junction to the housing shall withstand entry of water when subjected to a water jet pressure of 207 kPa (30 lbs. Per sq. inch), tested under laboratory conditions. Submittal information shall include data relative to gasket thickness and density and the means of securing it in place.

5. **Mounting Brackets**

5.1 The brackets shall be properly sized to accommodate the weight of the luminaire with calculations or other suitable reference documentation submitted to support the material choice.

5.2 The luminaire shall have an opening in the housing for installation (by others) of a 28.1 mm (3/4 inch) diameter flexible conduit. The location of the opening will be determined by the Engineer during the shop drawing review.

6. Lamp Socket:

- 6.1 The lamp socket shall be a 4KV pulse rated mogul type, porcelain glazed enclosed, and be provided with grips, or other suitable means to hold the lamp against vibration. The rating of the socket shall exceed the lamp starting voltage, or starting pulse voltage rating.
- 6.2 If the lamp socket is of the sealed removable type, proper alignment of the socket shall be provided and molded into the socket assembly and indicated in a contrasting color.
- 6.3 If the lamp socket is adjustable, the factory setting must be indicated legibly in the luminaire housing.

7. ANSI Identification Decal:

A decal, complying to ANSI standard C136-15 for luminaire wattage and distribution type, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

8. Optical Assembly:

- 8.1 Lens and Lens Frame. The lens shall be made of crystal clear, impact and heat resistant tempered glass a minimum of 6.35 mm (0.25") thick. The lens shall be held in such a manner as to allow for its expansion and contraction, due to temperature variation. The lens shall be a flat glass design.
- 8.2 Reflector:
 - 8.2.1 The reflector shall be hydro formed aluminum, 0.063" thick, bright-dip and clear anodized finish.
 - 8.2.2 The reflector shall be secured with a stainless steel aircraft cable during maintenance operations.
 - 8.2.3 If the reflector has multiple light distribution positions, each position must have positive stop/mounting with the original factory distribution identified.
 - 8.2.4 The luminaire shall be photometrically efficient. Luminaire efficiency, defined by the I.E.S. as "the ratio or luminous flux (lumens) emitted by a luminaire to that emitted by the lamp or lamps used within", shall not be less than 67%. Submittal information shall include published efficiency data.
 - 8.2.5 The reflector, the refractor or lens, and the entire optical assembly shall not develop any discoloration over the normal life span of the luminaire.

- 1.2.6 The reflector shall not be altered by paint or other opaque coatings which would cover or coat the reflecting surface. Control of the light distribution by any method other than the reflecting material and the aforementioned clear protective coating that will alter the reflective properties of the reflecting surface is unacceptable

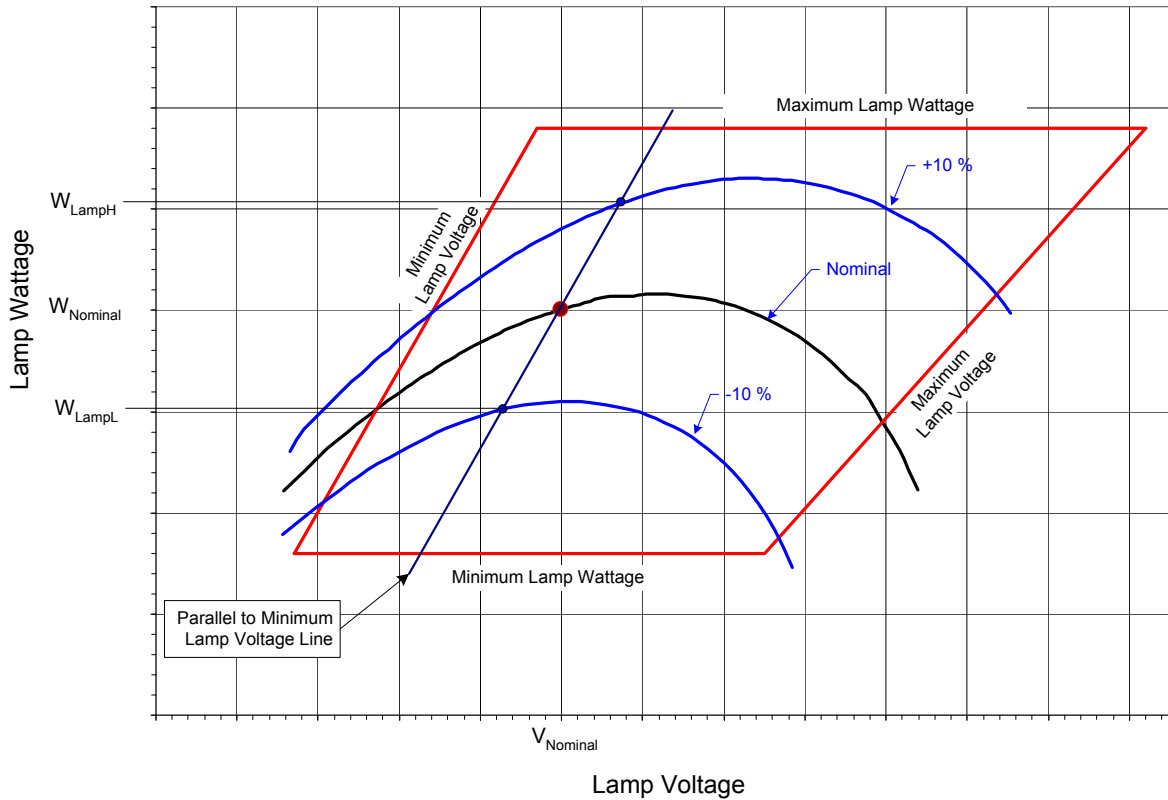
9. Ballast:

- 9.1 The ballast shall be a High Pressure Sodium, high power factor, lead type, Isolated Regulator Ballast (CWI) or a Constant Wattage Auto-regulator (CWA), for operation on a nominal 240 volt system.
- 9.2 The ballast shall be designed to furnish proper electrical characteristics for starting and operating a high pressure sodium vapor lamp of the specified rating at ambient temperatures of -29 degrees to +40 degrees C. The ballast windings shall be adequately impregnated and treated for protection against the entrance of moisture, insulated with Class H insulation, and able to withstand the NEMA standard dielectric test.
- 9.3 The ballast shall include an electronic starting assembly. The starter assembly shall be comprised of solid state devices capable of withstanding ambient temperatures of 85 degrees C. The starter shall provide timed pulsing with sufficient follow-through current to completely ionize and start all lamps. Minimum amplitude of the pulse shall be 2,500 volts, with a width of one (1) microsecond at 2,250 volts, and shall be applied within 20 electrical degrees of the peak of the open circuit voltage wave with a repetition rate as recommended by the lamp manufacturer for the 60 cycle wave. The lamp peak pulse current shall be a minimum of 0.2 amperes. Proper ignition shall be provided over a range of input voltage from 216 to 264 volts. The starter component shall be field replaceable and completely interchangeable with no adjustment necessary for proper operation. The starter component shall have push-on type electrical terminations to provide good electrical and mechanical integrity and ease of replacement. Terminal configuration shall preclude improper insertion of plug-in components. The starter circuit board shall be treated in an approved manner to provide a water and contaminant-resistant coating.
- 9.4 The ballast shall have an overall power factor of at least 0.9 when operated under rated lamp load.
- 9.5 The ballast shall withstand a 2,500 volt dielectric test between the core and windings without damage to the insulation.
- 9.6 The ballast shall not subject the lamp to a crest factor exceeding 1.8 and shall operate the lamp without affecting adversely the lamp life and performance.

- 9.7 The ballast shall be designed to ANSI Standards and shall be designed and rated for operation on a nominal 240 volt system. The ballast shall provide positive lamp ignition at the input voltage of 216 volts. It shall operate the lamp over a range of input voltages from 216 to 264 volts without damage to the ballast. It shall provide lamp operation within lamp specifications for rated lamp life at input design voltage range. Operating characteristics shall produce output regulation not exceeding the following values:

Nominal Ballast Wattage	Maximum Ballast Regulation
400	25%
310	26%
250	22%
150	22%
70	17%

For this measure, regulation shall be defined as the ratio of the lamp watt difference between the upper and lower operating curves to the nominal lamp watts; with the lamp watt difference taken within the ANSI trapezoid at the nominal lamp operating voltage point parallel to the minimum lamp volt line:



$$\text{Ballast Regulation} = \frac{W_{LampH} - W_{LampL}}{W_{LampN}} \times 100$$

where:

W_{LampH} = lamp watts at +10% line voltage (264v)

W_{LampL} = lamp watts at - 10% line voltage (216v)

W_{lampN} = lamp watts at 240v"

9.8 Ballast losses, based on cold bench tests, shall not exceed the following values:

Nominal Ballast Wattage	Maximum Ballast Losses
400	16.0%
310	19.0%
250	17.5%
150	26.0%
70	34.0%

Ballast losses shall be calculated based on input watts and lamp watts at nominal system voltage as indicated in the following equation:

$$\text{Ballast Losses} = \frac{W_{Line} - W_{Lamp}}{W_{Lamp}} \times 100$$

where:

W_{line} = line watts at 240v

W_{lamp} = lamp watts at 240v

- 9.9 Ballast output to lamp. At nominal system voltage and a lamp voltage of 52v, the ballast shall deliver a lamp wattage within $\pm 4\%$ of the nominal lamp wattage. For a 70w luminaire, the ballast shall deliver 70 watts $\pm 4\%$ at a lamp voltage of 52v for the nominal system voltage of 240v.
- 9.10 Ballast output over lamp life. Over the life of the lamp the ballast shall produce an average of the nominal lamp rating $\pm 5\%$. Lamp wattage readings shall be taken at 5-volt increments throughout the ballast trapezoid. The lamp wattage values shall then be averaged within the trapezoid and shall be within $\pm 5\%$ of the nominal ballast rating. Submittal documents shall include a tabulation of the lamp wattage vs. lamp voltage readings.
- 9.11 The ballast shall be integral to the luminaire. The ballast components shall be mounted on a removable door or on a removable mounting tray. The ballast tray or mounting door shall be manufactured with dissimilar metal conflicts kept to a minimum.
- 9.12 Ballast wiring and lamp socket wiring shall be connected by means of keyed plugs. Upon unplugging the ballast wiring the entire ballast assembly shall be removable for maintenance. The plugs shall not be interchangeable to avoid improper connection of the assemblies.
- 9.13 The mounting adjustments and wiring terminals shall be readily accessible. The removable door or pad shall be secure when fastened in place and all individual components shall be secure upon the removable element. Upon ballast assembly removal, each component shall be readily removable for replacement.
- 9.14 The luminaire shall be completely wired. All wiring connections within the luminaire shall be made with insulated compression connectors or insulated terminal blocks. An insulated terminal block shall be provided to terminate the incoming supply wires. The terminal block shall be rated for 600 volts and shall accommodate wire sizes from #10 to #6 AWG. The use of "wire nuts" is unacceptable. A ground terminal shall be provided for the connection of a ground wire.
- 9.15 Ballast and lamp Leads shall not be smaller than #16 AWG conductors rated at a minimum temperature rating of 90° C.

- 9.16 All wires shall be coded by tagging and/or color coding for proper identification. A complete legible permanently attached wiring diagram (no smaller than 3" x 4" with a min. font size of 8 pts.) coordinated with the wire identifications shall be displayed at the convenient location on the interior of the luminaire. The wiring diagram shall be oriented so that it is right side up and readable when the luminaire is in the installed position.
- 9.17 The ballast shall not be excessively noisy. Noticeable noisy ballasts, as determined by the Engineer, shall be replaced at no additional cost to the State.
- 9.18 The ballast shall provide lamp operation within lamp specifications for the rated lamp life at the input design voltage range. It shall have a 6 month operation capability with a cycling lamp.
- 9.19 Submittal information shall include manufacturer's literature and data to confirm compliance with all specified requirements including an ANSI Standard Ballast Characteristic Graph (Trapezoid) diagram, with all items clearly identified.

10. **Photometric Performance:**

- 10.1 The luminaire photometric performance shall produce results equal to or better than those listed in the included Luminaire Performance Table. Submittal information shall include computer calculations based on the controlling given conditions which demonstrate achievement of all listed performance requirements. The computer calculations shall be done according to I.E.S. recommendations and the submitted calculations shall include point-by-point illuminance, luminance and veiling luminance as well as listings of all indicated averages and ratios as applicable. Calculations shall be performed with AGI32. The program used to perform the calculations shall be identified on the submittal. The submittal data shall also include all photometric calculations files with the proposed photometric data on a CD ROM. The performance requirements shall define the minimum number of decimal places used in the calculations. Rounding of calculations shall not be allowed.
- 10.2 In addition to computer printouts of photometric performance, submittal information shall include: Descriptive literature; an Isofootcandle chart of horizontal lux (footcandles); Utilization curve; Isocandela diagram; Luminaire classification per ANSI designation; Candlepower values at every 2.5 degree intervals; Candlepower tables are to be provided on CD ROM in the IES format as specified in IES publication LM-63.

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE #3
 3 Lane Cross Section**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	<u>36 ft</u>
	Number of Lanes	<u>3</u>
	I.E.S. Surface Classification	<u>R3</u>
	Q-Zero Value	<u>.07</u>
LIGHT POLE DATA	Mounting Height	<u>16 ft</u>
	Mast Arm Length	<u>0 ft</u>
	Pole Set-Back From Edge of Pavement	<u>2 ft</u>
LUMINAIRE DATA	Lamp Type	<u>HPS</u>
	Lamp Lumens	<u>6,300</u>
	I.E.S. Vertical Distribution	<u>Medium</u>
	I.E.S. Control Of Distribution	<u>Cutoff</u>
	I.E.S. Lateral Distribution	<u>III</u>
	Total Light Loss Factor	<u>0.65</u>
LAYOUT DATA	Spacing	<u>45 ft</u>
	Configuration	<u>Opposite Side</u>
	Luminaire Overhang over edge of pavement	<u>-2 ft</u>

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		
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NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ILLUMINATION	Ave. Horizontal Illumination, E_{AVE}	<u>18 Lux</u>
	Uniformity Ratio, E_{AVE}/E_{MIN}	<u>2.5:1</u>
LUMINANCE	Average Luminance, L_{AVE}	<u>1.2 Cd/m²</u>
	Uniformity Ratio, L_{AVE}/L_{MIN}	<u>2.5:1</u>
	Uniformity Ratio, L_{MAX}/L_{MIN}	<u>4:1</u>
	Veiling Luminance Ratio, L_V/L_{AVE}	<u>0.30:1</u>

11. Independent Testing:

- 11.1 Independent testing of luminaires shall be required whenever the quantity of luminaires of a given wattage and distribution, as indicated on the plans, is 50 or more. For each luminaire type to be so tested, one luminaire plus one luminaire for each 50 luminaires shall be tested. Example: *A plan quantity of 75 luminaires would dictate that 2 to be tested; 135 luminaires would dictate that three be tested.*
- 11.2 The Contractor shall be responsible for all costs associated with the specified testing, including but not limited to shipping, travel and lodging costs as well as the costs of the tests themselves, all as part of the bid unit price for this item. Travel, lodging and other associated costs for travel by the Engineer shall be direct-billed to or shall be pre-paid by the Contractor, requiring no direct reimbursement to the Engineer or the independent witness, as applicable.
- 11.3 Commitment to test. The Vendor shall select one of the following options for the required testing with the Engineer's approval:
- a. Engineer Factory Selection for Independent Lab: The Contractor may select this option if the luminaire manufacturing facility is within the state of Illinois. The Contractor shall propose an independent test laboratory for approval by the Engineer. The selected luminaires shall be marked by the Engineer and shipped to the independent laboratory for tests.
 - b. Engineer Witness of Independent Lab Test: The Contractor may select this option if the independent testing laboratory is within the state of Illinois. The Engineer shall select, from the project luminaires at the manufacturer's facility or at the Contractor's storage facility, luminaires for testing by the independent laboratory.
 - c. Independent Witness of Manufacturer 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. The Contractor shall propose a qualified independent agent, familiar with the luminaire requirements and test procedures, for approval by the Engineer, to witness the required tests as performed by the luminaire manufacturer. The independent witness shall:
 - ▶ Have been involved with roadway lighting design for at least 15 years.
 - ▶ Not have been the employee of a luminaire or ballast manufacturer within the last 5 years.
 - ▶ Be a member of IESNA in good standing.
 - ▶ Provide a list of professional references.

- d. Engineer Factory Selection and Witness of Manufacturer Testing: The Contractor may select this option if the manufacturing facility is within the state of Illinois. At the manufacturer's facility, the Engineer shall select the luminaires to be tested and shall be present during the testing process. The Contractor shall schedule travel by the Engineer to and from the Manufacturer's laboratory to witness the performance of the required tests.

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 selection of the testing option shall be presented with the information submitted for approval. The proposed independent laboratory or independent witness shall be included with that information. The selection of the testing option shall be presented with the information submitted for approval. The proposed independent laboratory or independent witness shall be included with that information.

- 11.4 The testing performed shall include photometric, electrical, heat and water jet testing.
- 11.5 Photometric testing shall be in accordance with IES recommendations except that the selected luminaire(s) shall be tested as manufactured without any disassembly or modification and, as a minimum shall yield an isocandela chart, with max candela point and half candela trace indicated, an isocandela diagram, maximum plane and cone plots of candela, a candlepower table (house and street side), a coefficient of utilization chart, a luminous flux distribution table, and complete calculations based on specified requirements and tests.
- 11.6 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. Ballast test data shall also be provided in an electronic format acceptable to the Engineer to demonstrate compliance with sections 9.7, 9.8, 9.9 and 9.10.
- 11.7 Heat Testing. Heat testing shall be conducted to ensure that the luminaire complies with UL 1572. An ambient temperature of 40 degrees centigrade (104 degrees F) shall be used for the test.
- 11.8 Water spray test. The luminaires must pass the following water spray test.:

A spray apparatus consisting of four spray nozzles set at an angle of 30 degrees from the vertical plane space 30 inches apart on a 2 inch pipe, each delivering 12 gallons of water per minute at a minimum of 100 psi at each nozzle in a 90 degree cone. A water pressure gauge shall be installed at the first nozzle.

The luminaires shall be mounted in a ceiling configuration and with each nozzle set a distance of 18 inches below the fixture in the vertical plane and 18 inches away in the horizontal plane from the fixture lens, apply spray for a duration of 3 minutes at a minimum of 100 psi. When opened, the fixture shall not show any signs of leakage.

The above test shall be repeated in the opposite horizontal plane from the fixture lens with no signs of leakage.

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 and luminaire manufacturer at the same time.

- 11.9 Should any of the tested luminaires of a given distribution type and wattage fail to satisfy the specifications and perform according to approved submittal information, the luminaire of that distribution type and wattage shall be unacceptable and be replaced by alternate equipment meeting the specifications with the submittal and testing process repeated in their entirety; or corrections made to achieve required performance. In the case of corrections, the Vendor shall advise the Engineer of corrections 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 re-tested without prior approval from the Engineer.

Coordination shall be the Vendor's responsibility. Failure to coordinate arrangements and notice shall not be grounds for additional compensation or extension of time.

Submittal information shall include a statement of intent to provide the testing as well as a request for approval of the chosen laboratory.

12. Installation.

- 12.1 Underpass luminaires shall be either attached to structures (such as piers, etc.) or suspended from structures (such as bridge decks) as indicated or implied by the configuration on the Plans. Mounting, including all hardware and appurent items, shall be included as part of this item.
- 12.2 Unless otherwise indicated, suspended underpass luminaires shall be installed one-inch above the lowest underpass beam and shall be mounted using vibration dampening assemblies. All mounting hardware shall be corrosion resistant and shall be stainless steel unless otherwise indicated.
- 12.3 The Engineer reserves the right to select the final light distribution pattern, luminaire aiming angle and change it as deemed necessary to produce the proper pavement luminance.
- 12.4 Surface mounted luminaires, all luminaires not mounted on suspension rods, shall have one-inch thick stainless steel spacers installed between the luminaire and the deck or wall.

13. Guarantee.

The Vendor shall provide a written guarantee for materials, and workmanship for a period of 6 months after final acceptable of the lighting system.

14. Documentation.

All instruction sheets required to be furnished by the manufacturer for materials and supplies and for operation of the equipment shall be delivered to the Engineer.

The manufacturer shall have been incorporated for at least five years and shall have at least five years in the design and manufacturing of roadway underpass lighting. The manufacturer shall provide evidence of financial strength to finance the production of the project by submitting the name of at least three projects completed in the previous calendar year of greater than \$250,000 each. All steel used in the project shall be certified to be provided domestically, and all fixture components used shall be manufactured domestically.

15. Method of Measurement. Luminaires shall be counted, each.

16. Basis of Payment. This item shall be paid at the contract unit price each for **UNDERPASS LUMINAIRE**, of the wattage specified, **HIGH PRESSURE SODIUM VAPOR**, which shall be payment in full for the material and work described herein.

LIGHT TOWER

Effective: April 1, 2016

1. Description. This work shall consist of furnishing and delivering a light tower complete with lowering device, and all appurtenances required for a complete operating unit.
2. Definitions.

Light Tower: The complete light tower shaft and lowering device as one integral working system.

Shaft: The light tower shaft.

Lowering Device: The components involved with the mounting, operation, and raising and lowering of the luminaire ring, luminaires.

Tower Height: The height of the tower shall be measured from the bottom of the base plate to the center-line of the luminaire tenon arm. This dimension is also referred to as Mounting Height.

3. Materials. Materials shall be as specified elsewhere herein.
4. Submittals and Certifications. Shop drawings, product data and certifications shall be submitted. The submitted information shall be complete and shall include information relative to all specified requirements suitable for verification of compliance.

THE SUBMITTALS SHALL BE ARRANGED AND CROSS-REFERENCED TO THE SPECIAL PROVISIONS. FAILURE TO CROSS-REFERENCE THE SUBMITTAL INFORMATION WITH THE SPECIAL PROVISIONS WILL RESULT IN THE SUBMITTAL BEING RETURNED WITHOUT REVIEW.

The submittal information shall be dated, current, project specific, identified as to the project, and shall also include the following calculations and certifications:

- Shaft design calculations, including Registered Engineer Certification.
- Lowering device seating force calculations.
- Certification of intent to provide domestic steel in accordance with Article 106.01 of the Standard Specifications.
- Welding details and procedures.
- Letter of intent to provide specified weld inspection reports.
- Confirmation of coordination between anchor rod supplier and tower manufacturer for adequacy of anchor rod assembly.
- Manufacturer's recommended installation procedures.
- Letter of intent to provide manufacturer's representative during installation and to provide specified installation certification.

All certifications shall be notarized. A PDF format copy of the submittal shall be provided with all submittals, including resubmittals, on CDROM. Light tower submittals will require a longer review time than other items as and such the review period referenced in Article 105.04 shall be 60 days.

5. Deleted

6. Light Tower

6.1 General. Light towers (high mast poles) shall consist of any poles 24 m (80 ft) or more in length.

Each light tower shall be complete with internal, integral motorized lowering mechanism, luminaire ring, pole top hood, internal electric power cables, luminaire counter-weight (when applicable), and all appurtenances required for a complete operating unit.

The design shall be based upon AASHTO "LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" in effect on the date of invitation for bids, however the width of reinforced opening requirement in Chapter 5, Section 5.6.6.1 shall not apply. Light Towers shall be designed for ADT > 10,000, Risk Category Typical, and Fatigue Importance Category I.

A minimum total combined luminaire weight of 600 lb (272 kg) shall be used plus a combined hood area and lowering ring weight of 400 lb (181 kg). The associated total projected area shall be 24 sq ft (2.23 sq m) and 10 sq ft (0.93 sq m) respectively. Additional weights and areas shall be added when necessary for such things as luminaire shields. Project specific weights and areas shall be used in the design calculations when they exceed the above minimums.

Light towers shall be designed and constructed so no structural member or other component is applied in excess of the manufacturer's recommended rating (when applicable) or the published rating, whichever is lower.

The light towers shall be of a height and luminaire capacity as indicated and shall be of the non-latching ring support design. A latching-type ring support will not be acceptable.

The tower shall be provided as a single coordinated assembly, with one entity responsible as manufacturer of the whole. One entity must be the manufacturer of the lowering device or the tower shaft, or both, shall warrant the entire coordinated assembly.

- 6.2 Deflection. The design of the tower shaft shall achieve a maximum, fully loaded deflection at the top of the pole, which is not greater than the following percentage of the tower height:

Light Tower Maximum Deflection		
Tower Height		Maximum Deflection as % of Tower Height
Meters	Feet	
49	160	13.70
46	150	10.04
43	140	7.80
40	130	6.02
36	120	10.75
33	110	7.80
30	100	5.30
27	90	4.50
24	80	3.50

6.3 Shaft.

- 6.3.1 The tower shaft shall be a low deflection tapered shaft having polysided, circular, or elliptical cross sections. The shaft cross section at the top shall be not less than 7.5 in. (190 mm) in diameter. The shaft cross section at the bottom shall not be greater than that which is compatible with the base plate bolt circle specified, and shall not be less than 24 in. (600 mm) in diameter for new installations. The minimum wall thickness of the bottom portion of the tower shaft shall be 0.2391 in. (3 gauge).
- 6.3.2 All tower shaft components shall be fabricated from high strength, low alloy, steel according to AASHTO M 270 (M 270M); ASTM A 595 (A 595M), Grade A or B; ASTM A 1011 (A 1011M); ASTM A 606 (A 606M); ASTM A 588 (A 588M), or ASTM A 871 (A 871M) Grade 65, with a minimum yield strength of 50,000 psi (345,000 kPa).

All tower shaft hardware, such as ground lugs, hardware for the handhole door, including the clamp assemblies, hinge and door stop, shall be stainless steel according to Article 1006.31. Ground lugs shall be protected by removable plastic plugs or caps.

6.3.3 Each tower shaft shall be constructed of not more than the following welded or slip fitted sections:

Maximum Light Tower Sections		
Tower Height		Maximum Number of Sections
Meters	Feet	
49	160	4
46	150	4
43	140	4
40	130	4
36	120	3
33	110	3
30	100	3
27	90	3
24	80	2

6.3.4 Sections which are slip fitted shall have slip joints with a minimum overlap of 1.5 times the diameter of the bottom of the upper section at the slip joint. Towers having slip joint construction shall be pre-fitted and match marked at the factory and shall be shipped disassembled for assembly at the job site. Slip joints shall be marked with a scribe to allow verification that 1.5 times diameter insertion is provided. A copper bonding jumper, included with the tower, shall bond slip fit pole sections together with a flat copper mesh and UL Listed ground lugs. The bonding jumper shall not interfere with the operation of the luminaire ring.

6.4 Handhole.

6.4.1 Each tower shaft shall be constructed with a handhole/access door for access to power connections and lowering mechanism equipment. The handhole shall be large enough to make the following items visible from an extended operating position and accessible for maintenance: cable drum, transition plate, and the drive train oil level indicator. The handhole shall be sized and arranged to permit removal of the lowering mechanism without excessive dismantling of the equipment. The handhole may be a reinforced opening in the pole shaft as detailed on the plans or may be a part of a flared shaft base assembly as approved by the Engineer. The flared base shall not be considered a separate section of the tower shaft.

Minimum opening dimension for the handhole shall be 300 mm x 900 mm (12 in. x 36 in.) and it shall have a lockable door. The handhole shall be located so as to not interfere with the operation of the door clamps, and it shall be positioned on the tower shaft to align on center with one of the anchor bolt (rod) positions and at a minimum height, as detailed on the plans, to facilitate access to mounting nuts with tools required for installation.

- 6.4.2 The handholes in the pole shafts shall have rounded corners and shall be reinforced to maintain the original strength of the tower shaft. Flared base assemblies shall maintain the strength of the shaft and have no non-round protrusions.
- 6.4.3 Handhole Door. The handhole shall have a door with a full-height stainless steel piano hinge, or with not less than two stainless steel hinges. A bolt through a door and frame eyelet shall not constitute an acceptable hinge. Hinges shall be heavy duty, suitable for the weight of the handhole door. The handhole door shall not be warped in any direction. The door hinge shall be attached with stainless steel nuts and bolts.
- 6.4.4 Handhole door gasket. The door/opening shall be gasketed in a manner which will prevent the entry of water into the tower and the door shall have a tight compressive seal employing a tubular gasket to assure compressibility. The gasket shall be a one piece design and shall be jointed by chemical fusion at the bottom of the opening. The gasket shall be attached mechanically. Adhesives alone are not acceptable.
- 6.4.5 Handhole door clamps. The door shall be held closed with a 12 gauge captive adjustable, spring loaded, stainless steel clamp assembly. The clamps shall have a depth stop feature to insure uniform sealing pressure at all clamp points. A minimum of five clamps shall be used around the non-hinged sides of the door assembly. The door clamp locations and handhole shall be coordinated with the tower so that the clamps can operate over their full range of movement without any interference from other tower components including anchor bolts which may protrude up to 6" above the top surface of the base plate. The door clamps shall be attached with stainless steel nuts and bolts.
- 6.4.6 Padlock provision. A stainless steel padlock hasp and staple shall be provided for locking the door. Door hardware shall be stainless steel. The door shall be equipped with an integral door stop/hold-open mechanism.
- 6.4.7 Rain Shield. A rain shield shall be placed above the handhole to direct water away from the handhole. The shield shall be fabricated of the same material as the pole shaft, shall have rounded corners, and shall be permanently welded to the shaft. The rain shield cannot interfere with operation of the handhole door or door clamps. Details of the configuration and welding shall be submitted for the Engineer's approval.

- 6.4.8 Cable Hook. A cable hook/cradle, readily accessible from the front of the tower, shall be provided to hang the control operator cable assembly when not in use. The hook or cradle shall be made from steel rod no less than ½-inch in diameter and shall be galvanized as the pole is. This hook or cradle shall be large enough to hold 25 ft. (7.5m) of power cable and positioned for practical in-field use. The hook shall not have sharp edges or protrusions that could damage the cable and it shall not interfere with the operation of the lowering mechanism.
- 6.4.9 Each tower shaft shall have a handhole accessible ground pad welded to the shaft for connection of ground conductors. The pad shall be NEMA 2-hole pad and accessible with the lowering device installed.
- 6.4.10 Interior Bolt Exposure. Bolts attaching the various components to the tower, handhole, and handhole door shall be properly sized and coordinated with the matching nuts so that no more than 0.25" of thread is exposed past the nut when properly tightened.

6.5 Deleted.

6.6 Base Plate.

- 6.6.1 The base plate shall be factory predrilled (slotted) for the number and configuration of anchor rods as provided in the following table:

Base Plate Configuration				
Tower Height		Min, number anchor rods	Rod Circle	
Meters	Feet		mm	inches
49	160	8	965	38
46	150	8	965	38
43	140	8	914	36
40	130	8	914	36
36	120	8	914	36
33	110	8	762	30
30	100	8	762	30
27	90	8	762	30
24	80	6	762	30

The base plate shall have a round (disk) shape of the specified outer diameter or as otherwise approved by the Engineer. The minimum thickness of the base plate shall be 50 mm (2.0 in.). The base plate shall be circumferentially welded to the tower shaft. A backer ring shall be used for this circumferential weld. All crevices at the backer ring shall be completely sealed to moisture and corrosion. The plate shall be oriented such that one anchor rod is aligned with the vertical center line of the handhole.

7. Welding.

7.1 Manufacturer Welding Requirements.

- 7.1.1 Circumferential welds. Circumferential welds, including top flange welds, shall be full penetration welds.
- 7.1.2 Longitudinal welds. Longitudinal welds shall have a minimum of 60 percent penetration, except the longitudinal welds on both the male and female shaft sections shall be full penetration welds within a distance of two diameters of overlap joints.

Minimum preheats for welds shall be 40° C (100° F) for fillets, 65° C (150° F) for seams, and 110° C (225° F) for circumferential welds.

Weld procedure specifications for seams and circumferential welds must be qualified according to Section 4, Part B of AWS D1.1. Charpy V-Notch (CVN) impact specimens shall be tested according to Table III-1 (note 2) of Appendix III for minimum values of 34 J (25 ft lb) at 4° C (40° F). Fillet weld procedures shall be tested according to Table 4.4 of AWS D1.1.

The welds shall be smooth and thoroughly cleaned of flux and spatter and be according to the AWS.

All full penetration welds shall be inspected for soundness by the ultrasonic method and all partial penetration welds shall be inspected by the magnetic particle method. Welding inspection reports shall be submitted to the Engineer for approval. The welding symbols and complete information regarding location, type, size, welding sequence, and WPSs shall be shown on all shop drawings. The Contractor shall submit the manufacturer's welding procedures, including inspection procedures, to the Engineer for approval.

- 7.2 Independent Welding Inspection. In addition to manufacturer's own welding inspection, the Contractor shall have welding inspected by an independent Certified Welding Inspector (CWI). The selected inspector shall be approved by the Engineer before any inspecting is performed. The NDE inspector(s) shall be independent nondestructive testing inspector(s), certified as level II in RT, UT, and/or MT as applicable. The methods for testing full penetration and partial penetration welds by the independent welding inspector(s) shall be the same as specified above in section 7.1

The independent welding inspector shall send the test results directly to the Engineers, as follows: Illinois Department of Transportation, Attn: Engineer of Structural Services, 2300 S. Dirksen Parkway, Bureau of Bridges & Structures, Springfield, Illinois 62764 and to: Illinois Department of Transportation, District 1, Attn: Electrical Design Section Chief, Bureau of Traffic Operations, 201 West Center Court, Schaumburg, Illinois 60196. All welds must pass inspection. Any deficient welds must be brought to the attention of the Engineer and corrective measures must be outlined.

8. Light Tower Finish.

The light tower shall be hot-dip galvanized including the handhole, handhole door, base plate, mounting plate and all other elements welded to the shaft according to AASHTO M 111. Stainless steel components shall remain the natural stainless steel finish.

9. Head Frame.

9.1 Each tower shall be equipped with a head frame assembly to support and guide the luminaire ring assembly.

9.2 The head frame and luminaire ring shall have a positive mating/alignment interface at which the seating force is applied at each support cable. The interface shall be designed to operate with not less than 1.3 kN (300 lbs.) of total seating force distributed among the interface points. Manufacturer calculations shall be submitted to confirm this requirement. The stop used at the top of the tower shall not deform with the full force applied.

9.3 All head frame members and components, including support arms, shall be fabricated of steel of the same type as specified for the tower shafts or stainless steel of appropriate strength. The head frame shall have a head plate, a support, and 2 pulleys for each support cable. All openings in the head frame assembly shall be machined smooth and free from any burrs and sharp edges which could damage the support cables and power cable.

The head frame plate and attached components shall be fabricated of the same type of steel as the tower shaft or of Type 201L or Type 304 stainless steel. It shall then be hot-dipped galvanized according to AASHTO M 111 or painted as specified for the tower shaft or fabricated from stainless steel.

9.4 The head frame shall have a power cable pulley arrangement placed between and roughly equidistant from two support arms, and allow a minimum cable bending radius of not less than 6 1/2 in. (163 mm). The head frame shall have a minimum diameter of 36 in. (1 m).

- 9.5 The power cable shall pass through the head frame assembly utilizing a four-way roller guide assembly sized to accommodate the outside diameter of the power cable.
 - 9.6 Pulleys shall be constructed to allow associated cables to ride freely within pulley grooves and cable guides shall be incorporated to prevent cables from riding out of pulleys.
 - 9.7 Pulleys, attachment hardware, latches, hinges and the like shall be stainless steel. Pulleys shall be made of Unified Numbering System type 300 stainless steel and have permanently lubricated sealed bearings except the power cable pulleys may be cast aluminum or high-strength nylon.
 - 9.8 The head frame assembly shall be equipped with an aluminum hood with a minimum thickness of 0.125 in. (3 mm). The hood shall protect the operating head frame components from damage or deterioration from weather but shall permit pole ventilation while preventing the entry of birds. The hood shall have a strong secure mechanical means to open/raise the hood for the future maintenance of the head frame such as a spin screw mount, and shall have a double-secured latching system to assure closure. The Design shall be such as to minimize the risk that the hood will be displaced from gusts of wind. The head frame assembly shall be match-marked to its tower shaft and shall be attached to the shaft by stainless steel hardware.
10. Luminaire Ring.
- 10.1 Each tower shall be provided with a luminaire ring suitable for eight (8) or twelve (12) luminaires of the type, and orientation specified. The ring shall mate/align with the head frame and shall be coordinated relative to seating force.
 - 10.2 The ring shall be designed for lowering to a position with the center line of luminaire arms 1.4 m (54 inches) or less above the top of the tower base plate. The exact fully-lowered position shall be adjustable in the field. Wiring shall be fully enclosed in a metal raceway.
 - 10.3 The ring shall be equipped with spring loaded bumpers, spring loaded rollers, spring-loaded outriggers or other shock-absorbing mechanism to guide the ring during the raising/lowering operations. The guide mechanism shall be spring loaded and shall be designed to minimize shock to the luminaire during raising and lowering. These devices shall be attached in a secure manner. The mechanism does not have to maintain constant contact with the tower shaft.

- 10.4 Arms for the attachment of luminaires shall be standard 50 mm (2-inch) diameter tenon arms. The arms shall be attached to the ring in a secure manner either by welding or by means of stainless steel bolts, nuts, lock washers and hardware such that a permanent rigid attachment is achieved. Arms shall be coordinated with luminaire size and configuration and shall be arranged so that the overall diameter of the ring, including the luminaire, does not exceed 3.4 m (11 ft.). Tenon arm ends shall be threaded to accept a PVC pipe cap. All tenon arms shall be capped. The tenon arms shall be level when the ring is in the raised position.
- 10.5 The ring raceway shall be arranged with screened weep holes of not less than ½-inch diameter at no less than 90 degree intervals around the ring.
- 10.6 The ring shall be equipped with an enclosed wire raceway and a stainless steel NEMA 4X terminal box for wiring of the luminaires.

10.6.1 Junction Box. The box shall be made of Type 304 stainless steel, not less than 2.03 mm (14 gauge), with all seams continuously welded with stainless steel weld wire and ground smooth. Exterior surfaces shall have a smooth polished finish. The box shall be UL 50 "Junction and Pull Box", "Junction Box", or "Pull Box".

A grounding lug shall be provided for the connection of the equipment grounding conductors as required by NEC Article 250-114.

The box shall have an overlapping stainless steel cover and shall be secured to the box with a continuous stainless steel hinge and a minimum of 4 captive stainless steel clamps utilizing captive stainless steel hex-head bolts or deep slotted stainless steel screws.

Be suitable for surface mounting, complete with external stainless steel mounting lugs or brackets welded to the enclosure.

The box cover shall have a continuous formed, seamless, urethane, oil-resistant gasket. The gasket shall be extruded directly onto the junction box cover. The gasket shall adhere to the cover without the use of adhesives. A neoprene strip gasket, or urethane strip gasket cut out of a larger sheet and glued to the junction box will not be acceptable.

The box shall have a UL Listed stainless steel vent drain mounted in the bottom of the box. This vent drain shall also function as an air pressure equalizer. The vent drain shall maintain the NEMA rating of the junction box when installed.

- 10.6.2 The box shall be arranged and connected to the top of the ring from the top of the box in a manner that precludes moisture draining from the ring into the box. All fittings penetrating the box shall be watertight hubs with an integral O-ring. The hubs shall be watertight and corrosion resistant NEMA 4X and have an insulated polycarbonate throat. The insulated throat shall be rated up to 105° C. The hubs shall be UL Listed and comply with UL Standard 514B.
- 10.6.3 The box shall be equipped with a hinged door and a latch or with captive stainless steel closure hardware acceptable to the Engineer and an external special fixed-mount plug with a retained cap as specified elsewhere herein to accept a test power connection when the ring is in the lowered position.
- 10.6.4 The box shall, on the side, have the main tower cable entry and the entry for the luminaire wires; it shall also contain a terminal strip with identified terminals for connection of the main power cord, luminaires, and the test power receptacle. The terminal strip shall have terminals sized to accommodate the cables to be connected and shall have luminaire connection terminals to accommodate the usage of all luminaire positions.
- 10.7 The ring shall facilitate ease of wiring to the arms by the use of removable gasketed covers, physical arrangement, or other means acceptable to the Engineer. Arms shall be factory or field wired according to NEC Article 410-31.

The arms shall be wired using No. 12 AWG, Type SOOW. The cord shall have three conductor, flexible CPE jacketed construction according to UL 62 and be MSHA approved. The cord shall be rated 600 V and -58 to 221 °F (-50 to 105 °C). Each conductor shall be No.12 AWG stranded annealed copper per ASTM B 174 with EPDM insulation.

Wiring shall be color coded (black, red, white, and green, as applicable) with coloring via outer material color or by painting with a process approved by the Engineer. Wire rating information shall be visible in a contrasting color. Wires shall be installed to all luminaire arms.

Luminaire wires shall extend 600 mm (24 inches) longer than their respective tenon arm and shall be trained back into the arm which shall then be closed with a protective cap for shipment of the jobsite. All wires shall be capped and crimped with sealant and heat-shrink insulating sleeves (wire nuts, tape, crimps, etc. will not be acceptable.). Wiring shall alternate circuits to the luminaire arms so that adjacent arms are not on the same circuit. All ring wires shall be tagged with wire markers at both ends. The tenon arms shall also be tagged corresponding to the wiring contained within.

- 10.8 The luminaire ring shall be factory checked and marked for proper positioning and luminaire orientation. Catalog cuts and shop drawings shall indicate the orientation of the luminaire ring, handhole, and bolt circle in relation to each other on a single drawing.
 - 10.9 The ring shall be complete with a counterweight for each unmatched luminaire to maintain ring balance. Counterweights shall be coordinated with the luminaires to be installed.
 - 10.10 All luminaire rings shall be arranged to accommodate the complete indicated compliment of luminaires, regardless of the number actually to be installed, to facilitate luminaire positioning and orientation.
 - 10.11 The fully enclosed luminaire ring and attached components shall be fabricated of the same type of steel as the tower shaft or of Type 201L or Type 304 stainless steel. If it is not fabricated of stainless steel, it shall then be hot-dip galvanized according to AASHTO M 111 or painted according to Article 1069.08(c)(1). An open ring system shall be fabricated of Type 201L or Type 304 stainless steel.
11. Lowering and Support Mechanism.
- 11.1 The support shall be of the non-latching design.
 - 11.2 The mechanism shall operate to raise the luminaire ring to its fully raised position and to lower the ring to a position with the centerline of the luminaire tenon arms 1.4 m (54 inches) or less above the top of the tower base plate. The exact fully-lowered position shall be adjustable in the field.
 - 11.3 The lowering and support mechanism shall include, but not be limited to the support cables, power cable, pulleys, winch, gear reducer, mechanical clutch, electric motor, control and all accessories and appurtenances for a coordinated operating system.
 - 11.4 The lowering and support scheme shall be of the 2-cable or 3-cable type as specified.
 - 11.5 Three-cable mechanisms shall incorporate 3 support cables joined via an appropriate proven transition design to a single hoist cable wound around a single hoist winch. The transition design shall be such to prevent twisting of the support cables, to assure smooth winding of the cables on the winch and to prevent binding on the inside of the tower shaft.
 - 11.6 Two-cable mechanisms shall incorporate 2 support/hoist cables wound around a dual winch assembly. The design shall be such to prevent twisting of the cables and to assure smooth winding of the cables on their respective winches and to prevent binding on the inside of the tower shaft.

- 11.7 The hoisting system shall be securely mounted and the lower assembly, i.e. motor, winch, mechanical clutch, gear reducer, etc., shall be designed to allow ease in removal of the equipment via the tower handhole without dismantling the system. Individual components shall be accessible and removable without the removal of other components. Mounting plates and other mounting templates and provisions shall have standardized dimensions to facilitate removal and interchangeability from unit to unit. Mounting hardware shall have an abundant strength safety factor and shall be positioned for even distribution of load.
- 11.8 The lowering device shall tightly position the luminaire mounting ring against the head assembly frame by applying a holding force evenly distributed among the seating/interface points. The total force required by the system must not be less than 1.3 kN (300 lbs.) greater than the weight of the luminaire mounting ring with all luminaire positions occupied by luminaires. There shall be a positive indication at the handhole that the required force has been applied, visible from the extended operating position away from the handhole and not under the ring. Submittal information shall include load and seating force calculations to demonstrate compliance with specified requirements.
- 11.9 The mechanism shall be equipped with a multipoint safety chain and hook assembly to hold the luminaire ring in place during maintenance. All hardware shall be stainless steel. Chains shall be stainless steel. Two chains are required for each tower with each chain having sufficient strength as to independently withstand the weight of the entire luminaire ring assembly and seating force.
- 11.10 The system shall be designed so that unbroken power cable, suspension and/or hoist cable can be replaced from ground level.
- 11.11 Support and Hoist Cables.
- 11.11.1 Cables (wire rope) shall be manufactured from Type 304 or Type 302 stainless steel and shall be stranded assembly coated with a friction-limiting non-corrosive lubricant.
- 11.11.2 Cables shall be 7x19 wire strand and have no strand joints or strand splices.
- 11.11.3 Cables shall be manufactured and listed for compliance with military specification MIL-W-83420, Type 1, Composition B.

- 11.11.4 Cable terminals shall be stainless steel whenever possible, shall be compatible with the cable, and shall be as recommended by the cable manufacturer. The terminals, swaging, etc. shall meet the requirements of military specification MIL-DTL-781. Stainless steel oval sleeves shall be according to military specification MS51844. Care shall be exercised to assure a match of connector sizes to the wire rope size(s), and, to the extent possible, connectors shall have visible size markings.
- 11.11.5 For 3-cable systems, the support cables shall each be not less than 5 mm (3/16 inch) in diameter and the hoist cable shall not be less than 8 mm (5/16 inch) in diameter.
- 11.11.6 For 2-cable systems, the support/hoist cables shall each be not less than 6 mm (1/4 inch) in diameter.
- 11.11.7 As part of the tower shop drawings and product data submitted for approval, support and hoist cable information shall be provided. Submittals without such information will be incomplete and will be rejected. The information shall include, but not limited to:
- Catalog information to confirm sizing, stranding and other specified requirements.
 - Evidence of listing as military specification cable as specified.
 - Certification of compliance with all specification requirements made by the cable manufacturer.

Documentation of arrangement to provide a sample of the support cable to an independent laboratory as selected by the Engineer for testing to the military specifications listed herein, with results to be sent directly to the Engineer, all included incidental to this item. Copies of recent test reports made on identical cable indicating compliance with military specification requirements shall be submitted. The test reports shall include as a minimum, the following:

- Breaking Strength test.
- Endurance test.
- Stretch test.
- Test load.
- Chemical Composition.

11.12 Winch.

- 11.12.1 Drum. The winch/gear reducer assembly shall have a drum suitable for the hoist of support/hoist cables, arranged to provide smooth winding of the cable and to prevent slippage. The drum shall be stainless steel or cast/ductile iron and shall have a diameter not less than 18 times the diameter of its respective cable (wire rope). The winch drum shall be designed with cable guides for a smooth cable take-up of level lays and to prevent the cable from riding over the drum flange. The drum shall have the end of the cable attached by means of a swaged connection and one full layer of cable shall be wound on the drum even when the ring is in the fully lowered position. The drum flange axle shall be supported at both ends.
- 11.12.2 Gear Reducer. Each assembly shall incorporate a gear reducer having a reduction ratio which will prevent free fall of the luminaire ring upon failure or disengagement of the drive unit and which will produce a travel rate of 3 m (10 ft.) to 4.6 m (15 ft.) per minute under normal operation.
- 11.12.3 The unit shall have a worm gear which is totally enclosed in a lubricating reservoir. The lubricant shall have a viscosity range suitable for proper operation in ambient temperatures from -40° C to 49° C (-40° F. to 120° F.)
- 11.12.4 The worm shall be manufactured of case hardened ground alloy steel or cast iron.
- 11.12.5 The gear shall be of bronze alloy or of a proven alternate material and design acceptable to the Engineer with and the gear shall be keyed to the output shaft. The output shaft shall be high quality medium carbon steel ground to close tolerances. The worm and output shaft shall be mounted on anti-friction bearings. All shaft extensions shall be equipped with a lip-type synthetic element and oil seals.
- 11.12.6 The unit shall have provisions to verify oil levels in all gear boxes, and oil level indication shall be visible from the handhole when the unit is installed.

- 11.13 Clutch. The mechanism shall incorporate a mechanical clutch, installed between the winch/gear reducer and the cable winch assembly. The clutch shall be of mechanical type, in a sealed cast metal housing. The clutch torque shall be factory calibrated and coordinated with the electric motor. The clutch shall act to limit the seating force of the raised ring to 300 lb (1.3 kN). The clutch shall be suitable for the application and torque limitation and shall not deteriorate with use.

11.14 Motor.

- 11.14.1 The electric motor shall be matched to the load and torque characteristics required for a fully loaded luminaire ring and shall not be less than 746 watts (1 horsepower).
- 11.14.2 The motor shall be capable of producing torque in excess of the clutch maximum torque rating. The motor shall be totally enclosed fan cooled (TEFC), shall be reversible to operate the lowering mechanism in both directions, and shall be suitable for operation on the power supply characteristics shown on the drawings. Submittal information shall include complete motor data, including, but not limited to:
- Manufacturer
 - Nameplate Rated Watts (Horsepower)
 - Rated Voltage
 - Full Load RPM
 - Full Load Current
 - Locked Rotor Current
 - NEMA Design Letter
 - Insulation Class
 - Torque Data
 - Dimensional Data
 - Calculations to verify the compatibility of the drive unit components (motor, gear reducer, clutch and winch). Calculations shall verify the 300 lb (1.3 kN) seating force.

11.15 Lowering Device Control.

- 11.15.1 The lowering device control shall consist of motor short circuit and motor running overcurrent protection and motor control complete with all appurtenances and interconnecting wiring. The control may incorporate a reversing motor starter or a suitably-rated reversing control station.
- 11.15.2 The lowering device control may be provided in a separate NEMA 4X stainless steel enclosure or in the enclosure with the tower main Electrical breaker, provided the remote control station is a separate remote device.
- 11.15.3 The lowering device motor shall have a motor disconnecting means circuit and running overload protection according to N.E.C. requirements. The motor disconnect and short circuit protection shall be achieved by a molded case thermal magnetic bolt-on circuit breaker rated at 600 volts, of an ampere rating suitable for the motor and having a UL-listed interrupting rating of not less than 14,000 rms symmetrical amperes at 480 volts and 10,000 rms symmetrical amperes at 240 volts.

- 11.15.4 Running overcurrent protection shall be according to N.E.C. requirements. Motor overload protection shall be achieved by an appropriate dual element fuse in a spring-loaded screw-in type small-dimension fuse holder mounted within the enclosure in a suitable box or other arrangement approved by the Engineer.
- 11.15.5 The motor starter, if incorporated, shall not be smaller than NEMA size 1, shall be rated 600 volts and shall be full voltage, reversing type, with arc-extinguishing characteristics and renewable silver-to-silver contacts. A reversing control switch, if incorporated, shall be rated well in excess of the duty required and in no case less than 2,240 watts (3 horsepower) at 230 volts single phase. The control shall be momentary contact, raise-stop-lower with a neutral stop condition, requiring positive action by the person operating the device to keep the motor energized. The control shall have auxiliary contacts as indicated and as required for the control.
- 11.15.6 The enclosure shall have an exterior position-indicating trip-free operating handle for the motor circuit breaker. The enclosure(s) shall have exterior nameplates to read "LOWERING DEVICE CONTROL" and "MOTOR CIRCUIT BREAKER" as well as an interior nameplate "MOTOR OVERLOAD FUSE" which shall also be inscribed with the applicable fuse type and ratings. Nameplates shall be engraved, 2-color, attached with screws.
- 11.15.7 The line side power to the lowering device control shall be obtained via a plug extended connection to the power distribution cord/receptacle.
- 11.15.8 The control shall be complete with a cable-connected remote control station. The control station shall incorporate heavy duty control devices in a non-metallic impact-resistant NEMA 4X enclosure. The control shall be "dead man" type with "RAISE" and "LOWER" controls, requiring the operator to hold the respective control depressed in position for movement of the ring in either direction and with release of the control to stop the mechanism. The cord shall incorporate a No. 12 ground wire and the number of conductors required for a control, with control conductors not less than No. 14. The cord shall be weatherproof with watertight connections at either end and it shall be long enough to allow the operator to stand 7.5 m (25 ft.) away from the lowered luminaire ring. Provisions for storage of the control station and cord such as a suitable hanger cradle, shall be provided in a manner easily accessible at the handhole and in a location which precludes interference with the internal components of the lowering mechanism.

11.15.9 Cables extended from the enclosure shall be passed through a watertight sealing bushing and the cable shall be supported and arranged to preclude interference with the lowering mechanism. Wiring shall be in compliance with NEC requirements. Motor wires shall not be less than No. 12 and motor wiring shall be extended in UL-listed extra-flexible, weatherproof cord or other cord approved by the Engineer with suitable fittings, bushings and supports. All equipment shall be grounded and bonded via an appropriately sized equipment ground wire.

11.16 Electric Power Distribution.

11.16.1 Electric power for motorized operation of the lowering mechanism and for the power supply to the lighting shall be taken from the lighting circuitry feeding the tower. The distribution shall provide termination of the supply feeder, extension to a tower main breaker and distribution to lighting and the lowering device. The power cable extension from the branch circuit feeding the light tower shall be sealed with a multi-leg heat shrink break out boot. The power cord extension shall be included as a part of this item.

11.16.2 The tower shall be equipped with a main circuit breaker. The circuit breaker shall be molded case, 2-pole, 40-ampere thermal magnetic, bolt-on type having a UL-listed interrupting rating of not less than 14,000 rms symmetrical amperes at 480 volts. The breaker shall indicate "ON", "OFF" and "TRIPPED" conditions and the handle shall be trip-free.

11.16.3 The main breaker shall be housed in NEMA 4X stainless steel enclosure with an external, position-indicating operating handle with padlock provisions. The enclosure shall have a 2-color engraved nameplate to read "MAIN BREAKER", attached with screws. The box shall have openings and suitable bushings for cable extensions.

11.16.4 The main breaker shall be arranged for line-side connection to incoming feeder conductors entering the base of the tower via an extension of multi-conductor cable. The load side of the main breaker shall be connected to a cord and receptacle which shall be arranged for connection to either the luminaire ring main power, the lowered luminaire ring test power or the lowering device control.

11.16.5 Each connection to the main breaker shall be made with the specified electric power cable, extended from the enclosure through a watertight sealing/support bushing. The cables shall be arranged and secured to preclude any interference with the lowering device operation.

11.17 Electric Power Cable.

- 11.17.1 The electric power cable shall consist of a 4-conductor jacketed extra flexible cable, (2 phase conductors, neutral conductor and a ground conductor).
- 11.17.2 The power cable shall be Type W industrial grade portable power cord and shall be No. 8 AWG or larger. The cord shall have a multi-conductor, extra flexible CPE or CSPE jacketed construction with reinforced fillers to maintain a smooth round surface according to ICEA S-75-381, NEMA WC 58, UL 1650, and be MSHA approved. The cord shall be rated 2000 V and -40 to 194 °F (-40 to 90 °C). Each conductor shall be No. 8 AWG rope lay stranded annealed copper per ASTM B 172 or ASTM B 173.
- 11.17.3 Each individual conductor's insulation shall be color coded; one black, one red, one white and one green.
- 11.17.4 The individual conductors shall be assembled in a cable, with non-hydroscopic reinforced rubber fillers to maintain a smooth round outer surface, with a jacket applied overall. The jacket shall be a heavy duty jacket manufactured according to ASTM D 752 and shall be imprinted with the manufacturer, conductor size number of conductors, type of cable, voltage rating.

12. Ground Continuity.

- 12.1 A flexible copper braid connector of #2 copper equivalent shall be attached with studs and exothermic welds at tower shaft sections or the shafts shall be electrically joined by other means approved by the Engineer. Towers shall include all materials to achieve this bond.

13. Power Receptacles and Plugs.

- 13.1 Power receptacles and plugs shall be circuit-breaking devices which shall mate with each other. The plugs and receptacles shall be 4-wire 4-pole, 600 volt, 60 ampere weatherproof devices according to UL Standard 498 and International Electrical Commission Standard 309. The devices shall be listed by the manufacturer as suitable for make and break operation at rated current.
- 13.2 Components and insert assemblies shall be interchangeable to accept either pin or socket inserts to allow either plug or receptacle to be configured in an energized or de-energized condition, i.e. reverse-contact configurations shall be available. Locations of reverse-contact devices shall be as indicated.

- 13.3 Each plug or receptacle connection to a power cord shall be complete with a suitable non-metallic sealing connector body with a wire mesh strain relief. Other plugs and receptacles shall be complete with suitable sealing angle-adaptor panel of box mounting bodies, as applicable and shall be complete with back-boxes if so dictated by the power distribution configuration.
 - 13.4 Each plug and each receptacle shall be complete with a retained flap-type or retained screw-on cover.
 - 13.5 Plugs and receptacles shall be water-tight, dust-tight, and chemical resistant and be suitable for use when exposed to the weather and shall be applicable for safe use in harsh, wet weather conditions. The Engineer shall be the judge of applicability.
14. Shipment and Installation.
- 14.1 The light tower, luminaire ring, etc., and hardware shall be packaged during shipment to protect all surfaces from being scratched, marred, chipped, or damaged in any way. Prior to installation, the tower and all its components will be inspected by the Engineer and any parts found to be damaged or defective shall be replaced. Any minor damage to a completely painted light tower surface shall be touched up in a professional manner as approved by the paint manufacturer.
 - 14.2 The tower shall be set plumb on the foundation and fastened to the anchor rods with double nuts and washers. Flat washers shall be installed below and above the base plate of the pole. Locknuts with nylon or steel inserts shall be installed on top of the top nut. The nuts shall be tightened in compliance with torque specifications recommended by the manufacturer of the lighting unit.

The use of jam nuts will not be allowed.
 - 14.3 The space between the finished top of the foundation and the bottom of the base plate of the pole shall be enclosed with an expanded metal screen made of stainless steel. The size of the mesh of the screen shall be 1/4 in. (6 mm) or less and #18 gauge (1.22 mm) thick, or heavier as approved by the Engineer. The screen shall be held in place with a stainless steel band installed around the tower base plate. The band shall be held tight by a ratchet-type device. Grouting shall not be used to enclose the above described space.
 - 14.4 The light tower shall be straight and centered on its longitudinal axis, under no-wind conditions, so, when examined with a transit from any direction, the deviation from the normal shall not exceed 1/8 in. in 3 ft (3 mm in 1 m) within any 5 ft (1.5 m) of height, with total deviation not to exceed 3 in. (75 mm) from the vertical axis through the center of the pole base.

- 14.5 When the luminaire position and orientation has been confirmed and approved by the Engineer, the luminaire shall be anchored with a minimum size 1/4-20NC stainless steel set screw installed through tapped holes in the tenon and mounting bracket of the luminaire. Counterweights on un-used tenons shall be mounted in a similar manner.
- 14.6 The assembly and installation of light towers shall be supervised by a qualified representative of the tower or lowering device manufacturer. On-site supervision shall be provided on the first day of tower assembly and installation. Support by telephone shall be available thereafter. At the time of the final inspection, the Contractor shall provide to the Engineer the manufacturer's written certification, signed by their supervising representative, that all towers and lowering devices have been properly installed. The entire coordinated assembly shall be warranted by the tower or lowering device manufacturer.
15. Inspection.
- Light tower inspection shall include the complete operational demonstration of each light tower. The contractor shall provide sufficient manpower to perform this demonstration as a part on this item. Inspection check sheets will be provided.
16. Method of Measurement. Each light tower which is delivered and installed shall be counted as a unit for payment.
17. Basis of Payment. This work will be paid for at the contract unit price each for **LIGHT TOWER** of the mounting height, **LUMINAIRE MT – 8** or **LUMINAIRE MT – 12** as specified.

LUMINAIRE SAFETY CABLE ASSEMBLY (D-1)

Effective: January 1, 2012

Description: This item shall consist of providing a luminaire safety cable assembly as specified herein and as indicated in the plans.

Materials. Materials shall be according to the following:

Wire Rope. Cables (wire rope) shall be manufactured from Type 304 or Type 316 stainless steel having a maximum carbon content of 0.08 % and shall be a stranded assembly. Cables shall be 3.18 mm (0.125") diameter, 7x19 Class strand core and shall have no strand joints or strand splices.

Cables shall be manufactured and listed for compliance with Federal Specification RR-W-410 and Mil-DTL-83420.

Cable terminals shall be stainless steel compatible with the cable and as recommended by the cable manufacturer. Terminations and clips shall be the same stainless steel grade as the wire rope they are connected to.

U-Bolts. U-Bolts and associated nuts, lock washers, and mounting plates shall be manufactured from Type 304 or Type 316 stainless steel.

CONSTRUCTION REQUIREMENTS

General. The safety cable assembly shall be installed as indicated in the plan details. One end of the cable assembly shall have a loop fabricated from a stainless steel compression sleeve. The other end of the cable assembly shall be connected with stainless steel wire rope clips as indicated. Slack shall be kept to a minimum to prevent the luminaire from creeping off the end of the mast arm. Unless otherwise indicated in the plans, the luminaire safety cable shall only be used in conjunction with luminaires which are directly above the traveled pavement.

Basis of Payment: This work shall be paid for at the contract price each for **LUMINAIRE SAFETY CABLE ASSEMBLY**, which shall be payment for the work as described herein and as indicated in the plans.

TEMPORARY WOOD POLE

Description. This special provision describes the installation of wooden poles in support of temporary lighting design and temporary cameras of the heights identified and at the locations identified in the plans.

Materials. Materials shall be according to Article 1069.04 of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012.

Installation. Install shall be according to Article 830.0 of Standard Specifications for Road and Bridge construction, adopted January 1, 2012 and in accordance to IDOT District 1 standard detail BE-800.

Basis of Payment. This work will be paid for according to Article 830.05 of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 with the exception that these poles shall be paid for without mast arms. Payment shall be at the contract unit price each for WOOD POLE, of the length and class specified installed at the location and depth indicated on plan and details.

REMOVAL OF LIGHT TOWER, NO SALVAGE

Description. This special provision describes the removal of existing high mast roadway lighting towers with no salvage.

Materials. Not applicable.

Installation. Removal shall be according to Article 842 of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012, as modified for high mast roadway lighting towers as follows: removal shall include lamps, luminaires, mounting rings, towers, and all associated hardware and appurtenances.

Basis of Payment. This work will be paid for according to the contract unit price each for REMOVAL OF LIGHT TOWER, NO SALVAGE at the locations indicated on plan and details.

REMOVAL OF TOWER FOUNDATION

Description. This special provision describes the removal of existing high mast roadway lighting tower foundations.

Materials. Not applicable.

Installation. Removal shall be according to Article 842 of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012, for the increased size of foundations used for high mast roadway lighting towers.

Basis of Payment. This work will be paid for according to the contract unit price each for REMOVAL OF LIGHT TOWER FOUNDATION at the locations indicated on plan and details.

TEMPORARY MAST ARM

Description. This special provision describes the installation of a 15 foot mast arm on wooden poles. Locations are identified on plan.

Materials. Materials shall be according to Article 1069.02.(a) of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012.

Installation. Install shall be according to Article 830-03 of Standard Specifications for Road and Bridge construction, adopted January 1, 2012. The mast arm shall be installed on wooden poles as per IDOT District 1 temporary light pole detail BE-800.

Basis of Payment. This work will be paid for according to Article 830.05 of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 at the contract unit price each for TEMPORARY MAST ARM, ALUMINUM, 15FT installed at the mounting height indicated on plan and details.

GROUND MOUNTED LIGHT POLE, ALUMINUM 50 FT, WITHOUT MAST ARM

Description. This work consists of installing a ground mounted light pole without a mast arm for the Illinois Tollway in accordance with the Illinois Tollway Supplemental Specifications section 830.

Materials. All materials shall be in accordance with the Illinois Tollway Supplemental Specifications section 830 for 50ft Ground mounted light poles.

Construction Requirements. Construction shall be in accordance in accordance with the Illinois Tollway Supplemental Specifications section 830 for 50 ft Ground mounted light poles.

Measurement. This work will be measured as each for each unit installed complete.

Payment. Unit price will include cost of all material and labor required to install the light pole as per applicable construction plans and these specifications. This work will be paid for at the Contract Unit Price of EACH for GROUND MOUNTED LIGHT POLE, ALUMINUM 50 FT, WITHOUT MAST ARM.

MAST ARM, ALUMINUM, STREET LIGHTING, 15 FT.

Description. This work consists of installing a mast for the Illinois Tollway in accordance with the Illinois Tollway Supplemental Specifications section 830.

Materials. All materials shall be in accordance with the Illinois Tollway Supplemental Specifications section 830 for 15FT MAST ARMS.

Construction Requirements. Construction shall be in accordance in accordance with the Illinois Tollway Supplemental Specifications section 830 for 15FT MAST ARMS.

Measurement. This work will be measured as each for each unit installed complete.

Payment. Unit price will include cost of all material and labor required to install the mast arm as per applicable construction plans and these specifications. This work will be paid for at the Contract Unit Price of EACH for MAST ARM, ALUMINUM, STREET LIGHTING, 15 FT.

GROUNDING OF ITS SUBSYSTEMS

Effective: March 12, 2009

The grounding of ITS subsystems shall meet the requirements of Section 806 of the Standard Specifications. In addition, amend Article 806.03 of the Standard Specifications to include:

General. All ITS subsystems (CCTV camera system, dynamic message sign system, etc.), associated equipment, and appurtenances shall be properly grounded in strict conformance with the NEC and as shown on the Plans.

Testing shall be according to Section 801. 13(a)(5) of the Standard Specifications:

- (a) The grounded conductor (neutral conductor) shall be white color-coded. This conductor shall be bonded to the equipment-grounding conductor only at the Electric Service installation. All power cables shall include one neutral conductor of the same size as the phase (hot) conductors.
- (b) The equipment-grounding conductor shall be green color-coded. The following is in addition to Section 801.04 of the Standard Specifications.
 - (1) Equipment grounding conductors shall be XLP insulated No. 6, unless otherwise noted on the Plans, and bonded to the grounded conductor (neutral conductor) only at the Electric Service Installation. The equipment-grounding conductor is paid for separately and shall be continuous. The Earth shall not be used as the equipment-grounding conductor.
 - (2) Equipment grounding connectors shall be bonded, using a listed grounding conductor, to all ramp meters, DMS, and detector cabinets, handholes, and other metallic enclosures throughout the ITS subsystems, except where noted herein. A listed electrical joint compound shall be applied to all conductor terminations, connector threads, and contact points.
 - (3) All metallic and non-metallic raceways containing ITS circuit runs shall have a continuous equipment grounding conductor, except raceways containing only detector loop lead-in circuits, circuits under 50 volts and/or fiber optic cable will not be required to include an equipment grounding conductor.
- (c) The grounding electrode conductor shall be similar to the equipment grounding conductor in color-coding (green) and size. The grounding electrode conductor is used to connect the ground rod to the equipment grounding conductor and is bonded to ground rods via exothermic welding, listed pressure connectors, listed clamps or other approved listed means.

Basis of Payment. Payment shall be included in the various items associated with ITS.

TRAFFIC SURVEILLANCE – GENERAL (D-1)

Effective: June 1, 1994

Revised: July 21, 2001

The following supplements applicable sections of Section 800 of the Standard Specifications for Road and Bridge Construction.

The intent of this Special Provision is to prescribe the materials and construction methods commonly used in traffic surveillance installations. All material furnished shall be new. The locations and the details of all installations shall be as indicated on the Plans or as directed by the Engineer.

When the road is open to traffic, except as otherwise provided, the Contractor may request a turn on and inspection of all complete traffic surveillance installations system. This request must be made to the Engineer a minimum of seven (7) working days prior to the time of the requested inspection. Upon demonstration that all surveillance is operational and all work is completed in accordance with the contract and to the satisfaction of the Bureau of Traffic Operations Electrical Engineer, The Bureau of Traffic Operations Electrical Engineer will then allow all of the surveillance to be placed in continuous operation. The Agency that is responsible for the maintenance of the traffic surveillance installations will assume the maintenance upon successful completion of this inspection.

Projects which call for the storage and re-use of existing traffic surveillance equipment shall have a 30 day test period prior to project acceptance.

DEFINITION OF TERMS

Whenever in these Special Provisions the following terms are used, the intent and meaning shall be interpreted as follows:

- Induction Loop - A continuous non-spliced wire, three turns, permanently placed and sealed in sawcuts in the roadway and adjacent area, used in conjunction with an induction loop detector sensor unit.
- State Highway Communications Center - The main communication control facility of the Illinois Department of Transportation with present offices at 201 W. Center Court, Schaumburg, Illinois 60196-1096.

PROSECUTION OF SURVEILLANCE WORK

The work shall be as indicated on the Plans and as required by the Specifications. Unless otherwise indicated, the Contractor shall furnish and install all required materials and equipment, including all associated appurtenances, to produce a complete and operational installation. The appurtenances shall be as indicated, and the costs shall be included in the unit prices bid for the pay items of this contract. The work shall be done in a workmanlike manner.

CONNECTIONS TO EXISTING INSTALLATIONS

Where new work connects to existing installations, the Contractor shall do all necessary cutting, fitting and foundation drilling to the existing installation and shall remove all existing work, as required, to make satisfactory connections, with the work to be performed under these Provisions, so as to leave the entire work in a finished and workmanlike manner, as approved by the Bureau of Traffic Operations Electrical Engineer. No raceways shall be allowed to enter cabinet through the sides or back walls.

Some contracted work which does not call for a complete rebuilding of a surveillance location but the replacement of detector loops and lead-in cable only in conjunction with work such as pavement overlay, cut and grind, curb and gutter replacement and other similar type work where existing appurtenances have been in place for several years. This at times has created pre-existing conditions (such as blocked/broken lead-in conduits, buried handholes) which the contractor may have to repair/replace to make the location fully functioning. The Contractor will be compensated for such work utilizing contract items after a complete inspection by the Bureau of Traffic Operations Electrical Engineer, Resident Engineer and Electrical Maintenance Contractor's Rep. with a full review on a case by case basis. Upon completing such work the Contractor shall notify the R.E. to contact the Bureau of Traffic Operations Electrical Engineer for checks and test to insure the location is on-line and working correctly.

The Contractor shall furnish all labor and material to the furtherance of this end, whether or not distinctly shown on the plans, in any of the "Standard Specifications" or in the Special Provisions.

Note that the Contractor shall be entitled to only one request for location marking of existing systems by the Electrical Maintenance Contractor and that multiple requests may only be honored at the Contractor's expense.

STANDARD GUARANTEE

Manufacturers' warranties or guarantees on all electrical and mechanical equipment consistent with those provided as customary trade practice shall be obtained and transferred to the State.

IN-SERVICE WARRANTIES OR GUARANTEES

The Contractor shall provide warranties or guarantees that will provide for satisfactory in-service operation of the mechanical and electrical equipment and related components. These warranties or guarantees shall cover a period of two (2) years following project acceptance. The cost of these warranties and guarantees shall be considered incidental to the Contract.

EQUIPMENT DOCUMENTS

The Contractor shall furnish five (5) diagrams of the internal and external connection of the equipment in each Bureau of Traffic Operations Electrical cabinet. Contractor 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. A 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 termination and each terminal connection as to loop, tone, closure, phone, and lane function of each termination in the cabinet and provide a completed cable log and location as-built diagram at each location.

TERMINAL BLOCKS

Terminal blocks provided in field cabinets shall be the heavy duty barrier type. The terminal block shall be a minimum of 2 inches (50.8 mm) wide and 1-3/16 inch (30.16 mm) deep. Center to center of the terminal screws or studs shall be a minimum of 21/32 inch (16.67 mm) 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.

EXISTING EQUIPMENT

All existing equipment, replaced by new equipment shall remain the property of the State and shall be delivered to the Electrical Maintenance Contractor. The cost of removing and delivering the replaced equipment shall be paid for under separate pay item for Cabinet Housing Equipment - Removal.

TELECOMMUNICATION CABLE

When installing the telecommunication cable, the Contractor shall extend his installation and connections of the cable to the next adjacent Surveillance installations or junction box, beyond the limits of his contract section. He shall be responsible for insuring that the cable is continuous and connected from one contract section to the other.

The Contractor shall comply with the agreement between the State of Illinois and IBT/Ameritech as to connections, locations, and terminations of the phone lines (Telephone Company, Engineering, General Service Engineering Division, Outside Plant Engineering Notes 14-36A., March 1971, Administrative Aids and Procedures).

EXISTING SURVEILLANCE EQUIPMENT AND APPURTENANCES

Before starting work, the Contractor, in the presence of the Resident Engineer, Bureau of Traffic Operations Electrical Engineer and the State Electrical Maintenance Contractor's rep., shall inspect the existing equipment to be delivered or maintained by the Contractor and shall take an inventory of all defective, broken, and/or missing parts. Those parts found broken, defective, and/or missing shall be repaired or replaced by the State Electrical Maintenance contractor and shall be recorded as such. The Contractor shall be required to maintain all tone transmitters, tone receivers, tone power supplies, tone mounting frames, harnesses, controller and wiring. The Contractor shall be required to maintain all metering and surveillance cabinets, foundation, concrete handhole, vehicle detection equipment, all interconnecting cables and all Surveillance appurtenances including signal heads. Contractor shall number each cabinet as indicated on the plans, with reflective decals as those used on lighting pole standard.

Should damage occur to any surveillance items during the Contractor's contract period, the Contractor shall repair or replace all damaged equipment at his own expense. The Bureau of Traffic Operations Electrical Engineer shall determine what equipment shall be reusable and what shall be replaced. Replaced equipment shall be of equal or better quality and type.

The Contractor, prior to the commencement of his work, shall notify the Bureau of Traffic Operations Electrical Engineer for a pre-construction inspection. If construction begins prior to this meeting, the Contractor assumes maintenance responsibilities of the locations within his contract limits and shall make any repairs or replace any damaged equipment pre-existing or damaged as a result of his own negligence at his own expense. This also relieves the Electrical Maintenance Contractor of providing one free locate of the surveillance installations within the contract limits.

AS-BUILT PLANS

Upon completion of the work, the Contractor shall furnish one (1) copy of "as-built" drawings on CD compatible with Micro Station V8-2004 Edition software at the Bureau of Traffic Operations Electrical Design Section and four (4) full size sets of "as-built" plans to the Resident Engineer. The plans shall include definite locations and length of all cables, duct, conduit pushes, induction loop, lead-in, foundations, handhole and P-duct. The cost of the "as-built" plans shall be incidental to the contract. The Engineer will not authorize final inspection of any installations until the said plans are in his possession.

PROTECTION OF THE WORK

Electrical work, equipment and appurtenances shall be protected from damage during construction until final acceptance. Electrical raceway or duct openings, shall be capped or sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

STANDARDS OF INSTALLATION

Electrical work shall be installed in a neat and workmanlike manner in accordance with the best practices of the trade. Unless otherwise indicated, materials and equipment shall be 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 800 & 1088 of the Standard Specifications for Road and Bridge Construction.

In addition to the requirements of the Standard Specifications relating to control of materials, the Contractor shall comply with the following requirements.

The Contractor shall supply samples of all wire, cable, and equipment and shall make up and supply samples of each type of cable splice proposed for use in the work for the Engineer's approval.

Before equipment and/or material including cabinet, telemetry, and detectors are delivered to the job site, the Contractor shall obtain and forward to the Engineer a certified, notarized statement from the manufacturer, containing the catalog numbers of the equipment and/or material, guaranteeing that the equipment and/or material, after manufacture, comply in all respects with the requirements of the Specifications and these Special Provisions. Re-manufactured or modified equipment other than by the original manufacturer shall not be allowed. Original manufacturer shall certify that he made modification to the equipment.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which the subject materials and equipment are paid, and no additional materials and equipment are paid, and no additional compensation will be allowed. Materials and equipment not complying with the above requirements that have been installed on the job will be done at the Contractor's own risk and may be subject to removal and disposal at the Contractor's expense.

PROCUREMENT

Materials and equipment shall be the products of established manufacturers, shall be new, and suitable for the service required. The Contractor is obligated to conduct his own search into the timely availability of the specified equipment and to ensure that all materials and equipment are in strict conformance with the contract documents. Materials or equipment items which are similar or identical shall be the product of the same manufacturer. The cost of submittals, certifications, any required samples and similar costs shall not be paid for extra but shall be included into the pay item bid price for the respective material or work.

EXCEPTIONS, DEVIATIONS AND SUBSTITUTIONS

Exceptions to and deviations from the requirements of the Contract Documents shall not be allowed without approval by Engineer and Bureau of Traffic Operations Electrical Engineer. It is the Contractor's responsibility to note any deviations from contract requirements at the time of submittal and to make any requests for deviations in writing to the Engineer. In general, substitutions will not be acceptable. Requests for substitutions must demonstrate that the proposed substitution is superior to the material or equipment required by the Contract Documents. No substitutions shall be permitted without the approval of the Engineer, and Bureau of Traffic Operations Electrical Engineer.

SUBMITTALS

Within 30 days after contract award, the Contractor shall submit, for approval, complete manufacturer's product data (for standard products and components) and detailed shop drawings (for fabricated equipment). All of the submittal information shall be assembled by the Contractor and submitted to the Engineer at one time. All equipment samples shall be submitted at this time. Partial and sporadic submittals may be returned without review. The Contractor may request, in writing, permission to make a partial submittal. The Engineer will evaluate the circumstances of the request and may accept to review such a partial submittal. However, no additional compensation or extension of time shall be allowed for extra costs or delays incurred due to partial or late submittals.

TESTING

Before final acceptance, the electrical equipment, material, induction loops and work provided under this contract shall be tested. Tests will not be made progressively, as parts of the work are completed they shall be all made at one time. Items which fail to test satisfactorily shall be repaired or replaced. Bureau of Traffic Operations Electrical Engineer will witness all testing.

INSTALLATION/INSPECTION PROCEDURES

After all control boxes and equipment to be installed has been physically inspected and approved by Bureau of Traffic Operations Electrical Engineer, the equipment supplier shall then deliver all equipment to the job site. The Contractor shall then install/safeguard all the equipment which has been delivered prior to requesting an inspection. No unapproved equipment shall be on the job site or installed as part of the job. This does not relieve the Contractor from replacement/repairs of equipment found to be damaged or in non-compliance of these provisions.

Certain items such as conduit, wire, duct, anchor bolts, and junction boxes will be inspected and may be tested by the Department's Bureau of Materials and these items shall not be delivered to the job site without inspection approval. Items such as cabinets shall be inspected by the Engineer at the contractor's or manufacturer's shop and these items shall not be delivered to the job site without Bureau of Traffic Operations Electrical Engineer inspection approval. It shall be the Contractor's responsibility to arrange inspection activities with the Engineer thirty (30) days prior to installation. 30 days prior to installation of the tone equipment being supplied and, prior to request for a turn-on, the Bureau of Traffic Operations Electrical Engineer will be contacted for the correct frequencies, controller addresses and "DB" setting for each location to be installed. When the work is complete, all equipment fully operational, the Contractor shall schedule a turn-on inspection with the Engineer. Acceptance will be made as a total system, not as parts. The Contractor shall request the inspection no less than seven (7) working days prior to the desired inspection date.

No inspection shall be made until the delivery of acceptable "as built" drawings, specified certifications, and the required guarantees.

It will be the responsibility of the installing contractor to provide a qualified technician representing the tone equipment supplier to be at the turn-on inspection of each location to provide the technical expertise to bring each location on line.

The Contractor shall furnish the necessary manpower and equipment to make the Inspection. The Engineer may designate the type of equipment required for the inspection tests.

A written record of the loop analyzer readings shall be submitted to the Bureau of Traffic Operations Electrical Engineer prior to the final inspection.

Any part or parts of the installation that are missing, broken, defective, or not functioning properly during the inspection shall be noted and shall be adjusted, repaired, or replaced as directed by the Engineer and another inspection shall be made at another date. Only upon satisfaction of all points shall the installation be acceptable.

After the subject inspections are completed the Bureau of Traffic Operations Electrical Engineer will provide the contractor with a complete punch list of items necessary to be completed prior to final inspection and acceptance for maintenance.

The Contractor shall furnish a written guarantee for all materials, equipment and work performed under the contract for a period of not less than two (2) years from the date of final acceptance.

COMMUNICATIONS VAULT (D-1)

Effective: March 1, 2010

Description. Work under this item shall consist of constructing a composite concrete handhole and cover, in accordance with the details shown on the plans and as specified herein.

Materials. The composite concrete handhole and two piece vault lid shall be constructed of polymer concrete material, and shall be gray in color. The composite concrete handhole shall be 48 inches x 48 inches and shall have an effective depth of 36 inches.

The composite concrete handhole and cover shall have a design/test loading of 22,500/33,750 lbs respectively. The cover shall have a permanently recessed logo that reads "IDOT COMMUNICATIONS", or as otherwise designated by the Engineer. The composite concrete handhole lid shall have two ½-in x 4-in pull slots. The lid surface shall have a coefficient of friction of 0.50 in accordance with ASTM C-1028.

The Contractor shall install manufacturer-approved gasketing between the lid and the handhole to prevent water from entering the composite concrete handhole.

The composite concrete handhole lid shall be secured to the vault with two 3/8-inch NC stainless steel penta-head bolts and washers to lock the lid. In addition, a "lock tool" shall be provided for composite concrete handhole entry.

A fiber optic cable support assembly shall be recommended by the manufacturer and approved by the Engineer for fiber optic cable and splice enclosures used in the vault. Each support assembly shall consist of multiple brackets, racks, and/or rails required to suspend the required surplus cabling and any splice enclosures required.

The support assembly shall be made from or coated with weather resistant material such that there is no corrosion of the supports. The support assemblies shall be anchored to the vault using stainless steel hardware.

The fiber optic cable support assemblies shall be included in the Contract unit price for the composite concrete handhole. Void areas between openings and conduit shall be filled with self-curing caulking consisting of a permanent, flexible rubber which is unaffected by sunlight, water, oils, mild acids or alkalis. The caulking shall be mildew resistant and non-flammable. The material shall provide a permanent bond between the conduit entering the vault and the polymer concrete. The caulking shall be gray in color.

CONSTRUCTION REQUIREMENTS

Composite concrete handholes shall be installed in accordance with applicable requirements of Section 800 of the Standard Specifications and as provided herein.

A manufacturer-approved knockout punch driver shall be used to provide openings in the vaults for conduit, or the required openings may be machined at the time of stackable vault fabrication. Voids between entering conduits and punch driven or machined openings shall not exceed ½ inch.

Any void areas shall be caulked from the interior and exterior of the composite concrete handhole. The caulk shall be allowed to fully cure per the manufacturer's specifications, prior to backfilling.

The composite concrete handhole shall be placed on 12 inches of coarse aggregate, CA-5 or CA 7 Class A, as specified in Section 1004 of the Standard Specifications. Seal and flash test the vault per the manufacturer's recommendations.

A minimum of 150 feet of excess cable per cable run shall be coiled in each composite concrete handhole containing splices to allow moving the splice enclosure to the splicing vehicle unless otherwise indicated in the plans.

Basis of Payment. This item will be paid for at the contract unit price each for COMMUNICATIONS VAULT, which shall be payment in full for all material and work as specified herein.

REMOVE EXISTING HANDHOLE

Description. This work shall consist of removal and disposal of existing handholes or communications vaults.

Materials. None, backfill and restoration shall be incidental to other construction.

Removal. Removal shall be in accordance with Section 895.05(b) of the Standard Specifications. Removed items become property of Contractor and shall be removed from site within 48 hours.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE EXISTING HANDHOLE.

REMOVE EXISTING CONCRETE FOUNDATION

Description. This work shall consist of the removal of a concrete foundation.

Materials. None, backfill and restoration shall be incidental to other construction.

Construction. Removal shall be in accordance with Section 895.05(c) of the Standard Specifications. Removed items become property of Contractor and shall be removed from site within 48 hours.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE EXISTING CONCRETE FOUNDATION.

DIGITAL LOOP DETECTOR SENSOR UNIT (4 CHANNEL)

Description. This work shall consist of furnishing and installing digital four or two channel loop detector sensor units complete with associated enclosures, cable harness, quick disconnect plugs, and operation manuals in strict accordance with these specifications.

Functional Requirements.

- The sensor unit shall operate on a regulated 117 VAC. The sensor unit shall be of solid state design throughout. Each sensor unit shall include four or two complete loop detector channels in the space that is normally occupied by an INDUCTION LOOP DETECTOR SENSOR UNIT.
- The loop connected to each of the four channels or two shall be sequentially scanned at a rate of not less than 148 times per second. Only one loop shall operate at a time in the system to eliminate cross-talk.
- The digital loop sensor unit shall be automatically and instantaneously self-tuning requiring no burn-in or warm-up time. Then it shall also track environmental changes.
- The digital loop sensor unit shall be self-tracking and fully automatic in its recovery from power failure.
- The digital loop sensor unit shall be of sufficient sensitivity to detect the smallest licenseable motor vehicle, including motorbikes. The sensor unit shall detect a Honda CT-170 and hold the detection for minimum of four minutes.
- The sensor unit shall be designed to operate in conjunction with three turns of a loop of wire embedded up to 3" (76.2mm) deep in a reinforced concrete roadway. The loop and lead-ins will measure at least 100 megohms above ground and have a minimum inductance of 50 microhenries and a continuity resistance of not more than 2 ohms. Digital sensor unit shall be capable of tuning to an inductance range of 0 to 2000 microhenries.
- Vehicle detection shall be indicated by a single optically isolated solid state output per channel.
- Output circuit shall be an optically coupled output. It shall be a 2N37. Polarity of interface between telemetry and sensor unit must be observed.

- Any size or type of motor vehicle from motorcycle to a high bed tractor-trailer moving over the loop shall be detected and each vehicle shall produce only one output for the length of time the vehicle is over the loop.
- Detection shall be positive for all vehicle speeds 0 to 129km (80 mi.) per hour.
- The sensor unit shall be capable of reliable operations when placed up to 1000 ft. (304.8m) away from loops and connected with type No. 14 AWG, stranded copper wire. The loops will vary in size from 5 ft. x 6 ft (1.52m by 1.83m) up to 18 ft. x 6 ft. (5.49m by 1.83m). Loop system with 1000 ft (304.8m.) of lead-in shall perform with sensitivity to detect and hold the smallest motorbike.
- Each detection channel shall have its own output incandescent indicator lamp and 16 position thumbwheel switch. The thumbwheel switch shall select the sensitivity and mode. The thumbwheel switch shall provide eight sensitivities, .0025% to .33% and 3 modes: off, pulse, and presence.
- In the pulse mode each new vehicle shall produce an output pulse of 225 milliseconds duration. A vehicle remaining on a loop for more than two seconds shall be "tuned out" allowing operation of the loop to other vehicles.
- In the presence mode output duration shall be equal to the percent of time the vehicle is present on the loop. Vehicle detection and hold times shall not be less than 30 minutes.
- Electrical connections from the sensor unit to incoming and outgoing circuits shall be made by one MS type multiple positive connection plug and jack, or equivalent arrangement, to permit rapid replacement with similar existing units without disconnecting or reconnecting individual wires.
- All the tuning adjustments shall be made with controls provided on the sensor unit without requiring movement of the sensor unit.
- These controls shall be identified and it shall not be necessary to remove or change wires or contacts nor to use any tools other than a screw driver in tuning or making sensitivity adjustments.
- A properly tuned sensor unit shall detect all high vehicles (truck) with chassis 4 feet (1.22m) above pavement surface with one contact closure and yet shall not detect vehicles passing in lanes adjacent to loop installation.
- All transistors shall be silicon type. The main logic of the unit shall be a single MOSLSI chip to simplify the electronics, increase reliability and improve maintainability.
- The sensor unit shall be contained in a rigid high quality metal enclosure providing complete protection to all components and electrical connections.
- During normal detection operation the state of the output indicator shall correspond exactly to the state of the optically coupled output.
- A frequency switch shall be provided to raise or lower the loop oscillator frequency for the elimination of cross-talk between sensor unit, should it ever occur.
- The digital sensor unit shall be provided with a circuit breaker.
- Special circuitry shall be provided so that the sensor unit shall continue in proper operation even though the induction loop is shorted or leaking to ground.
- Induction loops shall be coupled to a transformer to provide for rejection of induction loop lead-in cable noise and shall allow low inductance operation (0 to 50 microhenries).
- A reset shall be provided to reset all channels.
- There shall be a write-on pad mounted on sensor to identify traffic lane with channel indication.

Basis of Payment. This work will be paid for at the contract unit price per each for DIGITAL LOOP DETECTOR SENSOR UNIT, of the number of channels specified, installed, operating and completely in place. Terminal boards, cable harness wiring and miscellaneous will not be paid for separately, but shall be considered as incidental to the cost of the item.

TONE EQUIPMENT

General.

- (a) Telemetry equipment shall be furnished and installed in the Traffic Systems Center Office and along expressway at locations designated in these Special Provisions and Plans, and in strict accordance with these specifications.
- (b) Communication link from field located cabinets to the Traffic Systems Center Office will be via 3002 Channel, C1 conditioning, Type 7 FDDC telephone pairs leased by the Traffic Systems Center, or telecommunication cable in barrier wall.
- (c) All tone transmitters and tone receivers shall be three frequency frequency-shift; that is equipment which the center frequency is normally on at all times and is electrically shifted +30 Hz to a higher frequency (mark) or -30 Hz to a lower frequency (space). Other frequency shifts from +10 to +300 shall be user selectable.
- (d) All transmitters, receivers, and power supplies shall be of the modular plug-in type construction. The circuitry of each unit shall be protected by a U-shaped metal chassis, cadmium-plated, with iridite finish.
- (e) All tone equipment shall be physically interchangeable with existing Traffic Systems Center tone equipment, that is furnished tone equipment shall be directly compatible with and replaceable by existing tone equipment with no modification to any hardware.
- (f) All transmitters, receivers, and power supplies shall be solid state. All transistors shall be silicon, excepting the power transistors in power supplies. All transmitters and receivers I.C.s shall be plug in.
- (g) All transmitters and receivers shall be programmable frequency-shift key units. These units shall have a universal card which is field programmable for any channel frequency or shift. The frequencies available shall be in the range of 120 Hz to 5235 Hz in increments of 5 Hz. The shifts available shall be 10, 25, 30, 35, 42.5, 60, 70, 75, 120, 150, 240 and 300 Hz. A new center frequency or shift shall be field programmed by simply changing setting of the program switch.

- (h) All transmitters and receivers shall be capable of being operated at any frequency program switches. The center frequency shall be clearly visible through or on the front of each transmitter and receiver. Such indication shall always correspond to the frequency of the elements currently operating in each module. Contractor shall supply 500 complete sets of pre-printed tags for labeling the units indicating the center frequency.
- (i) Transmitters and receivers shall work into a communication link with standard impedance of 600 ohms.
- (j) Transmitters and receivers shall be individually fused.

Materials.

- (a) General
 - (1) Receivers, transmitters and power supplies shall be capable of operation in field cabinets which provide protection against direct contact with the elements with no special provisions for environment control.
 - (2) All field located tone equipment shall be mounted in the surveillance cabinets as designated elsewhere in these specifications.
 - (3) All field located tone equipment shall be capable of operation on a temperature range of -22 degrees F to 140 degrees F (-30° to +60° C) and shall have P.C. boards coated for protection against humidity in the range of 0% to 96%.
 - (4) All field tone equipment shall be capable of being tipped, while in operation, from the vertical to the horizontal position and back again, without having adverse effect on the continuous operation of the transmitter, receiver or power supply
- (b) Power Supply
 - (1) The power supply shall operate on input voltage of 117 VAC allowing for 10% variation in line voltage.
 - (2) The power supply shall provide a regulated 12 VDC output at 1.7 amps.
 - (3) Each tone equipment mounting frame field located or office located, shall have its own regulated power supply, capable of operating at least ten tone modules in any combination of transmitters and receivers.
 - (4) The power supply shall have floating type gold plated connections to insure good connection.
 - (5) The front panel of the power supply shall have an on/off switch and a Red LED that indicates the status of the output DC voltage.

- (6) The power supply shall contain a switch and L.E.D. on the front panel to permit the monitoring of the supply voltage with the existing Traffic Systems Center tone test meter.
 - (7) The power supply shall be fused.
 - (8) The power supply shall have a DC voltage control.
- (c) Transmitter
- (1) The tone transmitter shall operate on an input of a regulated 12 VDC.
 - (2) The tone frequencies shall be programmable in the audio frequency range between 120 and 3820hertz.
 - (3) The transmission quality shall be such that there may be as many as 25 channels of tone transmitters operating over one telephone pair with perfect discrimination by the associated tone receivers. The frequency of one tone transmitter shall have no adverse effect on the operation of the frequency of any other transmitter connected to the same telephone pair.
 - (4) Output level of tone transmitters shall be adjustable over a range of -40 to +13 dBm.
 - (5) Transmitter harmonic output shall be at least 42 dB down from the fundamental for each harmonic component.
 - (6) Each unit furnished shall have an external jumper wire on the barrier type terminal block to provide a two frequency space-hold operation.
 - (7) The transmitter shall have a floating type gold plate connector to insure good connection.
 - (8) The transmitter shall be capable of holding any of its assigned frequencies (mark, space) continuously without degradation in life of performance.
 - (9) Each transmitter shall be capable of test operation of at least 30 pulses per second.
 - (10) No transmitter plugs shall be required for tone output. A toggle switch thru the faceplate shall put the transmitter "on line" and "off line".
 - (11) The transmitter shall have L.E.D. indicators for Mark-Red, Space-Yellow and Carrier-Green visible through the face panel.
 - (12) Test points through front face plate shall be provided to test for DC voltage levels.

(d) Receiver

- (1) The requirements as to the programmable channel frequency range, channel spacing, holding of shifted frequency, and operating voltage shall be the same as those for 3 Frequency Transmitter.
- (2) Input sensitivity of tone receiver shall be adjustable down to -45 dBm. The dynamic range shall be 25 dB.
- (3) Adjacent channel attenuation shall be at least 35 dB.
- (4) Each receiver shall be capable of test operation of at least 30 pulses per second.
- (5) Each receiver shall have one single pole, double throw, mark relay output and one single pole, double throw space output relay.
- (6) Each receiver shall also have a carrier detector circuit with one single pole, double throw relay output.
- (7) All output relay contacts shall be capable of handling a minimum of 30 VA continuously. Any substitution shall be subject to written approval of the Engineer.
- (8) Receiver shall have L.E.D. indicators for Mark-Red, Space-Yellow and Carrier-Green, visible through the face panel.
- (9) The receiver shall have a floating type gold plated connector to insure good connection.
- (10) Receiver shall operate in a space hold, 2 state operation.
- (11) An attenuation plug shall be provided to set sensitivity level of receiver.
- (12) Each receiver shall come with 2 spare relays as outlined in Sec. (d) (5) of this material specification.
- (13) Test points through front face plate shall be provided to test for DC voltage levels.

(e) Mounting Frame

- (1) Under this item, for a unit price each, the Contractor shall furnish and install an Inven 1X 11-1 mounting rack or equivalent in strict accordance with the requirements specified herein.

- (2) Each tone equipment mounting frame field located or office located, shall have with power supply added, 11 slots capable of operating at least ten tone modules in any combination of transmitters and receivers.
- (3) Each mounting frame shall provide a separate barrier type terminal block with screw-type terminal for each transmitter, receiver, and power supply.
- (4) Each mounting frame shall be constructed of steel with zinc bonderizing and hard baked finish of gold metallic epoxy paint.
- (5) Where the mounting frame is not completely filled with tone modules, the unused modules spaces shall be provided with the barrier type terminal blocks, within each mounting frame, shall be wired to the 12 VDC power supply.
- (6) Each mounting frame for the field equipment shall be of a size that shall hold the power supply, all transmitters and all receivers required at each field cabinet as specified elsewhere in these Special Provisions.
- (7) In all field cabinet locations where mounting frames are specified the mounting frames shall be bolted to the rear wall of the cabinet by means of a swing bracket as per field mounting frame with cradle assembly drawing #TY-1TSC 400#6.
- (8) The bracket cradle shall have three (3) position stops: horizontal, 45 degree and vertical.
- (9) The bracket cradles shall be constructed of ¼" (6.35mm) steel, cadmium plated with an irridite finish, as shown on plan for cradle assembly drawing #TY-1TSC 400#7.

Basis of Payment.

Power Supply

This item shall be paid for at the contract unit price each for TONE EQUIPMENT - POWER SUPPLY, installed, operating, and completely in place.

Terminal boards, wiring, and miscellaneous hardware will not be paid for separately, but shall be considered as incidental to the cost of this item.

Transmitter

This item will be paid for at the contract unit price each for TONE EQUIPMENT - 3 FREQUENCY TRANSMITTER PROGRAMMABLE, installed, operating and completely in place.

Terminal boards, wiring, and miscellaneous hardware will not be paid for separately, but shall be considered as incidental to the cost of this item.

Receiver

This item will be paid for at the contract unit price each for TONE EQUIPMENT - 3 FREQUENCY RECEIVER PROGRAMMABLE, installed, operating, and completely in place.

Terminal boards, wiring, optical-isolator, relays, cable assemblies and miscellaneous hardware will not be paid for separately, but shall be considered as this item.

Mounting Frame

This work shall be paid at the contract unit price each for TONE EQUIPMENT – MOUNTING FRAME, which shall be payment in full for all work as described herein and as directed by the Engineer.

REMOVE EXISTING SURVEILLANCE CAMERA EQUIPMENT

Description. This work shall consist of removal and transportation of equipment as shown on the plans and described in this Special Provision. Work includes the following:

- (a) Removal of a CCTV camera from a high mast light tower, including mounting hardware associated with attaching the camera to the luminaire ring.
- (b) Removal of a CCTV camera cabinet, including all equipment inside the cabinet.
- (c) Removal of a vehicle detection surveillance station cabinet, including all equipment inside the cabinet.
- (d) Securely packing CCTV camera and associated components, cabinets and internal equipment, and safely delivering all items to the Department (District 1 headquarters) or Electrical Maintenance Contractor as directed by the Engineer.

Materials. None.

CONSTRUCTION REQUIREMENTS

General. No removal work will be permitted without approval from the Engineer. The Contractor shall set up a meeting with the State's Electrical Maintenance Contractor (EMC) and the Traffic Systems Center (TSC) Engineer. The EMC and TSC Engineer shall be notified at least 48 hours in advance of the meeting. This meeting shall be scheduled within two weeks after contract is awarded.

The meeting shall be at each cabinet to determine the condition of equipment. Any equipment that is to be salvaged that is damaged after this meeting shall be repaired or replaced at the contractor's expense, to the satisfaction of the Engineer. The equipment that is not salvaged shall be disposed of as directed by the Engineer and all debris removed beyond the right-of-way.

The condition of the equipment shall be documented and signed by representatives of the TSC, EMC and the Contractor. A copy shall be given to the Engineer.

If this meeting does not occur, then all of the equipment will be assumed to be in working condition. Any equipment that is not in working condition upon delivery shall be repaired or replaced at the Contractor's expense.

Removal Details. The equipment shall be removed in accordance with the following applicable sections of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction:

- (a) **Concrete Foundation:** Section 895. This shall be paid for in the Remove Existing Concrete Foundation pay item.
- (b) **Handhole:** Section 895. This shall be paid for in the Remove Existing Handhole pay item.
- (c) **Electric service installation:** Section 845. This shall be paid for in the Removal of Electric Service Installation pay item.
- (d) **Cabinet:** Section 845. All cabinets shall be removed and salvaged as directed by the Engineer. This shall be paid for under this pay item.
- (e) **Conduits:** Existing underground conduits shall be abandoned.
- (f) **Induction Loops:** Existing Induction Loops to be abandoned
- (g) **Cabinet Electronic Equipment:** All of the Transmitters, Receivers, Power Supplies and Loop Detectors shall be salvaged and sent to the Electrical Maintenance Contractor. This shall be paid for under this pay item

The Contractor shall provide and utilize equipment appropriate for removing the camera from the high mast luminaire mounting ring, without causing damage to the high mast tower. The Contractor shall perform this work in conjunction with the removal of the associated high mast light tower. The traffic control and protection set up for the high mast tower removal shall be utilized for the associated CCTV camera equipment removal.

Protection of Equipment. Upon removal, equipment shall be immediately packaged in suitable containers for protection for delivery. Containers shall become the property of IDOT upon delivery. The contents of each container shall clearly identify the contents, source location and date of removal on the outside of the container.

The Contractor shall deliver the camera, cabinet, and equipment inside the cabinet to the Department or EMC as directed by the Engineer. All components which the Engineer designates as salvage shall be removed, boxed in containers, approved by the Engineer, and delivered and unloaded at a facility of the Department, as designated by the Engineer. Packaging material required for proper shipping shall be included. Materials that are not salvaged shall become the property of the Contractor and shall be disposed of according to Article 202.03.

The Contractor shall prepare a printed delivery receipt to be signed by a representative of the recipient. A copy of this signed receipt shall be provided to the Engineer.

Any damage resulting from the removal and/or transportation of equipment and associated hardware that are to be salvaged, shall be repaired or replaced in kind. The Engineer will determine the extent of damage and the suitability of repair and/or replacement.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE EXISTING SURVEILLANCE CAMERA EQUIPMENT, which shall be payment in full for all labor, material removal, and transportation to EMC necessary to complete the work as described above.

SURVEILLANCE 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, ramp meter and system detector stations, and dynamic message signs as shown on the Plans and hereinafter provided.

Materials

General

Cabinet, Model 334 shall be a durable, weatherproof enclosure, constructed of 3/16 in. (4.75mm) thick aluminum or 1/8 inch (3.175 mm) thick aluminum lined with bullet resistant fiberglass panels that shall be UL listed and tested for UL752 Level 3 with a nominal thickness of ½ inch (12.7mm) maximum, and a nominal weight of 5.0 lbs. per square foot (24.5 kg per square meter) maximum. The cabinet shall have a nominal outside dimension of 66 in. (1.7m) height x 24 inches (600mm) wide X 30 inches (762mm) deep. Cabinet, Model 334 shall consist of the following components: double door each equipped with a Corbin # 2 Brass lock or equal for front and rear cabinet entry, housing, mounting cage, power distribution assembly, 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 Corbin # 2 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 degrees. 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 (1.7 cubic meters) of air per minute for housing #1 and 26 cubic feet (0.74 cubic meters) 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 (4.25 cubic meters) 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° Celsius), and shut off when the temperature is less than 64°F (18° Celsius). In addition, the fan shall be manually adjustable for automatic turn on and off. The fan circuit shall be protected at 125% 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 1500 watts (7900 Btu/hr). The heater shall have a built-in quick response thermostat with sealed contacts that has a temperature control range 40 to 100° F (5 to 39 degrees Celsius), 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. Shelves shall be the full width of the rack and 12 in. (300mm) deep. The shelves shall be designed to support a minimum of 50 lbs. (23 kg).

The power distribution assembly shall be as shown on Plans and shall consist of input files that are common to both 332 and 336 type cabinets and provides 9 AC outputs and up to 28 isolated inputs. The power distribution assembly shall consist of the following: one 30A, 120V main circuit breaker; three 15A, 120V single pole secondary circuit breakers; eight standard 117 VAC controller and equipment receptacles; and one duplex, 3-prong, NEMA GF1 Type 5-15R grounded utility type outlet.

Rating of breakers shall be shown on face of breaker or handle. Breaker function shall also be labeled below breakers on front panel. The first equipment receptacle in the circuit shall have ground-fault circuit interruption as defined in the NEC. Circuit interruption shall occur on 6 mA of ground-fault current. All conductors from the power distribution assembly routed to the cabinet wiring shall be connected to the terminal block on the common side, except for the AC power conductor between the service terminal block and main circuit breaker. All internal conductors terminating at the blocks shall be connected to the other side of the blocks.

Two side panels shall be provided and mounted on the cabinet sidewalls. In viewing from the front door, the left side panel shall be designated as the "input/Communications" and the right side panel shall be designated as the "Service Panel". The panel shall be drilled and tapped, as necessary, to mount the terminal blocks and other attachments described herein, as well as to mount the panel to the cabinet wall.

The terminal blocks shall be barrier type rated at 20 A 600 V RMS minimum. The terminal screws shall be nickel-plated brass binder head type with screw inserts of same material. The terminals of the power line service terminal block shall be labeled "AC+, AC-, and AC GND", and shall be covered with a clear insulating material to prevent inadvertent contact. Terminating lugs large enough to accommodate No. 2 conductors shall be furnished for the service terminal block. The terminal block shall be rated for 50 A at 600 V peak, minimum.

The power distribution assembly shall also protect the equipment powered by the assembly from power transients. Over voltage protection shall be provided for the power distribution assembly and shall contain, as a minimum, a surge arrestor, which shall reduce the effect of power line voltage transients and be mounted to the service panel. The arrestor shall have the following minimum features:

Recurrent Peak Voltage:	184 V
Energy Rating (Minimum):	50 J
Power Dissipation, Average:	0.85 W
Peak Current for pulses less than 7 microseconds	1250 A
Stand-by Current for 60 Hz Sinusoidal:	1mA or less

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 F15-T8 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. (250mm) x 15 in. (381mm).

Foundations shall conform to those shown on Detail sheet "Cabinet Model 334 Details" of the plans. The foundation is paid for separately.

Each Induction Loop shall have lightning protection. The Contractor shall furnish and install stud-mounted lightning protection devices. The device shall have three-terminals, two of which are connected across the loop input of the detector for differential mode protection and the third terminal grounded to protect against common mode damage. Differential mode surge shall be clamped by the semi-conductor array instantly and common mode surge shall be handled by three element gas discharge tube which fires at 400VDC and thereafter clamps the two loop leads to 30 volts in respect to ground. The device shall be installed in close proximity to the loop input. Extension of the factory leads of the device shall not be allowed.

Identification

The Cabinet, Model 334 shall be identified and labeled with external markings as specified in Article 1069.06 of the Standard Specifications and as shown on the Plans.

Construction Requirements

The Contractor shall deliver the Cabinet Model 334 mounted on a plyboard-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.

All equipment in the cabinet, when required, shall be clearly and permanently labeled using marker strips. The marker strips shall be made of material that can be easily and legibly written on using a pencil or ballpoint pen. Marker strips shall be located immediately below the item that they are to identify and must be clearly visible with the items installed.

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 (40 liters/min) per square foot (0.1 meters) of surface area. The cabinet shall then be inspected for leakage. Evidence of water leakage shall be cause for rejection.

Operational Standalone Test: The operational standalone test for each Cabinet, Model 334 installed shall consist of the following:

Visual inspection of the cabinet and its contents for workmanship
Verification of the cabinet grounding in accordance with Article 1074.03 (a)(4) of the Standard Specifications
Measurement of the voltage at the input panel

Documentation

Shop drawings and wiring lists 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.

For each cabinet, four copies of a configuration of the equipment reporting to that cabinet shall be provided. The sheet shall also list field settable options for the equipment contained in the cabinet. This shall include device addresses and output voltage settings for power supplies. One of these copies shall be placed in the clear plastic envelope furnished as part of the cabinet. The other three copies shall be delivered to the Engineer.

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. The warranty shall warrant and guarantee repair of the component parts of the Cabinet Model 334 furnished by the Contractor that prove to be defective in workmanship and materials during the first two years of operation as defined and noted above at no additional cost to the Department.

The Engineer will notify the Contractor that a warranted item needs repair. The Contractor shall acknowledge the notification within 24 hours and replace or correct any part or parts of materials and equipment that are found defective within the two-year in-service warranty period. All items needing repair shall be returned to the Department in two weeks from the date of receipt at the Contractor's facility or replaced in-kind by the Contractor, and the Contractor shall be responsible for any return shipping costs. No compensation will be made to the Contractor for such replacements or corrections.

The Contractor shall provide a warranty certificate for this item and its related components to the Department. The Department reserves the right to transfer this service to other parties who may be contracted with in order to provide overall maintenance of this item.

Method of Measurement

This item shall be measured as each CABINET, MODEL 334, installed, tested, accepted, complete, and fully 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.

CLOSED CIRCUIT TELEVISION CABINET

Description. This work shall consist of all materials and labor required to install a pole mounted CCTV equipment cabinet.

Materials.

General

The Cabinet, Model 336 shall meet the Caltrans Transportation Electrical Equipment Specifications (TEES) for the components applied in the project. The cabinet shall be a durable, weatherproof enclosure constructed of 3/16 in. (4.75mm) thick aluminum or 1/8 inch (3.175 mm) thick aluminum lined with bullet resistant fiberglass panels that shall be UL listed and tested for UL752 Level 3 with a nominal thickness of 1/2 inch (12.7mm) maximum, and a nominal weight of 5.0 lbs. per square foot (24.5 kg per square meter) maximum. The cabinet shall be sized to adequately house all required components with extra space for arrangement and termination of wiring. The minimum size of the cabinet shall have a nominal outside dimension of 46 in. height x 24 inches wide X 24 inches deep. Cabinet, Model 336 shall consist of the following components: double door each equipped with a Corbin # 2 Brass lock or equal for front and rear cabinet entry, housing, mounting cage, power distribution assembly, 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.

Ground and Neutral Bus Bars. A single copper ground and neutral bus bar, mounted on the equipment panel shall be provided. Ground and neutral conductors shall be separated on the bus bar. Compression lugs, plus 2 spare lugs, shall be sized to accommodate the cables with the heads of the connector screws painted green for ground connections and white for neutral connections.

Utility Services Connection. Where required; the Contractor shall notify the Utility Company marketing representative a minimum of 30 working days prior to the anticipated date of hook-up. This 30 day advance notification will begin only after the Utility Company marketing representative has received service charge payments from the Contractor. Prior to contacting the Utility Company marketing representative for service connection, the service installation controller cabinet and cable must be installed for inspection by the Utility Company.

Construction. The Contractor shall confirm the orientation of the installation and its door side with the engineer, prior to installation. All conduit entrances into the service installation shall be sealed with a pliable waterproof material.

The Contractor shall confirm the orientation of the Cabinet Model 336 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.

All equipment in the cabinet, when required, shall be clearly and permanently labeled using marker strips. The marker strips shall be made of material that can be easily and legibly written on using a pencil or ballpoint pen. Marker strips shall be located immediately below the item that they are to identify and must be clearly visible with the items installed.

The CCTV equipment cabinet shall meet the testing, documentation, warranty requirements of the Cabinet, Model 334.

Basis of Payment. This work will be paid for at the contract unit price per each for CLOSED CIRCUIT TELEVISION CABINET 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.

FIBER OPTIC INNERDUCT (D-1)

Effective: April 1, 2005

1. Description.

This item shall consist of furnishing, installing, splicing, connecting and demonstrating continuity of fiber optic cable innerduct of sizes specified herein and as shown on the contract drawings. The innerduct shall be High Density Polyethylene.

2. Materials.

2.1 General:

The duct shall be a spiral ribbed plastic duct which is intended for underground use and which can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance. The ribbed duct shall have internally designed longitudinal ribs for reduced pulling frictions and increased lubrication effectiveness.

The duct shall be made of high density polyethylene which shall meet the requirements of ASTM D 3035. The innerduct material shall be composed of high density polyethylene meeting the requirements of PE334470E/C as defined in ASTM D3350.

Submittal information shall demonstrate compliance with the details of these requirements.

2.2 Dimensions:

Duct dimensions shall conform to the standards listed in ASTM D3035, SDR-11. Submittal information shall demonstrate compliance with these requirements.

Nominal Size (diameter)	Inside Diameter (minimum)	Outside Diameter (Average)	Wall Thickness (Min.)	Bend Radius (minimum)	Pull Strength	Weight Average (lbs/100ft.)
1"	1.030"	1.315"	0.120"	14"	500	19
1.25"	1.313"	1.660"	0.151"	17"	750	31
1.5"	1.506"	1.900"	0.173"	19"	1000	40
2"	1.885"	2.375"	0.216"	24"	1600	60

2.3 Marking:

As specified in NEMA Standard Publication No. TC-7, the duct shall be clearly and durably marked at least every 10 feet with the material designation (HDPE for high density polyethylene), nominal size of the duct, and the name and/or trademark of the manufacturer.

- 2.4 Color:
 Innerduct shall be colored as follows or as directed by the Engineer.

Usage Designation	Color
Fiber Optic Trunk Cable (Ducts containing cables of 96 fibers)	Orange
Fiber Optic Distribution Cable (Ducts containing cables of 12, 6, or 4 fibers and 96 fiber ducts designated as distribution fibers)	Blue

3. Installation.

- 3.1 Pulling Tension.
 Pulling tension of the duct shall be monitored throughout the pull and pulling tension shall not exceed those listed in the table or the specific manufacturer maximum pulling tensions as indicated in the catalog cut submittals. Failure to monitor the pulling tension will result in non-payment of that particular duct span and the span may be reinstalled with new duct at no additional cost to the State. Lubricants used shall be compatible with the duct.

- 3.2 Junction boxes.
 Where duct passes through junction and/or pull boxes, the duct shall remain continuous unless a break is specifically indicated in the plans or as directed by the Engineer.

- 3.3 Handholes.
 Where duct passes through handholes, the duct shall be looped uncut within the handhole unless otherwise indicated on the Plans or directed by the Engineer.

Bends.

Minimum bending radius shall be in accordance with the above table or the manufacturer's recommended radius, whichever is larger. Bends shall be made so that the duct will not be damaged and the internal diameter of the duct will not be effectively reduced. The degrees of bend in one duct run shall not exceed 360° between termination points.

- 3.4 In Trench
 The trench after all loose stones have been removed and all protruding stones have been removed or covered with backfill material as directed by the Engineer.

Where duct is shown to be installed in trench, it shall be installed at a depth not less than 30 inches unless otherwise indicated or specifically directed by the Engineer.

Where the specification for trench and backfill permits plowing in lieu of trench and backfill, the inner duct may be plowed into place. Unless otherwise indicated or specifically approved by the Engineer, plowing of inner duct shall lay the duct in place and shall not pull the duct through the length of the cut behind a bullet-nose mandrel or similar apparatus. In all cases, plowing operations shall be non-injurious to the duct.

3.5 In Raceway

Where duct is installed in raceways, lubricating compounds shall be used where necessary to assure smooth installation.

3.6 Encased in Concrete

Concrete shall be class SI complying with Section 720 of the Standard Specifications.

Steel Reinforcement Bars. Steel reinforcement bars shall comply with Section 706.10 of the Standard Specifications.

Underground concrete-encased conduit shall be supported on interlocking plastic spacers specifically designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common duct bank shall be not less than 2 inches. The interlocking spacers shall be used at a minimum interval of 8 ft.

Concrete cover overall shall not be less than 3 inches all around the encased run. Space below the conduit and concrete fill shall be assured. Care shall be exercised during concrete placement to assure that there are no voids, so that spacers are undisturbed, and so that conduit joints stay secure and unbroken. Concrete shall be deflected during placement to minimize the possible damage to or movement of the conduits.

Conduit encased in concrete shall have steel reinforcing where installed below roadway or other paved vehicle areas (including shoulder) and the reinforcement shall extend not less than 5 feet additional from the edge of pavement unless otherwise indicated. Steel reinforcement shall not be less than No. 4 bars at corners and otherwise spaced on 12-inch centers, tied with No. 4 bars on 12-inch centers.

The Engineer shall examine all conduit joints for compliance with section 5 of this specification before concrete is poured.

3.7 Embedded

Conduit embedded in structure shall be supported on interlocking plastic spacers specifically designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common structure shall be not less than 2 inches. The interlocking spacers shall be used at a minimum interval of 8 ft.

Concrete cover overall shall not be less than 3 inches all around the embedded run. Space below the conduit and concrete fill shall be assured. Care shall be exercised during concrete placement to assure that there are no voids, so that spacers are undisturbed, and so that conduit joints stay secure and unbroken. Concrete shall be deflected during placement to minimize the possible damage to or movement of the conduits.

The Engineer shall examine all conduit joints for compliance with section 5 of this specification before concrete is poured.

4. Joints

4.1 All HDPE duct to HDPE duct joints shall be made with an approved duct fusion splicing device.

4.2 HDPE coilable non-metallic conduit to non-HDPE coilable non-metallic conduit joints shall be either made with an approved mechanical connector or with a chemical compound. Both methods must be specifically designed for joining HDPE coilable non-metallic conduit. Minimum pullout force for the chemical compound shall be as listed in the following table.

Nominal Size		Pullout Force	
mm	in	N	Lbs
31.75	1.25	2400	540
38.1	1.50	2535	570
50.8	2.0	3335	750
63.5	2.5	4445	1000
76.2	3.0	6225	1400
101.6	4.0	8890	2000

5. Measurement

The duct shall be measured for payment in linear feet in place as described herein. Measurements shall be made in straight lines between horizontal changes in direction between the centers of the terminating points (poles, cabinets, junction boxes). Vertical measurement of the duct shall be as follows:

For runs terminating at junction boxes and/or control cabinets, the vertical measurement shall be taken from the bottom of the trench, or horizontal raceway, to a point 18 inches beyond the center of the junction box or control cabinet.

For runs terminating at poles, the vertical measure shall be taken from the bottom of the trench, or horizontal raceway, to a point 18 inches beyond the center of the light pole handhole regardless of light pole mounting method

Innerduct installed in excess of the limits describes herein shall not be paid for.

6. Basis of Payment

This item will be paid for at the contract unit price per foot for FIBER OPTIC INNERDUCT, of the size of duct as indicated, which shall be payment in full for all material and work as specified herein.

RADAR VEHICLE DETECTION SYSTEM

General. This work shall consist of furnishing, installing, and placing into operation a temporary radar vehicle sensing device (RVSD) and appurtenant communications equipment and cabling on a temporary wood pole with a shared equipment cabinet. The RVSD must be compatible with the Department's existing ATMS software drivers.

RVSD

Sensor Detection. The RVSD shall be equivalent to the Image Sensing Solutions RTMS G4 or Wavetronix SmartSensor HD and shall provide volume average speed, occupancy, classification counts, 85th percentile speed, average headway, average gap, speed bin counts and direction counts for user-configurable time intervals for a minimum of 8 lanes of traffic.

- The RVSD shall provide up to 8 length-based classification bins.
- The RVSD shall provide up to 15 speed bins.
- The RVSD shall provide speed, length, class, lane assignment, and range data for each vehicle detection.
- The RVSD shall provide presence data for at least 8 lanes of traffic.

Detectable Area.

Detection Range. The RVSD shall be able to detect and report information in lanes located with the far boundary at a minimum of 200 ft. from the base of the pole on which the RVSD is mounted.

Barrier Performance. The RVSD shall detect vehicles with the specified accuracy in lanes that are adjacent to a barrier when 50% of a sedan is visible over the barrier from the point of view of the RVSD.

Performance.

Volume Accuracy. The volume data shall be within 5% of truth for a direction of travel during nominal conditions.

Speed Accuracy. Average speed data shall be accurate to within 3 mph (5 kph) for any direction of travel when there are more than 5 cars per lane in an interval. The RVSD shall measure speed using a dual-radar speed trap that calculates the time delay between two different radar beams.

Occupancy Accuracy. Occupancy data shall be within 10% of truth for any direction of travel on a roadway during nominal conditions.

Classification Accuracy. The RVSD shall correctly determine classification for 80% of detected vehicles when the classification bins are at least 10 ft. (3 m) wide and occupancy of all lanes is below 30%.

Performance Maintenance. The RVSD shall not require cleaning or adjustment to maintain performance.

The RVSD shall not rely on battery backup to store configuration information, thus eliminating any need for battery replacement.

Once the RVSD is calibrated, it shall not require recalibration to maintain performance unless the roadway configuration changes.

The designed mean time between failures (MTBF) of the RVSD, operating continuously, shall be 10 years or more.

Physical Properties. The RVSD shall not exceed 8 lbs in weight. The RVSD shall not exceed 14 in. by 12 in. by 6 in. (35.6cm x 30.5cm x 15.2cm) in its physical dimensions. All external parts of the RVSD shall be ultraviolet-resistant, corrosion-resistant, and protected from fungus growth and moisture deterioration.

Enclosure. The enclosure shall be classified “f1” outdoor weatherability in accordance with UL 746C. The RVSD shall be classified as watertight according to the NEMA 250 Standard. The RVSD enclosure shall conform to test criteria set forth in the NEMA 250 standard for type 4X enclosures. Test results shall be provided for each of the following type 4X criteria:

- External Icing (NEMA 250 clause 5.6)
- Hose-down (NEMA 250 clause 5.7)
- 4X Corrosion Protection (NEMA 250 clause 5.10)
- Gasket (NEMA 250 clause 5.14)

The RVSD enclosure shall include a connector that meets the MIL-C-26482 specification. The MIL-C-26482 connector shall provide contacts for all data and power connections.

Power Requirements. The RVSD shall consume less than 10 W. The RVSD shall operate with a DC input between 12 VDC and 28 VDC.

Communication Ports. The RVSD shall have an RS-485 port and an RS 232 port. The RVSD shall have contact closure pairs for each lane in order to communicate with existing locations. The RS-232 port shall be full-duplex and shall support true RTS/CTS hardware handshaking for interfacing with various communication devices. The RVSD shall support the upload of new firmware into the RVSD's non-volatile memory over either communication port. The communication ports shall support all of the following baud rates: 9600, 19200, 38400, 57600, and 115200 bps.

Data Protocols. The RVSD shall support 3 different data protocols for all lanes being monitored: interval (bin) data, event (per vehicle) data, and real-time true presence data. The interval (bin) data packet protocol shall support:

- Sensory ID
- A timestamp
- Total volumes
- Average speed values
- Occupancy in 0.1% increments
- Volume in up to 8 length-based user-defined vehicle classification bins
- Volume for both directions of traffic (bin by direction)
- 85th percentile speed in either mph or kph

The real-time true presence data packet protocol shall support:

- Sensor ID
- True presence information for each lane

Data Buffering. The RVSD shall store, in non-volatile memory, at least 9,000 interval data packets.

Radar Design. The RVSD shall employ a dual radar design that includes 2 receive channels. The RVSD shall not rely on temperatures compensation circuitry to maintain transmit frequency stability.

Antenna Design. The RVSD antennae shall be designed on printed circuit boards.

Resolution. The RVSD shall transmit a signal with a bandwidth of at least 240 MHz

RF Channels. The RVSD shall provide at least 4 RF channels so that multiple units can be mounted in the same vicinity without causing interference between them.

Configuration.

Auto-configuration. The RVSD shall have a method for automatically defining traffic lanes or detection zones without requiring user intervention.

Manual configuration. The auto-configuration method shall not prohibit the ability of the user to manually adjust the RVSD configuration. The RVSD shall support the configuring of lanes or detection zones in one-ft. (0.3-m) increments.

Windows Mobile-based Software. The RVSD shall include graphical user interface software that displays all configured lanes and the current traffic pattern, as well as, measured speed or length. The graphical interface shall operate on Windows Mobile Windows 2000, windows XP and Windows Vista in the .NET framework.

- Automatically find the correct baud rate
- Operate over a TCP/IP/NTCIP connection

Operating Conditions. The RVSD shall maintain accurate performance in all weather conditions. The RVSD shall be capable of continuous operation over an ambient temperature range of 40°F to 165.2°F (-40°C to 74°C). The RVSD shall be capable of continuous operation over a relative humidity range of 5% to 95% (non-condensing).

Testing.

FCC. Each RVSD shall be Federal Communication Commission (FCC) certified under CFR 47, Part 15, section 15.249 as an intentional radiator.

NEMA TS2-2003 Testing. The RVSD shall comply with the applicable standards stated in the NEMA TS2-2003 Standard.

Manufacturing. The internal electronics shall comply with the requirements set forth in IPC-A-610C Class 3, Acceptability of Electronic Assemblies.

Support. The RVSD manufacturer shall provide both training and technical support services.

Training. The manufacturer provided training shall be sufficient to fully train installers and operators in the installation, configuration, and use of the RVSD to ensure accurate RVSD performance. The training shall be conducted locally. The manufacturer provided training shall consist of comprehensive classroom labs and hands-on, in-the-field installation and configuration training. Presentations shall be followed by hands-on labs in which trainees shall practice using the equipment to calibrate and configure a virtual RVSD. The manufacturer-provided training shall include the following items:

- Knowledgeable trainer
- Presentation materials
- Computer files
- Laptop computers

Field training shall provide each trainee with the hands-on opportunity to install and configure the RVSD at roadside.

Technical Assistance. Manufacturer-provided technical support shall be available to assist with the physical installation, alignment, auto-configuration, troubleshooting, maintenance and replacement of each RVSD.

Documentation. RVSD documentation shall include a comprehensive user guide as well as an installer quick reference guide and a user quick-reference guide. The RVSD manufacturer shall supply the following documentation and test results at the time of the bid submittal:

- Volume accuracy data, including performance analyses for:
 - Free-flowing traffic
 - Traffic with a lane roughly 8 ft (2.4m) beyond a 4-ft. (1.2m) concrete barrier
 - 6-ft. (1.8-m) and 240-ft. (73.2m) lateral offset (simultaneous)
- Speed accuracy test data for both per-vehicle and average speed
- Occupancy accuracy test data
- Vehicle classification test data
- Auto-configuration documentation
- FCC CFR 47 certification
- NEMA 250 Standard for Type 4X Enclosure third-party test data
- NEMA TS2-2003 Standard third-party test data

The RVSD shall be warranted free from material and workmanship defects for a period of 2 years from date of shipment.

Terminal Server. If the RVSD does not have a direct Ethernet connection, then a new, rugged terminal server shall be provided with each RVSD at no additional cost to the Department. The terminal server shall be an IP addressable device that converts RS-232/RS-422/RS-485 serial communications protocols to 10/100 Base T/TX Ethernet protocol. The terminal server shall be fully compatible with the RVSD and shall meet the following requirements:

- Serial ports
 - Electronic Industries Association (EIA) 232/422/485, switch selectable.
 - Baud rates [50 bits per second (bps) to 230 kilobits per second (Kbps)]; parity (none, even, odd, mark, space); stop bits (1, 2) and full control of serial parameters including but not limited to:
 - Data Terminal Ready (DTR)
 - Data Carrier Detect (DCD)
 - Data Set Ready (DSR)
 - Clear to Send (CTS)
 - Request to Send (RTS)
 - RTS toggle for half-duplex emulation.
- One 10/100Base-TX Ethernet port that automatically negotiates speed and full-duplex or half-duplex operation.
- Input power must be 120 volts alternating current (VAC).

- Environmental requirements.
 - Operating temperature range: -31 degrees Fahrenheit (F) to 158 degrees F.
 - Operating humidity range of 0 to 95 percent non-condensing.
 - If a separate power adapter is provided, it must be certified by an independent testing company as meeting the above temperature and humidity requirements.
- Diagnostic light emitting diodes (LEDs) for power and Ethernet link status.
- Security.
 - Secure Shell (SSH) version 2.
 - Secure Socket Layer (SSL) version 3/Transport Layer Security (TLS) version 1 that supports Advanced Encryption Standard (AES) 256-bit strong encryption as defined in the Internet Engineering Task Force (IETF) Request for Comments (RFC) 3268 and the Federal Information Processing Standards (FIPS) 197.
- Remote monitoring, diagnostics, and configuration using simple network management protocol (SNMP).
- Ancillary equipment, including power and communication cables, mounting hardware, and power adapter.

Mounting and Installation.

Mounting Assembly. The RVSD shall be mounted directly onto a mounting assembly fastened to a pole or other solid structure as shown on the plans. The RVSD mounting assembly shall be constructed of weather-resistant materials and shall be able to support a 20-lb. (9.1 kg) load.

Mounting Location. The RVSD shall be mounted at a height that is within the manufacturer's recommended mounting heights based on lateral offset from the nearest lane to the mounting pole. Two RVSD units shall not be mounted so that they are pointed directly at each other. The detector bracket shall be attached to the pole with stainless steel straps. Silicon dielectric compound shall be applied to the detector unit base before attaching it to the mounting bracket. Before tightening the bracket it should be aligned to +/- 2 degrees of perpendicular to the roadway and aimed at the detection area. A connector cable is then attached to the unit.

A distance of 40 ft. (12.2 m) or more, along the direction of the roadway, shall separate the RVSDs if they are located on opposing sides of a roadway and the RVSDs shall be configured to operate on different RF channels. It is recommended that the manufacturer be consulted to verify final RVSD placement if the RVSD is to be mounted near large planar surfaces (sound barrier, building, parked vehicles, etc) that run parallel to the monitored roadway. The RVSD shall be located within sight of cabinet for set-up.

Cabling. The cable end connector shall meet the MIL-C-26482 specification. The cable shall be the Orion Wire Combo-2207-2002-PVC-GY or equivalent. The cable shall be terminated only on the two farthest ends of the cable. If 12 VDC is being supplied for the RVSD then the cable length shall not exceed 110 ft. (33.5 m). If 24 VDC is being supplied for the RVSD then the cable length shall not exceed 600 ft. (182.9 m). A 3.5 foot (1.1m) serial cable shall be installed in control cabinet. The connector cable should be strapped to the pole to prevent cable strain.

Lightning Surge Protection. The RVSD shall be installed using lightning surge protection on all communication and power lines. The surge protection devices shall meet or exceed the EN 61000-4-5 Class 4 Specification. The lightning surge protection unit shall be as recommended by the RVSD manufacturer. The lightning surge protection shall withstand 6KV and/or 10,000A.

Power Supply. The RVSD shall include the RVSD manufacturer's power supply for the provided detector unit.

Cabinet. The radar detector shall be connected to power and the communications equipment in the same cabinet that will house additional RVSD and the electronics for a CCTV camera. It shall be connected to a RVSD manufacturer-recommended surge suppression device. A RVSD manufacturer-supplied power supply shall be used for power conversion. A terminal server, if needed, shall be installed inside the cabinet. The radar detection system shall include all equipment and devices recommended by the manufacturer for proper operation.

Method of Measurement. This item shall be measured as each RADAR VEHICLE DETECTION SYSTEM installed, tested, operational and complete with components specified herein.

Basis of Payment. This work will be paid for at the contract unit price per each for RADAR VEHICLE DETECTION SYSTEM, completely installed, tested, and operational in accordance with the contract drawings and these special provisions. Price shall include all labor, materials, equipment, setup, testing and training.

ETHERNET SWITCH

Description. This work shall consist of providing a hardened Ethernet Switch in a cabinet as shown on the plans.

Materials.

General

The Ethernet switch shall be an environmentally hardened managed Ethernet switch compliant with IEEE 802.3 (10Mbps) and IEEE 802.3u (100Mbps) as manufactured by RuggedCom, Series RS900G or approved equal.

Operating Environment

The Ethernet switch shall be capable of operating properly over an ambient temperature range of -40C to +85C without the use of internal or external cooling fans in accordance with IEC 60068-2-1 and 60068-2-2. The Ethernet switch shall be capable of operating properly in relative humidity conditions of 95% non-condensing at 55C in accordance with IEC 60068-2-30. The Ethernet switch shall meet the environmental requirements of traffic control equipment in accordance with NEMA TS 2 (1998), Section 2: Environmental Requirements. Specifically NEMA TS 2 1998 (Section 2.2.8)

- a. Vibration in each of the 3 mutually perpendicular planes.
- b. Vibration frequency sweep of 5 to 30 Hz
- c. Vibration strength = 0.5g
- d. Duration = 3 hours, 1 hour at each plane

The manufacturer shall provide evidence of independent testing verifying performance. In general, the Ethernet switch shall comply with the environmental requirements outlined in Table 1. The Ethernet switch shall be capable of operating properly when exposed to radiated electric fields of up to 10V/m continuously and magnetic fields of up to 40A/m continuously. In general, the Ethernet switch shall comply with the EMI Immunity requirements given in IEC 61850-3 and IEEE1613. The Ethernet switch shall also pass the minimum EMC immunity requirements of EN61800-3. EN61800-3 A11 is the IEC standard for EMC emissions and immunity requirements for Adjustable Speed Power Drive Systems.

Port Requirements

The Ethernet switch shall have 8 10/100BaseTX ports 2 - 1000BaseX fiber optical ports. All fiber optic link ports shall be capable of Multimode or Single mode. The Ethernet switch shall have the option of both small form pluggable (SFP) optics and fixed (soldered on) optics. Single mode optics shall support distances up to 70km. The Ethernet switch shall support the following requirements and options:

10/100BaseTX ports:

- RJ45 connectors
- Cable type: Category 5, unshielded twisted pair (CAT 5 UTP)
- Segment Length: 100m
- Auto-negotiation support (10/100Mbps)
- Auto MDIX crossover capability
- TVS (Transient voltage suppression) between Line +/-, Line +/--ground, to protect the circuitry.
- Full Duplex operation (IEEE 802.3x)

1000BaseX fiber optical ports:

- SFP (small form pluggable)
- LC Connectors (multi-mode), LC or SC Connectors (single-mode)_
- Optical Characteristics: 850 nm multi-mode, 1310 nm single-mode, 1550nm single-mode
- Supports Fiber Type: 62.5/125 um multi-mode fiber, 9/125 um single-mode fiber
- Segment Length: + 2 km with multi-mode fiber, Minimum Optical Budget 14 dB @ 850 nm
- Optical Budget single-mode fiber: minimum 17 dB @ 1310 nm
- Full Duplex operation (IEEE 802.3x)
- Optical power shall be sufficient to transport the signal back to the I55 Weigh Station video collection hut.

Networking Requirements

The Ethernet switch shall support automatic address learning of up to 8192 MAC addresses. The Ethernet switch shall support the following advanced layer 2 functions:

- IEEE 802.1Q VLAN, with support for up to 255 VLANs and 4096 VLAN ID's.
- IEEE 802.1p priority queuing
- IEEE 802.1w rapid spanning tree
- IEEE802.1Q-2005 MSTP (formerly 802.1s)
- IEEE 802.1Q-2005 standard GMRP
- IEEE 802.3x flow control
- IEEE.802.3ad-Link Aggregation
- IGMPv2 with 256 IGMP groups
- Port Rate Limiting
- Configuration via test file which can be modified through standard text editor
- Forwarding/filtering rate shall be 14,880 packets per second (PPS) for 10Mps, 148,800 for 100Mps, 1,488,000 for 1000Mps
- DHCP Option 82

Network Management Functionality Requirements

The Ethernet switch shall provide the following network management functions

- SNMPv2, SNMPv3
- RMON
- GVRP
- Port Mirroring
- 802.1x port security
- SSL – Secure Socket Layer
- SSH – Secure Shell
- TFTP
- Network Time Protocol (NTP),
- Simple Network Time Protocol (SNTP)
- Management via web or Telnet
- Built in Protocol Analyzer which enables traces to be run from within the Ethernet switch operating system. Must be able to forward traces to an IP address or UDP port. Traces for must include but not be limited to the following: STP, MAC, Link, IGMP, GVRP, PPP, Transport, DHCPRA, 802.1X, WEBS, SNMP, IP, TacPlus, Radius, FORW, IPASSIGN, TRANSPORT

Additionally, the Ethernet switch shall demonstrate to provide sub 15 ms failover per Ethernet switch hop in a ring topology.

Programmable Critical Failure Relay

The Ethernet switch shall provide a programmable critical failure out relay that may be configured to activate upon critical error detection such as loss of link or detection of critical system errors. This function shall be user enabled and programmable. The output contacts shall be available in a Form-C configuration with Max Current at 2A@250 VAC, .15A@125VDC, 2@20VDC.

Power Supply Requirements

The Ethernet switch shall be supplied with provisions for operation at the following power supply inputs, 85 to 264 Vac (50/60Hz). The power supply shall be internal to the Ethernet switch. Power supply shall have two stage isolation accomplished via two transformers which step down from primary AC/DC to VDC. A power cord of not less than 5 feet in length shall be supplied as well. The Ethernet switch shall require no more than 15W of power.

'Hipot' Testing in the Field The Ethernet switch shall allow for dielectric strength ('hipot') tests in the field, in accordance with IEC 60255-5, by trained personnel. It shall be capable of enduring a test voltage of at least 2kVrms on power supply inputs above 60V and 0.5kVrms on power supply inputs below 60V. A removable grounding wire shall be provided to allow disconnecting of any transient suppression circuitry at the power supply input to allow for 'hipot' testing without activating the transient suppression circuitry.

Mounting Requirements

The Ethernet switch shall provide options for DIN Rail mounting or panel mounting via brackets

Warranty

The Ethernet switch shall be warranted for defects in material and workmanship for five (5) years after shipment. The Warranty shall include software updates and 7x24 phone support for the 5 year warranty period.

Environmental Requirements

The Ethernet switch shall comply with the atmospheric, vibration, shock and bump requirements outlined in Table 1. This compliance shall be demonstrated by type withstands tests (i.e. 'type tests') as outlined in Table 1 and summarized in a Type Test Report per the test report requirements of each of the standards given in Table 1.

Table 1: Environmental Tests				
Test	Description		Test Level	Severity
IEC 60068-2-1	Cold Temp	Test Ad	-40 deg. C, 16 hours	N/A
IEC 60068-2-2	Dry Heat	Test Bd	+85 deg. C, 16 hours	N/A
IEC 60068-2-30	Humidity	Test Db	95% (non-condensing), 55 deg. C, 6 cycles	N/A
IEC 60255-21-1	Vibration	Test Fc		Class 1
IEC 60255-21-2	Shock	Test Ea		Class 1
IEC 60255-21-2	Bump	Test Eb		Class 1

Safety Requirements / Agency Approvals

The Ethernet switch shall comply with the following electrical safety requirements or equivalents: UL60950 or CSA C22.2 No. 60950 (safety requirements for IT equipment). The Ethernet switch shall also have CE (Europe) qualification. The Ethernet switch shall also comply with FCC Part15 Class A for EMI emissions.

Construction. The Contractor shall securely mount the Ethernet Switch as shown on the plans. The switch shall be installed such that its status lights and ports are easily accessible for maintenance technicians. The switch shall be configured and tested to operate with optimized bandwidth and manage network traffic to enable remote monitoring and control of the field devices. The switch shall be configured to be fully interoperable with the existing network.

Method of Measurement. This items shall be measured ETHERNET SWITCH, installed each, tested, operational and complete.

Basis of Payment. This work shall consist of furnishing all labor, materials, equipment, setup and testing to supply and install an ETHERNET SWITCH, complete in accordance with the contract drawings and these special provisions. Miscellaneous connectors, cables and Ethernet cables shall be included in the unit price.

MODIFICATION OF EXISTING VIDEO DISTRIBUTION SYSTEM (D-1)

December 1, 2014

General. The CCTV (Closed Circuit Television) Distribution System is a fully integrated IP multicast system, comprised primarily of Cisco network hardware and software, providing multi-point Internet Protocol based video images and control over Ethernet to multiple monitoring center locations while minimizing bandwidth demand upon the system.

The system shall be generally configured to collect video images and connect control from field mounted cameras at distribution node locations and to produce video images and controls at designated distribution nodes and at two monitoring locations: District 1 Headquarters in Schaumburg, Traffic Systems Center in Oak Park.

The system shall utilize existing CCTV elements, and shall include all materials and equipment necessary to integrate the new cameras into the existing system. The work under this Special Provision includes the coordination with camera equipment provided under this contract, adjacent contract(s), and coordination with existing CCTV equipment as indicated, including adjustments of or supplements to the equipment as may be required.

Video Control Software. The existing control software is ICX's 360 Cameleon Enterprise camera control. Included in this item, the Contactor shall provide 10 ITS software license units. The Contractor shall configure the cameras within the video control software. This work shall be coordinated with the Electrical Maintenance Contractor.

HD IP Video Decoder. The HD video decoder shall be capable of decoding high definition and standard definition streams using H.264 or MPEG-4 compression technology. The HD video decoder shall provide one (1) DVI-I, one (1) HDMI, and one (1) DP monitor output with two outputs usable simultaneously. The HD video decoder shall be of the same manufacturer as the HD cameras provided on this project.

Video Distribution System (VDS) Control System Driver. The decoder and video output shall be controlled and configured through the VDS. Consequently a software driver for the VDS is required and included as a part of the decoder. The VDS control system is Cameleon ITS manufactured by 360 Surveillance, a division of FLIR. It is the Contractor's responsibility to determine if an existing software driver exists for the proposed decoder. If a driver does not exist for the proposed decoder, the work and cost of developing the driver shall be included in this item.

Provisioning of IP routing and switching equipment. The Contractor shall fully integrate all the equipment to be installed with the existing video distribution system as a part of this item and this coordination will require technical services of the existing system integrator, AT&T, a Cisco Systems Integrator (Contact: Jim Patterson, AT&T, 217.801.2329) and coordination with the State District 1 Electrical Maintenance Contractor. This work shall be included in the item and will not be paid for separately.

Method of Measurement. The modification of existing video distribution system shall be measured for payment as lump sum when furnished, installed, configured, warranted, made fully operational, and tested as detailed herein.

Basis of Payment. This work will be paid for at the contract lump sum price for MODIFICATION OF EXISTING VIDEO DISTRIBUTION SYSTEM which shall be for the work as specified herein.

CLOSED CIRCUIT TELEVISION CAMERA EQUIPMENT

Description. This item shall consist of furnishing and installing equipment for the control and distribution of CCTV video from the CCTV camera to a Video Collection Point (VCP). Transmission for the video and control signals shall be by fiber optic cable as specified elsewhere herein and as indicated in the plans.

Construction Requirements

General. The Contractor shall prepare and submit a shop drawing detailing the complete closed-circuit television cabinet equipment installation. The shop drawings shall identify the installation and specifications 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.

Appropriate connectors shall be furnished and installed to interface the in-cabinet components to the integrated dome camera assembly. The Contractor shall mount the in-cabinet components in the equipment cabinet and connect them to AC power, communications, and video feeds.

Testing. The Contractor shall test each installed CCTV Cabinet Equipment. 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 repeat the test at the communications shelter associated with the CCTV camera.

The Contractor shall maintain a log of all testing and the corresponding 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.

Documentation. One copy of all operations and maintenance manuals for each CCTV component shall be delivered for each assembly installed. In addition, 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.

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.

Materials.

Equipment Installation. The CCTV equipment shall be mounted in an enclosure provided and paid for separately. The installation and mounting of the CCTV equipment shall be fully coordinated with the enclosure or co-location.

Co-location of CCTV equipment. The CCTV equipment maybe co-located within another equipment controller cabinet as indicated.

The equipment shall be securely mounted on a mounting back panel or on a corrosion resistant DIN rail if equipment is configured as such.

Closed Circuit Television Camera Power Supply.

The Closed Circuit Television Camera Power Supply shall supply power to the camera dome assembly. The requirements include:

Input voltage	120 VAC \pm 10%
Output voltage	24 VAC \pm 10%
Operating Temperature Range:	-40°C to +70°C (minimum)
Storage Temperature Range:	-40°C to +75°C (minimum)

The power supply shall include an AC power indicator with power on/off switch. All outputs shall be fused. The power supply shall be sized for the dome units being supplied, considering pan/tilt, heating, and blower requirements, and shall not be less than 100 VA.

Over-voltage Protection. Over-voltage protection shall be provided on the power conductors, camera control conductors, and the video cables. The specific protection is based on the elements being protected.

Incoming Power Protection. The incoming power shall be protected with a filtering surge protector that absorbs power line noise and switching transients. The specified performance shall be as follows:

Peak current	20 kA (8x20 μ s waveshape)
Life Test	5% change
Clamp voltage	280 V typical @ 20 kA
Response time	\leq 5 ns
Continuous service current	10 amps max. 120 VAC/60 Hz
Operating Temperature	-40°C to +75°C (minimum)
Nominal dimensions	7.15 inches by 3.13 inches by 2.3 inches

Camera Cable Surge Protection. The CAT5/5e/6 cable from the camera shall be protected with a lightning surge protector. The unit shall be fully compatible with the camera cabling and PoE and shall have shielded RJ45 jacks for EMI noise suppression. The unit shall provide high performance 3-stage protection:

1. Differential gas discharge tube
2. PTC resettable fuse
3. Low capacitance diode array

Specific requirements include:

Ethernet Connectors	(2) Shielded RJ45 Ports
Gas Tube Voltage	+/- 90 V
PTC Fuse Rating	+/- 1 A
Clamping Voltage	+/- 58 V
Operating Temperature	-40° C to +80° C
Nominal dimensions	6.3 x 3.2 x 2.2 (inches)

The protector shall protect a minimum of four conductors. [Transmit Data (2 wires) and Receiver Data (2 wires)]

Ethernet Switch. The Ethernet switch shall meet the requirements specified for the ETHERNET SWITCH and shall be paid for separately under that pay item.

Enclosure. The CCTV cabinet shall meet the requirements specified for the CLOSED CIRCUIT TELEVISION CABINET or CABINET, MODEL 334 and shall be paid for separately under those respective pay items.

Method of Measurement. CCTV equipment shall be counted, each installed, tested, operational and complete.

Basis Of Payment. This item shall be paid at the contract unit each for CLOSED CIRCUIT TELEVISION CAMERA EQUIPMENT for all labor, materials, equipment, setup and testing. Miscellaneous connectors and cables shall be included in the unit price.

RADAR VEHICLE SENSING SYSTEM

General. This item shall govern the above-ground radar vehicle sensing system (RVSS) in a complete permanent site installation including radar vehicle sensing devices (RVSD), mounting pole and foundation, solar assembly, cabinet and foundation, and appurtenant communications equipment and cabling. The RVSD must be compatible with the Department's existing ATMS software drivers.

RADAR VEHICLE SENSING DEVICE

Sensor Detection. The RVSD shall be equivalent to the Image Sensing Solutions RTMS G4 or Wavetronix SmartSensor HD and shall provide volume average speed, occupancy, classification counts, 85th percentile speed, average headway, average gap, speed bin counts and direction counts for user-configurable time intervals for a minimum of 8 lanes of traffic.

- The RVSD shall provide up to 8 length-based classification bins.
- The RVSD shall provide up to 15 speed bins.
- The RVSD shall provide speed, length, class, lane assignment, and range data for each vehicle detection.
- The RVSD shall provide presence data for at least 8 lanes of traffic.

Detectable Area.

Detection Range. The RVSD shall be able to detect and report information in lanes located with the far boundary at a minimum of 200 ft. from the base of the pole on which the RVSD is mounted.

Barrier Performance. The RVSD shall detect vehicles with the specified accuracy in lanes that are adjacent to a barrier when 50% of a sedan is visible over the barrier from the point of view of the RVSD.

Performance.

Volume Accuracy. The volume data shall be within 5% of truth for a direction of travel during nominal conditions.

Speed Accuracy. Average speed data shall be accurate to within 3 mph (5 kph) for any direction of travel when there are more than 5 cars per lane in an interval. The RVSD shall measure speed using a dual-radar speed trap that calculates the time delay between two different radar beams.

Occupancy Accuracy. Occupancy data shall be within 10% of truth for any direction of travel on a roadway during nominal conditions.

Classification Accuracy. The RVSD shall correctly determine classification for 80% of detected vehicles when the classification bins are at least 10 ft. (3 m) wide and occupancy of all lanes is below 30%.

Performance Maintenance. The RVSD shall not require cleaning or adjustment to maintain performance.

The RVSD shall not rely on battery backup to store configuration information, thus eliminating any need for battery replacement.

Once the RVSD is calibrated, it shall not require recalibration to maintain performance unless the roadway configuration changes.

The designed mean time between failures (MTBF) of the RVSD, operating continuously, shall be 10 years or more.

Physical Properties. The RVSD shall not exceed 8 lbs in weight. The RVSD shall not exceed 14 in. by 12 in. by 6 in. (35.6cm x 30.5cm x 15.2cm) in its physical dimensions. All external parts of the RVSD shall be ultraviolet-resistant, corrosion-resistant, and protected from fungus growth and moisture deterioration.

Enclosure. The enclosure shall be classified “f1” outdoor weatherability in accordance with UL 746C. The RVSD shall be classified as watertight according to the NEMA 250 Standard. The RVSD enclosure shall conform to test criteria set forth in the NEMA 250 standard for type 4X enclosures. Test results shall be provided for each of the following type 4X criteria:

- External Icing (NEMA 250 clause 5.6)
- Hose-down (NEMA 250 clause 5.7)
- 4X Corrosion Protection (NEMA 250 clause 5.10)
- Gasket (NEMA 250 clause 5.14)

The RVSD enclosure shall include a connector that meets the MIL-C-26482 specification. The MIL-C-26482 connector shall provide contacts for all data and power connections.

Power Requirements. The RVSD shall consume less than 10 W. The RVSD shall operate with a DC input between 12 VDC and 28 VDC.

Communication Ports. The RVSD shall have an RS-485 port and an RS 232 port. The RVSD shall have contact closure pairs for each lane in order to communicate with existing locations. The RS-232 port shall be full-duplex and shall support true RTS/CTS hardware handshaking for interfacing with various communication devices. The RVSD shall support the upload of new firmware into the RVSD’s non-volatile memory over either communication port. The communication ports shall support all of the following baud rates: 9600, 19200, 38400, 57600, and 115200 bps.

Data Protocols. The RVSD shall support 3 different data protocols for all lanes being monitored: interval (bin) data, event (per vehicle) data, and real-time true presence data. The interval (bin) data packet protocol shall support:

- Sensory ID
- A timestamp
- Total volumes
- Average speed values
- Occupancy in 0.1% increments
- Volume in up to 8 length-based user-defined vehicle classification bins
- Volume for both directions of traffic (bin by direction)
- 85th percentile speed in either mph or kph

The real-time true presence data packet protocol shall support:

- Sensor ID
- True presence information for each lane

Data Buffering. The RVSD shall store, in non-volatile memory, at least 9,000 interval data packets.

Radar Design. The RVSD shall employ a dual radar design that includes 2 receive channels. The RVSD shall not rely on temperatures compensation circuitry to maintain transmit frequency stability.

Antenna Design. The RVSD antennae shall be designed on printed circuit boards.

Resolution. The RVSD shall transmit a signal with a bandwidth of at least 240 MHz

RF Channels. The RVSD shall provide at least 4 RF channels so that multiple units can be mounted in the same vicinity without causing interference between them.

Configuration.

Auto-configuration. The RVSD shall have a method for automatically defining traffic lanes or detection zones without requiring user intervention.

Manual configuration. The auto-configuration method shall not prohibit the ability of the user to manually adjust the RVSD configuration. The RVSD shall support the configuring of lanes or detection zones in one-ft. (0.3-m) increments.

Windows Mobile-based Software. The RVSD shall include graphical user interface software that displays all configured lanes and the current traffic pattern, as well as, measured speed or length. The graphical interface shall operate on Windows Mobile Windows 2000, windows XP and Windows Vista in the .NET framework.

- Automatically find the correct baud rate
- Operate over a TCP/IP/NTCIP connection

Operating Conditions. The RVSD shall maintain accurate performance in all weather conditions. The RVSD shall be capable of continuous operation over an ambient temperature range of 40°F to 165.2°F (-40°C to 74°C). The RVSD shall be capable of continuous operation over a relative humidity range of 5% to 95% (non-condensing).

Testing.

FCC. Each RVSD shall be Federal Communication Commission (FCC) certified under CFR 47, Part 15, section 15.249 as an intentional radiator.

NEMA TS2-2003 Testing. The RVSD shall comply with the applicable standards stated in the NEMA TS2-2003 Standard.

Manufacturing. The internal electronics shall comply with the requirements set forth in IPC-A-610C Class 3, Acceptability of Electronic Assemblies.

Support. The RVSD manufacturer shall provide both training and technical support services.

Training. The manufacturer provided training shall be sufficient to fully train installers and operators in the installation, configuration, and use of the RVSD to ensure accurate RVSD performance. The training shall be conducted locally. The manufacturer provided training shall consist of comprehensive classroom labs and hands-on, in-the-field installation and configuration training. Presentations shall be followed by hands-on labs in which trainees shall practice using the equipment to calibrate and configure a virtual RVSD. The manufacturer-provided training shall include the following items:

- Knowledgeable trainer
- Presentation materials
- Computer files
- Laptop computers

Field training shall provide each trainee with the hands-on opportunity to install and configure the RVSD at roadside.

Technical Assistance. Manufacturer-provided technical support shall be available to assist with the physical installation, alignment, auto-configuration, troubleshooting, maintenance and replacement of each RVSD.

Documentation. RVSD documentation shall include a comprehensive user guide as well as an installer quick reference guide and a user quick-reference guide. The RVSD manufacturer shall supply the following documentation and test results at the time of the bid submittal:

- Volume accuracy data, including performance analyses for:
 - Free-flowing traffic
 - Traffic with a lane roughly 8 ft (2.4m) beyond a 4-ft. (1.2m) concrete barrier
 - 6-ft. (1.8-m) and 240-ft. (73.2m) lateral offset (simultaneous)
- Speed accuracy test data for both per-vehicle and average speed
- Occupancy accuracy test data
- Vehicle classification test data
- Auto-configuration documentation
- FCC CFR 47 certification
- NEMA 250 Standard for Type 4X Enclosure third-party test data
- NEMA TS2-2003 Standard third-party test data

The RVSD shall be warranted free from material and workmanship defects for a period of 2 years from date of shipment.

Terminal Server. If the RVSD does not have a direct Ethernet connection, then a new, rugged terminal server shall be provided with each RVSD at no additional cost to the Department. The terminal server shall be an IP addressable device that converts RS-232/RS-422/RS-485 serial communications protocols to 10/100 Base T/TX Ethernet protocol. The terminal server shall be fully compatible with the RVSD and shall meet the following requirements:

- Serial ports
 - Electronic Industries Association (EIA) 232/422/485, switch selectable.
 - Baud rates [50 bits per second (bps) to 230 kilobits per second (Kbps)]; parity (none, even, odd, mark, space); stop bits (1, 2) and full control of serial parameters including but not limited to:
 - Data Terminal Ready (DTR)
 - Data Carrier Detect (DCD)
 - Data Set Ready (DSR)
 - Clear to Send (CTS)
 - Request to Send (RTS)
 - RTS toggle for half-duplex emulation.
- One 10/100Base-TX Ethernet port that automatically negotiates speed and full-duplex or half-duplex operation.
- Input power must be 120 volts alternating current (VAC).
- Environmental requirements.
 - Operating temperature range: -31 degrees Fahrenheit (F) to 158 degrees F.
 - Operating humidity range of 0 to 95 percent non-condensing.
 - If a separate power adapter is provided, it must be certified by an independent testing company as meeting the above temperature and humidity requirements.
- Diagnostic light emitting diodes (LEDs) for power and Ethernet link status.

- Security.
 - Secure Shell (SSH) version 2.
 - Secure Socket Layer (SSL) version 3/Transport Layer Security (TLS) version 1 that supports Advanced Encryption Standard (AES) 256-bit strong encryption as defined in the Internet Engineering Task Force (IETF) Request for Comments (RFC) 3268 and the Federal Information Processing Standards (FIPS) 197.
- Remote monitoring, diagnostics, and configuration using simple network management protocol (SNMP).
- Ancillary equipment, including power and communication cables, mounting hardware, and power adapter.

Mounting and Installation.

Mounting Assembly. The RVSD shall be mounted directly onto a mounting assembly fastened to a pole or other solid structure as shown on the plans. The RVSD mounting assembly shall be constructed of weather-resistant materials and shall be able to support a 20-lb. (9.1 kg) load.

Mounting Location. The RVSD shall be mounted at a height that is within the manufacturer's recommended mounting heights based on lateral offset from the nearest lane to the mounting pole. Two RVSD units shall not be mounted so that they are pointed directly at each other. The detector bracket shall be attached to the pole with stainless steel straps. Silicon dielectric compound shall be applied to the detector unit base before attaching it to the mounting bracket. Before tightening the bracket it should be aligned to +/- 2 degrees of perpendicular to the roadway and aimed at the detection area. A connector cable is then attached to the unit.

A distance of 40 ft. (12.2 m) or more, along the direction of the roadway, shall separate the RVSDs if they are located on opposing sides of a roadway and the RVSDs shall be configured to operate on different RF channels. It is recommended that the manufacturer be consulted to verify final RVSD placement if the RVSD is to be mounted near large planar surfaces (sound barrier, building, parked vehicles, etc) that run parallel to the monitored roadway. The RVSD shall be located within sight of cabinet for set-up.

Cabling. The cable end connector shall meet the MIL-C-26482 specification. The cable shall be the Orion Wire Combo-2207-2002-PVC-GY or equivalent. The cable shall be terminated only on the two farthest ends of the cable. If 12 VDC is being supplied for the RVSD then the cable length shall not exceed 110 ft. (33.5 m). If 24 VDC is being supplied for the RVSD then the cable length shall not exceed 600 ft. (182.9 m). A 3.5 foot (1.1m) serial cable shall be installed in control cabinet. The connector cable should be strapped to the pole to prevent cable strain.

Lightning Surge Protection. The RVSD shall be installed using lightning surge protection on all communication and power lines. The surge protection devices shall meet or exceed the EN 61000-4-5 Class 4 Specification. The lightning surge protection unit shall be as recommended by the RVSD manufacturer. The lightning surge protection shall withstand 6KV and/or 10,000A.

Power Supply. The RVSD shall include the RVSD manufacturer's power supply for the provided detector unit.

Cabinet. The radar detector shall be connected to power and the communications equipment in the same cabinet that will house additional RVSD and the electronics for a CCTV camera. It shall be connected to a RVSD manufacturer-recommended surge suppression device. A RVSD manufacturer-supplied power supply shall be used for power conversion. A terminal server, if needed, shall be installed inside the cabinet. The radar detection system shall include all equipment and devices recommended by the manufacturer for proper operation.

MOUNTING POLE

Material. The mounting pole shall support the solar power assembly, radar vehicle sensors units, and enclosure. The pole shall be a conventional-type round tapered aluminum pole without mast arm, complete with all required hardware including bolt covers as specified herein and applicable portions of Section 1069 of the Standard Specifications.

The pole shall be designed to AASHTO design criteria for 80 MPH (128.72 KPH) wind loading. The pole shall be designed such that the deflection of the pole from the vertical axis does not exceed one degree per 10 feet (3.04M) of nominal pole height, as caused by the dead weight moment of design load for mounted items, including 2 RVSDs, Solar Panels, and enclosure as shown on the plans. The actual combinations of these items are shown on the plans. The poles shall be the same regardless of combination.

The pole shall be coordinated with all items being provided on this project to be free of susceptibility to harmful harmonics and vibration. The pole shall incorporate an integral vibration damper. The submittal for approval shall address this requirement.

The shaft shall be of smooth circular cross section seamless tapered aluminum alloy, type 6063-T6. It shall be free of dents, kinks, ripples, scratches or other defects. The outer wall shall have a satin ground finish, 50 grit or finer.

The shaft shall have a cast aluminum base plate conforming to ASTM designation B108 and SG70A for aluminum alloy, welded to the pole shaft. All welding shall be performed by the inert gas shielded arc method, and all welds shall be free from cracks and pores. The base plate shall have slots suitable for 1 inch (25.4 mm) diameter anchor bolts and 11.5 inch ((292.1mm) nominal bolt circles.

The height of the pole shall be 30 feet (9.144m), or as otherwise noted on the plans. The shaft for the poles shall have an 8 inch (203.2 mm) bottom diameter and shall taper to a consistent diameter of 6 inches (152.4 mm) at a point 18'-7" (5.67m) up from the base. The shaft shall have a nominal wall thickness of not less than 250 mils.

The shaft shall have a 4-inch by 8-inch (101.6 mm x 203.2 mm) handhole with rounded ends. The handhole shall be reinforced and shall have a cover of the same materials as the pole held in place with 1/8" (3.175 mm)-20 steel core nylon screws. The holes for the screws shall be tapped with the appropriate thread configuration. The handhole shall be located 18 inches (457.2mm) from the bottom of the pole to the centerline of the handhole.

The support structures shall provide a means of routing the required conductors inside the structure from the base of the structure. These conductors shall not be exposed between ground level and the base of the items being installed. The shaft shall be equipped with a ground lug, welded inside the shaft, suitable for No. 8 and No. 4 wires, located adjacent to and accessible from the handhole. The support structure shall position the RVSD on a mounting bracket as recommended by Manufacturer of RVSD. The mounting height shall be as recommended by Manufacturer of RVSD.

The pole shall be securely mounted on a 24-inch diameter, concrete foundation. The concrete foundation shall meet the requirements of the Concrete Foundation specified herein.

Installation. The pole shall be set plumb on the foundation without the use of shims grout or any other leveling devices under the pole base.

SOLAR POWER ASSEMBLY

Material.

The solar arrays shall be made in North America and have a 20-year factory warranty. Each solar array shall provide a minimum of 120 watts of peak power. The solar arrays shall be UL listed, FM Class 1, Div. 11, Group C & D approved.

The array mount shall attach to the side of the pole with stainless steel fasteners. The array mount shall be stainless steel. The array shall be capable of withstanding 125 mph winds.

A solar charge regulator shall be provided that is UL listed and rated for a minimum of 10 amperes continuous current, with solid state, low voltage disconnect. The solar charge regulator shall be sealed with internal temperature compensation, lightning protection, reverse polarity protection and LED indicators. The regulator shall be FM Class 1, Div. II, Groups ABCD and have the CE mark.

The Contractor shall supply batteries that are 12 V, gel-electrolyte, non-spillable, and maintenance free units. The batteries shall have a minimum rating of 120 ampere hours. The batteries shall be capable of supplying power for the system it is attached to for a period of 7 days between charges. The batteries shall be manufactured in the United States and be available from a minimum of 5 different vendors. The batteries shall have a minimum warranty of 1 year from date of IDOT final acceptance.

Installation. The solar arrays shall be mounted on poles at locations shown on plans. The arrays shall face south. The batteries and power regulator shall be installed in cabinets as shown in plans. Terminal Blocks shall be provided that have separate connections for the solar array power, the battery power, and the load power. 2-20A circuit breakers shall be installed on the back of the cabinet. One shall be connected to the + of the solar panels. The other shall be connected to the + output of the charge regulator.

Testing. The solar power assembly shall be tested for a period of 30 days prior to final acceptance by IDOT. Once a day, 3 voltages shall be checked and documented. These voltages are: solar array output voltage, battery voltage, and charge regulator output voltage. If the voltage on the output of the charge regulator and/or the batteries is below 10V on any day, the Contractor shall add more solar panels and/or more batteries at no additional cost to the Department.

CABINET

The cabinet shall be a standard ESP3 / Type 3 cabinet as shown on the plans and specified herein. It shall include anchor bolts, bases, pedestals, posts, fans, cable harnesses, ground rods, terminal boards, shelves, mounting hardware, and all miscellaneous items needed as directed by the Engineer.

Materials. Cabinets shall be of fabricated aluminum supplied in sizes with minimum inside dimensions as listed below.

TYPE	HEIGHT	WIDTH	DEPTH	THICKNESS	OPENING
E.S.P. 3	49-1/2"	30"	17"	3/16"	38" x 27-11/2"

Cabinets shall be watertight. Doors shall be gasketed to provide a waterproof seal. Bases shall be caulked to obtain a moisture-proof bond. All cabinet types shall have a minimum of two (2) shelves for setting detectors and other equipment on, and Type 2 Corbin brass locks or equal.

E.S.P. Type 3 cabinets shall be fitted with a thermostatically controlled fan. It shall be mounted at the top of the cabinet for a forced air fan system that has a screened air exhaust opening under roof overhang and no opening in top of cabinetry. The fan shall be capable of operating at 130C.F.M. (3.68m³/min) at .160" (4.1mm) of water static pressure.

Materials shall conform to controller cabinets as listed in the Standard Specifications 1074.03 except that the door shall not have any outside designation nor shall the cabinet door be equipped with a police door or louvers.

Installation Details. Installation shall conform to applicable portions of Section 863 of the Standard Specifications. Cabinets shall be primed and painted. The final coat color shall be specified by the Department at the time of the pre-construction meeting. Interior of all cabinets shall be painted high gloss white.

All cabinets shall be serviced by 117 volts AC power and a telecommunication system. Each cabinet shall be equipped with a 10 ampere circuit breaker, ground rod, 115 VAC RFI filtering surge protector (ACD-340 surrestor), 130 volt, 70 joules, 10 amp varistor, a pull chain porcelain base light fixture with a 3 prong 110 volt outlet. The porcelain fixture shall be mounted on a metal plate that shall be mounted on the cabinet ceiling. 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 or switch. If more than one wire has a common terminal on a terminal strip, the adjacent strip shall be used and an appropriate jumpered connection shall be made.

All cables and wiring entering a cabinet shall be dressed, harnessed, tied, laced, and clamped to produce a workmanlike wiring installation.

All cables (power, communications) shall be labeled with a panduit type cable tag. The tag shall identify the type of cable and the cable destination.

A copper grounding bus shall be mounted on the rear wall of the cabinets.

Each cabinet shall contain a wiring diagram of the installation in addition to the diagrams which are to be submitted to the Engineer.

Prior to the wiring of the cabinet, the Contractor shall submit box print for approval before cabinet wiring shall begin.

The Contractor shall furnish three (3) diagrams of the internal and external connections of the equipment in each cabinet. Contractor 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 in the cabinet.

Incidental to the cost of each cabinet, the Contractor shall construct 6" P.C.C. pad of a rectangular area 3' x 4' immediately adjacent to the cabinet foundation on the same side of the foundation as the cabinet door, with the 4' dimension of the rectangle parallel to the cabinet door when closed. The concrete pad width shall extend a minimum of 6" beyond each side of the foundation. The pad will not be required if the foundation is immediately adjacent to or within a paved area as determined by the Engineer.

No raceways shall be allowed to enter cabinet through the sides, top or back walls.

Anchor bolts shall be installed for pedestal and base mounted cabinets. These shall be considered as incidental to the cost of the cabinets.

Cable harnesses, terminal boards, and mounting hardware shall be installed as needed. These items shall be considered as incidental to the cost of the contract.

Terminal blocks provided in field cabinets shall be the heavy duty barrier type. The terminal block shall be a minimum of 2" wide and 1-3/16" deep. Center to center of the terminal screws or studs shall be a minimum of 21/32" 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.

CELLULAR MODEM

A rugged outdoor 3G/4G cellular modem shall be provided for backhaul communications of outputs from radar vehicle sensing devices (RVSD).

Materials. The cellular modem shall have a small form factor and be manufactured for outdoor use and shall operate in harsh environments (operating temperature range of -22°F to +158°F). It shall be static IP addressable and include an Ethernet interface (10/100 Base-T, RJ45) and LED status indicators. The cellular modem shall support real-time 2-way communications for remote management and shall include management software by the modem manufacturer. The modem shall include an external antenna and cabling for optimum signal reception as recommended by the manufacturer. It shall include a power supply from the manufacturer of the modem and shall include the manufacturer's installation and operations manuals and documentation of exact equipment model and serial numbers in hardcopy and PDF formats on CD-ROM. The modem shall be approved by Verizon Wireless for use on their network.

Construction Details. The cellular modem shall be mounted securely inside an enclosure as shown on the plans. It shall be placed to minimize the length of antenna cabling. Power supply and connections shall be installed in accordance with the manufacturer's recommendations. Three copies of the cellular modem product manuals shall be provided to the Department. One copy shall be stored on site inside the equipment cabinet.

CONCRETE FOUNDATION

The concrete foundation for the mounting pole and cabinet for the RVSS site shall include 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 and in accordance with applicable portions of Section 878 of the Standard Specifications or as directed by the Engineer.

Materials. The materials shall conform to the specifications of Class SI concrete and concrete Reinforcement Bars in the Standard Specifications for Road and Bridge Construction. The conduit and fittings within the limits of the foundation shall conform to the same requirements as that specified for the conduit outside these limits.

Anchor bolts shall meet the requirements of Section 505 of the Standard Specifications and the material shall conform to the requirements of Article 1006.09 of the Standard Specifications for Road and Bridge Construction. A ground rod shall be installed in each foundation and shall conform to Section 806. Unless otherwise indicated in plans, ground rods shall be one piece copper-clad steel rods 3/4" x 10'.

Construction Details. Concrete foundations shall be Type A or Type D and location as specified on the plans. The foundation minimum depth shall be 48 inches below grade. The top of the foundation shall be finished level. Shimming will not be permitted. All edges along the top of the foundation shall be given 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. Whenever the excavation is irregular, a form shall be used to provide the proper dimension of the entire foundation below the ground surface. Where a concrete foundation is contiguous to a sidewalk, preformed joint filler of 1/2 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 space the anchor bolts in accordance with the pattern of the bolt holes in the base. After installation of cables, all conduit openings in foundations shall be sealed with an approved mastic. The required number and size of galvanized steel conduits shall be installed in every concrete foundation as shown on the plans. An excess of galvanized steel conduits shall be installed in every concrete foundation. These excess stubs shall be 2 inches in diameter. Placement and quantity shall be determined by the Engineer, and the ends of the stubs shall be capped.

Incidental to the cost of each control box foundation, the Contractor shall construct a 5-inch depth P.C.C. sidewalk of a rectangular area 3 ft by 4 ft immediately adjacent to the cabinet door, with the 4 ft dimension of the rectangle parallel to the cabinet door when closed. This paragraph shall be applicable at all cabinet foundation 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. Where indicated on the plans, a safety railing shall be provided. Safety railing shall be made of galvanized steel, with a width equal to the concrete pad and height of 36 inches.

Method of Measurement. This item shall be measured as each RADAR VEHICLE SENSING SYSTEM installed, tested, operational and complete.

Basis of Payment. This work will be paid for at the contract unit price per each for RADAR VEHICLE SENSING SYSTEM, completely installed, tested, and operational in accordance with the contract drawings and these special provisions. Price shall include all labor, materials, equipment, setup, testing and training.

ATMS SYSTEM INTEGRATION

Description.

This item includes integrating all remote vehicle sensing device (RVSD) units and all telemetry as shown in the plans into the IDOT Advanced Traffic Management System (ATMS). This item includes all software, programming, miscellaneous devices, and cables necessary to provide the successful expansion of the expressway traffic monitoring system to reflect changes in field sensors introduced by this project.

Integration.

The Contractor shall subcontract with the development and maintenance contractor for the ATMS to perform all ATMS software and hardware modifications. Contact information is:

Delcan, a PARSONS Company
c/o Scott Lee – project manager
650 E Algonquin Rd, Suite 104
Schaumburg, IL 60173

Phone: (847) 925-0120

The ATMS system shall be upgraded and expanded to add all RVSD units, RVSS, and all telemetry shown on the plans. The integration must be made to make this expansion a seamless transition, and function in an identical manner as the existing expressway surveillance. Work under this item includes but is not limited to the following:

- (a) Integrate data from the additional RVSD units thru the NTCIP interface at a rate of once every 20 seconds.
- (b) Create new Vehicle Detection Station (VDS) display, data table, description and control panel display, and travel time tables.
- (c) Modify the existing graphic user interface, report generators, data bases, broadcast feeds (both subscriber and internal), data tables for the dynamic message sign control.
- (d) Display on the Traffic Systems Center ATMS maps, and all user interfaces to the new VDS data including Volume, Occupancy, Speed, Vehicle Classification (length), and operational status.
- (e) Create new segments and groupings used to display travel time and congestion data to the Dynamic Message Signs.
- (f) Update the Lake Michigan Interstate Gateway Alliance (LMIGA) data feeds for presentation of the additional data to the web page and user interfaces.
- (g) Develop an integration acceptance test plan and conduct said test to verify that all RVSD units and telemetry has been properly integrated according to the requirements. This acceptance plan shall conclude with a 30 day burn-in period. During the burn-in period, the subcontractor shall identify and resolve any problems identified with the integration.
- (h) Include software provisions to accommodate the replacement of RVSS vehicle data to loop vehicle data for westbound I-90 / I-190 lanes.

Basis of Payment.

This item shall be paid for at the contract lump sum price for ATMS SYSTEM INTEGRATION, which price shall be payment in full for the work described. Acceptance shall be granted after integration, as described above, and after passing an acceptance test proposed by the Subcontractor, and agreed upon by the Engineer.

CLOSED CIRCUIT TELEVISION CAMERA, HD (D-1)

Effective: December 1, 2014

1. Description.

This item shall consist of furnishing and installing an integrated High Definition Closed-Circuit Television (CCTV) Dome Camera Assembly as described herein and as indicated in the Plans.

2. Materials.

2.1 General. The HD (High Definition) CCTV Dome Color Camera shall be a rugged, non-pressurized, outdoor surveillance domed camera system. The HD CCTV Dome Camera shall be designed to perform over a wide range of environmental and lighting conditions and automatically switches from color daytime to monochrome nighttime operation. The high definition camera shall be either a Bosch Autodome IP series 7000 HD, Pelco Spectra 1080P HD Series, or a Siquira HSD820H3-E series in compliance with the requirement herein.

Camera shall use a standard Web browser interface for remote administration and configuration of camera parameters. The browser interface shall provide PTZ control including preset and pattern and on-screen display (OSD) for access to camera programming.

All equipment and materials used shall be standard components that are regularly manufactured and utilized in the manufacturer's system.

The manufacturer shall be ISO 14001 Certified. The manufacturer's quality system shall be in compliance with the I.S./ISO 9001/EN 29001, QUALITY SYSTEM. The manufacturer shall provide a three year (3) warranty. The manufacturer shall pay inbound and outbound shipping charges during the warranty period for products returned as warranty claims. The manufacturer shall also provide an advance exchange program for warranty claims.

The warranty period shall begin on the date of final acceptance of the video distribution system. This warranty shall include repair or replacement of all failed components via a factory authorized repair facility. All items sent to the repair facility for repair shall be returned within two weeks of the date of receipt at the facility. The repair facility location shall be in the United States. Any extended warranty coverage required to comply with the specified warranty period shall be provided as a part of this pay item at no additional cost to the Department.

- 2.2 Physical construction.** The CCTV Dome Camera shall be provided in a NEMA 4X or IP66 certified, rugged, weather-resistant package. The CCTV Dome Camera shall also comply with the following requirements:

Environmental	Requirement
IP Rating	IP 66
Weight (max.)	10 lbs
Overall Dimensions	10" dia. x 14"
Humidity	0 to 100%
Operating temperature	-40°C to 50°C
Mount	1 ½" NPT

The CCTV dome camera shall be equipped with a fan and heater controlled by a thermostat. The heater shall prevent internal fogging of the lower dome throughout the operating temperature range of the camera.

An optional rugged clear dome bubble shall be available from the CCTV camera manufacturer. The rugged dome shall be made from 3mm thick polycarbonate, designed to meet stringent strength standards without compromising optical clarity. The dome, by itself, shall withstand a 100 foot-pound impact. This energy is equivalent to that of a 10 lb sledgehammer being dropped from a height of 10 feet. The dome, when installed in the CCTV camera, shall exceed the UL 1598 horizontal impact standard for lighting fixtures, by a factor of 10. The submittal needs to indicate compliance with this requirement.

2.3 Power. The CCTV Dome Camera shall be designed to operate from a 120V power source. The appropriate power supply, if required for the CCTV Dome Camera to operate, shall be included as a part of this item. The power requirements for the camera shall comply with the following:

Item	Requirement	
Port	RJ-45 for 100Base-TX; Auto MDI/MDI-X;	
Cabling Type	CAT5 cable or better for 100Base-TX	
Input Voltage	18 to 32 VAC; 24 VAC nominal; 22 to 27 VDC; 24 VDC nominal	
Input Power	24 VAC nominal	25 VA nominal (without heater and blower);
		75 VA nominal (with heater and blower)
	24 VDC nominal	0.7 A nominal (without heater and blower); 3 A nominal (with heater and blower)
	PoE	IEEE802.3af (without heater and blower)

2.4 Camera. The camera shall provide a minimum of two simultaneous video streams with a 2.1 megapixel (MPx) 1920 x 1080 resolution, auto iris with 30X optical, and 12X digital zoom. The CCTV Dome Camera shall incorporate

Item	Requirement
Sensor Type	1/2.8-inch Type Exmor CMOS sensor
Optical Zoom	30X
Digital Zoom	12X
Maximum Resolution	1920 x 1080
Lens	f/1.6 - f/4.7, (4.3 mm - 129.0 mm optical)
Horizontal Angle of View	59° (wide) - 2° (tele)
Aspect Ratio	16:9
Light Sensitivity	Sensitivity in lux for 90% reflectance, f/1.6 (wide angle), 28 dB gain at 30 IRE (30% of signal level) with Sensitivity Boost OFF; 4X improvement to sensitivity with Sensitivity Boost ON
Color (33 ms)	0.65 lux
Color (250 ms)	0.07 lux
Mono (33 ms)	0.20 lux
Mono (250 ms)	0.015 lux
Day/Night Capabilities	Yes
IR Cut Filter	Yes
IR Trace	Curves 850 nm and 950 nm
Wide Dynamic Range	80dB
Iris Control	Auto iris with manual override
Backlight Compensation	Auto / Manual
Automatic Gain Control	Auto / Manual
Active Noise Filtering	Auto / Manual
Electronic Image Stabilization (EIS)	30X

2.5 Video

Item	Requirement
Video Encoding	H.264 in High, Main, or Base profiles and MJPEG
Video Streams	Up to 2 simultaneous streams, the second stream is variable based on the setup of the primary stream
Frame Rate	Up to 30, 25, 15, 12.5, 10, 8.333, 7.5, 6, 5, 3, 2.5, 2, 1 (depending upon coding, resolution, and stream configuration)
Minimum Available Resolutions	1920 x 1080 1280 x 720 720 x 480
Supported Protocols	TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, IPv6, SNMP v2c/v3, QoS, HTTP, HTTPS, LDAP (client), SSH, SSL, SMTP, FTP, and 802.1x (EAP)
Security Access	Password protected
Software Interface	Web browser view and setup

2.6 PTZ Mechanical

Item	Requirement
Pan Movement	360° continuous pan rotation
Pan Speed	Variable between 400° per second continuous pan to 5.0° per second
Vertical Tilt	Unobstructed tilt of +1° to -90°
Manual Control Speed	Pan speed of 0.1° to 80° per second; tilt operation shall range from 0.5° to 40° per second.
Automatic Preset Speed	Pan speed of 280° and a tilt speed of 160° per second
Presets	255 positions
Tours	2 tours
Preset Accuracy	± 0.2°
Proportional Pan/Tilt Speed	Speed decreases in proportion to the increasing depth of zoom
Motor	Continuous duty and variable speed, operating at 18 to 32 VAC, 24 VAC nominal
Window Blanking	16 blanked windows
Auto Flip	Rotates dome 180° at bottom of tilt travel
Power Consumption	Nominal 45 VA (without heater and blower running) Nominal 75 VA (with heater and blower running)

The camera shall provide a freeze frame feature that freezes a camera image as a preprogrammed preset is called, providing a live view once positioned. Selections for on/off shall be available through the embedded Web browser.

The camera shall provide image stabilization to compensate for vibration introduced into the camera.

The camera shall support IPv6 configurations in conjunction with IPv4.

3. **Still Picture Capture.** The camera shall be capable of capturing a still image in JPEG format and automatically transferring this image to an FTP site. The resolution of the image shall be user selectable. The frequency of captures shall be user settable and shall as a minimum range from 1 picture every 30 seconds to 1 picture every five minutes.
4. **Video Distribution System (VDS) Control System Driver.** The camera and video output shall be controller and configured through the VDS. Consequently a software driver for the VDS is required and included as a part of the CCTV camera. The VDS control system is Cameleon ITS manufactured by 360 Surveillance, a division of FLIR. It is the Contractor's responsibility to determine if an existing software driver exists for the propose camera manufacturer. If a driver does not exist for the proposed CCTV camera, the work and cost of developing the driver shall be included in this item.
5. **Testing.** The Contractor shall test each CCTV Dome Camera Assembly in the presence of the Engineer after the camera is installed. This test may be done locally at the camera support structure.
6. **Product Support.** The manufacturer shall provide technical support via email, fax and toll-free telephone. The above forms of support shall be provided Monday through Friday, 8:00am to 8:00pm EST.
7. **Installation.** The Contractor shall install the CCTV camera in accordance with manufacturer's instructions. The camera firmware shall be the latest stable release available at the time of installation.
8. **Documentation.** In addition to the initial submittal(s) prior to procurement, the Contractor shall provide installation and operation manuals, documentation of exact equipment model and serial numbers, software/firmware version numbers, in hardcopy and PDF formats on CD-ROM.
9. **Measurement.** Closed-Circuit Television (CCTV) Cameras, High Definition shall be counted as each upon successful completion of the testing described herein for payment.
10. **Basis of Payment.** This item will be paid for at the contract unit price each for CLOSED CIRCUIT TELEVISION CAMERA, which shall be payment in full for all material and work as specified herein.

CABINET HOUSING EQUIPMENT, TYPE IV

Description. This item shall consist of furnishing and installing cabinets of the type and size specified in place including anchor bolts, bases, pedestals, posts, fans, 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 sizes with minimum inside dimensions as listed below.

TYPE	HEIGHT	WIDTH	DEPTH	THICKNESS	OPENING
E.S.P. 1	22-1/2"	14-1/4"	9-3/4"	3/16"	18" x 11"
E.S.P. 2	36"	20"	15"	3/16"	28" x 17-1/2"
E.S.P. 3	49-1/2"	30"	17"	3/16"	38" x 27-11/2"
E.S.P. 4	55"	44"	26"	3/16"	2-1/2" x 41-1/2"

Cabinets shall be watertight. Doors shall be gasketed to provide a waterproof seal. Bases shall be caulked to obtain a moisture-proof bond. All cabinet types shall have a minimum of two (2) shelves for setting detectors and other equipment on, and Type 2 Corbin brass locks or equal.

E.S.P. Type 3 and Type 4 cabinets shall be fitted with a thermostatically controlled fan. It shall be mounted at the top of the cabinet for a forced air fan system that has a screened air exhaust opening under roof overhang and no opening in top of cabinetry. The fan shall be capable of operating at 130C.F.M. (3.68m³/min) at .160" (4.1mm) of water static pressure.

Where the E.S.P. Type 3 cabinet is used to house equipment controlling ramp metering signals, the E.S.P. Type 3 cabinet shall have a signal load relay installed. The signal load relay shall consist of two components, a base which is mounted on the E.S.P. Type 3 cabinet wall and a locking screw. The coil of this relay shall be connected to the mark output of the signal change tone receiver. The one set contacts of the load relay shall be used to change the ramp signals and one set of contacts shall be used to key the mark input to the signal change transmitter. This relay shall be incidental to the cost of the cabinet when used.

Materials shall conform to controller cabinets as listed in the Standard Specifications 1074.03 except that the door shall not have any outside designation nor shall the cabinet door be equipped with a police door or louvers. Post top mounted cabinets, shall have a 1/4" (6.4mm) bottom of cabinet welded.

Each Induction loop shall have lightning protection. The Contractor shall furnish and install stud-mounted lightning protection devices. The device shall have three-terminals, two of which are connected across the loop input of the detector for differential mode protection and the third terminal grounded to protect against common mode damage. Differential mode surge shall be clamped by the semi-conductor array instantly and common mode surge shall be handled by three element gas discharge tube which fires at 400VDC and thereafter clamps the two loop leads to 30 volts in respect to ground. The device shall be installed in close proximity to the loop input. Extension of the factory leads of the device shall not be allowed.

Installation Details. Installation shall conform to applicable portions of Section 863 of the Standard Specifications. Cabinets, cabinet posts, and cabinet pedestals shall be primed and painted. The final coat color shall be specified by the Department at the time of the pre-construction meeting. Interior of all cabinets shall be painted high gloss white.

CMS/DMS Type 4 cabinets shall be serviced by 117 volts AC power with a 60 amp circuit breaker minimum.

All cabinets shall be serviced by 117 volts AC power and a telecommunication system. Each cabinet shall be equipped with a 10 ampere circuit breaker, ground rod, 115 VAC RFI filtering surge protector (ACD-340 surrestor), 130 volt, 70 joules, 10 amp varistor, lightning protection for each loop (SRA-6LC surrestor), data line protection for each leg of the four (4) wire telecommunication system (SRA 64C surrestor), a pull chain porcelain base light fixture with a 3 prong 110 volt outlet. The porcelain fixture shall be mounted on metal plate, that shall be mounted on the cabinet ceiling. No holes shall be drilled thru 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 or switch. If more than one wire has a common terminal on a terminal strip, the adjacent strip shall be used and an appropriate jumpered connection shall be made.

All cables and 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.

A copper grounding bus shall be mounted on the rear wall of the cabinets.

Each cabinet shall contain a wiring diagram of the installation in addition to the diagrams which are to be submitted to the Engineer.

Prior to the wiring of the cabinet, the contractor shall submit box print for approval before cabinet wiring shall begin.

The Contractor shall furnish three (3) diagrams of the internal and external connections of the equipment in each Traffic Systems Center 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 termination and each terminal connection as to loop, tone, closure, phone, and lane function of each termination in the cabinet.

Incidental to the cost of each cabinet, the Contractor shall construct 5" (127mm) P.C.C. sidewalk of a rectangular area 3' x 4' (1 meter by 1.2m) immediately adjacent to the cabinet foundation on the same side of the foundation as the cabinet door, with the 4' (1.2m) dimension of the rectangle parallel to the cabinet door when closed. If the width of the required cabinet foundation is greater than the 3 feet (1 meter) width of the standard concrete foundation, Type D, the 4' (1.2m) dimension of the sidewalk area shall be increased to equal the width of the foundation plus 1ft (30 cm) , the area to extend 6" (15cm) 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 therefrom.

No raceways shall be allowed to enter cabinet through the sides, top or back walls.

Anchor bolts shall be installed for pedestal and base mounted cabinets. These shall be considered as incidental to the cost of the cabinet.

Cable harnesses, terminal boards, and mounting hardware shall be installed as needed. These items shall be considered as incidental to the cost of the cabinet.

Terminal blocks provided in field cabinets shall be the heavy duty barrier type. The terminal block shall be a minimum of 2" (50.8mm) wide and 1-3/16" (30.2mm) deep. Center to center of the terminal screws or studs shall be a minimum of 21/32" (16 mm) 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. Cabinets will be accepted as concrete foundation mounted, pole mounted, pedestal mounted, or attached to structure. Each cabinet installed complete and in place will be counted as a single unit.

Basis of Payment. This work will be paid for at the contract price each for CABINET HOUSING EQUIPMENT, mounting and size specified, installed complete and in place.

CLOSED CIRCUIT TELEVISION CAMERA STRUCTURE, FOUNDATION, 80 FT. MOUNTING HEIGHT (D-1)

Effective: March 1, 2010

Description:

This item shall consist of the construction of a steel reinforced concrete foundation, of the dimensions indicated, complete with raceways. The foundation depth shall be as indicated in the Foundation Depth Table on the plans (where applicable) or as otherwise shown on the Contract Drawings or as directed by the Engineer.

The foundation shall include excavation, reinforcement, concrete, anchor bolts, nuts, washers and raceways as well as clean up and restoration of the location when such work is not provided under other paid items.

Materials:

Concrete shall be Class SI complying with Article 720 of the Standard Specifications and shall incorporate a Calcium Nitrite Corrosion Inhibitor as specified in Check Sheet #21 of the Supplemental Specifications and Recurring Special Provisions, Adopted February 1, 1995.

Reinforcement bars shall comply with Article 706.10 of the Standard Specifications.

Unless otherwise indicated, anchor bolts shall comply with the requirements of ASTM Designation A 687. Unless otherwise indicated, nuts shall be hexagon nuts in conformance with ASTM A 194 2H or ASTM a 563 DH, and washers shall be in conformance with ASTM F436.

The entire length of the anchor bolts as well as the nuts and washers shall be hot dip galvanized in accordance with the requirements of ASTM Designation A 153.

Unless otherwise indicated, conduit raceways shall be heavy wall rigid polyvinylchloride (PVC) conduit, (Schedule 40) UL listed and in conformance with NEMA TC2 and Federal Specification WC 1094A. Raceways shall be of the number and size as indicated.

Construction Requirements:

The foundation depths shall be as directed by the Engineer based upon evaluation of the soil conditions encountered. The Engineer may determine soil condition by visual inspection or, where practical, by the use of a pocket penetrometer and will establish foundation depth based upon the Foundation Depth Table shown on the plans, where applicable.

The hole for the foundation shall be made by drilling with an auger, of the same diameter as the foundation. The foundation shall be cast in place and allowed to cure for 10 days minimum before the light pole is erected. If soil conditions require the use of a liner to form the hole, the liner shall be withdrawn as the concrete is deposited. The top of the foundation shall be constructed level so that no shims or other leveling device will be needed to set the light standard plumb on the foundation. A liner or form shall be used to produce a uniform smooth side to the top of the foundation. Foundation top shall be chamfered 19.05 mm (3/4 inch) unless otherwise indicated.

Extreme care shall be used in establishing the top elevation of concrete foundations, especially when foundations are installed before final grading is complete. Foundations shall not protrude above grade more than the limits indicated on the plans, except for specifically indicated locations, and where not otherwise indicated, foundation shall not protrude above grade more than 101.6 mm (4 inches) above a 1524.0 mm (60-inch) chord centered at the foundation, at any point around the circumference. Where foundation heights extend beyond specified limits, the Engineer may direct replacement of the foundation and the incorrect foundation will not be measured for payment.

The steel reinforcement, the raceway conduits and the anchor bolts shall be secured in place to each other and properly positioned in the augered hole so that at time of pouring of concrete mixture in place the above said components retain their proper positions. Special attention shall be paid to the positioning of the anchor bolts. It is of utmost importance that the anchor bolt projections on top of the foundation, after placement of the concrete, remain in a perfectly vertical position.

Method of Measurement:

The foundation shall be measured for payment in linear meters (feet) of the foundation in place, in accordance with the total length of concrete pier required, indicated as foundation depth, in the Foundation Depth Table on the Plans and as directed by the Engineer, i.e., extra foundation depth, beyond the directive of the Engineer, will not be measured for payment. Where extension above grade is required, this distance shall be measured for payment.

Basis of Payment:

This work will be paid for at the contract unit price per linear foot for CLOSED CIRCUIT TELEVISION CAMERA STRUCTURE, FOUNDATION, 80 FT. MOUNTING HEIGHT, which shall be payment in full for the work as shown on the Drawings and described herein.

CLOSED CIRCUIT TELEVISION CAMERA STRUCTURE, GALVANIZED STEEL, 80 FT. MOUNTING HEIGHT

Description. This work shall consist of furnishing a CCTV camera structure complete with camera lowering device. The structure shall be a galvanized steel structure. The lowering device shall be configured to support a **high definition** camera with the appropriate power and Ethernet cable connections.

Definitions.

- CCTV Camera Structure: The complete camera structure and lowering device as one integral working system.
- Shaft: The camera structure shaft.
- Lowering Device: The components involved with the mounting, operation, and raising and lowering of the CCTV camera.
- Structure Height: The height of the structure shall be measured as indicated on the detail drawings

Materials.

Materials shall be as specified elsewhere herein.

Deflection.

The design of the structure shaft shall achieve a maximum, fully loaded deflection at the top of the structure, which is not greater than 1-inch

Submittals and Certifications.

The structure shall be designed in accordance with 2001 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals with Appendix C wind pressure for a 90 mph wind zone with a 1.3 gust factor. The pole shall be designed for use with a single arm camera lowering device with a total effective area of 2 square feet and total weight of 95 lbs. The structure shall not exceed 1" deflection in a 30 mph (non-gust) wind.

The camera structure shall be designed and constructed so no structural member or other component is applied in excess of the manufacturer's recommended rating (when applicable) or the published rating, whichever is lower

Shop drawings, product data and certifications shall be submitted. The submitted information shall be complete and shall include information relative to all specified requirements suitable for verification of compliance.

THE SUBMITTALS SHALL BE ARRANGED AND CROSS-REFERENCED TO THE SPECIAL PROVISIONS AND STANDARD SPECIFICATIONS. FAILURE TO CROSS-REFERENCE THE SUBMITTAL INFORMATION WITH THE SPECIAL PROVISIONS WILL RESULT IN THE SUBMITTAL BEING RETURNED WITHOUT REVIEW.

The submittal information shall be dated, current, project specific, identified as to the project, and shall also include the following calculations and certifications as applicable to the material utilized:

- Shaft design calculations, including Registered Engineer Certification.
- Certification of intent to provide domestic steel in accordance with Article 106.01 of the Standard Specifications.
- Welding details and procedures.
- Letter of intent to provide specified weld inspection reports.
- Confirmation of coordination between anchor rod supplier and the structure manufacturer for adequacy of anchor rod assembly.
- Manufacturer's recommended installation procedures.
- Letter of intent to provide manufacturer's representative during installation and to provide specified installation certification.

All certifications shall be notarized.

Shaft.

The pole shall be a maximum of three sections for field assembly. The pole shafts shall be a round cross section and meet the requirements of ASTM A595 grade A with a minimum yield strength of 55,000 psi. The bottom section shall have a minimum .3125 wall thickness and a minimum diameter of 23". The three shafts sections shall taper at a rate of .14" per foot and have an overall height of 80'. The pole base plate shall meet the requirements of ASTM A36 and be arranged to accommodate four (4) 1 1/2" x 54" x 6" anchor bolts on a 27" bolt circle. Anchor bolts shall conform to ASTM F1554 gr. 55

The pole assembly shall be equipped with a 6" x 27" reinforced hand hole opening with a 3 gauge cover and shall be attached with four (4) 1/4"-20 hex hd s.s. screws. The bottom of the hand hole shall be located up 14" from the bottom. The hand hole frame shall meet ASTM A529 grade 50 and shall be made from 3/4" x 3 1/2" bar. There shall be a 3/8" diameter rod for wire tie off located at the top of the opening and 1 3/4" from the front of the hand hole frame and also a 1/2" tapped hole located 1 3/4" from the front of the frame at the bottom of the opening as shown on the drawing.

Six (6) 1" i.d. eye rings for power and communication cables are required as shown on the drawing. Two (2) shall be located 38" up from the bottom, two (2) located 6" below the top of the bottom shaft and two (2) 6" below the top of the center shaft.

There shall be a 3 ½" schedule 40 (4" od) pipe tenon 11 ¾" tall on a 3/8" thick plate welded to the top of the pole. The pipe tenon shall include a 1 ¾" x 5 ¼" slot and two (2) 5/8" holes as shown on the drawing to accommodate the Camera Lowering System arm assembly. A J-hook shall be included inside the top of the tenon assembly and shall include a removable cast aluminum pole top.

Camera Lowering Device

General

The camera lowering system shall be designed to support and lower a **high definition** closed circuit television camera, lens, housing, PTZ mechanism, cabling, connectors and other supporting field components without damage or causing degradation of camera operations. The camera lowering system device and the pole are interdependent; and thus, must be considered a single unit or system. The lowering system shall consist of a pole, suspension contact unit, divided support arm, and a pole adapter for attachment to a pole top tenon, pole top junction box, conduit mount adapter and camera connection box. The divided support arm and receiver brackets shall be designed to self-align the contact unit with the pole center line during installation and insure the contact unit cannot twist under high wind conditions. For maximum arm strength, round support arms are not acceptable.

The camera-lowering device shall withstand wind forces of 100mph with a 30 percent gust factor using a 1.65 safety factor. The lowering device manufacturer, upon request, shall furnish independent laboratory testing documents certifying adherence to the stated wind force criteria utilizing, as a minimum effective projected area, the actual effective projected area (EPA) or an EPA greater than that of the camera system to be attached. The camera-lowering device to be furnished shall be the product of manufacturers with a minimum of 3 years of experience in the successful manufacturing of camera lowering systems. The lowering device provider shall be able to identify a minimum of 3 previous projects where the purposed system has been installed successfully for over a one-year period of time each.

The lowering device manufacturer shall furnish a factory representative to assist the electrical contractor with the assembly and testing of the first lowering system onto the pole assembly. The manufacturer shall furnish the applicable DOT engineer documentation certifying that the electrical contractor has been instructed on the installation, operation and safety features of the lowering device. The contractor shall be responsible for providing applicable maintenance personnel "on site" operational instructions and providing three (3) copies of operations and maintenance manuals to the DOT engineer.

Suspension Contact Unit

The suspension contact unit shall have a load capacity 600 lbs. with a 4 to 1 safety factor. There shall be a locking mechanism between the fixed and moveable components of the lowering device. The movable assembly shall have a minimum of 2 latches. This latching mechanism shall securely hold the device and its mounted equipment. The latching mechanism shall operate by alternately raising and lowering the assembly using the winch and lowering cable. When latched, all weight shall be removed from the lowering cable and all electrical contacts shall be fully engaged. The fixed unit shall have a heavy duty cast tracking guide and means to allow latching in the same position each time. The contact unit housing shall be weatherproof with a gasket provided to seal the interior from dust and moisture.

The prefabricated components of the lift unit support system shall be designed to preclude the lifting cable from contacting the power or video/Ethernet cabling. The lowering device manufacturer shall provide a conduit mount adapter for housing the lowering cable. This adapter shall have an interface to allow the connection of a contractor provided 1.25 inch PVC conduit and be located just below the cable stop block at the back of the lowering device. The Contractor shall supply internal conduit in the pole as directed by the Lowering Device provider. The only cable permitted to move within the pole or lowering device during lowering or raising shall be the stainless steel lowering cable. All other cables must remain stable and secure during lowering and raising operations.

The female and male socket contact halves of the connector block shall be made of Hypalon. The female brass socket contacts and the male high conductivity brass pin contacts shall be permanently molded into the polymer body.

The current carrying male contacts shall be 1/8 inches in diameter. There shall be two male contacts that are longer than the rest which will make first and break last providing optimum grounding performance. The contacts shall be fully coordinated with the **high definition** camera specified elsewhere herein.

The current carrying female contacts shall be 1/8 inches I.D. All of the contacts shall be recessed 0.125" from the face of the connector. Cored holes in the socket measuring 0.25" in diameter and 0.125" deep molded into the connector body are centered on each contact on the face of the connector to create rain-tight seals when mated with the male connector.

The wire leads from both the male and female contacts shall be permanently and integrally molded in the Hypalon body. The current carrying and signal wires molded to the connector body shall be constructed of #18/1 AWG Hypalon jacketed wire.

The contacts shall be self-wiping with a shoulder at the base of each male contact so that it will recess into the female block, thereby giving a rain-tight seal when mated. The facility manufacturing the electrical contact connector must comply with Mil Spec Q-9858 and Mil Spec I-45208.

Lowering Tool

The camera-lowering device shall be operated by use of a portable lowering tool. The tool shall consist of a lightweight metal frame and winch assembly with cable as described herein, a quick release cable connector, an adjustable safety clutch and a variable speed industrial duty electric drill motor. This tool shall be compatible with accessing the support cable through the hand hole of the pole. The lowering tool shall attach to the pole with one single bolt. The tool will support itself and the load assuring lowering operations and provide a means to prevent freewheeling when loaded. The lowering tool shall be delivered to the State upon project completion. The lowering tool shall have a reduction gear to reduce the manual effort required to operate the lifting handle to raise and lower a capacity load. The lowering tool shall be provided with an adapter for operating the lowering device by a portable drill using a clutch mechanism. The lowering tool shall be equipped with a positive breaking mechanism to secure the cable reel during raising and lowering operations and prevent freewheeling. The manufacturer shall provide a variable speed, heavy-duty reversible drill motor and a minimum of two complete lowering tools plus any additional tools required by plan notes. The lowering tool shall be made of durable and corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

Camera Junction Box

The camera junction box shall be of two piece clamshell design with one hinge side and one latch side to facilitate easy opening. The general shape of the box shall be cylindrical to minimize the EPA. The Camera Junction Box shall be cast aluminum with stabilizing weights on the outside of the box to increase room on the interior. The box shall be capable of having up to 40 pounds of stabilizing weights. The bottom of the Camera Junction Box shall be drilled and tapped with a 1-1/2" NPT thread to accept industry standard dome housings and be able to be modified to accept a wide variety of other camera mountings. The junction box shall be gasketed to prevent water intrusion. The bottom of the box shall incorporate a screened and vented hole to allow airflow and reduce internal condensation.

Materials

All pulleys for the camera lowering device and portable lowering tool shall have sealed, self lubricated bearings, oil tight bronze bearings, or sintered- oil impregnated, bronze bushings. The lowering cable shall be a minimum 1/8-inch diameter stainless steel aircraft cable with a minimum breaking strength of 1740 pounds with (7) strands of 19 wire each.

All electrical connections between the fixed and lowerable portion of the contact block shall be protected from exposure to the weather by a waterproof seal to prevent degradation of the electrical contacts. The electrical connections between the fixed and movable lowering device components shall be designed to conduct high frequency data bits as well as the power requirements for operation of dome environmental controls.

The interface and locking components shall be made of stainless steel and or aluminum. All external components of the lowering device shall be made of corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

The Camera Manufacturer shall provide weights and /or counterweights as necessary to assure that the alignment of pins and connectors are proper for the camera support to be raised into position without binding. The lowering unit will have sufficient weight to disengage the camera and its control components in order that it can be lowered properly

Installation of the lowering device and camera shall be included as a part of this item and shall not be paid for separately.

Pole/Tower Installation.

The pole shall be set plumb on the foundation without the use of shims, grout or any other leveling devices under the pole base. The arm shall be set at right angles to the centerline of the pavement.

Poles shall not be installed until cameras are available for installation at the same time the poles are installed. Poles shall not be installed and left standing without a coordinated installation of arm and camera. Poles shall not be paid unless the coordinated assembly is complete.

Method of Measurement. CCTV camera structures shall be counted, each with all appurtenances installed.

Basis of Payment. This item shall be paid for at the contract unit price each for CLOSED CIRCUIT TELEVISION CAMERA STRUCTURE, GALVANIZED STEEL, of the mounting height specified.

FIBER OPTIC FUSION SPLICE

Description. This work shall consist of making all fiber optic fusion splices at a given site as shown on the plans. Fiber splicing consists of in-line fusion splices for all fibers described in the cable plan at the particular location. Splices may be stored in rugged fiber optic splice closures in communications vaults or in splice trays of an above-ground fiber optic splice enclosure.

Two splices are identified. A mainline splice includes fusion splicing all fibers in the cable sheath. In a lateral splice, the buffer tubes in the mainline cable are dressed out and designated buffer tubes and fiber strands are accessed and fusion spliced to lateral cable fiber strands or fiber pigtails as identified on the plans.

Materials. All equipment and ancillary materials needed to make fiber optic fusion splices shall be included in this work.

CONSTRUCTION REQUIREMENTS

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. All fiber splices shall be fusion spliced and secured inside a protective enclosure. 45 days prior to the start of the fiber optic cabling installation, the Contractor shall submit the proposed locations of the mainline splice points for review by the Department.

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. Fusion splices must meet the acceptance testing requirements of the Fiber Optic Cable specifications. As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice not satisfying the requirements.

Method of Measurement. Fiber optic splices of the type specified will be measured as each for all the required splices shown on the plans at a given site completed, tested, and secured within protective enclosures.

Basis of Payment. This work will be paid for at the contract unit price per each for FIBER OPTIC SPLICE – LATERAL or FIBER OPTIC SPLICE – MAINLINE, which price shall be payment in full for all fusion splice work at a site location, complete as specified herein.

UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT (TOLLWAY)

Effective: September 1, 2015

Description. This work shall consist of furnishing, installing, preparing and verifying Coilable Nonmetallic Conduit (CNC) pathways for use.

General Construction Requirements.. This work shall be constructed in accordance with Section 810 of the Tollway Supplemental Specifications and the following:

Physical Inspection.. Prior to preparation work and conduit usage, physically inspect all infrastructure elements associated with the new conduit system proposed for use in the Plans. During the inspection, all issues or concerns that have been identified shall be noted on a conduit pull plan and provided to the Engineer. Visual verification of the conduit system shall include all of the following elements:

- Appropriate Trench Depth
- Conduit and junction box, hand hole, check connection integrity
- Backfill material
- Location tape (Fiber only)
- Pull and transition junction boxes (located as per plan locations and with correct connections),
- Ground boxes (located as per plan and with correct connections)

Preparation of Conduit. Following inspection, prepare the conduit run for usage according to the following requirements for empty conduit pathways:

Blow, push, or pull a test mandrel through empty conduits. Check for obstructions and debris, conduit deflection, and conduit fitting issues. Mandrels are not used for ducts less than 2 inches in diameter, as recommended per NEMA Bulletin *TCB 2-2012*.

Mandrels used for testing empty conduits that greater than 2 inches in diameter shall meet all of the following requirements.

- Type - Ball (Common) or Bell Shaped (contingent upon detection or removal debris),
- Diameter - greater than 70% of the inside diameter of conduit and per NEMA *TCB 2-2012*, and
- Length - 2 in minimum (varies on type/size of mandrel).

Contractor shall perform conformance testing on in-place conduit sections to verify that the internal diameter is free of obstructions and can maintain air pressure as specified herein. Testing shall verify that the raceway is ready for a forced air cable installation. Testing shall be in conformance with the procedures for the AT 400 Pressure Test Kit as manufactured by Arnco® Corporation or approved equal. Testing shall be performed for Cleaning & Continuity, Coupler Leak and Internal Sizing Conformance. All in-placed sections of conduit shall be tested and achieve satisfactory results for each test prior to use. Conduit sections not receiving satisfactory test results shall be repaired or replaced as needed and re-tested until satisfactory results are achieved. Conduit used for casing and conduit which is to house innerduct shall not be tested.

Testing shall be performed in the presence of the Engineer. Documentation of the tests shall indicate the location of each test section, the tests performed, time and date of each test, test results and resultant action based on the test results.

- (a) Cleaning & Continuity.** The test involves pushing a foam swab along the inside diameter of the test section using compressed air. A satisfactory test result occurs when the foam swab travels the length of the test section, in accordance with the above test procedure. Contractor shall remove all accumulated debris within each test section as part of testing.
- (b) Coupler Leak.** The test involves sealing and pressurizing the inside diameter of the test section and measuring pressure loss. Measurements shall be taken at least twice after reaching and holding maximum testing pressure. A satisfactory test result occurs when pressures measurements do not exceed the acceptable pressure losses, in accordance with the test procedure.

Acceptable pressure loss for CNC testing, for size noted in the table below, using a maximum internal pressure of 100psi, shall be as follows:

Test section length	Acceptable pressure loss (psi)	
	after 1 minute	after 2 minutes
Using 175 CFM compressor		
1-inch ID duct		
1,000 LF of duct	100	100
2,500 LF of duct	55	100
5,000 LF of duct	20	40
10,000 LF of duct	5	10
1¼-inch ID-duct		
1,000 LF of duct	85	100
2,500 LF of duct	25	50
5,000 LF of duct	5	10
10,000 LF of duct	0	0
1½-inch ID-duct		
1,000 LF of duct	45	90
2,500 LF of duct	10	20
5,000 LF of duct	0	0
10,000 LF of duct	0	0
Using 250 CFM compressor		
1-inch ID duct		
1,000 LF of duct	100	100
2,500 LF of duct	100	100
5,000 LF of duct	100	100
10,000 LF of duct	20	40
1¼-inch ID-duct		
1,000 LF of duct	100	100
2,500 LF of duct	65	100
5,000 LF of duct	25	50
10,000 LF of duct	5	10
1½-inch ID-duct		
1,000 LF of duct	100	100
2,500 LF of duct	35	70
5,000 LF of duct	10	20
10,000 LF of duct	0	0
Using 375 CFM compressor		
1-inch ID duct		
1,000 LF of duct	100	100
2,500 LF of duct	100	100
5,000 LF of duct	100	100
10,000 LF of duct	40	80

1¼-inch ID-duct		
1,000 LF of duct	100	100
2,500 LF of duct	100	100
5,000 LF of duct	55	100
10,000 LF of duct	20	40
1½-inch ID-duct		
1,000 LF of duct	100	100
2,500 LF of duct	80	100
5,000 LF of duct	30	60
10,000 LF of duct	10	20

(a) Internal Sizing Conformance. The test is used for conduits that are less than 2 inches in diameter. The test involves pushing a sizing dart along the inside diameter of the test section using compressed air. The width of the sizing dart shall contain a circular section, of diameter that is 80 percent of the internal diameter of the conduit. A satisfactory test result occurs when the dart travels the length of the test section, in accordance with the test procedure.

Certified copies of the test report shall be submitted to the Engineer prior to the installation of the duct.

The Contractor shall install in all empty conduits underground or above grade, a minimum 5/8-inch woven polyester pull toneable tape with a minimum tensile strength of 1200 lbs-force. The pull tape should also have dimensional marks in feet measurements. Conduit shall be capped until conductors are installed. Underground cable marking tape is to be installed over underground unit ducts and conduits per Article 810.04 of the Tollway Supplemental Specifications.

Method of Measurement: This work will be measured for payment in feet, as indicated by the pull tape installed and accepted.

Basis of Payment: This work will be paid for at the contract unit price per foot for UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, of the size specified.

Pay Item Number	Designation	Unit of Measure
JS810872	UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 1" DIA.	FOOT
JS810873	UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 1 1/4" DIA.	FOOT
JS810874	UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 1 1/2" DIA.	FOOT
JS810875	UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 2" DIA.	FOOT
JS810877	UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 3" DIA.	FOOT
JS810879	UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 4" DIA.	FOOT
JS810880	UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 5" DIA.	FOOT
JS810881	UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 6" DIA.	FOOT
JS810883	UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 8" DIA.	FOOT

DRILL EXISTING JUNCTION BOX

Description. This work shall consist of drilling a hole in an existing junction box and furnishing and installing a new conduit.

Materials. All materials shall be in accordance to the requirements of section 813 of the Standard Specification.

Installation Details. Use a knockout punch to make a hole into the side wall of the metallic base adapter underneath a ground-mounted cabinet, or in the bottom of a pole-mounted cabinet. Use the punch size recommended by the manufacturer for the conduit being installed. Do not disturb any existing cables, cabinet equipment, or the integrity of the base adapter.

Run a galvanized steel close nipple through the hole, using sealing lock nut on each side of the wall.

Install a plastic insulating bushing on the nipple inside the base adapter or cabinet.

Connect the nipple to an underground conduit using metal conduit and fittings as required. Match the size of the underground conduit. At right angle connections, install mogul LB conduit bodies to facilitate the installation of cable.

Method of Measurement. This item shall be measured as each for DRILL EXISTING JUNCTION BOX, per hole drilled for a single conduit.

Basis of Payment. This work shall be paid for at the contract unit price each for DRILL EXISTING JUNCTION BOX, which shall be payment in full for the work complete as specified herein and as directed by the Engineer.

FIBER OPTIC CABLE, SINGLE MODE (D-1)

Effective: March 15, 2013

Description. The Contractor shall furnish and install loose-tube, single-mode, fiber optic cable of the number of fibers specified as shown in the plans and as directed by the Engineer.

Other ancillary components, required to complete the fiber optic cable plant, including but not limited to, moisture and water sealants, cable caps, fan-out kits, etc., shall be included in the cost of fiber optic cable and will not be paid for separately.

Materials. The single-mode, fiber optic cable shall incorporate a loose, buffer-tube design. The cable shall be an accepted product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1999 for a single sheathed, non-armored cable, and shall be new, unused and of current design and manufacture.

Fibers

The cables shall use dispersion unshifted fibers. The optical and physical characteristics of the un-cabled fibers shall include:

The single-mode fiber shall meet EIA/TIA-492CAAA, "Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers," and ITU recommendation G.652.D, "Characteristics of a single-mode optical fiber cable."

Physical Construction		
Requirement	Units	Value
Cladding Diameter	µm	12.50 ± 0.7
Core-to-Cladding Concentricity	µm	≤ 0.5
Cladding Non-Circularity	µm	≤ 0.7%
Mode Field Diameter (1310 nm)	µm	9.2 ± 0.4
Mode Field Diameter (1550 nm)	µm	10.4 ± 0.5
Coating Diameter	µm	245 ± 5
Colored Fiber Nominal Diameter	µm	253 – 259
Fiber Curl Radius of Curvature	m	> 4.0

Optical Characteristics				
Requirement			Units	Value
Cabled Fiber Attenuation		1310 nm	dB/km	≤ 0.4
		1550 nm		≤ 0.3
Point Discontinuity		1310 nm	dB	≤ 0.1
		1550 nm		≤ 0.1
Macrobend Attenuation	Turns	Mandrel OD	dB	
	1	32 ± 2 mm		< 0.05 at 1550 nm
	100	50 ± 2 mm		< 0.05 at 1310 nm
	100	50 ± 2 mm		< 0.10 at 1550 nm
	100	60 ± 2 mm		< 0.05 at 1550 nm
	100	60 ± 2 mm		< 0.05 at 1625 nm
Cable Cutoff Wavelength (Λ_{ccf})			nm	< 1260
Zero Dispersion Wavelength (Λ_0)			nm	1302 ≤ Λ_0 ≤ 1322
Zero Dispersion Slope (S_0)			ps/(nm ² -km)	≤ 0.089
Total Dispersion		1550 nm	ps/(nm-km)	≤ 3.5
		1285-1330 nm		≤ 17.5
		1625 nm		≤ 21.5
Cabled Polarization Mode Dispersion			(ps/km ²)	≤ 0.2
IEEE 802.3 GbE – 1300 nm Laser Distance			(m)	Up to 5000
Water Peak Attenuation: 1383 ± 3 nm			(dB/km)	≤ 0.4

Cable Construction

The number of fibers in each cable shall be as specified on the plans.

Optical fibers shall be placed inside a loose buffer tube. The nominal outer diameter of the buffer tube shall be 3.0 mm. Each buffer tube shall contain up to 12 fibers. The fibers shall not adhere to the inside of the buffer tube.

Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." The fibers shall be colored with ultraviolet (UV) curable inks.

Buffer tubes containing fibers shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." Buffer tube colored stripes shall be inlaid in the tube by means of co-extrusion when required. The nominal stripe width shall be 1 mm.

For cables containing more than 12 buffer tubes, standard colors are used for tubes 1 through 12 and stripes are used to denote tubes 13 through 24. The color sequence applies to tubes containing fibers only, and shall begin with the first tube. If fillers are required, they shall be placed in the inner layer of the cable. The tube color sequence shall start from the inside layer and progress outward.

In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and shall not be subject to fading or smearing onto each other. Colors shall not cause fibers to stick together.

The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrinkback requirements of 7 CFR 1755.900.

Fillers may be included in the cable core to lend symmetry to the cable cross-section where needed. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer. Fillers shall be nominally 2.5 mm or 3.0 mm in outer diameter.

The central member shall consist of a dielectric, glass reinforced plastic (GRP) rod (optional steel central member). The purpose of the central member is to provide tensile strength and prevent buckling. The central member shall be overcoated with a thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.

Each buffer tube shall contain a water-swellaable yarn for water-blocking protection. The water-swellaable yarn shall be non-nutritive to fungus, electrically non-conductive, and homogeneous. It shall also be free from dirt or foreign matter. This yarn will preclude the need for other water-blocking material; the buffer-tube shall be gel-free. The optical fibers shall not require cleaning before placement into a splice tray or fan-out kit.

Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process.

Water swellaable yarn(s) shall be applied longitudinally along the central member during stranding.

Two polyester yarn binders shall be applied contrahelically with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking, and dielectric with low shrinkage.

For single layer cables, a water swellaable tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The water swellaable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

For dual layer cables, a second (outer) layer of buffer tubes shall be stranded over the original core to form a two layer core. A water swellaable tape shall be applied longitudinally over both the inner and outer layer. The water swellaable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

The cables shall contain one ripcord under the sheath for easy sheath removal.

Tensile strength shall be provided by the central member, and additional dielectric yarns as required.

The dielectric yarns shall be helically stranded evenly around the cable core.

The cables shall be sheathed with medium density polyethylene (MDPE). The minimum nominal jacket thickness shall be 1.4 mm. Jacketing material shall be applied directly over the tensile strength members (as required) and water swellable tape. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The MDPE jacket material shall be as defined by ASTM D1248, Type II, Class C, Category 4 and Grades J4, E7 and E8.

The jacket or sheath shall be free of holes, splits, and blisters.

The cable jacket shall contain no metal elements and shall be of a consistent thickness.

Cable jackets shall be marked with the manufacturer's name, month and year of manufacture, sequential meter or foot markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code (NESEC), fiber count, and fiber type. The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white, with the exception that cable jackets containing one or more co-extruded white stripes, which shall be printed in light blue. The height of the marking shall be approximately 2.5 mm.

The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

The shipping, storage, and operating temperature range of the cable shall be -40°C to +70°C. The installation temperature range of the cable shall be -30°C to +70°C.

General Cable Performance Specifications

The fiber optic cable manufacturer shall provide documentation and certify that the fiber optic cable complies with the following EIA-455-xxx Fiber Optic Test Procedures (FOTP):

When tested in accordance with FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures (-40°C and +70°C) shall not exceed 0.15 dB/km at 1550 nm for single-mode fiber and 0.3 dB/km at 1300 nm for multimode fiber.

When tested in accordance with FOTP-82, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable," a one meter length of unaged cable shall withstand a one meter static head or equivalent continuous pressure of water for one hour without leakage through the open cable end.

When tested in accordance with FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable," the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 70°C.

When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 220 N/cm (125 lbf/in) applied uniformly over the length of the sample. The 220 N/cm (125 lbf/in) load shall be applied at a rate of 2.5 mm (0.1 in) per minute. The load shall be maintained for a period of 1 minute. The load shall then be decreased to 110 N/cm (63 lbf/in). Alternatively, it is acceptable to remove the 220 N/cm (125 lbf/in) load entirely and apply the 110 N/cm (63 lbf/in) load within five minutes at a rate of 2.5 mm (0.1 in) per minute. The 110 N/cm (63 lbf/in) load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 110 N/cm (63 lbf/in) load. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fibers and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," except that the number of cycles shall be two at three locations along a one meter cable length and the impact energy shall be at least 4.4 Nm (in accordance with ICEA S-87-640)", the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a rated tensile load of 2670N (601 lbf) and residual load of 30% of the rated installation load. The axial fiber strain shall be $\leq 60\%$ of the fiber proof level after completion of 60 minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be $\leq 20\%$ of the fiber proof level after completion of 10 minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than 2 meters shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable," the cable shall withstand four full turns around a mandrel of ≤ 20 times the cable diameter after conditioning for four hours at test temperatures of -30°C and $+60^{\circ}\text{C}$. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears, or other openings. The change in attenuation shall not exceed 0.30 dB at 1550 nm for single mode fiber and 0.50 dB at 1300 nm for multimode fiber.

Quality Assurance Provision

All cabled optical fibers > 1000 meters in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel. The cable manufacturer shall be TL 9000 registered.

Packaging

Top and bottom ends of the cable shall be available for testing. Both ends of the cable shall be sealed to prevent the ingress of moisture. Each reel shall have a weather resistant reel tag attached identifying the reel and cable. The reel tag shall include the following information:

- Cable Number
- Gross Weight
- Shipped Cable Length in Meters
- Job Order Number
- Product Number
- Customer Order Number
- Date Cable was Tested
- Manufacturer Order Number
- Cable Length Markings
 - Top (inside end of cable)
 - Bottom (outside end of cable)

The reel (one flange) marking shall include:

- Manufacturer
- Country of origin
- An arrow indicating proper direction of roll when handling
- Fork lift-handling illustration
- Handling Warnings.

Each cable shall be accompanied by a cable data sheet. The cable data sheet shall include the following information:

- Manufacturer Cable Number
- Manufacturer Product Number
- Manufacturer Factory Order Number
- Customer Name
- Customer Cable Number
- Customer Purchase Order Number
- Mark for Information
- Ordered Length
- Maximum Billable Length
- Actual Shipped Length
- Measured Attenuation of Each Fiber

The cable shall be capable of withstanding a minimum-bending radius of 20 times its outer diameter during installation and 10 times its outer diameter during operation without changing the characteristics of the optical fibers.

The cable shall meet all of specified requirements under the following conditions:

- Shipping/storage temperature: -58° F to +158° F (-50° C to +70° C)
- Installation temperature: -22° F to +158° F (-30° C to +70° C)
- Operating temperature: -40° F to +158° F (-40° C to +70° C)
- Relative humidity from 0% to 95%, non-condensing

Optical Patch Cords and Pigtails

The optical patch cords and pigtails shall comply with the following:

- The optical patch cords shall consist of a section of single fiber, jacketed cable equipped with optical connectors at both ends.
- The factory installed connector furnished as part of the optical patch cords and pigtails shall meet or exceed the requirements for approved connectors specified herein.
- The fiber portion of each patch cord and pigtail shall be a single, jacketed fiber with optical properties identical to the optical cable furnished under this contract.
- The twelve fiber single-mode fiber optic cable shall be installed as a pigtail with factory installed ST compatible connectors.
- The patch cords shall comply with Telcordia GR-326-CORE

Connectors

The optical connectors shall comply with the following:

- All connectors shall be factory installed ST compatible connectors. Field installed connectors shall not be allowed.
- Maximum attenuation 0.4dB, typical 0.2dB.
- No more than 0.2dB increase in attenuation after 1000 insertions.
- Attenuation of all connectors will be checked and recorded at the time of installation with an insertion test minimum 5 times checked with an OTDR.
- All fibers shall be connectorized at each end.
- All fibers shall terminate at a fiber patch panel
- Unused fibers will be protected with a plastic cap to eliminate dust and moisture.
- Termination shall be facilitated by splicing factory OEM pigtailed on the end of the bare fiber utilizing the fusion splicing method. Pigtails shall be one meter in length.

CONSTRUCTION REQUIREMENTS

Experience Requirements. Personnel involved in the installation, splicing and testing of the fiber optic cables shall meet the following requirements:

- A minimum of three (3) years experience in the installation of fiber optic cables, including fusion splicing, terminating and testing single mode fibers.
- Install two systems where fiber optic cables are outdoors in conduit and where the systems have been in continuous satisfactory operation for at least two years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the installed fiber optic systems.
- One fiber optic cable system (which may be one of the two in the preceding paragraph), which the Contractor can arrange for demonstration to the Department representatives and the Engineer.

Installers shall be familiar with the cable manufacturer's recommended procedures for installing the cable. This shall include knowledge of splicing procedures for the fusion splicer being used on this project and knowledge of all hardware such as breakout (furcation) kits and splice closures. The Contractor shall submit documented procedures to the Engineer for approval and to be used by Construction inspectors.

Personnel involved in testing shall have been trained by the manufacturer of the fiber optic cable test equipment to be used, in fiber optic cable testing procedures. Proof of this training shall be submitted to the Engineer for approval. In addition, the Contractor shall submit documentation of the testing procedures and a copy of the test equipment operation manual for approval by the Engineer.

Installation in Raceways. Prior to installation, the Contractor shall provide a cable-pulling plan. The plan shall include the following information:

- Identify where each cable will enter the underground system and the direction each pull.
- Identify locations where the cable is pulled out of a handhole, coiled in a figure eight, and pulled back into the hand hole.
- The plan shall address the physical protection of the cable during installation and during periods of downtime.
- Identify the location of slack storage locations
- Identify the locations of splices.
- Identify distances between fiber access points and crossings.

The cable-pulling plan shall be provided to the Engineer for approval a minimum of 15 working days prior to the start of installation. The Engineer's approval shall be for the operation on the freeway and does not include an endorsement of the proposed procedures. The Contractor is responsible for the technical adequacy of the proposed procedures.

During cable pulling operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and pulling operations. Unless specified otherwise by the fiber optic cable manufacturer, the outside bend radius of the cable during installation shall be no less than 20 times the outside diameter of the fiber optic cable. Entry guide chutes shall be used to guide the cable into the handhole conduit ports. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation-bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the cable manufacturers specifically approve the array.

If figure-eight techniques are used during cable installation, the cable shall be handled manually and stored on the ground. The cable shall be placed on tarps to prevent damage from gravel, rocks, or other abrasive surfaces. Tarps should also be used in muddy conditions to keep the cable clean. Enough area to accommodate the cable length to be stored and sufficient personnel to maintain the required minimum-bending diameter as well as avoid kinking or otherwise damaging the cable shall be provided. If the cable has been figure-eighted in preparation for a forward feed, the figure-eight must be flipped over to access the outside cable end. Provide sufficient personnel to avoid kinking the cable as the figure-eight is flipped over. When removing the cable from the figure-eight, use care to avoid kinking the cable and violating the minimum-bending diameter.

Power assisted or figure-eight eliminator equipment, which is used to eliminate manual figure-eight procedures, shall not be used unless specifically allowed by the cable manufacturer in writing.

The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. A dynamometer or in-line tensiometer shall be used to monitor tension in the pull-line near the winch. This device must be visible to the winch operator or used to control the winch. The pulling system shall have an audible alarm that sounds whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the engineer as well as included in the record drawing package.

The use of a breakaway link (swivel) may be used to ensure that the maximum tension of the cable is not exceeded. Breakaway links react to tension at the pulling eye and shall not be used in lieu of tension measuring devices. All pulling equipment and hardware which will contact the cable during installation must maintain the cable's minimum bend radius. Equipment including sheaves, capstans, bending shoes, and quadrant blocks shall be designed for use with fiber optic cable.

The cable shall be pulled into the conduit as a single component, absorbing the pulling force in all tension elements. The central strength member and Aramid yarn shall be attached directly to the pulling eye during cable pulling. "Basket grip" type attachments, which only attach to the cable's outer jacket, shall not be permitted. A breakaway swivel, rated at 95% of the cable manufacturer's approved maximum tensile loading, shall be used on all pulls. When simultaneously pulling fiber optic cable with other cables, separate grooved rollers shall be used for each cable.

To minimize the exposure of the backbone cable and to facilitate the longer lengths of fiber optic cable, the Contractor shall use a "blown cable" (pneumatically assisted) technique to place the fiber optic cable. A Compressed air cooler shall be used when ambient air temperatures reach 90°F or more.

Where cable is to be pulled through existing conduit which contains existing cables, optical or other, the existing cables shall be removed and reinstalled with the fiber optic cable as indicated on the plans. The removal of the cable(s) shall be paid for separately. Reinstallation of the existing cables, if indicated on the plans, along with the fiber optic cable shall be included in this item for payment.

Tracer Wire. A tracer wire shall be installed with all fiber optic cable runs. One tracer wire shall be installed along with the fiber optic cable in each raceway. If a raceway has more than one fiber optic cable, only one tracer wire per raceway is required. If there are parallel raceways, a tracer wire is required in each raceway that contains a fiber optic cable. Tracer wire shall be installed in raceway segments which are metallic to provide a continuous tracer wire system.

The tracer wire shall be a direct burial rated, number 12 AWG (minimum) solid (.0808" diameter), steel core soft drawn high strength tracer wire. The wire shall have a minimum 380 pound average tensile break strength. The wire shall have a 30 mil high density yellow polyethylene (HDPE) jacket complying with ASTM-D-1248, and a 30 volt rating. Connection devices used shall be as approved by the tracer wire manufacturer, except wire nuts of any type are not acceptable and shall not be used.

The cost of the tracer wire shall be included in the cost of the fiber optic cable and not paid for separately.

Aerial Fiber Optic Cable. Aerial fiber optic cable shall be lashed to a span wire. The fiber optic cable shall be as described herein and shall be waterblocked utilizing water-swellaable materials. The cable assembly shall be designed and manufactured to facilitate midspan access.

The submittal information must include a copy of the standard installation instructions for the proposed cable. Installed cable sag shall not exceed 1% of the span distance. The submittal information must also include catalog cuts for all hardware to be utilized in the installation.

Construction Documentation Requirements. The Contractor shall examine the proposed cable plant design. At least one month prior to starting installation of the fiber optic cable plant, the Contractor shall prepare and submit to the Engineer for review and approval, ten (10) copies of the Contractor's "Installation Practices for Outdoor Fiber Optic Cable Systems" manual. This manual shall address the Contractor's proposed practices covering all aspects of the fiber optic cable plant. This submittal shall include all proposed procedures, list of installation equipment, and splicing and test equipment. Test and quality control procedures shall be detailed as well as procedures for corrective action.

Operations and Maintenance Documentation. After the fiber optic cable plant has been installed, ten (10) complete sets of Operation and Maintenance Documentation shall be provided. The documentation shall, as a minimum, include the following:

- Complete and accurate as-built diagrams showing the entire fiber optic cable plant including locations of all splices.
- Final copies of all approved test procedures
- Complete performance data of the cable plant showing the losses at each splice location and each terminal connector.
- Complete parts list including names of vendors.

Testing Requirements. The Contractor shall submit detailed test procedures for approval by the Engineer. All fibers (terminated and un-terminated) shall be tested bi-directionally at both 1310 nm and 1550 nm with both an Optical Time Domain Reflectometer (OTDR) and a power meter with an optical source. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

Fibers which are not to be terminated shall be shall be tested with a temporary fusion spliced pigtail fiber. Mechanical splice or bare fiber adapters are not acceptable.

The Contractor shall provide the date, time and location of any tests required by this specification to the Engineer at least 5 working (7 calendar) days before performing the test. Included with the notification shall be a record drawing of the installed fiber optic cable system. The drawings shall indicate actual installed routing of the cable, the locations of splices, and locations of cable slack with slack quantities identified.

Upon completion of the cable installation, splicing, and termination, the Contractor shall test all fibers for continuity, events above 0.1 dB, and total attenuation of the cable. The test procedure shall be as follows:

A Certified Technician utilizing an Optical Time Domain Reflectometer (OTDR) and Optical Source/Power Meter shall conduct the installation test. The test equipment used shall have been calibrated within the last two years. Documentation shall be provided. The Technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.

A fiber ring or fiber box shall be used to connect the OTDR to the fiber optic cable under test at both the launch and receive ends. The tests shall be conducted at 1310 and 1550 nm for all fibers.

All testing shall be witnessed by the IDOT Engineer and a copy of the test results (CD ROM or USB Drive) shall be submitted on the same day of the test. Hardcopies shall be submitted as described herein with copies on CD ROM.

At the completion of the test, the Contractor shall provide copies of the documentation of the test results to the Project Engineer. The test documentation shall be submitted as two bound copies and three CD ROM copies, and shall include the following:

Cable & Fiber Identification:

- Cable ID
- Operator Name
- Cable Location - beginning and end point
- Date & Time
- Fiber ID, including tube and fiber color
- Setup Parameters
- Wavelength
- Range (OTDR)
- Pulse width (OTDR)
- Scale (OTDR)
- Refractory index (OTDR)
- Setup Option chosen to pass OTDR "dead zone"

Test Results shall include:

- OTDR Test results
- Measured Length (Cable Marking)
- Total Fiber Trace
- Total Length (OTDR)
- Splice Loss/Gain
- Optical Source/Power Meter Total Attenuation (dB/km)
- Events > 0.10 dB

All work shall be neat and in a workmanlike manner. Particular care shall be taken as to not crush or kink the fiber optic cable. If in the opinion of the Engineer the cable has been crushed or kinked, the entire cable span shall be removed and replaced at no additional cost to the Department.

Sample Power Meter Tabulation:

Power Meter Measurements (dB)									
Location		Fiber No.	Cable Length (km)	A to B		B to A		Bidirectional Average	
A	B			1310 nm	1550 nm	1310 nm	1550 nm	1310 nm	1550 nm
		1							
		2							
Maximum Loss									
Minimum Loss									

The OTDR test results file format must be Bellcore/Telcordia compliant according to GR196-CORE Issue 2, OTDR Data Standard, GR 196, Revision 1.0, GR 196, Revision 1.1, GR 196, Revision 2.0 (SR-4731) in a ".SOR" file format. A copy of the test equipment manufacturer's software to read the test files, OTDR and power, shall be provided to the Department. These results shall also be provided in tabular form, see sample below:

Sample OTDR Summary					
Cable Designation:	<i>TCF-IK-03</i>	OTDR Location:	<i>Pump Sta. 67</i>	Date:	<i>0/0/00</i>
Fiber Number	Event Type	Event Location	Event Loss (dB)		
<i>1</i>	<i>Splice</i>	<i>23,500 ft</i>	<i>0.082</i>	<i>0.078</i>	
<i>1</i>	<i>Splice</i>	<i>29,000 ft</i>	<i>0.075</i>	<i>0.063</i>	
<i>2</i>	<i>Splice</i>	<i>29,000 ft</i>	<i>0.091</i>	<i>0.082</i>	
<i>3</i>	<i>Splice</i>	<i>26,000 ft</i>	<i>0.072</i>	<i>0.061</i>	
<i>3</i>	<i>Bend</i>	<i>27,000 ft</i>	<i>0.010</i>	<i>0.009</i>	

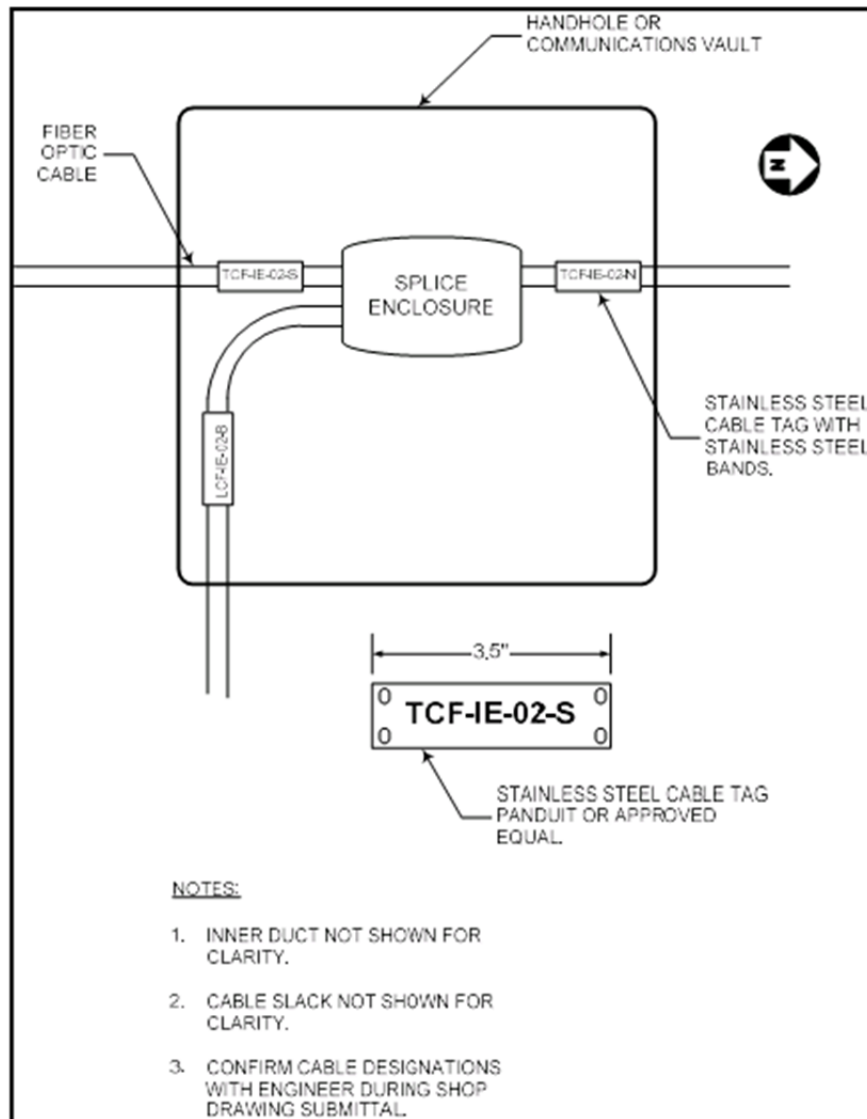
The following shall be the criteria for the acceptance of the cable:

- (a) Max cable attenuation @1310 nm ≤ 0.4 dB/km, @1550 nm ≤ 0.3 dB/km; events shall be ≤ 0.1 dB
- (b) Contractor shall submit to the Engineer a loss budget which includes cable attenuation, events from splices, and connectors at each patch panel where the cable is terminated. This shall be done for each trunk, distribution and lateral cable installed on the project. The loss budget shall be submitted for review 30 days prior to the cable installation. Once approved by the Engineer, the fiber cable can be installed and the loss budget document shall be used to judge whether the installed cable, spliced and terminated, is acceptable by the Department.

Splicing Requirements. Splices shall be made at locations shown on the Plans. Any other splices shall be permitted only with the approval of the Engineer. Splices will be paid for separately. All splice locations must be identified in the Record Drawings. Cable runs which dead-end at a handhole, communications vault, interconnect cabinet, or any other type of enclosure, shall be dead ended in a splice enclosure.

Slack Storage of Fiber Optic Cables. Included as a part of this item, slack fiber shall be supplied as necessary to allow splicing the fiber optic cables in a controlled environment, such as a splicing van or tent. After splicing has been completed, the slack fiber shall be stored underground in handholes or in the raised base adapters of ground mounted cabinets in accordance with the fiber optic cable manufacturer's guidelines. Fiber optic cable slack shall be 100 feet for each cable at each splice location, above or below ground. Fiber optic cable slack shall be 50 feet for each cable at access points, above or below ground, where splicing is not involved. If the innerduct is cut, the ends of the innerduct should extend beyond the first vertical rack so they can be secured at that point. This slack shall be measured for payment.

Fiber optic cable shall be tagged inside handholes with yellow tape containing the text: "CAUTION - FIBER OPTIC CABLE." In addition, permanent tags, as approved by the engineer, shall be attached to all cable in a hand hole or other break-out environment. These tags shall be stainless steel, nominally 0.75" by 1.72", and permanently embossed. These tags shall be attached with stainless steel straps, and shall identify the cable number, the number of fibers, and the specific fiber count. Tags and straps shall be Panduit or approved equal. See figure below:



Label the destination of each trunk cable onto the cable in each handhole, vault or cable termination panel.

Method of Measurement. Fiber optic cable will be measured for payment in feet in place installed and tested. Fiber optic cable will be measured horizontally and vertically between the changes in direction, including slack cable. The entire lengths of cables installed in buildings will be measured for payment

Basis of Payment. This work will be paid for at the contract unit price per foot for FIBER OPTIC CABLE of the type, size, and number of fibers specified. Payment shall not be made until the cable is installed, spliced and tested in compliance with these special provisions.

FIBER OPTIC TERMINATION PANEL, 12F OR 24F (D-1)

Effective: Dec. 28, 2009

Description Work under this item shall consist of furnishing and installing a fiber optic termination panel, type and size as specified on the plans and described herein. This equipment will be used to link field equipment using single-mode fiber optic cable.

Materials The fiber optic termination panel shall comply with the following requirements:

- (a) The fiber optic termination panel shall be rack mountable or wall mounted
- (b) Rack mounted termination panels shall be installed in 19" racks inside of ITS or 334 Type Cabinets or Pump Houses w/19" racks
- (c) The fiber patch panel shall terminate pigtail fibers as called out on the Plans.
- (d) The fiber optic termination panel shall allow termination of a fiber patch cord to interconnect outside plant fibers to fiber optic communication equipment
- (e) Shall be supplied with optical splice tray and holder
- (f) Wall mounted termination panels shall be installed in Pump Station, Type III, Type IV, or Type V control Cabinets
- (g) Wall-mounted termination panels shall be made out of solid steel construction, shall be powder coated, and feature top or bottom cable entry w/dust resistant grommets.
- (h) Rack-mounted units shall be aluminum material per ATSMB 209, powder coated, and modular design.
- (i) The approved type optical connectors on the end of each pigtail shall screw into a sleeve securely mounted to a patch panel within the controller cabinet. The maximum optical loss across the connection shall not exceed 0.25 dB.
- (j) The fibers with the optical connectors on the pigtail cable shall be routed through and secured in the fiber optic termination panel as directed by and to the satisfaction of the Engineer.
- (k) The bulkheads or single-mode adapter types shall be single-mode ST compatible, ceramic, unless a substitute is approved by the Engineer.

CONSTRUCTION REQUIREMENTS

The Fiber Optic Termination Panel shall be installed in the locations shown on the Plans. The panels shall come with cable strain relief hardware and pull out label for administrative documentation. All work shall be neat and in a workmanlike manner. Particular care shall be taken as to not crush or kink the fiber optic cable. If in the opinion of the engineer the cable has been crushed or kinked, the entire cable span shall be removed and replaced at the Contractor's expense.

The approved type of single-mode connectors on the end of each pigtail must screw into a sleeve securely mounted to the termination panel within the fiber termination panel enclosure. The panel must be provided with pre-connectorized and pre-wired port modules.

Basis of Payment FIBER OPTIC TERMINATION PANEL, 12F OR 24F will be paid for at the Contract unit price each. This price shall be payment for furnishing and installing the FIBER OPTIC TERMINATION PANEL 12F OR 24F along with any necessary fiber optic patch cords and any other materials, hardware, and labor necessary to complete the installation.

ELECTRICAL CABLE IN CONDUIT, 4C/NO. 18 SHIELDED LOOP LEAD-IN (D-1)

Effective: March 1, 2010

Revised: March 30, 2011

Description.

This work shall consist of furnishing materials and labor for installation of shielded loop lead-in cables in conduit as specified herein and indicated by the Engineer, complete with all identification, terminating and testing.

Materials.

General:

Lead-ins shall be Canoga 30003 or equal cable. The jacket of high density polyethylene shall be rated to 600 volts in accordance with UL 83 Section 36.

All cables shall be UL listed.

Unless otherwise indicated, all cable shall be rated 600 volts.

The cable shall be rated 90 degrees C dry and 75 degrees C wet and shall be suitable for installation in wet and dry locations, exposed to the weather, and shall be resistant to oils and chemicals.

The UL listing mark, cable voltage, insulation type and ratings, as well as the cable size shall all be clearly printed on the cable in a color contrasting with the insulation color.

Conductors:

Conductors shall be #18 awg 7X.0152" un-coated copper.

Conductors shall meet the requirements of ASTM Designation B-8 as applicable.

Unless otherwise indicated, all conductors shall be stranded and twisted 4 turns per foot.

The cable shall be an assembly of pairs of left hand lay twisted insulated conductors, with a core filled with a petroleum base flooding compound, overlapped conductive tape shield and a black high density polyethylene jacket overall. This cable shall meet the requirements of IEEE Standard 383.

Insulation:

The conductors shall be coded as follows: black-red-white-green.

Cable insulation shall incorporate polyvinyl chloride (PVC) with a clear nylon covering overall as specified and the insulation shall meet or exceed the requirements of ICEA S-61-402, NEMA Standard Publication No. WC-5, UL Standard 83, as applicable.

Unless otherwise indicated, cable conductors shall be solid full color coded via insulation color.

Quality Control:

Submittal information shall include demonstration of compliance with all specified requirements.

All cables shall be delivered to the site in full reels. Cable on the reels shall be protected from damage during shipment and handling by wood lagging or other means acceptable to the Engineer. Reels shall be tagged or otherwise identified to show the UL listing.

Installation.

The loop lead-in shall be a Canoga 30003 or approved equal cable. The loop lead-in shall be barrel sleeved, crimped, soldered and protected by heat shrinkable tubing to the loop #14 wire. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be brought into the cabinet or handhole at the time the induction loop is placed in the pavement. Loops located over 1000 feet from cabinet require four (4) turns of No. 14 wire.

Lead-in cable Canoga 30003 or equivalent will be installed where the lead-in length from point of interception to the point of termination exceeds 150 feet.

Where lead-in runs are less than 150 feet, the loop wire will be utilized as lead-in to the point of termination w/o splices, being twisted 5 turns per foot. The additional loop wire will not be paid for separately but shall be included in the Induction Loop Pay Item.

Loop lead-ins placed in handholes shall be coiled, taped, and hung from the side of the handhole to protect against water damage. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged in each handhole through which it passes. The loop lead-in shall be color coded and tagged at the core hole, in each junction box it passes through and at the termination point in the cabinet.

TRAFFIC SYSTEMS CENTER LOOP SPLICING REQUIREMENT

MAINLINE LOOPS		METERING LOOPS			
Lane 1	Blue	Lane 4	Violet	Loop 1	Green
Lane 2	Brown	Exit	Black	Loop 2	Yellow
Lane 3	Orange	Entrance	White	Loop 3	Red

When 2 or 3 loops are installed on an exit or entrance ramp the loop color code shall conform to the mainline loop color code and shall be marked as entrance or exit ramp loops.

In addition to color codes each loop shall be identified with a written label attached to the loop wire, or lead-in wire. The tags shall be Panduit #MP250W175-C or equivalent. All wires and cables shall be identified in each handhole or cabinet the cable passes through, or terminates in. The labels shall be attached to the cable by use of two cable ties.

Testing.

After installation, the cable shall be tested as approved by the Engineer. Cable failing to pass the test shall be replaced with new cable at no additional cost.

Method of Measurement.

The cable shall be measured for payment in linear foot in place. Measurements shall be made in straight lines between changes in direction and to the centers of Equipment. All vertical cable and permissible cable slack shall be measured for payment. A total of six (6) feet of slack shall be allowed for the end of a run terminating at a panel and four (4) feet will similarly be allowed when terminating at a wall-mounted panel. Additional vertical distance for the height of conduit risers, etc., as applicable, will be measured for payment for equipment so mounted.

Basis of Payment.

This work shall be paid at the Contract unit price per linear foot, furnished and installed for ELECTRICAL CABLE IN CONDUIT, LEAD IN, NO. 18 4/C, TWISTED SHIELDED.

ELECTRIC SERVICE DISCONNECT

Description:

This item shall consist of furnishing and installing an Electric Service Disconnect, mounted on a wood pole or wall as specified below, shown on accompanying details drawing and as directed by the Engineer.

Materials:

The disconnect box shall be NEMA 4X stainless steel, nominally 12" x 18" x 8" with piano hinged door, steel back panel, fast acting stainless steel enclosure clamps, padlock provisions and door stop kit, Hoffman catalog #A-16H1208SS6LP/A-16P12/A-DSTOPK/C-PMK12, or approved equal.

Circuit Breakers shall be thermal magnetic bolt-on type with a minimum interrupt capacity of 10,000 symmetrical amperes at 120 volts. Breakers shall be lockable in the off position for lock out/tag-out compliance.

Disconnect surge protector shall be suitable for 240/120 volt single phase 60 Hz. AC electrical service. Protector shall have a surge energy capability of 3600 joules or better at 8/20 microseconds, rated -40 to 60 degrees C., with LED operating indicators and shall be UL listed per UL 1449. Protector shall be a Cutler Hammer CMOV230L65XST or approved equal.

Conduit and wire to complete the installation of the disconnect box shall be paid for via pay items elsewhere herein.

Bus bars, connectors and lugs shall be copper, insulated and isolated, and configured to prevent shorted conditions from tightening terminations. Lug and connectors shall be rated for 75 degrees C. Overall bus section shall be configured behind an insulating barrier shield which is removable for access to connections.

Combination ground and neutral bar shall be configured with separate ground and neutral sections and spare terminals as indicated. The heads of ground screws shall be painted green. The heads of neutral screws shall be painted white.

A plastic laminated layout and circuit diagram shall be affixed to the interior side of the enclosure door.

A 2-color engraved plastic nameplate, attached with screws and engraved as indicated, shall be provided for each main breaker.

The exact mounting height of the box shall be field determined and marked by the Engineer.

Electrical service shall be of the voltage indicated. Where 120 volt service is indicated, service drop cable shall be installed accordingly.

The electric service equipment assembly shall be UL labeled, suitable for use as service equipment.

Stainless steel unistrut channel, stainless steel "L" shaped brackets, and stainless steel hardware shall be provided for proper installation of the disconnect, as shown on disconnect mounting details. (TY-1TSC-400 #20).

Installation:

When mounting on pole, the box shall be installed as per accompanying disconnect mounting detail (TY-1TSC-400#19)

When mounting on wall, the box shall be installed as per accompanying disconnect details (TY-1TSC-400#25 and #26).

Note detail drawing for installation of stainless steel straps and iron conduit straps (TY-1TSC-400#19).

Pole mounted disconnect shall be installed a minimum of 10 feet above final grade, as shown on electric service detail TY-1TSC-400#20. Wall mounted disconnect shall be installed a minimum of 4 feet above final grade, as shown on electric service detail TY-1TSC400#25 One Electric Service Disconnect may be used for more than one location as shown on plans. If so, an extra circuit breaker shall be installed to control the 2nd location. The 2nd circuit breaker supplied shall be considered incidental to the Electric Service Disconnect pay item.

Removal of existing Electric Service Type "C" shall be considered as incidental to Electric Service Disconnect pay item. Contractor shall not be entitled to extra compensation for removal of Type "C" service.

All work beginning to end shall be coordinated with the power utility company. Contractor shall call the power utility company to set up all service calls.

Method of Measurement:

Each Electric Service Disconnect mounted on a wood pole or on a wall for the Surveillance System, installed as per the above specifications and as directed by Engineer, shall count as a unit for payment.

Basis of Payment:

This item shall be paid at the contract unit price each for ELECTRIC SERVICE DISCONNECT, which shall be payment in full for the material and work as described herein. To make Electric Service and Disconnect complete, ground rod and miscellaneous hardware shall be included in contract unit price for ELECTRIC SERVICE DISCONNECT.

CONCRETE FOUNDATIONS (SPECIAL)

Description. Concrete foundations shall be constructed to support ITS equipment cabinets 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 disturbed areas in accordance with Sections 211, 250, and 251 of the Standard Specifications.

Materials. 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 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 Concrete foundations. Concrete foundation dimensions shall be in accordance with those dimensions shown in the Plans on the detail sheet "Cabinet, Model 334 Installation Detail". The foundation shall be located as required in order to avoid existing and relocated utilities. The top of the foundation shall be finished level. Shimming of the appurtenance to be attached will not be permitted.

Prior to pouring the foundation, the Contractor shall check the Plans for the specific number, size, and direction of conduit entrances required at the given location. All 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 per each concrete foundation in-place installed in accordance with the total length of concrete foundation required for 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 each of CONCRETE FOUNDATIONS (SPECIAL).

HANDHOLE

DESCRIPTION

This item shall consist of constructing a handhole, a heavy-duty handhole, or a double handhole, 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 handholes shall be installed in accordance with the Standard Specifications Sec. 814.

MATERIALS

All handholes shall be constructed of Class SI concrete meeting the requirements of the Standard Specifications for Road and Bridge Construction Section 1020.

CONSTRUCTION DETAILS

Handhole of the type specified shall be constructed in accordance with the details shown on the plans and conform to the following requirements:

1. Concrete: Concrete construction shall be done in accordance with the provisions of Concrete for Structures and Incidental Construction contained in the Standard Specifications for Road and Bridge Construction Sec. 503.
2. 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 in. (25.4mm) above the finished surface of the ground.
3. Backfilling: Any backfilling necessary under a pavement, shoulder, sidewalk or within 2 ft. (60 cm) of the pavement edge shall be made with sand or stone screenings.
4. Forming: Forms will be required for the inside face of the handhole wall, and across all trenches leading into the handholes excavation. The ends of conduits leading into the handhole shall fit into a conduit bell which shall fit tightly against the inside form and the concrete shall be carefully placed around it so as to prevent leakage.
5. French Drain: A french drain conforming to the dimensions shown on the plans shall be constructed in the bottom of the handhole excavation.
6. Steel Hooks: Each handhole shall be provided with four galvanized steel hooks of appropriate size, one on each wall of the handhole.
7. Frame and Cover: The outside of the cover shall contain a recessed ring Type "G" for lifting and a legend "IDOT TSC" cast-in.

8. Cleaning: The handhole shall be thoroughly cleaned of any accumulation of silt, debris, or foreign matter of any kind, and shall be free from such accumulations at the time of final inspection.

BASIS OF PAYMENT

This work will be paid for at the contract unit price each for HANDHOLE or HEAVY DUTY HANDHOLE, or CONCRETE HEAVY DUTY HANDHOLE (SPECIAL), as the case may be, for all necessary excavating, backfilling, disposal of surplus material and form work, frame and cover, and furnishing all materials.

INDUCTION LOOP (D-1)

Effective: June 1, 1994

Revised: August 12, 2015

1. DESCRIPTION

This item shall consist of furnishing, installing and testing an induction loop, of the dimensions shown on the plans or of the dimension from Table 1, at the locations shown. The induction loop shall be installed in accordance with all details shown on the plans and applicable portions of Section.886 Standard Specifications for Road and Bridge Construction. All saw cutting, cable installation, joint sealing, lead-ins and testing necessary to complete the installation shall conform with the following requirements.

2. MATERIALS

The cable used for induction loop shall be #14-19 strand XHHW XLP-600V, encased in orange Detecta-duct tubing as manufactured by Kris-Tech Wire Company, Inc., IMSA 51-7, or comparable. All loop wire shall be UL listed. Lead-ins shall be Canoga 30003 or equal cable. The jacket, constructed of high density polyethylene, shall be rated to 600 volts in accordance with UL 83 Section 36.

Joint sealer shall have sufficient strength and resiliency to withstand stresses set up by vibrations and differences in expansion and contraction due to temperature changes. The joint sealer shall have a minimum tensile strength of 100 P.I.E. when tested by ASTM Method D638-58T. Adhesion to clean dry, oil-free Portland Cement concrete shall be at least equal to the tensile strength of the concrete. The joint sealer, with qualities described above, shall be capable of curing in a maximum time of 30 minutes at all temperatures above 50 degrees F (10 degrees C). Curing shall be defined as the capability of withstanding normal traffic loads without degradation. A hard asphalt-based filling and insulating compound having a high softening point and a high pouring temperature shall be used if the outside installation temperature is below 50 degrees F (10 degrees C). The filling compound shall have a softening point of not less than 235 degrees F (110 degrees C) and a summer pouring temperature of 375 degrees F (190 degrees C); winter pouring temperature of 425 degrees F (220 degrees C). Sealant for Detector Loop(s): The sealer shall meet or exceed the characteristics provided by OZ GEDNEY DOZSeal 230 filling compound.

3. INSTALLATION DETAILS

Slots in the pavement shall be cut with a concrete sawing machine in accordance with the applicable portions of Art. 420.05 of the Standard Specifications for Road and Bridge Construction. The slot must be clean, dry, and oil-free. Wire shall be inserted in the pavement slot with a blunt tool which will not damage the insulation. Loops shall not be dry cut. Loops shall not be installed at an outside temperature below 50 degrees F (10 degrees C) unless directed by Engineer.

Plastic sleeving shall be used to insulate the wire where loop wire crosses cracks and joints in the pavement. The sleeving shall be properly sealed with electrical tape to prevent joint sealer from entering sleeves. Sleeving shall extend a minimum of 8 inch (20 cm) each side of joint.

Induction loops on exit and entrance ramps shall be square or rectangular with edges perpendicular or parallel to traffic flow. All mainline loops shall be round loops, 6 feet (1.8 m.) in diameter. Induction loops shall be centered on all ramps and in traffic lanes unless designated otherwise on the plans or by the Engineer. Traffic lanes shall be referred to by number and loop wire shall be color-coded and labeled accordingly. Lane one shall be the lane adjacent to the median, or that lane on the extreme left in the direction of the traffic flow; subsequent lanes are to be coded sequentially towards the outside shoulder. A chart which shows the coding for each installation shall be included in each cabinet. Core holes shall not be allowed at corner of loop. Saw cuts for all induction loops and lead-ins shall not be greater than 2.75 inches (7 cm) in depth.

All excess joint sealer shall be removed so that the level of the sealer in the saw cut is at the same level as the adjoining pavement.

All induction loops shall contain three (3) turns of No. 14 wire min. Each induction loop shall have its own Canoga 30003 or equal home run or lead-in to the cabinet when said induction loops is over 150 feet (45 m) from cabinet. Induction loops shall not be connected in series with other loops. This wire shall be free from kinks or any insulation abrasions. The loop lead-in shall be a Canoga 30003 cable. The loop lead-in shall be barrel sleeved, crimped, soldered and protected by heat shrinkable tubing to the loop #14 wire. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be brought into a cabinet or handhole at the time the induction loop is placed in the pavement. Loops located over 1000 feet (300m) from cabinet require four (4) turns of No. 14 wire.

Where lead in runs are less than 150 feet (45 meters), the loop wire shall be utilized as lead-in from the Core Hole to the Cabinet, w/o splices, being twisted 5 turns per foot (16 turns per meter). The additional loop wire will not be paid for separately, but shall be considered part of this Pay Item.

Where duct is collapsed or damaged, making it impossible to pull loop lead-in, the affected area will need to be replaced. This will be paid for by the pay item UNDERGROUND CONDUIT, COILABLE NONMETTALIC CONDUIT, 1¼" DIA.

Loop lead-ins placed in handholes shall be coiled, taped and hung from the side of the handhole to protect against water damage. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged in each handhole thru which it passes. The loop lead-in shall be color coded and tagged at the core hole, in each junction box it passes thru, and at the termination point in the cabinet. Contractor shall core drill all mainline round loops 6 feet (1.83 meters) in diameter x 0.25 inch (6 mm) in width x 2.75 inches (7 cm) in depth.

Loop lead-ins shall not be allowed in saw cuts in shoulders. The Engineer shall be contacted regarding proposed changes in loop locations necessitated by badly deteriorated pavement. The Engineer may relocate such loops. Loop Wire and lead-ins shall not be installed in the curb and gutter section or through the edge of pavement. A hole shall be drilled at least 12 inches (30 cm) in from the edge of pavement through which the P-duct, loop wire and lead-in shall be installed. Saw cuts through shoulders to core hole shall not be allowed.

W (M)	S (M)
13 ft (4.0 m)	9 ft (2.8 m)
14 ft (4.3 m)	10 ft (3.1 m)
15 ft (4.6 m)	11 ft (3.4 m)
16 ft (4.9 m)	12 ft (3.7 m)
17 ft (5.2 m)	13ft (4.0 m)
18 ft (5.5 m)	14ft (4.3 m)
19 ft (5.8 m)	15 ft (4.6 m)
20 ft (6.1 m)	16 ft (4.9 m)
21 ft (6.4 m)	17 ft(5.2 m)
22 ft (6.7 m)	18 ft (5.5 m)
23 ft (7.0 m)	19 ft (5.8 m)
24 ft (7.3 m)	20 ft (6.1 m)
25 ft (7.6 m)	21 ft (6.4 m)

Should the induction loop and/or core hole for the induction loop and loop lead-in cable be paved over by other construction operations, it shall be the contractor's responsibility for locating and finding the induction loop and/or the core hole for the repair of a bad loop or lead-in or for the installation of a new loop or loop lead-in. The locating of the core hole and the induction loop shall be incidental to the cost of the induction loop lead-in installation.

No extra compensation shall be allowed for finding and locating induction loops and/or core hole.

The loop shall be spliced to the lead-in wire with a barrel sleeve crimped and soldered. Epoxy filled heat shrink tubing shall be used to protect 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 tube shall be shrunk with a heat gun. Any other method will not be acceptable, i.e. the use of a torch will not be acceptable. No burrs shall be left on the wire when done soldering. Cold solder joints will not be acceptable. Refer to T.S.C. typical(s) TY-1TSC-418 #2 & #3 for proper loop to loop lead-in splice detail.

Where there are continuous count stations or multiple lane exits or entrance ramps the loop in the left most lane shall be wrapped clockwise, the adjacent lane loop wrapped counter-clockwise, etc, alternating wrapping the loops every other lane.

4. TRAFFIC SYSTEMS CENTER LOOP SPLICING REQUIREMENT COLOR CODE

<u>MAINLINE LOOPS</u>				<u>METERING LOOPS</u>	
Lane 1	Blue	Lane 4	Violet	Loop 1	Green
Lane 2	Brown	Exit	Black	Loop 2	Yellow
Lane 3	Orange	Entrance	White	Loop 3	Red

When 2 or 3 loops are installed on an exit or entrance ramp the loop color code shall conform to the mainline loop color code and shall be marked as entrance or exit ramp loops.

In addition to color codes each loop shall be identified with a written label attached to the loop wire, or lead-in wire. The tags shall be Panduit #MP250W175-C or equivalent. All wires and cables shall be identified in each handhole or cabinet that the cable passes through, or terminates in. The labels shall be attached to the cable by use of two cable ties.

5. PROSECUTION OF SURVEILLANCE WORK

The work shall consist of replacement and/or repairs caused by the pavement repair, removal and resurfacing to all induction loops, loop lead-in, poly-duct, steel conduits, all interconnecting cables and all Surveillance appurtenances. The Contractor shall make modifications to existing installations to render the location functional. The Contractor shall also furnish and install new induction loops, loop lead-ins, poly-duct, steel conduits, all interconnecting cables, and all Surveillance appurtenances.

Should damage occur to any Traffic Systems Center cabinets, housing telemetry equipment and/or vehicle detection equipment, the Contractor shall install and replace all damaged equipment at his own expense. The Traffic Systems Center staff shall determine what equipment shall be reusable and what shall be replaced. Replaced equipment shall be of equal or better quality and type.

6. CONNECTIONS TO EXISTING INSTALLATIONS

Where new work connects to existing installations, the Contractor shall do all necessary cutting, fitting and foundation drilling to the existing installation. The Contractor shall remove all existing equipment, as required to make satisfactory connections, so as to leave the entire work in a finished and workmanlike manner, as approved by the Engineer. No raceways shall be allowed to enter cabinet through the sides or backwalls.

7. PROTECTION OF WORK

Electrical work, equipment and appurtenances shall be protected from damage during construction until final acceptance. Electrical raceway or duct openings, shall be capped or sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

8. STANDARDS OF INSTALLATION

Electrical work shall be installed 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.

9. TESTING

Before final acceptance, the induction loops shall be tested. Tests will not be made progressively, as parts of the work are completed. They shall be all made at one time. Items which fail to test satisfactorily shall be repaired or replaced.

An electronic test instrument capable of measuring large values of electrical resistance, such as major megger, shall be used to measure the resistance of the induction loop and its lead-in. The resistance of the loop and its lead-in shall be a minimum of 100 meg ohms 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 specified by the Engineer. The loop and loop lead-in shall have an inductance between 100 micro henries and 700 micro henries. The continuity test of the loop and loop lead-in shall not have a resistance greater than two (2) ohms. The Contractor shall do 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.

10. FINAL ACCEPTANCE INSPECTION

When the work is complete, tested and fully operational, the Contractor shall schedule a Final Acceptance Inspection with the Engineer. Final acceptance will be made as a total system, not as parts.

The Contractor shall furnish the necessary manpower and equipment to make the Final Acceptance Inspection. The Engineer will designate the type of equipment required for the inspection tests.

11. METHOD OF MEASUREMENT

The induction loop measurement shall be the length of saw cut in the pavement which contains loop wire. The actual length of wire used in the saw cut shall not be considered in any measurement.

12. BASIS OF PAYMENT

This item will be paid at the contract unit price per lineal foot (meter) as INDUCTION LOOP for furnishing and installing all materials listed complete and operating in place. If loop is less than 150 ft. from cabinet, loop wire shall be used as lead-in and will not be paid separately. If loop is greater than 150 ft. from cabinet, loop wire shall be spliced in handhole to an ELECTRIC CABLE IN CONDUIT, LEAD-IN NO. 18 4/C TWISTED SHIELDED (see ELECTRICAL CABLE IN CONDUIT, 4C NO. 18 SHIELDED LOOP DETECTOR WIRE SPECIAL PROVISION).

REMOVE FIBER OPTIC CABLE FROM CONDUIT

Description. This work shall consist of removing a portion of the existing fiber optic interconnect cable from conduit as shown on the plans.

Materials. None.

Construction. The existing fiber optic cable shall be disconnected from the communications end equipment and fiber enclosures, and removed from the existing conduits. Removal of the fiber optic cable shall prevent damage to end equipment from the cable being tugged. The existing fiber optic cable shall not be disconnected and removed until the temporary equipment and communications are installed in advance and operating to the satisfaction of the Engineer. Cables shall be taken off site for proper disposal.

Basis of Payment. This work will be paid for at the contract unit price per foot for REMOVE FIBER OPTIC CABLE FROM CONDUIT which price shall be payment in full for disconnecting the existing fiber optic cable from the end locations and removing the existing fiber optic cable from the existing conduits.

REMOVE TEMPORARY INTERCONNECT

Description. This work shall consist of the removal of equipment installed as part of the Advance Work plans as described in this Special Provision. Work includes the following:

- (a) Removal of 336 cabinets from a wood pole, including mounting hardware.
- (b) Removal of CCTV cameras from a wood pole, including mounting hardware.
- (c) Removal of a RVDS from a wood pole, including mounting hardware.
- (d) Securely packing CCTV camera and associated components, RVDS and associated components, cabinets and internal equipment, and safely delivering all items to the Department (District 1 headquarters) or Electrical Maintenance Contractor as directed by the Engineer.
- (e) Removal of wood poles used exclusively for temporary CCTV camera installations. The removal of wood poles for temporary lighting are paid for separately.
- (f) Removal of span wire and attached fiber optic cables or power cables for temporary ITS systems.
- (g) Removal of fiber optic cable installed in underground conduit to create temporary connections to camera locations and IDOT District 1 headquarters.
- (h) Removal of power cables installed in underground conduit to create temporary connections to camera locations and power sources.

Materials. None.

CONSTRUCTION REQUIREMENTS

General. No removal work will be permitted without approval from the Engineer. The Contractor shall set up a meeting with the State's Electrical Maintenance Contractor (EMC) and the Traffic Systems Center (TSC) Engineer. The EMC and TSC Engineer shall be notified at least 48 hours in advance of the meeting.

Each cabinet location shall be visited during the meeting to determine the condition of equipment. Any equipment that is to be salvaged that is damaged after this meeting shall be repaired or replaced at the contractor's expense, to the satisfaction of the Engineer. The equipment that is not salvaged shall be disposed of as directed by the Engineer and all debris removed beyond the right-of-way.

The condition of the equipment shall be documented and signed by representatives of the TSC, EMC and the Contractor. A copy shall be given to the Engineer.

If this meeting does not occur, then all of the equipment will be assumed to be in working condition. Any equipment that is not in working condition upon delivery shall be repaired or replaced at no additional cost to the Department.

Removal Details. The equipment shall be removed in accordance with the applicable sections of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction:

- (a) **Cabinet:** All cabinets shall be removed and salvaged as directed by the Engineer.
- (b) **Cabinet Electronic Equipment:** Equipment housed in the cabinet shall be salvaged as directed by the Engineer.
- (c) **CCTV Camera:** The CCTV camera assembly shall be removed and salvaged as directed by the Engineer.
- (d) **RVDS:** The RVDS assembly shall be removed and salvaged as directed by the Engineer.
- (e) **Wood Pole:** Wood Poles installed for temporary CCTV camera installations shall be removed and disposed of by the Contractor.
- (f) **Span Wire:** Span wire shall be removed and disposed of by the Contractor.
- (g) **Conduit:** Conduits installed for temporary connections that will not be used as part of the final ITS system shall be abandoned.
- (h) **Cable:** Cables installed for temporary connections that will not be used as part of the final ITS system shall be removed and disposed of by the Contractor. This work shall be paid for under this pay item.

Coordination with Temporary Lighting Removal. Removal of temporary ITS equipment and infrastructure shall be coordinated with the temporary lighting removal. Wood poles no longer required for temporary lighting, but needed to support ITS fiber optic cables and power cables, shall remain in place until the temporary ITS system has been decommissioned.

Salvaging Details. Upon removal, equipment to be salvaged, as designated by the Engineer, shall be immediately packaged in suitable containers for protection and delivery. Each container shall clearly identify the contents, source location, and date of removal on the outside of the container. Containers shall become the property of IDOT upon delivery.

Salvaged equipment shall be delivered and unloaded at a facility of the Department or EMC, as designated by the Engineer. Packaging material required for proper shipping shall be included. The Contractor shall prepare a printed delivery receipt to be signed by a representative of the recipient. A copy of this signed receipt shall be provided to the Engineer.

Any damage resulting from the removal and/or transportation of equipment and associated hardware that are to be salvaged, shall be repaired or replaced in kind. The Engineer will determine the extent of damage and the suitability of repair and/or replacement.

Basis of Payment. This work will be paid for at the contract lump sum price for REMOVE TEMPORARY INTERCONNECT, which shall be payment in full for all labor, material removal, and transportation (to EMC or Department) necessary to complete the work as described above.

FIBER OPTIC SPLICE CLOSURE, WATERTIGHT

Description. This work shall consist of furnishing and installing an rugged fiber optic splice closure to secure and protect fiber optic fusion splices.

Materials. 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 unspliced 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.

Factory Testing.

Compression Test. The closure shall not deform more than 10% in its largest cross-sectional dimension when subjected to a uniformly distributed load of 1335 N at temperatures of 0 and 100 degrees Fahrenheit. 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 and 100 degrees Fahrenheit. 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 lbs. cylindrical steel impacting head with a 2 in. spherical radius at the point where it contacts the closure. It shall be dropped from a height of 12 in. The closure shall not exhibit any cracks or fractures to the housing that would preclude it from passing the water immersion test. There shall be no permanent deformation to the original diameter or characteristic vertical dimension by more than 5%.

Cable gripping and sealing testing. The cable gripping and sealing hardware shall not cause an increase in fiber attenuation in excess of 0.05 dB/fiber @ 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 fiber.

Vibration Test. The splice organizers shall securely hold the fiber splices and store the excess fiber. The fiber splice organizers and splice retaining hardware shall be tested per EIA Standard FOTP-II, Test Condition 1. The individual fibers shall not show an increase in attenuation in excess of 0.1 dB/fiber.

Water Immersion Test. The closure shall be capable of preventing a 10 ft. water head from intruding into the splice compartment for a period of 7 days. Testing of the splice closure is to be accomplished by the placing of the closure into a pressure vessel and filling the vessel with tap water to cover the closure. Apply continuous pressure to the vessel to maintain a hydrostatic head equivalent to 10 ft. on the closure and cable. This process shall be continued for 30 days. Remove the closure and open to check for the presence of water. Any intrusion of water in the compartment containing the splices constitutes a failure.

Certification. It is the responsibility of the Contractor to insure that either the manufacturer or an independent testing laboratory has performed all of the above tests, and the appropriate documentation has been submitted to the Department. Manufacturer certification is required for the model(s) of closure supplied. It is not necessary to subject each supplied closure to the actual tests described herein.

CONSTRUCTION REQUIREMENTS

The closure shall be installed according to the manufacturer's recommended guidelines. The Contractor shall 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.

After completing all fusion splices, the Contractor shall secure the splice closure to the side of the splice facility using cable support brackets. All cables shall be properly dressed and secured to rails or racks within the manhole. No cables or enclosures will be permitted to lie on the floor of the splice facility.

All work shall be neat and in a workmanlike manner. Particular care shall be taken as to not crush or kink the fiber optic cable. If in the opinion of the Engineer the cable has been crushed or kinked, the entire cable span shall be removed and replaced at no additional cost to the Department.

Basis of Payment. This work will be paid for at the contract unit price per each for FIBER OPTIC SPLICE CLOSURE, WATERTIGHT.

FIBER OPTIC SPLICE ENCLOSURE

Description. Work under this item shall consist of furnishing and installing a fiber optic splice enclosure, type and size as specified on the plans and described herein. This enclosure will be mounted inside a cabinet and will be used to secure, protect, and organize single-mode fiber optic cable fiber strands and fusion splices.

Materials. The fiber optic splice enclosure shall comply with the following requirements:

- (a) The enclosure shall have the capacity to accommodate all fibers from the entering fiber optic cables.
- (b) The enclosure shall have provisions for cable strain-relief.
- (c) The enclosure shall be rack mountable or wall mounted
- (d) Rack mounted enclosures shall be installed in EIA standard 19" racks
- (e) Shall be supplied with optical splice trays and organizer holders. Trays shall be aluminum with clear plastic covers, designed for outdoor use, and accommodate 12 fusion splices. The trays shall have perforations for cable ties and buffer tube strain relief features. Individual trays shall be removable from the enclosure without disturbing the other trays or removing the enclosure itself from the cabinet.
- (f) The enclosure shall have the tray capacity to accommodate immediate fusion splices and future splices of the entering fiber optic cables.
- (g) Wall-mounted enclosures shall be made out of solid steel construction, shall be powder coated, and feature top or bottom cable entry w/dust resistant grommets.
- (h) Rack-mounted units shall be aluminum material per ATSMB 209, powder coated, and modular design.

Construction. The Fiber Optic Splice Enclosure shall be installed in the above-ground cabinets or facilities as specified on the Plans. The enclosures shall come with cable strain relief hardware and pull out label for administrative documentation. Cables that are spliced within a facility will be secured to the equipment racks or walls as appropriate and indicated on the Plans.

All work shall be neat and in a workmanlike manner. Particular care shall be taken as to not crush or kink the fiber optic cable. If in the opinion of the Engineer the cable has been crushed or kinked, the entire cable span shall be removed and replaced at no additional cost to the Department.

Basis of Payment. This work will be paid for at the contract unit price per each for FIBER OPTIC SPLICE ENCLOSURE which price shall be payment in full for furnishing and installing a fiber optic splice enclosure as shown on the plans and specified herein, along with accessories, mounting hardware, and labor necessary to complete the installation.

MATERIAL TRANSFER DEVICE (BDE)

Effective: June 15, 1999

Revised: August 1, 2014

Description. This work shall consist of placing SMA binder and surface course mixtures, except that these materials shall be placed using a material transfer device (MTD).

Materials and Equipment. The MTD shall have a minimum surge capacity of 15 tons (13.5 metric tons), shall be self-propelled and capable of moving independent of the paver, and shall be equipped with the following:

- (a) Front-Dump Hopper and Conveyor. The conveyor shall provide a positive restraint along the sides of the conveyor to prevent material spillage. MTDs having paver style hoppers shall have a horizontal bar restraint placed across the foldable wings which prevents the wings from being folded.
- (b) Paver Hopper Insert. The paver hopper insert shall have a minimum capacity of 14 tons (12.7 metric tons).
- (c) Mixer/Agitator Mechanism. This re-mixing mechanism shall consist of a segmented, anti-segregation, re-mixing auger or two full-length longitudinal paddle mixers designed for the purpose of re-mixing the hot-mix asphalt (HMA). The longitudinal paddle mixers shall be located in the paver hopper insert.

CONSTRUCTION REQUIREMENTS

General. The MTD shall be used for the placement of all SMA binder and surface course mixtures placed with a paver. The MTD speed shall be adjusted to the speed of the paver to maintain a continuous, non-stop paving operation.

Use of a MTD with a roadway contact pressure exceeding 25 psi (172 kPa) will be limited to partially completed segments of full-depth HMA pavement where the thickness of binder in place is 10 in. (250 mm) or greater.

Structures. The MTD may be allowed to travel over structures under the following conditions:

- (a) Approval will be given by the Engineer.
- (b) The vehicle shall be emptied of HMA material prior to crossing the structure and shall travel at crawl speed across the structure.
- (c) The tires of the vehicle shall travel on or in close proximity and parallel to the beam and/or girder lines of the structure.

Method of Measurement. This work will be measured for payment in tons (metric tons) for all SMA binder and surface course materials placed with a material transfer device.

Basis of Payment. This work will be paid for at the contract unit price per ton (metric ton) for MATERIAL TRANSFER DEVICE.

The various HMA mixtures placed with the MTD will be paid for as specified in their respective specifications. The Contractor may choose to use the MTD for other applications on this project; however, no additional compensation will be allowed.

LUMINAIRE, LED, HORIZONTAL MOUNT

Replace Article 821.04 with the following:

821.04 Conventional Pole Installation

- (a) Luminaire. Luminaires shall be 400 watt high pressure sodium or light emitting diode (LED) technology as specified on the Plans. Luminaires have been specified based on Manufacturer’s published photometric data for high pressure sodium and LED Luminaires on file with the Tollway.

Where LED luminaires are supplied, each shall have optics as defined by the following Manufacturer IES photometric files for the distribution types listed:

Manufacturer	Distribution Type	Photometric File
American Electric Lighting	Type II	ATB2_60BLEDE10_XXXXX_R2
General Electric Lighting Solutions	Type 23E1	ERS2_23E1X40
Philips	Type R2M	RFL-215W96LED4K-T-R2M (S1410224m)

Where high pressure sodium luminaires are supplied, each shall have optics as defined by the following Manufacturer IES photometric files for the distribution types listed:

Manufacturer	Distribution Type	Photometric File
American Electric Lighting	Type M-C-II	325-40S-R2-FG-HP
	Type M-C-III	325-40S-R3-FG-HP
General Electric Lighting Solutions	Type M-C-III	451002
	Type S-C-II	450101
Hubbell Lighting	Type M-C-II	HP-03062
	Type M-C-III	HP-03065

All luminaires supplied under the Contract shall meet or exceed the photometric performance requirements on file with the Tollway for the application and layout specified.

- (b) Horizontal mount luminaires shall be installed in a level, horizontal plane, with adjustments as needed to insure that the optics are set perpendicular to the traveled roadway.
- (c) When installed on a bridge mounted pole, a minimum size 1/4-20NC stainless steel set screw shall be provided to secure the luminaire to the mast arm tenon. A hole shall be drilled and tapped thru the tenon and luminaire mounting bracket and then fitted with the screw. This shall be installed after the pole has been erected and the luminaire leveled as specified herein.

Replace Article 821.06 with the following:

821.06 Underpass Installation

- (a) Luminaire. Luminaires shall be 150 watt high pressure sodium or light emitting diode (LED) technology as specified on the Plans. Luminaires have been specified based on Manufacturer’s published photometric data for high pressure sodium and LED Luminaires on file with the Tollway.

Where LED luminaires are supplied, each shall have optics as defined by the following Manufacturer IES photometric files for the distribution types listed:

Manufacturer	Distribution Type	Photometric File
Cree	Type 3M	FLD-304-3M-YM-06-E-UL-700-40K-CONFIGURED
Kenall	Type 2	LTS-5N-100L40K-DV
Philips	Type 4 Forward	FX180-FNA5-R-12

Where high pressure sodium luminaires are supplied, each shall have optics as defined by the following Manufacturer IES photometric files for the distribution types listed:

Manufacturer	Distribution Type	Photometric File
Holophane	Type IV, Very Short, Non-cutoff	33429

All luminaires supplied under the Contract shall meet or exceed the photometric performance requirements on file with the Tollway for the application and layout specified.

- (b) In addition to the general installation requirements each underpass luminaire shall be installed in strict accordance with the plans and the Manufacturer's recommendations. The Contractor shall verify that all LED luminaires are oriented such that the light distribution is perpendicular to the roadway and that the luminaires are tilted up in accordance with the data for each Manufacturer on file with the Tollway.
- (c) When attached directly to a structure, the underpass luminaire shall be installed on stainless steel c-channels to provide space between the luminaire and the structure.
- (d) When suspended, the underpass luminaires shall be installed with the top of the luminaire one (1) inch below the lowest underpass beam and shall be mounted parallel to the plane of the roadway, taking into consideration the grade and superelevation of the traveled lanes. A minimum of four (4) Vibration dampening hanger devices shall be used and be sized to the weight and shape of the underpass luminaire. The vibration dampening hangers shall be the double deflection, neoprene and spring type, allow for a one (1) inch minimum deflection and a 30 degree rod swing. The body of the hanger and the hanger spring shall be stainless steel. The hangers shall be manufactured with the provision for attaching to a bridge structure using threaded rods and be failsafe. The hangers shall be as manufactured by Mason Industries, 30N Series or approved equal. All mounting hardware such as threaded rods, nuts, washers, etc. shall be stainless steel.
- (e) The underpass luminaire shall include all conduit, fittings and cable from the closest junction box to the luminaire and all mounting and attachment hardware.

Method of Measurement: This work will be measured as each for each unit installed and accepted.

Basis of Payment: This work will be paid for at the contract unit price of each for LUMINAIRE, LED, HORIZONTAL MOUNT, of the type specified.

Pay Item Number	Designation	Unit of Measure
JS821100	LUMINAIRE, LED, HORIZONTAL MOUNT	EACH

CDWM PERMIT AND TESTING FEE

Description. This work shall consist of obtaining a B-permit for plumbing inspection from the Chicago Department of Water Management where noted in the contract plans.

The permit can be obtained from:

Department of Buildings
Plumbing Permit & Plan Section, City Hall
121 N LaSalle Street
Room 906

Method of Measurement. CDWM permit and testing fee will be measured for payment on a lump sum basis.

Basis of Payment. This work will be paid for at the contract unit price for lump sum basis for CDWM PERMIT AND TESTING FEE which includes all work and fees associated with obtaining the B-permit from the CDWM.

MAINTENANCE OF EXISTING TRAFFIC SURVEILLANCE

Effective: June 1, 1994

Revised: May 29, 2015

This item shall consist of maintaining the existing Traffic Surveillance locations in place as shown on the plans and as described herein. The energy charges for the operation of the Traffic Surveillance Installation shall be paid for by others.

The maintenance of existing Traffic Surveillance Installation shall meet the requirements of Section Art. 801.11 of the Standard Specifications, except as follows:

Full maintenance responsibility shall start as soon as the General Contractor or Subs begins any physical work on the Contract or any portion thereof. The General Contractor shall maintain the existing surveillance Installations located within the Contract limits, in compliance with the current State Electrical Maintenance Contract by a qualified electrical Sub-Contractor.

At least five days prior to maintenance assumption of the existing Traffic Surveillance Installation(s) under this Contract, the Contractor shall request that the Resident Engineer contact TSC for an inspection of the Installation(s). The TSC Engineer shall establish a date and time of inspection and at that time shall check the Installation to determine if any corrective work should be done by the State's Electrical Maintenance Contractor prior to the Contractor taking over maintenance of the Installation. The Resident Engineer, TSC Engineer, and the Contractor shall mutually agree on the date of maintenance transfer to the Contractor for this section.

Maintenance Procedures: The Electrical Sub-Contractor shall perform the following maintenance procedures for each existing Installation designated to remain in operation during Construction.

The electrical Sub-Contractor shall:

1. Patrol and inspect each surveillance Installation every two (2) weeks for general operation of the tone equipment and loop amplifiers to insure that they are functioning properly, check cabinet and or signal foundation tighten where necessary, check for proper alignment of signal heads (if applicable), lamp failures (if applicable), and shall be logged on the Surveillance Inspection and Repair Check List..

2. Provide immediate corrective action to replace burned out lamps or damaged sockets. When lamps are replaced, the reflector and lens shall be cleaned. All replacement lamps shall meet the approval of the Resident Engineer. The electrical Sub-Contractor shall repair or replace all defective equipment from any cause whatsoever.
3. Maintain in stock at all times a sufficient amount of materials and equipment to provide effective temporary and permanent repairs.
4. Provide immediate corrective action when any part or parts of the system fail to function properly. Two heads facing each approach shall be considered the minimum acceptable signal operation.
5. Replace defective or damaged equipment.
6. A Record tag shall be attached to each individual piece of equipment, with the following information: (1) date originally installed by the Engineer. The interval between successive dates of cleaning shall not exceed one year. Any component which fails in a manner which affects the intended operation of any Installation shall be repaired before it is returned to service. The Electrical Sub-Contractor shall be required to maintain the existing type of equipment during the period of time that the original equipment is being repaired.
7. Provide the Resident Engineer with the names, addresses, and telephone numbers of two (2) persons qualified and assigned to the maintenance of the Traffic Surveillance Installation. These people must be made available 24 hours per day, each and every day of the year for emergency calls by the Engineer.
8. Respond to all emergency calls from the Department within one hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the Contractor shall replace it with new and identical equipment. The cost of furnishing and installing the replaced equipment shall be borne by the General Contractor at no additional charge to the State. The General Contractor may institute action to recover damages from a responsible third party. If at any time the Contractor fails to perform all work as specified herein to keep the Traffic Surveillance Installation in proper operating condition or if the Resident Engineer cannot contact the Contractor's designated personnel, the Resident Engineer shall have the State's Electrical Maintenance Contractor perform the maintenance work required. The State's Electrical Maintenance Contractor shall bill the General Contractor for the total cost of the work. The General Contractor shall pay this bill within thirty (30) days of the date of receipt of the invoice or the cost of such work shall be deducted from the amount due the Contractor.
9. All dispatch tickets reporting malfunctions shall be responded to and cleared within one (1) hour, and immediate corrective action shall be taken to correct the problem. He shall report back via telephone his findings and clear any dispatch tickets. If follow-up work is necessary, it shall commence within 10 days of notice, and permanent repairs shall be completed within 45 days!
10. The Contractor shall maintain all devices and appurtenances at the surveillance locations including but not limited to tone equipment, loop detectors, CB radios, inductance loops, flashing beacons, interconnecting cables, and wooden posts.
11. Upon completion of all Contract work, it shall be required prior to inspection that the cabinet be vacuumed and dusted and all handholes be pumped.

BASIS OF PAYMENT

This item shall be paid for at the Lump Sum Contract unit price for MAINTENANCE OF EXISTING TRAFFIC SURVEILLANCE, which price shall be payment in full for all materials, equipment, and labor needed to perform the work described herein.

SURVEILLANCE INSPECTION AND REPAIR CHECKLIST					
Location #:		Cabinet:		Patrolman:	
Date:	Arrival Time	Departure Time:	Direction:		
Expressway:					

	OK?	N/A	Deficiencies and/or Comments
Inspect Loop Detectors			
Verify Functioning Bulbs, Signal Load Relays, and Flashing Beacon Controller			
Telephone TSC for Location Turn-on			
Replace Burnt-out Lamps and Damaged Lenses			
Check for Missing, Damaged, or Loose Signs			
Check Cabinet and Signal Foundation and Tighten Where Necessary			
Check Lubrication of Cabinet Doors, Hinges, and Locks			
Check Tuning and Operation of Loop Detectors			
Check tuning and operation of tone equipment			
Inspect Stop Bar Striping for Deficiencies			
Log follow-up activity needed/telephone shop technician for Ticket # _____			
Before leaving the Installation, patrolman shall call TSC by Cellular telephone and ask that the purported maintenance activity and accuracy of the data be checked.			
Time Called: _____ Talked to: _____ Verified OK: _____			
This form shall be faxed to Resident Engineer and TSC Engineer within 24 hours of completion of work.			

ELECTRIC CABLE NO. 19 - 6 PAIR

Effective: June 1, 1994

Revised: December 18, 2015

DESCRIPTION

This item shall consist of furnishing and installing telephone cable intended for direct burial in P-duct or G.S. conduit. The number of conductors shall be twisted into pairs stranded into a cable core and enclosed in two polyethylene jackets, with a copper shield between the inner and outer jackets. All

No. 19 electric cable shall conform with these specifications and the current addition of the Rural Electrification Specification for fully color-coded, polyethylene or crystalline propylene/ethylene copolymer-insulated, double polyethylene copolymer-insulated, double polyethylene-jacketed telephone cables for direct burial PE 39. The No. 19 cables shall be installed in complete spans.

MATERIAL AND TESTING

No. 19 electric cable shall meet the requirement set forth in the REA Specification **PE 39**.

CONSTRUCTION

CONDUCTORS: Each conductor shall be a solid round wire of commercially pure annealed copper. Conductors shall meet the requirements of ASTM Designation B-3, latest issue, except that the requirements for dimensions and permissible variations are waived.

CONDUCTOR INSULATION: Each conductor shall be insulated with colored insulating grade high density polyethylene or crystalline propylene/ethylene copolymer. The manufacturer shall have the option of using either of the above materials.

IDENTIFICATION OF PAIRS: The polyethylene or propylene copolymer compounds used for conductor insulation shall be colored so as to identify (1) the "tip" and "ring" conductor of each pair, and (2) each pair in the completed cable.

STANDARDS OF COLOR: The colors of insulated conductors supplied in accordance with this specification shall fall within the limits of standards of color as defined by the Munsell Color Notations specified in paragraph 4.031.

TWISTING OF PAIRS: The insulated conductors shall be twisted into pairs.

In order to provide sufficiently high crosstalk losses at voice and carrier frequencies, the pair twists shall be designed to enable the cable to meet the pair-to-pair capacitance unbalance requirements and the crosstalk requirements.

CORE COVERING: The core shall consist of an inner jacket of polyethylene applied over the completed core, a metal shield, and an outer jacket of polyethylene.

SHIELD: A gopher-resistant corrugated shield of FULLY ANNEALED COPPER shall be applied longitudinally over the inner jacket. The shield shall completely cover the inner jacket and shall be so constructed that the completed cable shall meet the bending requirements given in paragraph 9 of Rural Electrification Specification **PE-39**. The shield shall provide 100% electrical shielding plus **resistance to gopher attack** or other severe service conditions.

MUTUAL CAPACITANCE: The average mutual capacitance of all pairs in any reel shall be in accordance with the following table:

<u>Number of Cable Pairs</u>	<u>Average Mutual Capacitance</u>	
	<u>mf/mile</u>	<u>(mf/km)</u>
3	0.083 plus or minus 0.010	(0.052 plus or minus 0.006)
6, 12	0.083 plus or minus 0.007	(0.052 plus or minus 0.004)
18 or more	0.083 plus or minus 0.004	(0.052 plus or minus 0.002)

Mutual capacitance is the effective capacitance between the two wires of a pair.

CAPACITANCE UNBALANCE: (Pair to Pair): Pair-to-pair capacitance unbalances as measured on the completed cable at a frequency of 1000 plus or minus 100 Hz shall not exceed the following values:

<u>Number of Cable Pairs</u>	<u>Pair-to-Pair Capacitance Unbalance (Max)</u>	
	<u>mmf/kft</u>	<u>(mmf/km)</u>
Less than 12	100	(181.1)

CAPACITANCE UNBALANCE - (Crosstalk Loss): The r.m.s. output-to-output far-end crosstalk loss as measured on the completed cable at a frequency of 150 kHz shall be not less than 73 db per 1,000 feet (67.8 db per kilometer) for cable sizes of 6 pairs and larger. The r.m.s. calculation shall be based on the combined total of all adjacent and alternate pair combinations within the same layer and center to first layer pair combinations.

CAPACITANCE UNBALANCE - (Pair to Shield): Pair-to-shield direct capacitance unbalances as measured on the completed cable at a frequency of 1000 plus or minus 100 Hz shall not exceed the following values:

<u>Cable Pairs</u>	<u>Pair-to-Shield Unbalance (Max)</u>	
	<u>mmf/kf</u>	<u>(mmf/km)</u>
Less than 12	250	(820)

CONDUCTOR RESISTANCE: The d.c. resistance of any conductor as measured on the completed cable shall not exceed the following values when measured at or corrected to 20° C.

<u>AWG</u>	<u>Maximum Resistance</u>	
	<u>ohms/kf</u>	<u>(ohms/km)</u>
19	8.7	(28.5)

BASIS OF PAYMENT

This work will be paid for at the contract price per lineal foot (meter) for ELECTRIC CABLE IN CONDUIT, COMMUNICATIONS, NO. 19 of the number of pairs specified, for furnishing all materials, making all electrical connection and installing the cable in place.

PAVED SHOULDER REMOVAL, VARIABLE DEPTH (TOLLWAY)

Effective: February 3, 2014

Description. The work shall consist of partial removal of existing asphalt and concrete shoulder pavements as shown on the plans for subsequent resurfacing or inlays with asphalt mixtures in accordance with the applicable portions of Section 440 of the Standard Specifications.

Equipment. The equipment used for concrete shoulder removal, partial depth, shall be in accordance with Article 1101.16(b) of the Standard Specifications.

CONSTRUCTION REQUIREMENTS

All removal shall be done in such a manner that the shoulders are not damaged.

Method of Measurement. This work will be measured for payment in accordance with Article 440.07(a) of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price per square yard for PAVED SHOULDER REMOVAL, VARIABLE DEPTH.

Pay Item Number	Designation	Unit of Measure
J1440030	PAVED SHOULDER REMOVAL, VARIABLE DEPTH	SQ YD

ASPHALT BINDER AND SURFACE COURSE MIXTURES (TOLLWAY)

Effective: December 13, 2011

Revised: April 1, 2016

Description. This work shall consist of constructing either hot-mix asphalt (HMA) or warm mix asphalt (WMA) binder and/or surface course on a prepared base as required by contract design. When WMA pay items are required by design, an HMA mix may be utilized for special or low tonnage applications in lieu of WMA mixtures upon approval by the Engineer at no additional cost to the Illinois Tollway. When HMA pay items are required by design, a WMA mix may be utilized for special or low tonnage application in lieu of HMA mixtures upon approval by the Engineer at no additional cost to the Illinois Tollway. Work shall be according to Sections 406, 407, 1030 and 1032 of the Standard Specifications except as modified herein.

Materials. Article 406.02 of the Standard Specifications shall govern the requirements for materials except as modified herein and in the Illinois Tollway’s special provision ASPHALT-TACK COAT.

Revise Article 1030.02(c) of the Standard Specifications to read:

“(c)RAP Material..... Illinois Tollway special provision for Reclaimed Asphalt Pavement”

Replace Article 1030.02(i) of the Standard Specifications with the following:

“(i)Warm Mix Additives / Processes. When a WMA is specified or permitted, the warm mix technology used shall be a recognized additive / process with successful project(s) constructed nationally or internationally that allow for a reduction in the temperature at which the HMA is produced and placed. Warm mix additives/processes that may be considered for Illinois Tollway approval and Contractor use include the following:

- (1) Organic Additives (requiring minor plant modifications)
- (2) Chemical Additives (requiring minor plant modifications)
- (3) Water Injection Foaming Processes (requiring major plant modifications)

The Illinois Tollway maintains an approved list of warm-mix asphalt technologies or processes.

The Contractor shall ensure that a Technical Representative from the approved warm mix asphalt additive or process manufacturer is present during the first day of production and placement of HMA produced with warm mix technology.”

Add the following to Article 1030.02 of the Standard Specifications:

“(k)RAS Material..... Illinois Tollway special provision for Reclaimed Asphalt Shingles”

Add the following to Article 1032.05(b) of the Standard Specifications:

“At the contractor’s option, the modified asphalt binder shall be either an SBS/SBR polymerized PG 76-22 binder, or a GTR modified PG 64-22 GTR 12 binder that complies with the requirements defined herein. For any mixture only FRAP / RAP with no RAS, the asphalt binder shall be either an SBS/SBR polymerized PG 70-28 binder or a PG 58-28 GTR 12 binder when the mix design’s binder replacement is between 20 percent and 25 percent. For any mixture containing RAS, the asphalt binder shall be an SBS/SBR polymerized PG 70-22 binder or a GTR modified PG 58-22 GTR 12 binder that complies with requirements defined herein when the mix design’s binder replacement is 20 percent or less; or shall be an SBS/SBR polymerized PG 70-28 binder or a GTR modified PG 58-28 GTR 12 binder that complies with requirements defined herein when the mix design’s binder replacement is greater than 20 percent. This table summarizes these options:

Reclaimed Material	Binder Replacement, %	Asphalt Binder Options
None	0	SBS/SBR PG 76-22 PG 64-22 GTR 12
FRAP / RAP only	Less than 20	SBS/SBR PG 76-22 PG 64-22 GTR 12
	20 to 25	SBS/SBR PG 70-28 PG 58-28 GTR 12
RAS (By itself, or with FRAP / RAP)	Less than 20	SBS/SBR PG 70-22 PG 58-22 GTR 12
	20 to 40	SBS/SBR PG 70-28 PG 58-28 GTR 12

- (1) SBS/SBR PG 76-22, PG 70-22, or PG 70-28 Binder. The SBS/SBR PG 76-22, PG 70-22, or PG 70-28 binder shall meet the requirements of Article 1032.05(b) of the Standard Specifications. In addition, the elastic recovery of the Asphalt Binder used shall be a minimum of 80.
- (2) Ground Tire Rubber (GTR) Binder. The base asphalt cement (AC) that is blended with the Ground Tire Rubber (GTR) shall be a PG 64-22 performance-grade (PG) when used in mix designs with a binder replacement of 20 percent or less, or shall be a PG 58-28 performance-grade (PG) when used in a mix design with a binder replacement greater than 20 percent, meeting the requirements of Article 1032.05 of the Standard Specifications. The GTR shall be produced from processing automobile and/or truck tires by the ambient grinding method. Heavy equipment tires, uncured or de-vulcanized rubber will not be permitted. The GTR shall not exceed 1/16 in. in length and shall contain no free metal particles. Detection of free metal particles shall be determined by thoroughly passing a magnet through a 2 oz. sample. Metal embedded in rubber particles will be permitted.

The GTR shall be stored in a dry location protected from the rain. When the GTR is combined with the asphalt cement, the moisture content of the GTR shall not cause foaming of the blend.

When tested in accordance with ASTM C-136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates, (Illinois-modified AASHTO T-27, Sieve Analysis of Fine and Coarse Aggregates) a 2 oz. sample of the GTR shall conform to the following gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing</u>
No. 8 (2.36 mm)	100
No. 16 (1.18 mm)	98 ± 2
No. 30 (600 μm)	95 ± 5
No. 50 (300 μm)	50 ± 10
No. 100 (150 μm)	10 ± 5
No. 200 (75 μm)	2 ± 2

A mineral powder (such as talc) meeting AASHTO M17, Mineral Filler for Bituminous Paving Mixtures, requirements may be added, up to a maximum of 4% by weight of GTR particles, to reduce sticking and caking of the GTR particles.

GTR shall have a specific gravity of 1.15 ± 0.05 when tested in accordance with ASTM D-1817, Standard Test Method for Rubber Chemicals-Density.

Extender Oils or Polymeric Additions With approval of the Engineer, compatible extender oils and/or polymers may be added to the GTR or to the asphalt-rubber blend. The additional costs for the extender oils and/or polymer additions shall be borne by the Contractor. The Contractor shall provide material product information along with usage rates for approval.”

Equipment. Add the following to the list of specific references of Article 406.03 of the Standard Specifications.

- “(j) RAP Processing Equipment Illinois Tollway special provision for Reclaimed Asphalt Pavement
- “(k) RAS Processing Equipment Illinois Tollway special provision for Reclaimed Asphalt Shingles”

Add the following to Article 406.02 of the Standard Specifications.

“For the production of WMA binder and surface course mixes, use equipment and WMA technologies capable of producing an asphalt mixture that is workable at the minimum placement and compaction temperature desired, regardless of storage or haul distance considerations.”

Add the following to Article 1030.03 of the Standard Specifications.

“When a mix is produced using an approved warm mix asphalt technology, the asphalt mixing plant shall be modified as required by the additive or process manufacturer to introduce the technology and produce a WMA mixture meeting the volumetric properties specified herein. Plant modifications may include additional plant instrumentation, the installation of asphalt binder foaming systems and/or WMA additive delivery systems, tuning the plant burner and adjusting the flights in order to operate at lower production temperatures and/or reduced tonnage.

All metering devices will meet the current IDOT requirement for liquid or mineral additives. Document the integration of plant controls and interlocks when using WMA additive metering devices.”

Mixture Design. Revise Article 1030.04(a)(1) of the Standard Specifications and the Supplemental Specifications to read:

“(1) High ESAL Mixtures. The Job Mix Formula (JMF) shall fall within the following limits.

Sieve Size	IL-19.0 mm ^{3/}		IL-12.5 mm		IL-9.5 mm	
	min	max	min	max	min	max
1 in. (25 mm)		100				
3/4 in. (19 mm)	90	100		100		
1/2 in. (12.5 mm)	69	89	90	100		100
3/8 in. (9.5 mm)				89	90	100
#4 (4.75 mm)	45	60	28	65	32	69
#8 (2.36 mm)	30	45	28	48	32	52 ^{2/}
#16 (1.18 mm)	20	35	10	32	10	32
#50 (300 μm)	8	16	4	15	4	15
#100 (150 μm)	6	9	3	10	3	10
#200 (75 μm)	3	6	4	6	4	6
Ratio Dust/Asphalt Binder		1.0		1.0		1.0

1/ Based on percent of total aggregate weight.

2/ The mixture composition shall not exceed 44 percent passing the #8 (2.36 mm) sieve for surface courses with Ndesign = 90.

3/ For mixture IL-19-0, the fine fraction shall consist of at least 67% manufactured sand meeting the FA 20 gradation. The manufactured sand shall be stone sand, slag sand, steel slag sand, or combinations thereof.

Revise the table in Article 1030.04(b)(1) of the Standard Specifications to read:

"VOLUMETRIC REQUIREMENTS High ESAL				
	Voids in the Mineral Aggregate (VMA), % minimum			Voids Filled with Asphalt Binder (VFA), %
Ndesign	IL-19.0	IL-12.5	IL-9.5	
50	13.5	14.0	15.0	65 – 78
70				65 - 75
90				

Revise the first and second paragraphs of Article 1030.04(c) of the Standard Specifications to read:

“(c)Determination of Need for Anti-Stripping Additive. The mix designer shall determine if an additive is needed in the mix to prevent stripping. The determination will be made on the basis of moisture sensitivity testing (IL Modified AASHTO T 283) on production ingredient materials sampled at the HMA plant. The results will inform the contractor of the need for an anti-strip additive in the mix based on the following minimums:

- 1) for polymer modified asphalt mix have a conditioned tensile strength of 115 psi or better with no TSR requirements, for non-modified asphalt mix have a conditioned tensile strength of 100 psi or better for 6 in. specimens;
- 2) for polymer modified asphalt mix have a conditioned tensile strength of 100 psi or better with a TSR of 0.85 or better for 6 in. specimens, for non-modified asphalt mix have a conditioned tensile strength of 80 psi or better with a TSR of 0.85 or better for 6 in. specimens;
- 3) any asphalt mix with anti-strip (liquid or lime) conditioned tensile strength may not be lower than the original mix conditioned tensile strength without anti-strip and no visual stripping of the coarse or fine aggregate in the broken faces shall be observed.

If it is determined that an additive is required, the additive may be hydrated lime, slaked quicklime, or a liquid additive, at the Contractor’s option.”

Add the following to Article 1030.04 of the Standard Specifications:

“(e) Warm Mix Technology. A Warm Mix Technology shall be used with an approved HMA mix design.

The mixture design for any WMA binder or surface course shall be developed based on a lab produced HMA mix design modified as a WMA mix design through trial batch production of the WMA mixture and test strip placements. The original HMA mix design to be modified shall be designed and submitted to the Engineer without including the WMA additive or technology. When a WMA surface or binder course mix using an additive is to be used, document the additive used and recommend the dosage rate on a resubmittal of the original HMA mix design that is to be modified as a WMA mix design. The Illinois Tollway Material Engineer and Contractor will verify the original HMA mix design with any WMA technology based on plant produced samples taken from the WMA test strip. Any needed mix design adjustments will apply to the development of the WMA binder course or surface course mix design.

In addition to the HMA mix design, for WMA mix designs proposed using organic or chemical additives, Hamburg Wheel testing according to Illinois Modified AASHTO T324 shall be conducted on a laboratory mixed sample at the recommended dosage rate. The Hamburg Wheel testing requirements from this sample are:

Asphalt Binder Grade	# Wheel Passes	Maximum Rut Depth, in.
PG 76-XX	20,000	½ inch
PG 70-XX	15,000	½ inch
PG 64-XX	10,000	½ inch
PG 58-XX	10,000	½ inch

The final adjusted design for the WMA mix design shall be submitted for acceptance with the following information included:

- 1) All information required for Superpave HMA.
- 2) WMA technology and/or WMA additives information.
- 3) WMA technology manufacturer’s established recommendations for usage.
- 4) WMA technology manufacturer’s established target rate for water and additives, the acceptable variation for production, and documentation showing the impact of excessive production variation.
- 5) WMA technology material safety data sheets (MSDS).
- 6) Documentation of at least 3 past WMA technology field applications including project type, project owner, tonnage, location, mix design, mixture volumetrics, field density, and performance.
- 7) Temperature range for mixing.
- 8) Temperature range for compacting.
- 9) Asphalt binder performance grade test data over the range of WMA additive percentages proposed for use.

- 10) WMA mixture QC/QA test results measured from the test strip samples specific to the Contractor's proposed WMA technology.
- 11) Laboratory test data, samples and sources of all mixture components, and asphalt binder viscosity-temperature relationships.
- 12) Mix production Hamburg test results from WMA test strip.

The Illinois Tollway may accept an existing WMA mixture design with a WMA additive / process previously used on a Illinois Tollway project and may waive the test strip trial batch required to verify the WMA mix design.”

Quality Control / Quality Assurance. Article 1030.05 of the Standard Specifications shall govern the requirements for Quality Control / Quality Assurance (QC/QA) of HMA and WMA mixtures.

WMA Production. WMA shall be produced at a temperature range recommended by the additive / process manufacturer and verified through a QC/QA mixture test strip. It may be necessary to initially produce HMA mixes at conventional HMA temperatures immediately before WMA production at lower temperatures in order to prime the plant for proper operating temperatures.

A QC/QA mixture test strip will be required for all WMA mixes. The test strip shall be constructed at a location approved by the Engineer to determine the mix properties, density, and laydown characteristics, and as needed to finalize any proposed mix design. These test results and visual inspections on the mixture shall be used to make corrective adjustments if necessary. For all mixtures produced with a WMA technology, the QC/QA WMA mixture test strip shall be constructed at an approved off-site location to determine the mix properties, density, production temperature target, compaction procedure, and laydown characteristics. A field TSR test of the mix produced for any WMA test strip will be required.

Prior to the start of mix production and placement, The Illinois Tollway Materials Engineer will review and approve all test strip results, WMA mix designs, and rolling pattern.

The test strips will be performed as follows:

- (a) Team Members. The start-up team, if required, shall consist of the following:
 - (1) Resident Engineer
 - (2) Illinois Tollway Project Manager, or representative
 - (3) Illinois Tollway Materials Engineer, or representative
 - (4) Engineer's Nuclear Density Gauge Specialist
 - (5) Contractor's QC Manager
 - (6) Engineer's QA representative
 - (7) Contractor's Density Tester
 - (8) AC Supplier representative
- (b) Communication. The Contractor shall advise the team members of the anticipated start time of production for the test strip. The QC Manager shall direct the activities of the test strip team. A Illinois Tollway-appointed representative from the start-up team will act as spokesperson for the Illinois Tollway.

(c) The Test Strip(s) for HMA mixtures shall be in accordance with Article 406.06 of the Standard Specifications. The Test Strip(s) for WMA mixtures shall consist of approximately 300 tons. It shall contain two growth curves which shall be compacted by a static steel-wheeled roller and tested as outlined herein.

- (1) Mix Information. On the day of construction of the Test Strip, the Contractor shall provide the start-up team documentation of test data showing the combined hot-bin or the combined aggregate belt sample and mineral filler at a drier-drum plant.
- (2) Mix and Gradation Test Strip Samples. The first and second sets of mixture and gradation samples shall be taken by the Contractor at such times as to represent the mixture between the two growth curves and the rolling pattern area, respectively. All test strip samples shall be processed by the Contractor for determination of mix composition and Superpave properties including air voids. This shall include washed gradation tests. This information shall then be compared to the JMF and required design criteria. Prepare and test any WMA test strip mixtures, including Superpave gyratory compacted specimens for QC/QA using the same test methods, procedures and frequencies as specified for HMA, except that the WMA mixture shall be aged at the production temperature for a period of 2 hours before gyratory or performance based test specimens are compacted.

Hamburg Wheel testing according to Illinois Modified AASHTO T324 shall be conducted from the test strip production mixture. The Hamburg Wheel testing requirements from this sample are:

Asphalt Binder Grade	# Wheel Passes	Maximum Rut Depth, in.
PG 76-XX	20,000	½ inch
PG 70-XX	15,000	½ inch
PG 64-XX	10,000	½ inch
PG 58-XX	10,000	½ inch

- (3) Construction of the Test Strip. After the Contractor has produced the mix, transported the mix, and placed approximately 100 to 150 tons of mix, placement of the mix shall stop, and a growth curve shall be constructed. After completion of the first growth curve, paving shall resume for 50 to 100 tons of mix, placement shall stop, and the second growth curve shall be constructed within this area. Additional growth curves may be required if an adjustment/plant change is made during the test strip. The Contractor shall use the specified rolling procedures for all portions of the test strip except for the growth curve areas which shall be compacted as directed by the Engineer.
- (4) Location of Test Strip. The test strip shall be located on a pavement type similar to the contract pavement and acceptable to the Engineer. It shall be on a relatively flat portion of the roadway. Descending/Ascending grades or ramps shall be avoided.

- (5) Compaction Temperature. For WMA mixtures, the temperature of the mix at the beginning of the growth curve shall be within the additive / process manufacturer's recommended temperature range for compaction.
- (6) Compaction and Testing. The QC Manager will specify the roller(s) speed and number of passes required to obtain a completed growth curve. The nuclear gauge shall be placed near the center of the hot mat and the position marked for future reference. With the bottom of the nuclear gauge and the source rod clean, a 15 seconds nuclear reading (without mineral filler) shall be taken after each pass of the roller. Rolling shall continue until the maximum density is achieved and three consecutive passes show no appreciable increase in density or no evidence of destruction of the mat. The growth curve shall be plotted.
- (7) Evaluation of Growth Curves. Mixtures which exhibit density potential less than 94 percent or greater than 97 percent of the maximum theoretical density (D) shall be considered as sufficient cause for mix adjustment. If a mix adjustment is made, an additional test strip may be constructed. The Illinois Tollway will pay half the cost of the contract unit price for a test strip if additional one is required. The information shall then be compared to the AJMF and required design criteria.

If the nuclear density potential of the mixture does not exceed 91 percent, the operation will cease until all test data is analyzed or a new mix design is produced.

In addition, other aspects of the mixture, such as appearance, segregation, texture, or other evidence of mix problems, should be noted and corrective action taken at this time.

- (d) Documentation. The WMA test strip and rolling pattern information (including growth curves) will be tabulated by the contractor with copies provided to each team member, and the original submitted to the Engineer. Any change to the rolling pattern shall be approved by the Engineer.

CONSTRUCTION REQUIREMENTS

Placing. Article 406.06 of the Standard Specifications shall govern the requirements of HMA and WMA placement except as modified herein:

Revise the first and second paragraphs of Article 406.06(b) of the Standard Specifications to read:

"General. HMA and WMA shall be placed on a clean, dry base and when weather conditions are suitable. The HMA leveling binder and HMA binder courses shall be placed only when the temperature in the shade is at least 40°F and the forecast is for rising temperatures. The HMA surface course shall be placed only when the air temperature in the shade is at least 45°F and the forecast is for rising temperatures. The WMA leveling binder and WMA binder courses shall be placed only when the temperature in the shade is at least 32°F and the forecast is for rising temperatures. The WMA surface course shall be placed only when the air temperature in the shade is at least 35°F and the forecast is for rising temperatures.

The HMA shall be delivered at a temperature of 250 to 350°F. The WMA shall be delivered on dates when the ambient air temperatures during placement will be at least 50° F and rising within a temperature range as established by the WMA additive / process manufacturer and reported by the Contractor to the Engineer with the WMA mix design submittal. The temperature of WMA shall not exceed the manufacturer's recommended maximum placement temperature when measured immediately behind the paver when the air temperature is 50°F and rising. The WMA shall be delivered at a temperature of 250 to 350°F on dates when the ambient air temperatures during placement will be between the WMA specified minimum temperature and 50°F."

Revise the first paragraph of Article 406.06(d) of the Standard Specifications to read:

(d) Lift Thickness. The minimum compacted lift thickness for constructing HMA binder and surface courses shall be as follows, unless otherwise noted on the plans.

Compaction. Article 406.07 of the Standard Specifications shall govern the requirements of HMA and WMA compaction except as modified herein:

Add the following paragraph to Article 406.07 of the Standard Specifications:

"Compact WMA immediately after spreading and before the WMA mixture temperature falls below the minimum job mix compaction temperature as recommended by the manufacturer of the WMA technology used. Discontinue paving if the Contractor is unable to achieve the specified density before the mixture cools below the minimum recommended WMA job mix design compaction temperature."

Method of Measurement. This work will be measured in accordance with Article 406.13 of the Standard Specifications.

Basis of Payment. This work will be paid for in accordance with Article 406.14 of the Standard Specifications except as modified herein:

Add the following to the second paragraph of Article 406.14 of the Standard Specifications:

"The WMA surfacing will be paid for at the contract unit price per ton for WARM MIX ASPHALT BINDER COURSE, of the mixture composition and Ndesign specified; and WARM MIX ASPHALT SURFACE COURSE, of the friction aggregate mixture and Ndesign specified."

Replace the third paragraph of Article 406.14 of the Standard Specifications with the following:

"The HMA surfacing in which polymer or GTR modified asphalt binders are required, will be paid for at the contract unit price per ton for MODIFIED HOT-MIX ASPHALT BINDER COURSE, of the mixture composition and Ndesign specified; and MODIFIED HOT-MIX ASPHALT SURFACE COURSE, of the friction aggregate mixture and Ndesign specified.

The WMA surfacing in which polymer or GTR modified asphalt binders are required, will be paid for at the contract unit price per ton for MODIFIED WARM-MIX ASPHALT BINDER COURSE, of the mixture composition and Ndesign specified; and MODIFIED WARM-MIX ASPHALT SURFACE COURSE, of the friction aggregate mixture and Ndesign specified.”

Add the following to Article 406.14 of the Standard Specifications:

“WMA test strips will be evaluated for payment at the contract unit price each for CONSTRUCTING WARM MIX ASPHALT TEST STRIP, according to the following:

- (a) If the WMA placed during the initial test strip is determined to be acceptable, the mixture and test strip will be paid at the contract unit prices.
- (b) If the WMA placed during the initial test strip (1) is determined to be unacceptable to remain in place by the Engineer, and (2) was not produced within the tolerances of the JMF, the initial mixture and test strip will not be paid for and shall be removed at no additional cost to the Illinois Tollway. An additional test strip will be paid for in full, if produced within the JMF tolerances.
- (c) If the WMA placed during the initial test strip (1) is determined to be unacceptable to remain in place by the Engineer, and (2) was produced within the tolerances for the JMF, the mixture shall be removed. Removal will be paid for according to Article 109.04 of the Tollway Supplemental Specifications. This initial mixture and test strip will be paid for at the contract unit price, and any additional test strips will be paid for at one half the unit price of each test strip.
- (d) If the WMA placed during a test strip is determined to be acceptable to remain in place by the Engineer and the Engineer deems a new start-up is required for any reason, the initial mixture and test strip will be paid for at the contract unit prices. The additional mixture will be paid for at the contract unit price and any additional test strips will be paid for at one-half the unit price for each test strip.
- (e) If the Contractor requests and is granted approval for a mix design other than the initial approved WMA mix design, he/she shall construct a test strip for the new mix design at no additional cost to the Illinois Tollway.

Add the following to Article 406.14 of the Standard Specifications:

“HMA and WMA mixtures will be paid for under its respective item. If permissive use of an HMA mixture in place of a specified WMA mixture is granted by the Engineer, a new pay item will be established for the HMA with the same unit price. If permissive use of a WMA mixture in place of a specified HMA mixture is granted by the Engineer, a new pay item will be established for the WMA with the same unit price.”

Pay Item Number	Designation	Unit of Measure
JI406510	WARM-MIX ASPHALT SURFACE COURSE, MIX “D”, N70	TON

ASPHALT BINDER AND SURFACE COURSE MIXTURES (TOLLWAY)

Effective: December 13, 2011

Revised: April 1, 2016

Description. This work shall consist of constructing either hot-mix asphalt (HMA) or warm mix asphalt (WMA) binder and/or surface course on a prepared base as required by contract design. When WMA pay items are required by design, an HMA mix may be utilized for special or low tonnage applications in lieu of WMA mixtures upon approval by the Engineer at no additional cost to the Illinois Tollway. When HMA pay items are required by design, a WMA mix may be utilized for special or low tonnage application in lieu of HMA mixtures upon approval by the Engineer at no additional cost to the Illinois Tollway. Work shall be according to Sections 406, 407, 1030 and 1032 of the Standard Specifications except as modified herein.

Materials. Article 406.02 of the Standard Specifications shall govern the requirements for materials except as modified herein and in the Illinois Tollway’s special provision ASPHALT-TACK COAT.

Revise Article 1030.02(c) of the Standard Specifications to read:

“(c)RAP Material..... Illinois Tollway special provision for Reclaimed Asphalt Pavement”

Replace Article 1030.02(i) of the Standard Specifications with the following:

“(j)Warm Mix Additives / Processes. When a WMA is specified or permitted, the warm mix technology used shall be a recognized additive / process with successful project(s) constructed nationally or internationally that allow for a reduction in the temperature at which the HMA is produced and placed. Warm mix additives/processes that may be considered for Illinois Tollway approval and Contractor use include the following:

- (1) Organic Additives (requiring minor plant modifications)
- (2) Chemical Additives (requiring minor plant modifications)
- (3) Water Injection Foaming Processes (requiring major plant modifications)

The Illinois Tollway maintains an approved list of warm-mix asphalt technologies or processes.

The Contractor shall ensure that a Technical Representative from the approved warm mix asphalt additive or process manufacturer is present during the first day of production and placement of HMA produced with warm mix technology.”

Add the following to Article 1030.02 of the Standard Specifications:

“(k)RAS Material..... Illinois Tollway special provision for Reclaimed Asphalt Shingles”

Add the following to Article 1032.05(b) of the Standard Specifications:

“At the contractor’s option, the modified asphalt binder shall be either an SBS/SBR polymerized PG 76-22 binder, or a GTR modified PG 64-22 GTR 12 binder that complies with the requirements defined herein. For any mixture only FRAP / RAP with no RAS, the asphalt binder shall be either an SBS/SBR polymerized PG 70-28 binder or a PG 58-28 GTR 12 binder when the mix design’s binder replacement is between 20 percent and 25 percent. For any mixture containing RAS, the asphalt binder shall be an SBS/SBR polymerized PG 70-22 binder or a GTR modified PG 58-22 GTR 12 binder that complies with requirements defined herein when the mix design’s binder replacement is 20 percent or less; or shall be an SBS/SBR polymerized PG 70-28 binder or a GTR modified PG 58-28 GTR 12 binder that complies with requirements defined herein when the mix design’s binder replacement is greater than 20 percent. This table summarizes these options:

Reclaimed Material	Binder Replacement, %	Asphalt Binder Options
None	0	SBS/SBR PG 76-22 PG 64-22 GTR 12
FRAP / RAP only	Less than 20	SBS/SBR PG 76-22 PG 64-22 GTR 12
	20 to 25	SBS/SBR PG 70-28 PG 58-28 GTR 12
RAS (By itself, or with FRAP / RAP)	Less than 20	SBS/SBR PG 70-22 PG 58-22 GTR 12
	20 to 40	SBS/SBR PG 70-28 PG 58-28 GTR 12

- (1) SBS/SBR PG 76-22, PG 70-22, or PG 70-28 Binder. The SBS/SBR PG 76-22, PG 70-22, or PG 70-28 binder shall meet the requirements of Article 1032.05(b) of the Standard Specifications. In addition, the elastic recovery of the Asphalt Binder used shall be a minimum of 80.
- (2) Ground Tire Rubber (GTR) Binder. The base asphalt cement (AC) that is blended with the Ground Tire Rubber (GTR) shall be a PG 64-22 performance-grade (PG) when used in mix designs with a binder replacement of 20 percent or less, or shall be a PG 58-28 performance-grade (PG) when used in a mix design with a binder replacement greater than 20 percent, meeting the requirements of Article 1032.05 of the Standard Specifications. The GTR shall be produced from processing automobile and/or truck tires by the ambient grinding method. Heavy equipment tires, uncured or de-vulcanized rubber will not be permitted. The GTR shall not exceed 1/16 in. in length and shall contain no free metal particles. Detection of free metal particles shall be determined by thoroughly passing a magnet through a 2 oz. sample. Metal embedded in rubber particles will be permitted.

The GTR shall be stored in a dry location protected from the rain. When the GTR is combined with the asphalt cement, the moisture content of the GTR shall not cause foaming of the blend.

When tested in accordance with ASTM C-136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates, (Illinois-modified AASHTO T-27, Sieve Analysis of Fine and Coarse Aggregates) a 2 oz. sample of the GTR shall conform to the following gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing</u>
No. 8 (2.36 mm)	100
No. 16 (1.18 mm)	98 ± 2
No. 30 (600 µm)	95 ± 5
No. 50 (300 µm)	50 ± 10
No. 100 (150 µm)	10 ± 5
No. 200 (75 µm)	2 ± 2

A mineral powder (such as talc) meeting AASHTO M17, Mineral Filler for Bituminous Paving Mixtures, requirements may be added, up to a maximum of 4% by weight of GTR particles, to reduce sticking and caking of the GTR particles.

GTR shall have a specific gravity of 1.15 ± 0.05 when tested in accordance with ASTM D-1817, Standard Test Method for Rubber Chemicals-Density.

Extender Oils or Polymeric Additions With approval of the Engineer, compatible extender oils and/or polymers may be added to the GTR or to the asphalt-rubber blend. The additional costs for the extender oils and/or polymer additions shall be borne by the Contractor. The Contractor shall provide material product information along with usage rates for approval.”

Equipment. Add the following to the list of specific references of Article 406.03 of the Standard Specifications.

- “(j) RAP Processing Equipment Illinois Tollway special provision for Reclaimed Asphalt Pavement
- “(k) RAS Processing Equipment Illinois Tollway special provision for Reclaimed Asphalt Shingles”

Add the following to Article 406.02 of the Standard Specifications.

“For the production of WMA binder and surface course mixes, use equipment and WMA technologies capable of producing an asphalt mixture that is workable at the minimum placement and compaction temperature desired, regardless of storage or haul distance considerations.”

Add the following to Article 1030.03 of the Standard Specifications.

“When a mix is produced using an approved warm mix asphalt technology, the asphalt mixing plant shall be modified as required by the additive or process manufacturer to introduce the technology and produce a WMA mixture meeting the volumetric properties specified herein. Plant modifications may include additional plant instrumentation, the installation of asphalt binder foaming systems and/or WMA additive delivery systems, tuning the plant burner and adjusting the flights in order to operate at lower production temperatures and/or reduced tonnage.

All metering devices will meet the current IDOT requirement for liquid or mineral additives. Document the integration of plant controls and interlocks when using WMA additive metering devices.”

Mixture Design. Revise Article 1030.04(a)(1) of the Standard Specifications and the Supplemental Specifications to read:

“(1) High ESAL Mixtures. The Job Mix Formula (JMF) shall fall within the following limits.

Sieve Size	IL-19.0 mm ^{3/}		IL-12.5 mm		IL-9.5 mm	
	min	max	min	max	min	max
1 in. (25 mm)		100				
3/4 in. (19 mm)	90	100		100		
1/2 in. (12.5 mm)	69	89	90	100		100
3/8 in. (9.5 mm)				89	90	100
#4 (4.75 mm)	45	60	28	65	32	69
#8 (2.36 mm)	30	45	28	48	32	52 ^{2/}
#16 (1.18 mm)	20	35	10	32	10	32
#50 (300 μm)	8	16	4	15	4	15
#100 (150 μm)	6	9	3	10	3	10
#200 (75 μm)	3	6	4	6	4	6
Ratio Dust/Asphalt Binder		1.0		1.0		1.0

- 1/ Based on percent of total aggregate weight.
- 2/ The mixture composition shall not exceed 44 percent passing the #8 (2.36 mm) sieve for surface courses with Ndesign = 90.
- 3/ For mixture IL-19-0, the fine fraction shall consist of at least 67% manufactured sand meeting the FA 20 gradation. The manufactured sand shall be stone sand, slag sand, steel slag sand, or combinations thereof.

Revise the table in Article 1030.04(b)(1) of the Standard Specifications to read:

"VOLUMETRIC REQUIREMENTS High ESAL				
	Voids in the Mineral Aggregate (VMA), % minimum			Voids Filled with Asphalt Binder (VFA), %
Ndesign	IL-19.0	IL-12.5	IL-9.5	
50	13.5	14.0	15.0	65 – 78
70				65 - 75
90				

Revise the first and second paragraphs of Article 1030.04(c) of the Standard Specifications to read:

“(c) Determination of Need for Anti-Stripping Additive. The mix designer shall determine if an additive is needed in the mix to prevent stripping. The determination will be made on the basis of moisture sensitivity testing (IL Modified AASHTO T 283) on production ingredient materials sampled at the HMA plant. The results will inform the contractor of the need for an anti-strip additive in the mix based on the following minimums:

- 1) for polymer modified asphalt mix have a conditioned tensile strength of 115 psi or better with no TSR requirements, for non-modified asphalt mix have a conditioned tensile strength of 100 psi or better for 6 in. specimens;
- 2) for polymer modified asphalt mix have a conditioned tensile strength of 100 psi or better with a TSR of 0.85 or better for 6 in. specimens, for non-modified asphalt mix have a conditioned tensile strength of 80 psi or better with a TSR of 0.85 or better for 6 in. specimens;
- 3) any asphalt mix with anti-strip (liquid or lime) conditioned tensile strength may not be lower than the original mix conditioned tensile strength without anti-strip and no visual stripping of the coarse or fine aggregate in the broken faces shall be observed.

If it is determined that an additive is required, the additive may be hydrated lime, slaked quicklime, or a liquid additive, at the Contractor’s option.”

Add the following to Article 1030.04 of the Standard Specifications:

“(e) Warm Mix Technology. A Warm Mix Technology shall be used with an approved HMA mix design.

The mixture design for any WMA binder or surface course shall be developed based on a lab produced HMA mix design modified as a WMA mix design through trial batch production of the WMA mixture and test strip placements. The original HMA mix design to be modified shall be designed and submitted to the Engineer without including the WMA additive or technology. When a WMA surface or binder course mix using an additive is to be used, document the additive used and recommend the dosage rate on a resubmittal of the original HMA mix design that is to be modified as a WMA mix design. The Illinois Tollway Material Engineer and Contractor will verify the original HMA mix design with any WMA technology based on plant produced samples taken from the WMA test strip. Any needed mix design adjustments will apply to the development of the WMA binder course or surface course mix design.

In addition to the HMA mix design, for WMA mix designs proposed using organic or chemical additives, Hamburg Wheel testing according to Illinois Modified AASHTO T324 shall be conducted on a laboratory mixed sample at the recommended dosage rate. The Hamburg Wheel testing requirements from this sample are:

Asphalt Binder Grade	# Wheel Passes	Maximum Rut Depth, in.
PG 76-XX	20,000	½ inch
PG 70-XX	15,000	½ inch
PG 64-XX	10,000	½ inch
PG 58-XX	10,000	½ inch

The final adjusted design for the WMA mix design shall be submitted for acceptance with the following information included:

- 13) All information required for Superpave HMA.
- 14) WMA technology and/or WMA additives information.
- 15) WMA technology manufacturer’s established recommendations for usage.
- 16) WMA technology manufacturer’s established target rate for water and additives, the acceptable variation for production, and documentation showing the impact of excessive production variation.
- 17) WMA technology material safety data sheets (MSDS).
- 18) Documentation of at least 3 past WMA technology field applications including project type, project owner, tonnage, location, mix design, mixture volumetrics, field density, and performance.
- 19) Temperature range for mixing.
- 20) Temperature range for compacting.
- 21) Asphalt binder performance grade test data over the range of WMA additive percentages proposed for use.
- 22) WMA mixture QC/QA test results measured from the test strip samples specific to the Contractor’s proposed WMA technology.

- 23) Laboratory test data, samples and sources of all mixture components, and asphalt binder viscosity-temperature relationships.
- 24) Mix production Hamburg test results from WMA test strip.

The Illinois Tollway may accept an existing WMA mixture design with a WMA additive / process previously used on a Illinois Tollway project and may waive the test strip trial batch required to verify the WMA mix design.”

Quality Control / Quality Assurance. Article 1030.05 of the Standard Specifications shall govern the requirements for Quality Control / Quality Assurance (QC/QA) of HMA and WMA mixtures.

WMA Production. WMA shall be produced at a temperature range recommended by the additive / process manufacturer and verified through a QC/QA mixture test strip. It may be necessary to initially produce HMA mixes at conventional HMA temperatures immediately before WMA production at lower temperatures in order to prime the plant for proper operating temperatures.

A QC/QA mixture test strip will be required for all WMA mixes. The test strip shall be constructed at a location approved by the Engineer to determine the mix properties, density, and laydown characteristics, and as needed to finalize any proposed mix design. These test results and visual inspections on the mixture shall be used to make corrective adjustments if necessary. For all mixtures produced with a WMA technology, the QC/QA WMA mixture test strip shall be constructed at an approved off-site location to determine the mix properties, density, production temperature target, compaction procedure, and laydown characteristics. A field TSR test of the mix produced for any WMA test strip will be required.

Prior to the start of mix production and placement, The Illinois Tollway Materials Engineer will review and approve all test strip results, WMA mix designs, and rolling pattern.

The test strips will be performed as follows:

- (a) Team Members. The start-up team, if required, shall consist of the following:
 - (1) Resident Engineer
 - (2) Illinois Tollway Project Manager, or representative
 - (3) Illinois Tollway Materials Engineer, or representative
 - (4) Engineer's Nuclear Density Gauge Specialist
 - (5) Contractor's QC Manager
 - (6) Engineer's QA representative
 - (7) Contractor's Density Tester
 - (8) AC Supplier representative
- (b) Communication. The Contractor shall advise the team members of the anticipated start time of production for the test strip. The QC Manager shall direct the activities of the test strip team. A Illinois Tollway-appointed representative from the start-up team will act as spokesperson for the Illinois Tollway.

(c) The Test Strip(s) for HMA mixtures shall be in accordance with Article 406.06 of the Standard Specifications. The Test Strip(s) for WMA mixtures shall consist of approximately 300 tons. It shall contain two growth curves which shall be compacted by a static steel-wheeled roller and tested as outlined herein.

- (1) Mix Information. On the day of construction of the Test Strip, the Contractor shall provide the start-up team documentation of test data showing the combined hot-bin or the combined aggregate belt sample and mineral filler at a drier-drum plant.
- (2) Mix and Gradation Test Strip Samples. The first and second sets of mixture and gradation samples shall be taken by the Contractor at such times as to represent the mixture between the two growth curves and the rolling pattern area, respectively. All test strip samples shall be processed by the Contractor for determination of mix composition and Superpave properties including air voids. This shall include washed gradation tests. This information shall then be compared to the JMF and required design criteria. Prepare and test any WMA test strip mixtures, including Superpave gyratory compacted specimens for QC/QA using the same test methods, procedures and frequencies as specified for HMA, except that the WMA mixture shall be aged at the production temperature for a period of 2 hours before gyratory or performance based test specimens are compacted.

Hamburg Wheel testing according to Illinois Modified AASHTO T324 shall be conducted from the test strip production mixture. The Hamburg Wheel testing requirements from this sample are:

Asphalt Binder Grade	# Wheel Passes	Maximum Rut Depth, in.
PG 76-XX	20,000	½ inch
PG 70-XX	15,000	½ inch
PG 64-XX	10,000	½ inch
PG 58-XX	10,000	½ inch

- (3) Construction of the Test Strip. After the Contractor has produced the mix, transported the mix, and placed approximately 100 to 150 tons of mix, placement of the mix shall stop, and a growth curve shall be constructed. After completion of the first growth curve, paving shall resume for 50 to 100 tons of mix, placement shall stop, and the second growth curve shall be constructed within this area. Additional growth curves may be required if an adjustment/plant change is made during the test strip. The Contractor shall use the specified rolling procedures for all portions of the test strip except for the growth curve areas which shall be compacted as directed by the Engineer.

- (4) Location of Test Strip. The test strip shall be located on a pavement type similar to the contract pavement and acceptable to the Engineer. It shall be on a relatively flat portion of the roadway. Descending/Ascending grades or ramps shall be avoided.
- (5) Compaction Temperature. For WMA mixtures, the temperature of the mix at the beginning of the growth curve shall be within the additive / process manufacturer's recommended temperature range for compaction.
- (6) Compaction and Testing. The QC Manager will specify the roller(s) speed and number of passes required to obtain a completed growth curve. The nuclear gauge shall be placed near the center of the hot mat and the position marked for future reference. With the bottom of the nuclear gauge and the source rod clean, a 15 seconds nuclear reading (without mineral filler) shall be taken after each pass of the roller. Rolling shall continue until the maximum density is achieved and three consecutive passes show no appreciable increase in density or no evidence of destruction of the mat. The growth curve shall be plotted.
- (7) Evaluation of Growth Curves. Mixtures which exhibit density potential less than 94 percent or greater than 97 percent of the maximum theoretical density (D) shall be considered as sufficient cause for mix adjustment. If a mix adjustment is made, an additional test strip may be constructed. The Illinois Tollway will pay half the cost of the contract unit price for a test strip if additional one is required. The information shall then be compared to the AJMF and required design criteria.

If the nuclear density potential of the mixture does not exceed 91 percent, the operation will cease until all test data is analyzed or a new mix design is produced.

In addition, other aspects of the mixture, such as appearance, segregation, texture, or other evidence of mix problems, should be noted and corrective action taken at this time.

- (d) Documentation. The WMA test strip and rolling pattern information (including growth curves) will be tabulated by the contractor with copies provided to each team member, and the original submitted to the Engineer. Any change to the rolling pattern shall be approved by the Engineer.

CONSTRUCTION REQUIREMENTS

Placing. Article 406.06 of the Standard Specifications shall govern the requirements of HMA and WMA placement except as modified herein:

Revise the first and second paragraphs of Article 406.06(b) of the Standard Specifications to read:

“General. HMA and WMA shall be placed on a clean, dry base and when weather conditions are suitable. The HMA leveling binder and HMA binder courses shall be placed only when the temperature in the shade is at least 40°F and the forecast is for rising temperatures. The HMA surface course shall be placed only when the air temperature in the shade is at least 45°F and the forecast is for rising temperatures. The WMA leveling binder and WMA binder courses shall be placed only when the temperature in the shade is at least 32°F and the forecast is for rising temperatures. The WMA surface course shall be placed only when the air temperature in the shade is at least 35°F and the forecast is for rising temperatures.

The HMA shall be delivered at a temperature of 250 to 350°F. The WMA shall be delivered on dates when the ambient air temperatures during placement will be at least 50° F and rising within a temperature range as established by the WMA additive / process manufacturer and reported by the Contractor to the Engineer with the WMA mix design submittal. The temperature of WMA shall not exceed the manufacturer’s recommended maximum placement temperature when measured immediately behind the paver when the air temperature is 50°F and rising. The WMA shall be delivered at a temperature of 250 to 350°F on dates when the ambient air temperatures during placement will be between the WMA specified minimum temperature and 50°F.”

Revise the first paragraph of Article 406.06(d) of the Standard Specifications to read:

(d) Lift Thickness. The minimum compacted lift thickness for constructing HMA binder and surface courses shall be as follows, unless otherwise noted on the plans.

Compaction. Article 406.07 of the Standard Specifications shall govern the requirements of HMA and WMA compaction except as modified herein:

Add the following paragraph to Article 406.07 of the Standard Specifications:

“Compact WMA immediately after spreading and before the WMA mixture temperature falls below the minimum job mix compaction temperature as recommended by the manufacturer of the WMA technology used. Discontinue paving if the Contractor is unable to achieve the specified density before the mixture cools below the minimum recommended WMA job mix design compaction temperature.”

Method of Measurement. This work will be measured in accordance with Article 406.13 of the Standard Specifications.

Basis of Payment. This work will be paid for in accordance with Article 406.14 of the Standard Specifications except as modified herein:

Add the following to the second paragraph of Article 406.14 of the Standard Specifications:

“The WMA surfacing will be paid for at the contract unit price per ton for WARM MIX ASPHALT BINDER COURSE, of the mixture composition and Ndesign specified; and WARM MIX ASPHALT SURFACE COURSE, of the friction aggregate mixture and Ndesign specified.”

Replace the third paragraph of Article 406.14 of the Standard Specifications with the following:

“The HMA surfacing in which polymer or GTR modified asphalt binders are required, will be paid for at the contract unit price per ton for MODIFIED HOT-MIX ASPHALT BINDER COURSE, of the mixture composition and Ndesign specified; and MODIFIED HOT-MIX ASPHALT SURFACE COURSE, of the friction aggregate mixture and Ndesign specified.

The WMA surfacing in which polymer or GTR modified asphalt binders are required, will be paid for at the contract unit price per ton for MODIFIED WARM-MIX ASPHALT BINDER COURSE, of the mixture composition and Ndesign specified; and MODIFIED WARM-MIX ASPHALT SURFACE COURSE, of the friction aggregate mixture and Ndesign specified.”

Add the following to Article 406.14 of the Standard Specifications:

“WMA test strips will be evaluated for payment at the contract unit price each for CONSTRUCTING WARM MIX ASPHALT TEST STRIP, according to the following:

- (a) If the WMA placed during the initial test strip is determined to be acceptable, the mixture and test strip will be paid at the contract unit prices.
- (b) If the WMA placed during the initial test strip (1) is determined to be unacceptable to remain in place by the Engineer, and (2) was not produced within the tolerances of the JMF, the initial mixture and test strip will not be paid for and shall be removed at no additional cost to the Illinois Tollway. An additional test strip will be paid for in full, if produced within the JMF tolerances.
- (c) If the WMA placed during the initial test strip (1) is determined to be unacceptable to remain in place by the Engineer, and (2) was produced within the tolerances for the JMF, the mixture shall be removed. Removal will be paid for according to Article 109.04 of the Tollway Supplemental Specifications. This initial mixture and test strip will be paid for at the contract unit price, and any additional test strips will be paid for at one half the unit price of each test strip.
- (d) If the WMA placed during a test strip is determined to be acceptable to remain in place by the Engineer and the Engineer deems a new start-up is required for any reason, the initial mixture and test strip will be paid for at the contract unit prices. The additional mixture will be paid for at the contract unit price and any additional test strips will be paid for at one-half the unit price for each test strip.

- (e) If the Contractor requests and is granted approval for a mix design other than the initial approved WMA mix design, he/she shall construct a test strip for the new mix design at no additional cost to the Illinois Tollway.

Add the following to Article 406.14 of the Standard Specifications:

“HMA and WMA mixtures will be paid for under its respective item. If permissive use of an HMA mixture in place of a specified WMA mixture is granted by the Engineer, a new pay item will be established for the HMA with the same unit price. If permissive use of a WMA mixture in place of a specified HMA mixture is granted by the Engineer, a new pay item will be established for the WMA with the same unit price.”

HIGH LOAD MULTI-ROTATIONAL BEARINGS

Effective: October 13, 1988

Revised: April 1, 2016

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 noted 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 manufacturer's 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 Article 1083.02(c).
- (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) At 100% elongation, min	D 412	1500 psi (10,350 kPa)	2300 psi (15,900 kPa)
Tensile Stress, psi (kPa) At 200% elongation, min	D 412	2800 psi (19,300 kPa)	4000 psi (27,600 kPa)
Tensile Strength, psi (kPa), min	D 412	4000 psi (27,600 kPa)	6000 psi (41,400 kPa)
Ultimate Elongation, %, min	D 412	350	220
Compression Set 22 hr. at 158 °F (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 given a corrosion protection coating as specified on the plans and according to the applicable Special Provisions and Articles 506.03 and 506.04 of the Standard Specifications. During cleaning and coating the stainless steel, PTFE sheet and neoprene shall be protected from abrasion and coating material.

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.

MODULAR EXPANSION JOINT

Effective: May 19, 1994

Revised: December 29, 2014

Description. This work shall consist of furnishing and installing a modular expansion joint(s) as shown on the plans, and according to applicable portions of Section 520 of the Standard Specifications.

General. The expansion joint device shall be capable of handling the specified longitudinal movement. In addition, when specified, the joint shall also be capable of handling the differential non-parallel longitudinal movement. The expansion joint device shall effectively seal the joint opening in the deck surface and barrier curbs against the entrance of water and foreign materials. There shall be no appreciable change in the deck surface plane with the expansion and contraction movements of the bridge.

The device shall consist of a shop-fabricated modular assembly of transverse neoprene seals, edge and separation beams, bearing on support bars spanning the joint opening. The assembly shall maintain equal distances between intermediate support rails, at any cross section, for the entire length of the joint. The assembly shall be stable under all conditions of expansion and contraction, using a system of longitudinal control springs and upper and lower support beam bearings and springs.

At sidewalks, concrete median barriers and concrete parapet joints, a sliding steel plate shall be fabricated and installed according to the plans. Painting or galvanizing of sliding steel plates shall be as specified on the plans.

Suppliers: The Department maintains a pre-qualified list of proprietary structural systems allowed for modular expansion joints. This list can be found on the Departments web site under Prequalified Structural Systems. The Contractor's options are limited to those systems pre-qualified by the Department. These systems have been reviewed for structural feasibility and adequacy only. Presence on this list shall in no case relieve the Contractor of the site specific design or QC/QA requirements stated herein.

The manufacturer shall provide evidence of current certification by AISC according to Article 106.08(d) of the Standard Specifications.

Submittals: Shop drawings and a copy of the calculations and support documents shall be submitted to the Engineer for approval according to Article 105.04 of the Standard Specifications. Submittals will be required for each modular expansion joint device specified. In addition the Contractor shall provide the Department with a certification of compliance by the manufacturer listing all materials in the system. The certification shall attest that the system conforms to the design and material requirements and be supported by a copy of the successful results of the fatigue tests performed on the system as herein specified. Submittals with insufficient test data and supporting certifications will be rejected.

The shop drawings shall include tables showing the total anticipated movements for each joint and the required setting width of the joint assemblies at various temperatures.

Design Requirements: The maximum vertical, transverse and horizontal rotations and displacements shall be defined and included in the design.

The expansion joint device(s) shall be designed, detailed and successfully tested, according to Section 14 of the AASHTO LRFD Bridge Design Specifications.

Top, bottom and sides of support bars shall be restrained to prevent uplift, transmit bearing loads, and maintain the lateral position of the bars.

The total movement of each individual sealing element shall not exceed 3 in. (75 mm).

Materials:

- (a) Metals. Structural Steel. All structural steel shall be according to AASHTO M 270, Grade 50 (M 270M Grade 345), unless otherwise specified.

Stainless steel sheets for the sliding surfaces of the support bars shall conform to the requirements of ASTM A240 (A240M) type 302 or 304.

The use of aluminum components in the modular joint will not be allowed.

- (b) Preformed Elastomeric Seals. The elastomeric sealing element shall be according to ASTM D5973.

Lubricant/Adhesive for installing the preformed elastomeric elements in place shall be a one-part, moisture-curing, polyurethane and hydrocarbon solvent mixture as recommended by the manufacturer and containing not less than 65 percent solids.

- (c) Support Bar Bearings. Support bar bearings shall be fabricated from elastomeric pads with polytetrafluorethylene (PTFE) surfacing or from polyurethane compound with PTFE sliding surfaces. The elastomeric and PTFE materials shall meet the requirements of Section 1083 of the Standard Specifications.

- (d) Control Springs. Suitable elastomeric type springs which work longitudinally shall be used to maintain the equidistant spacing between transverse edge and separation beams when measured at any given cross section through the joint.

- (e) Support Bars. Support bars shall incorporate stainless steel sliding surfaces to permit joint movement.

Construction Requirements

General. Installation of expansion devices shall be according to the plans and shop drawings.

The fabricator of the modular joint assembly shall be AISC certified according to Article 106.08 for Bridge and Highway Metal Component Manufacturers. In lieu of AISC certification, the Contractor may have all welding on main members (support bars and separation beams) observed and inspected by independent (third party) personnel at the Contractor's expense. Welding shall then be observed by a Certified Welding Inspector (CWI) in addition to the manufacturer's own welding inspection. Third party Non Destructive Examination (NDE) shall be performed by inspector(s), certified as level II in applicable methods, and all complete penetration beam-to-bar welds and butt joints in beams shall be UT inspected and 10 percent of fillets and partial pen welds shall be MT inspected.

The manufacturer of the expansion device shall provide a qualified technical service representative to supervise installation. Modular expansion joint devices shall be factory prefabricated assemblies, preset by the manufacturer prior to shipment with provisions for field adjustment for the ambient temperature at the time of installation.

Unless otherwise shown on the plans, the neoprene seals shall be continuous without any field splices. Installation of the joint seals shall be performed by a trained representative of the Manufacturer.

All steel surfaces of the prefabricated assembly shall be shop painted with the primer specified for structural steel, except areas in direct contact with the seals, galvanized items and stainless steel surfaces.

The metal surfaces in direct contact with the neoprene seals shall be blast cleaned to permit a high strength bond of the lubricant/adhesive between the neoprene seal and mating metal surfaces.

The Contractor shall anticipate and make all necessary adjustments to existing or plan-specified reinforcement bars, subject to the approval of the Engineer, in order to prevent interferences with placement of the selected joint in the structure. Any adjustments to reinforcement bars interfering with the joint installation shall be the responsibility of the Contractor and preapproved by the Engineer prior to installation of the joint. Cutting of reinforcement shall be minimized, and any bars that are cut shall be replaced in-kind at no additional cost.

The prefabricated joint assembly shall be properly positioned and attached to the structure according to the manufacturer's approved shop drawings. The attachment shall be sufficiently rigid to prevent non-thermal rotation, distortion, or misalignment of the joint system relative to the deck prior to casting the concrete. The joints shall be adjusted to the proper opening based on the ambient temperature at the time of installation and then all restraints preventing thermal movement shall be immediately released and/or removed. The joint assembly units shall be straight, parallel and in proper vertical alignment or reworked until proper adjustment is obtained prior to casting of the concrete around the joint.

After the joint system is installed, the joint area shall be flooded with water and inspected, from below for leakage. If leakage is observed, the joint system shall be repaired, at the expense of the Contractor, as recommended by the manufacturer and approved by the Engineer.

Method of Measurement. This work will be measured for payment in place, in feet (meters), along the centerline of the joint from face to face of the parapets or curbs. All sliding plate assemblies at the sidewalks, parapets and median barriers will not be measured for payment. The size will be defined as the specified longitudinal movement rounded up to the nearest 3 inch (75 mm) increment.

Basis of Payment: When only a longitudinal movement is specified, this work will be paid for at the contract unit price per foot (meter) for the MODULAR EXPANSION JOINT, of the size specified. When a differential non parallel movement is also specified, this work will be paid for at the contract unit price per foot (meter) for the MODULAR EXPANSION JOINT-SWIVEL, of the size specified.

All materials, equipment and labor required to fabricate, paint and install the sliding plate assemblies at the sidewalks, parapets and median barriers will not be paid for separately but shall be included in the price for the expansion joint specified.

When the fabrication and erection of modular expansion joint is accomplished under separate contracts, the applicable requirements of Article 505.09 shall apply, except the furnishing pay items shall include storage and protection of fabricated materials up to 75 days after the completion dates.

Fabricated modular expansion joints and other materials complying with the requirements of this item, furnished and accepted, will be paid for at the contract unit price per foot (meter) for FURNISHING MODULAR EXPANSION JOINT or FURNISHING MODULAR EXPANSION JOINT – SWIVEL of the size specified.

Storage and care of fabricated joints 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 MODULAR EXPANSION JOINTS 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.

Modular expansion joints and other materials erected according to the requirements of the specifications, and accepted, will be paid for at the contract unit price per foot (meter) for ERECTING MODULAR EXPANSION JOINT or ERECTING MODULAR EXPANSION JOINT - SWIVEL of the size specified.

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.

ERECTION OF CURVED STEEL STRUCTURES

Effective: June 1, 2007

Description: In addition to the requirements of Article 505.08(e), the following shall apply.

The Contractor or sub-Contractor performing the erection of the structural steel is herein referred to as the Erection Contractor.

Erection Plan: The Erection Contractor shall retain the services of an Illinois Licensed Structural Engineer, experienced in the analysis and preparation of curved steel girder erection plans, for the completion of a project-specific erection plan. The structural engineer, herein referred to as the Erection Engineer, shall sign and seal the erection plan, drawings, and calculations for the proposed erection of the structural steel.

The erection plan shall be complete in detail for all phases, stages, and conditions anticipated during erection. The erection plan shall include structural calculations and supporting documentation necessary to completely describe and document the means, methods, temporary support positions, and loads necessary to safely erect the structural steel in conformance with the contract documents and as outlined herein. The erection plans shall address and account for all items pertinent to the steel erection including such items as sequencing, falsework, temporary shoring and/or bracing, girder stability, crane positioning and movement, means of access, pick points, girder shape, permissible deformations and roll, interim/final plumbness, cross frame/diaphragm placement and connections, bolting and anchor bolt installation sequences and procedures, and blocking and anchoring of bearings. The Erection Contractor shall be responsible for the stability of the partially erected steel structure during all phases of the steel erection.

The erection plans and procedures shall be submitted to the Engineer for review and acceptance prior to starting the work. Review, acceptance and/or comments by the Department shall not be construed to guarantee the safety or final acceptability of the work or compliance with all applicable specifications, codes, or contract requirements, and shall neither relieve the Contractor of the responsibility and liability to comply with these requirements, nor create liability for the Department. Significant changes to the erection plan in the field must be approved by the Erection Engineer and accepted by the Engineer for the Department.

Basis of Payment: This work shall not be paid for separately but shall be included in the applicable pay items according to Article 505.13 of the Standard Specifications.

GRANULAR BACKFILL FOR STRUCTURES

Effective: April 19, 2012

Revised: October 30, 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.

WEEP HOLE DRAINS FOR ABUTMENTS, WINGWALLS, RETAINING WALLS AND CULVERTS

Effective: April 19, 2012

Revised: October 22, 2013

Delete the last paragraphs of Articles 205.05 and 502.10 and replace with the following.

“If a geocomposite wall drain according to Section 591 is not specified, a prefabricated geocomposite strip drain according to Section 1040.07 shall be placed at the back of each drain hole. The strip drain shall be 24 inches (600 mm) wide and 48 inches (1.220 m) tall. The strip drain shall be centered over the drain hole with the bottom located 12 inches (300 mm) below the bottom of the drain hole. All form boards or other obstructions shall be removed from the drain holes before placing any geocomposite strip drain.”

Revise the last sentence of the first paragraph of Article 503.11 to read as follows.

“Drain holes shall be covered to prevent the leakage of backfill material according to Article 502.10.”

Revise the title of Article 1040.07 to Geocomposite Wall Drains and Strip Drains.

BRIDGE DECK CONSTRUCTION

Effective: October 22, 2013

Revised: April 1, 2016

Revise the Second Paragraph of Article 503.06(b) to read as follows.

“When the Contractor uses cantilever forming brackets on exterior beams or girders, additional requirements shall be as follows.”

Revise Article 503.06(b)(1) to read as follows.

- “(1) Bracket Placement. The spacing of brackets shall be per the manufacturer’s published design specifications for the size of the overhang and the construction loads anticipated. The resulting force of the leg brace of the cantilever bracket shall bear on the web within 6 inches (150 mm) of the bottom flange of the beam or girder.”

Revise Article 503.06(b)(2) to read as follows.

“(2) Beam Ties. The top flange of exterior steel beams or girders supporting the cantilever forming brackets shall be tied to the bottom flange of the next interior beam. The top flange of exterior concrete beams supporting the cantilever forming brackets shall be tied to the top flange of the next interior beam. The ties shall be spaced at 4 ft (1.2 m) centers. Permanent cross frames on steel girders may be considered a tie. Ties shall be a minimum of 1/2 inch (13 mm) diameter threaded rod with an adjusting mechanism for drawing the tie taut. The ties shall utilize hanger brackets or clips which hook onto the flange of steel beams. No welding will be permitted to the structural steel or stud shear connectors, or to reinforcement bars of concrete beams, for the installation of the tie bar system. After installation of the ties and blocking, the tie shall be drawn taut until the tie does not vary from a straight line from beam to beam. The tie system shall be approved by the Engineer.”

Revise Article 503.06(b)(3) to read as follows.

“(3) Beam Blocks. Suitable beam blocks of 4 in x 4 in (100 x 100 mm) timbers or metal structural shapes of equivalent strength or better, acceptable to the Engineer, shall be wedged between the webs of the two beams tied together, within 6 inches (150 mm) of the bottom flange at each location where they are tied. When it is not feasible to have the resulting force from the leg brace of the cantilever brackets transmitted to the web within 6 inches (150 mm) of the bottom flange, then additional blocking shall be placed at each bracket to transmit the resulting force to within 6 inches (150 mm) of the bottom flange of the next interior beam or girder.”

Delete the last paragraph of Article 503.06(b).

Revise the third paragraph of Article 503.16 to read as follows.

“Fogging equipment shall be in operation unless the evaporation rate is less than 0.1 lb/sq ft/hour (0.5kg/sq m/hour) and the Engineer gives permission to stop. The evaporation rate shall be determined according to the following formula.

$$E = (T_c^{2.5} - rT_a^{2.5})(1 + 0.4V)x10^{-6} \text{ (English)}$$

$$E = 5[(T_c + 18)^{2.5} - r(T_a + 18)^{2.5}](V + 4)x10^{-6} \text{ (Metric)}$$

Where:

E = Evaporation Rate, lb/ft²/h (kg/sq m/h)

T_c = Concrete Temperature, °F (°C)

T_a = Air Temperature, °F (°C)

r = Relative Humidity in percent/100

V = Wind Velocity, mph (km/h)

The Contractor shall provide temperature, relative humidity, and wind speed measuring equipment. Fogging equipment shall be adequate to reach or cover the entire pour from behind the finishing machine or vibrating screed to the point of curing covering application, and shall be operated in a manner which shall not accumulate water on the deck until the curing covering has been placed."

Revise the third paragraph of Article 503.16(a)(1) to read as follows.

"At the Contractor's option, a vibrating screed may be used in lieu of a finishing machine for superstructures with a pour width less than or equal to 24 ft (7.3 m). After the concrete is placed and consolidated, it shall be struck off with a vibrating screed allowing for camber, if required. The vibrating screed shall be of a type approved by the Engineer. A slight excess of concrete shall be kept in front of the cutting edge at all times during the striking off operation. After screeding, the entire surface shall be finished with hand-operated longitudinal floats having blades not less than 10 ft (3 m) in length and 6 in. (150 mm) in width. Decks so finished need not be straightedge tested as specified in 503.16(a)(2)."

Delete the fifth paragraph of 503.16(a)(1).

Revise Article 503.16(a)(2) to read as follows.

"(2) Straightedge Testing and Surface Correction. After the finishing has been completed and while the concrete is still plastic, the surface shall be tested for trueness with a 10 ft (3 m) straightedge, or a hand-operated longitudinal float having blades not less than 10 ft (3 m) in length and 6 in. (150 mm) in width. The Contractor shall furnish and use an accurate 10 ft (3 m) straightedge or float which has a handle not less than 3 ft (1 m) longer than 1/2 the pour width. The straightedge or float shall be held in contact with the surface and passed gradually from one side of the superstructure to the other. Advance along the surface shall be in successive stages of not more than 1/2 the length of the straightedge or float. Any depressions found shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished."

Replace the second sentence of the first paragraph of Article 1020.13(a)(5) with the following sentences.

"Cotton mats in poor condition will not be allowed. The cotton mats shall be placed in a manner which will not create indentations greater than 1/4 inch (6 mm) in the concrete surface. Minor marring of the surface is tolerable and is secondary to the importance of timely curing."

Revise Article 1020.14(b) to read as follows.

- “(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.
- (1) Bridge Deck Concrete. For concrete in bridge decks, slabs, and bridge approach slabs the Contractor shall schedule placing and finishing of the concrete during hours in which the ambient air temperature is forecast to be lower than 85 °F (30 °C). It shall be understood this may require scheduling the deck pour at night in order to utilize the temperature window available. The temperature of the concrete immediately before placement shall be a minimum of 50 °F (10 °C) and a maximum of 85 °F (30 °C).
- (2) Non-Bridge Deck Concrete. Except as noted above, 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 restrictions above shall be considered at point of placement. When insulated forms are used according to Article 1020.13(d)(1), 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 freshly mixed concrete may be increased by the Contractor to offset anticipated heat loss, but in no case shall the maximum concrete temperature be permitted to exceed the limits stated in this Article.”

Revise Article 1103.13(a) to read as follows.

- “(a) Bridge Deck and Approach Slabs. The finishing machine shall be equipped with: (1) a mechanical strike off device; (2) either a rotating cylinder(s) or a longitudinal oscillating screed which transversely finishes the surface of the concrete. The Contractor may attach other equipment to the finishing machine to enhance the final finish when approved by the Engineer. The finishing machine shall produce a deck surface of uniform texture, free from porous areas, and with the required surface smoothness.

The finishing machine shall be operated on rails or other supports that will not deflect under the applied loads. The maximum length of rail segments supported on top of beams and within the pour shall be 10 ft (3 m). The supports shall be adjustable for elevation and shall be completely in place to allow the finishing machine to be used for the full length of the area to be finished. The supports shall be approved by the Engineer before placing of the concrete is started.”

Revise Article 1103.17(k) to read as follows.

“(k) Fogging Equipment. Fogging equipment shall be hand held fogging equipment for humidity control. The equipment shall be capable of atomizing water to produce a fog blanket by the use of pressure 2500 psi minimum (17.24 MPa) and an industrial fire hose fogging nozzle or equivalent. Fogging equipment attached to the finishing machine will not be permitted.”

BUTT JOINTS (BDE)

Effective: July 1, 2016

Add the following to Article 406.08 of the Standard Specifications.

“(c) Temporary Plastic Ramps. Temporary plastic ramps shall be made of high density polyethylene meeting the properties listed below. Temporary plastic ramps shall only be used on roadways with permanent posted speeds of 55 mph or less. The ramps shall have a minimum taper rate of 1:30 (V:H). The leading edge of the plastic ramp shall have a maximum thickness of 1/4 in. (6 mm) and the trailing edge shall match the height of the adjacent pavement \pm 1/4 in. (\pm 6 mm).

The ramp will be accepted by certification. The Contractor shall furnish a certification from the manufacturer stating the temporary plastic ramp meets the following requirements.

Physical Property	Test Method	Requirement
Melt Index	ASTM D 1238	8.2 g/10 minutes
Density	ASTM D 1505	0.965 g/cc
Tensile Strength @ Break	ASTM D 638	2223 psi (15 MPa)
Tensile Strength @ Yield	ASTM D 638	4110 psi (28 MPa)
Elongation @ Yield ^{1/} , percent	ASTM D 638	7.3 min.
Durometer Hardness, Shore D	ASTM D 2240	65
Heat Deflection Temperature, 66 psi	ASTM D 648	176 °F (80 °C)
Low Temperature Brittleness, F ₅₀	ASTM D 746	<-105 °F (<-76 °C)

1/ Crosshead speed -2 in./minute

The temporary plastic ramps shall be installed according to the manufacturer’s specifications and fastened with anchors meeting the manufacturer’s recommendations. Temporary plastic ramps that fail to stay in place or create a traffic hazard shall be replaced immediately with temporary HMA ramps at the Contractor’s expense.”

COARSE AGGREGATE QUALITY (BDE)

Effective: July 1, 2015

Revise Article 1004.01(b) of the Standard Specifications to read:

“(b) Quality. The coarse aggregate shall be according to the quality standards listed in the following table.

COARSE AGGREGATE QUALITY				
QUALITY TEST	CLASS			
	A	B	C	D
Na ₂ SO ₄ Soundness 5 Cycle, ITP 104 ^{1/} , % Loss max.	15	15	20	25 ^{2/}
Los Angeles Abrasion, ITP 96 ^{11/} , % Loss max.	40 ^{3/}	40 ^{4/}	40 ^{5/}	45
Minus No. 200 (75 μm) Sieve Material, ITP 11	1.0 ^{6/}	---	2.5 ^{7/}	---
Deleterious Materials ^{10/}				
Shale, % max.	1.0	2.0	4.0 ^{8/}	---
Clay Lumps, % max.	0.25	0.5	0.5 ^{8/}	---
Coal & Lignite, % max.	0.25	---	---	---
Soft & Unsound Fragments, % max.	4.0	6.0	8.0 ^{8/}	---
Other Deleterious, % max.	4.0 ^{9/}	2.0	2.0 ^{8/}	---
Total Deleterious, % max.	5.0	6.0	10.0 ^{8/}	---
Oil-Stained Aggregate ^{10/} , % max	5.0	---	---	

1/ Does not apply to crushed concrete.

2/ For aggregate surface course and aggregate shoulders, the maximum percent loss shall be 30.

3/ For portland cement concrete, the maximum percent loss shall be 45.

4/ Does not apply to crushed slag or crushed steel slag.

5/ For hot-mix asphalt (HMA) binder mixtures, except when used as surface course, the maximum percent loss shall be 45.

6/ For crushed aggregate, if the material finer than the No. 200 (75 μm) sieve consists of the dust from fracture, essentially free from clay or silt, this percentage may be increased to 2.5.

- 7/ Does not apply to aggregates for HMA binder mixtures.
- 8/ Does not apply to Class A seal and cover coats.
- 9/ Includes deleterious chert. In gravel and crushed gravel aggregate, deleterious chert shall be the lightweight fraction separated in a 2.35 heavy media separation. In crushed stone aggregate, deleterious chert shall be the lightweight fraction separated in a 2.55 heavy media separation. Tests shall be run according to ITP 113.
- 10/ Test shall be run according to ITP 203.
- 11/ Does not apply to crushed slag.

All varieties of chert contained in gravel coarse aggregate for portland cement concrete, whether crushed or uncrushed, pure or impure, and irrespective of color, will be classed as chert and shall not be present in the total aggregate in excess of 25 percent by weight (mass).

Aggregates used in Class BS concrete (except when poured on subgrade), Class PS concrete, and Class PC concrete (bridge superstructure products only, excluding the approach slab) 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.”

CONCRETE END SECTIONS FOR PIPE CULVERTS (BDE)

Effective: January 1, 2013

Revised: April 1, 2016

Description. This work shall consist of constructing cast-in-place concrete and precast concrete end sections for pipe culverts. These end sections are shown on the plans as Highway Standard 542001 or 542011. This work shall be according to Section 542 of the Standard Specifications except as modified herein.

Materials. Materials shall be according to the following Articles of Division 1000 – Materials of the Standard Specifications.

Item	Article/Section
(a) Portland Cement Concrete (Note 1)	1020
(b) Precast Concrete End Sections (Note 2)	
(c) Coarse Aggregate (Note 3)	1004.05
(d) Structural Steel (Note 4)	1006.04
(e) Anchor Bolts and Rods (Note 5)	1006.09
(f) Reinforcement Bars	1006.10(a)
(g) Nonshrink Grout	1024.02
(h) Chemical Adhesive Resin System	1027
(i) Mastic Joint Sealer for Pipe	1055
(j) Hand Hole Plugs	1042.16

Note 1. Cast-in-place concrete end sections shall be Class SI, except the 14 day mix design shall have a compressive strength of 5000 psi (34,500 kPa) or a flexural strength of (800 psi) 5500 kPa and a minimum cement factor of 6.65 cwt/cu yd (395 kg/cu m).

Note 2. Precast concrete end sections shall be according to Articles 1042.02 and 1042.03(b)(c)(d)(e) of the Standard Specifications. The concrete shall be Class PC according to Section 1020, and shall have a minimum compressive strength of 5000 psi (34,000 kPa) at 28 days.

Joints between precast sections shall be produced with reinforced tongue and groove ends according to the requirements of ASTM C 1577.

Note 3. The granular bedding placed below a precast concrete end section shall be gradation CA 6, CA 9, CA 10, CA 12, CA 17, CA 18, or CA 19.

Note 4. All components of the culvert tie detail shall be galvanized according to the requirements of AASHTO M 111 or M 232 as applicable.

Note 5. The anchor rods for the culvert ties shall be according to the requirements of ASTM F 1554, Grade 105 (Grade 725).

CONSTRUCTION REQUIREMENTS

The concrete end sections may be precast or cast-in-place construction. Toe walls shall be either precast or cast-in-place, and shall be in proper position and backfilled according to the applicable paragraphs of Article 502.10 of the Standard Specifications prior to the installation of the concrete end sections. If soil conditions permit, cast-in-place toe walls may be poured directly against the soil. When poured directly against the soil, the clear cover of the sides and bottom of the toe wall shall be increased to 3 in. (75 mm) by increasing the thickness of the toe wall.

- (a) Cast-In-Place Concrete End Sections. Cast-in-place concrete end sections shall be constructed according to the requirements of Section 503 of the Standard Specifications and as shown on the plans.
- (b) Precast Concrete End Sections. When the concrete end sections will be precast, shop drawings detailing the slab thickness and reinforcement layout shall be submitted to the Engineer for review and approval.

The excavation and backfilling for precast concrete end sections shall be according to the requirements of Section 502 of the Standard Specifications, except a layer of granular bedding at least 6 in. (150 mm) in thickness shall be placed below the elevation of the bottom of the end section. The granular bedding shall extend a minimum of 2 ft (600 mm) beyond each side of the end section.

Anchor rods connecting precast sections shall be brought to a snug tight condition followed by an additional 2/3 turn on one of the nuts. Match marks shall be provided on the bolt and nut to verify relative rotation between the bolt and the nut.

When individual, precast end sections are placed side-by-side for a multi-pipe culvert installation, a 3 in. (75 mm) space shall be left between adjacent end section walls and the space(s) filled with Class SI concrete.

Method of Measurement. This work will be measured for payment as each, with each end of each culvert being one each.

Basis of Payment. This work will be paid for at the contract unit price per each for CONCRETE END SECTION, STANDARD 542001 or CONCRETE END SECTION, 542011, of the pipe diameter and slope specified.

CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE)

Effective: June 1, 2010

Revised: November 1, 2014

The reduction of emissions of particulate matter (PM) for off-road equipment shall be accomplished by installing retrofit emission control devices. The term “equipment” refers to diesel fuel powered devices rated at 50 hp and above, to be used on the jobsite in excess of seven calendar days over the course of the construction period on the jobsite (including rental equipment).

Contractor and subcontractor diesel powered off-road equipment assigned to the contract shall be retrofitted using the phased in approach shown below. Equipment that is of a model year older than the year given for that equipment’s respective horsepower range shall be retrofitted:

Effective Dates	Horsepower Range	Model Year
June 1, 2010 ^{1/}	600-749	2002
	750 and up	2006
June 1, 2011 ^{2/}	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006
June 1, 2012 ^{2/}	50-99	2004
	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006

1/ Effective dates apply to Contractor diesel powered off-road equipment assigned to the contract.

2/ Effective dates apply to Contractor and subcontractor diesel powered off-road equipment assigned to the contract.

The retrofit emission control devices shall achieve a minimum PM emission reduction of 50 percent and shall be:

- a) Included on the U.S. Environmental Protection Agency (USEPA) *Verified Retrofit Technology List* (<http://www.epa.gov/cleandiesel/verification/verif-list.htm>), or verified by the California Air Resources Board (CARB) (<http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm>); or
- b) Retrofitted with a non-verified diesel retrofit emission control device if verified retrofit emission control devices are not available for equipment proposed to be used on the project, and if the Contractor has obtained a performance certification from the retrofit device manufacturer that the emission control device provides a minimum PM emission reduction of 50 percent.

Note: Large cranes (Crawler mounted cranes) which are responsible for critical lift operations are exempt from installing retrofit emission control devices if such devices adversely affect equipment operation.

Diesel powered off-road equipment with engine ratings of 50 hp and above, which are unable to be retrofitted with verified emission control devices or if performance certifications are not available which will achieve a minimum 50 percent PM reduction, may be granted a waiver by the Department if documentation is provided showing good faith efforts were made by the Contractor to retrofit the equipment.

Construction shall not proceed until the Contractor submits a certified list of the diesel powered off-road equipment that will be used, and as necessary, retrofitted with emission control devices. The list(s) shall include (1) the equipment number, type, make, Contractor/rental company name; and (2) the emission control devices make, model, USEPA or CARB verification number, or performance certification from the retrofit device manufacturer. Equipment reported as fitted with emissions control devices shall be made available to the Engineer for visual inspection of the device installation, prior to being used on the jobsite.

The Contractor shall submit an updated list of retrofitted off-road construction equipment as retrofitted equipment changes or comes on to the jobsite. The addition or deletion of any diesel powered equipment shall be included on the updated list.

If any diesel powered off-road equipment is found to be in non-compliance with any portion of this special provision, the Engineer will issue the Contractor a diesel retrofit deficiency deduction.

Any costs associated with retrofitting any diesel powered off-road equipment with emission control devices shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall not be grounds for a claim.

Diesel Retrofit Deficiency Deduction

When the Engineer determines that a diesel retrofit deficiency exists, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be \$1,000.00 for each deficiency identified.

The deficiency will be based on lack of diesel retrofit emissions control.

If a Contractor accumulates three diesel retrofit deficiency deductions for the same piece of equipment in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of the contract time, waiver of penalties, or be grounds for any claim.

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (DBE)

Effective: September 1, 2000

Revised: July 2, 2016

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR Part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract that the Contractor signs with a subcontractor.

The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (a) Withholding progress payments;
- (b) Assessing sanctions;
- (c) Liquidated damages; and/or
- (d) Disqualifying the Contractor from future bidding as non-responsible.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR Part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. The determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform **23.00%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

- (a) The bidder documents that enough DBE participation has been obtained to meet the goal or,
- (b) The bidder documents that a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders shall consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217) 785-4611, or by visiting the Department's website at:

<http://www.idot.illinois.gov/doing-business/certifications/disadvantaged-business-enterprise-certification/il-ucp-directory/index>.

BIDDING PROCEDURES. Compliance with this Special Provision is required prior to the award of the contract and the failure of the low bidder to comply will render the bid not responsive.

In order to assure the timely award of the contract, the low bidder shall submit:

- (a) The bidder shall submit a DBE Utilization Plan on completed Department forms SBE 2025 and 2026.
 - (1) The final Utilization Plan must be submitted within five calendar days after the date of the letting in accordance with subsection (a)(2) of Bidding Procedures.
 - (2) To meet the five day requirement, the bidder may send the Utilization Plan electronically by scanning and sending to **DOT.DBE.UP@illinois.gov** or faxing to (217) 785-1524. The subject line must include the bid Item Number and the Letting date. The Utilization Plan should be sent as one .pdf file, rather than multiple files and emails for the same Item Number. It is the responsibility of the bidder to obtain confirmation of email or fax delivery.

Alternatively, the Utilization Plan may be sent by certified mail or delivery service within the five calendar day period. If a question arises concerning the mailing date of a Utilization Plan, the mailing date will be established by the U.S. Postal Service postmark on the certified mail receipt from the U.S. Postal Service or the receipt issued by a delivery service when the Utilization Plan is received by the Department. It is the responsibility of the bidder to ensure the postmark or receipt date is affixed within the five days if the bidder intends to rely upon mailing or delivery to satisfy the submission day requirement. The Utilization Plan is to be submitted to:

Illinois Department of Transportation
Bureau of Small Business Enterprises
Contract Compliance Section
2300 South Dirksen Parkway, Room 319
Springfield, Illinois 62764

The Department will not accept a Utilization Plan if it does not meet the five day submittal requirement and the bid will be declared not responsive. In the event the bid is declared not responsive due to a failure to submit a Utilization Plan or failure to comply with the bidding procedures set forth herein, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty, and may deny authorization to bid the project if re-advertised for bids. The Department reserves the right to invite any other bidder to submit a Utilization Plan at any time for award consideration.

- (b) The Utilization Plan shall indicate that the bidder either has obtained sufficient DBE participation commitments to meet the contract goal or has not obtained enough DBE participation commitments in spite of a good faith effort to meet the goal. The Utilization Plan shall further provide the name, telephone number, and telefax number of a responsible official of the bidder designated for purposes of notification of Utilization Plan approval or disapproval under the procedures of this Special Provision.
- (c) The Utilization Plan shall include a DBE Participation Commitment Statement, Department form SBE 2025, for each DBE proposed for the performance of work to achieve the contract goal. For bidding purposes, submission of the completed SBE 2025 forms, signed by the DBEs and scanned or faxed to the bidder will be acceptable as long as the original is available and provided upon request. All elements of information indicated on the said form shall be provided, including but not limited to the following:
- (1) The names and addresses of DBE firms that will participate in the contract;
 - (2) A description, including pay item numbers, of the work each DBE will perform;
 - (3) The dollar amount of the participation of each DBE firm participating. The dollar amount of participation for identified work shall specifically state the quantity, unit price, and total subcontract price for the work to be completed by the DBE. If partial pay items are to be performed by the DBE, indicate the portion of each item, a unit price where appropriate and the subcontract price amount;
 - (4) DBE Participation Commitment Statements, form SBE 2025, signed by the bidder and each participating DBE firm documenting the commitment to use the DBE subcontractors whose participation is submitted to meet the contract goal;
 - (5) If the bidder is a joint venture comprised of DBE companies and non-DBE companies, the Utilization Plan must also include a clear identification of the portion of the work to be performed by the DBE partner(s); and,
 - (6) If the contract goal is not met, evidence of good faith efforts; the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor is selected over a DBE for work on the contract.

GOOD FAITH EFFORT PROCEDURES. The contract will not be awarded until the Utilization Plan submitted by the apparent successful bidder is approved. All information submitted by the bidder must be complete, accurate and adequately document that enough DBE participation has been obtained or document that good faith efforts of the bidder, in the event enough DBE participation has not been obtained, before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan documents sufficient commercially useful DBE work to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A. The Utilization Plan will not be approved by the Department if the Utilization Plan does not document sufficient DBE participation to meet the contract goal unless the apparent successful bidder documented in the Utilization Plan that it made a good faith effort to meet the goal. This means that the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts that the bidder has made. Mere *pro forma* efforts, in other words, efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

- (a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases, and will be considered by the Department.
 - (1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.
 - (2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime Contractor might otherwise prefer to perform these work items with its own forces.
 - (3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

- (4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.
 - b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable. In accordance with subsection (c)(6) of the above Bidding Procedures, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.
- (5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
- (6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.
- (7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.

- (b) If the Department determines that the apparent successful bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided that it is otherwise eligible for award. If the Department determines that the bidder has failed to meet the requirements of this Special Provision or that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification shall include a statement of reasons for the determination. If the Utilization Plan is not approved because it is deficient as a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no more than a five calendar day period in order to cure the deficiency.
- (c) The bidder may request administrative reconsideration of a determination adverse to the bidder within the five working days after the receipt of the notification date of the determination by delivering the request to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217) 785-1524). Deposit of the request in the United States mail on or before the fifth business day shall not be deemed delivery. The determination shall become final if a request is not made and delivered. A request may provide additional written documentation or argument concerning the issues raised in the determination statement of reasons, provided the documentation and arguments address efforts made prior to submitting the bid. The request will be forwarded to the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person in order to consider all issues of documentation and whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for 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 DBE regular dealer or DBE manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal. All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the DBE Participation Commitment Statement.

- (a) NO AMENDMENT. No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764. Telephone number (217) 785-4611. Telefax number (217) 785-1524.
- (b) CHANGES TO WORK. Any deviation from the DBE condition-of-award or contract plans, specifications, or special provisions must be approved, in writing, by the Department as provided elsewhere in the Contract. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract. Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A or AER 260A, must be signed and submitted. If the commitment of work is in the form of additional tasks assigned to an existing subcontract, then a new Request for Approval of Subcontractor shall not be required. However, the Contractor must document efforts to assure that the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.
- (c) SUBCONTRACT. The Contractor must provide DBE subcontracts to IDOT upon request. Subcontractors shall ensure that all lower tier subcontracts or agreements with DBEs to supply labor or materials be performed in accordance with this Special Provision.

- (d) ALTERNATIVE WORK METHODS. In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:
- (1) That the replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or
 - (2) That the DBE is aware that its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or
 - (3) That the DBE is not capable of performing the replacement work or has declined to perform the work at a reasonable competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.
- (e) TERMINATION AND REPLACEMENT PROCEDURES. The Contractor shall not terminate or replace a DBE listed on the approved Utilization Plan, or perform with other forces work designated for a listed DBE except as provided in this Special Provision. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the Department's written consent as provided in subsection (a) of this part. Unless Department consent is provided for termination of a DBE subcontractor, the Contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the DBE in the Utilization Plan.

As stated above, the Contractor shall not terminate or replace a DBE subcontractor listed in the approved Utilization Plan without prior written consent. This includes, but is not limited to, instances in which the Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Written consent will be granted only if the Bureau of Small Business Enterprises agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate or replace the DBE firm. Before transmitting to the Bureau of Small Business Enterprises any request to terminate and/or substitute a DBE subcontractor, the Contractor shall give notice in writing to the DBE subcontractor, with a copy to the Bureau, of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor shall give the DBE five days to respond to the Contractor's notice. The DBE so notified shall advise the Bureau and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Bureau should not approve the Contractor's action. If required in a particular case as a matter of public necessity, the Bureau may provide a response period shorter than five days.

For purposes of this paragraph, good cause includes the following circumstances:

- (1) The listed DBE subcontractor fails or refuses to execute a written contract;
- (2) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
- (3) The listed DBE subcontractor fails or refuses to meet the prime Contractor's reasonable, nondiscriminatory bond requirements;
- (4) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (5) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1200 or applicable state law.
- (6) You have determined that the listed DBE subcontractor is not a responsible contractor;
- (7) The listed DBE subcontractor voluntarily withdraws from the projects and provides to you written notice of its withdrawal;
- (8) The listed DBE is ineligible to receive DBE credit for the type of work required;
- (9) A DBE owner dies or becomes disabled with the result that the listed DBE subcontractor is unable to complete its work on the contract;
- (10) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the prime Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the prime Contractor can self-perform the work for which the DBE contractor was engaged or so that the prime Contractor can substitute another DBE or non-DBE contractor after contract award.

When a DBE is terminated, or fails to complete its work on the Contract for any reason the Contractor shall make a good faith effort to find another DBE to substitute for the original DBE to perform at least the same amount of work under the contract as the terminated DBE to the extent needed to meet the established Contract goal. The good faith efforts shall be documented by the Contractor. If the Department requests documentation under this provision, the Contractor shall submit the documentation within seven days, which may be extended for an additional seven days if necessary at the request of the Contractor. The Department shall provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

- (f) 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 Resident Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes that the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (h) of this part.
- (g) ENFORCEMENT. The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.
- (h) RECONSIDERATION. Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of "Good Faith Effort Procedures" of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

ENGINEER'S FIELD OFFICE (BDE)

Effective: April 1, 2016

Revise the fifth sentence of the first paragraph of Article 670.07 of the Standard Specifications to read:

"This price shall include all utility costs and shall reflect the salvage value of the building or buildings, equipment, and furniture which remain the property of the Contractor after release by the Engineer, except the Department will pay that portion of the monthly long distance, monthly local telephone, and online data usage that, when combined, exceed \$250."

EQUAL EMPLOYMENT OPPORTUNITY (BDE)

Effective: April 1, 2015

FEDERAL AID CONTRACTS. Revise the following section of Check Sheet #1 of the Recurring Special Provisions to read:

"EQUAL EMPLOYMENT OPPORTUNITY

In the event of the Contractor's noncompliance with the provisions of this Equal Employment Opportunity Clause, the Illinois Human Rights Act, or the Illinois Department of Human Rights Rules and Regulations, the Contractor may be declared ineligible for future contracts or subcontracts with the State of Illinois or any of its political sub-divisions or municipal corporations, and the contract may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.

During the performance of this Contract, the Contractor agrees as follows:

- (1) That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status, or an unfavorable discharge from military service; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
- (2) That, if it hires additional employees in order to perform this contract or any portion hereof, it will determine the availability (according to the Illinois Department of Human Rights Rules and Regulations) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.

- (3) That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status or an unfavorable discharge from military service.
- (4) That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations. If any labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and Rules and Regulations, the Contractor will promptly so notify the Illinois Department of Human Rights and IDOT and will recruit employees from other sources when necessary to fulfill its obligations thereunder.
- (5) That it will submit reports as required by the Illinois Department of Human Rights Rules and Regulations, furnish all relevant information as may from time to time be requested by the Illinois Department of Human Rights or IDOT, and in all respects comply with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.
- (6) That it will permit access to all relevant books, records, accounts, and work sites by personnel of IDOT and the Illinois Department of Human Rights for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.
- (7) That it will include verbatim or by reference the provisions of this clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so that the provisions will be binding upon the subcontractor. In the same manner as with other provisions of this contract, the Contractor will be liable for compliance with applicable provisions of this clause by subcontractors; and further it will promptly notify IDOT and the Illinois Department of Human Rights in the event any subcontractor fails or refuses to comply with these provisions. In addition, the Contractor will not utilize any subcontractor declared by the Illinois Human Rights Commission to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations."

STATE CONTRACTS. Revise Section II of Check Sheet #5 of the Recurring Special Provisions to read:

“II. EQUAL EMPLOYMENT OPPORTUNITY

In the event of the Contractor's noncompliance with the provisions of this Equal Employment Opportunity Clause, the Illinois Human Rights Act or the Illinois Department of Human Rights Rules and Regulations, the Contractor may be declared ineligible for future contracts or subcontracts with the State of Illinois or any of its political sub-divisions or municipal corporations, and the contract may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.

During the performance of this Contract, the Contractor agrees as follows:

1. That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status, or an unfavorable discharge from military service; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
2. That, if it hires additional employees in order to perform this contract or any portion hereof, it will determine the availability (according to the Illinois Department of Human Rights Rules and Regulations) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.
3. That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status, or an unfavorable discharge from military service.
4. That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations. If any labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and Rules and Regulations, the Contractor will promptly so notify the Illinois Department of Human Rights and IDOT and will recruit employees from other sources when necessary to fulfill its obligations thereunder.

5. That it will submit reports as required by the Illinois Department of Human Rights Rules and Regulations, furnish all relevant information as may from time to time be requested by the Illinois Department of Human Rights or IDOT, and in all respects comply with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.
6. That it will permit access to all relevant books, records, accounts and work sites by personnel of IDOT and the Illinois Department of Human Rights for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.
7. That it will include verbatim or by reference the provisions of this clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so that the provisions will be binding upon the subcontractor. In the same manner as with other provisions of this contract, the Contractor will be liable for compliance with applicable provisions of this clause by subcontractors; and further it will promptly notify IDOT and the Illinois Department of Human Rights in the event any subcontractor fails or refuses to comply with these provisions. In addition, the Contractor will not utilize any subcontractor declared by the Illinois Human Rights Commission to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.”

ERRATA FOR THE 2016 STANDARD SPECIFICATIONS (BDE)

Effective: April 1, 2016

- Page 84 Article 204.02. In the seventh line of the first paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”.
- Page 90 Article 205.06. In the first sentence of the third paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”.
- Page 91 Article 205.06. In the first sentence of the fourth paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”, and in the second sentence change “AASHTO T 224” to “Illinois Modified AASHTO T 99 (Annex A1)”.
- Page 91 Article 205.06. In the second line of the fifth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”.
- Page 91 Article 205.06. In the sixth line of the eighth paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”.
- Page 148 Article 302.09. In the second sentence of the fifth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”, and in the third sentence change “AASHTO T 99” to “Illinois Modified AASHTO T 99”.

- Page 152 Article 310.09. In the second sentence of the second paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”, and in the third sentence change “AASHTO T 99” to “Illinois Modified AASHTO T 99”.
- Page 155 Article 311.05(a). In the first sentence of the fifth paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”, and in the second sentence change “AASHTO T 224” to “Illinois Modified AASHTO T 99 (Annex A1)”.
- Page 155 Article 311.05(a). In the second line of the sixth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”.
- Page 163 Article 351.05(a). In the second sentence of the fifth paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”, and in the third sentence change “AASHTO T 224” to “Illinois Modified AASHTO T 99 (Annex A1)”.
- Page 163 Article 351.05(a). In the second line of the sixth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”.
- Page 169 Article 352.11. In the second sentence of the fourth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”, and in the third sentence change “AASHTO T 134 (Method B)” to “Illinois Modified AASHTO T 134 (Method B)”.
- Page 169 Article 352.12. In the first sentence of the first paragraph change “AASHTO T 22” to “Illinois Modified AASHTO T 22”, and in the second sentence change “AASHTO T 134 (Method B)” to “Illinois Modified AASHTO T 134 (Method B)”.
- Page 196 Article 406.07(a). After the footnotes in Table 1 - Minimum Roller Requirements for HMA add the following:

“EQUIPMENT DEFINITION

- V_s - Vibratory roller, static mode, minimum 125 lb/in. (2.2 kg/mm) of roller width. Maximum speed = 3 mph (5 km/h) or 264 ft/min (80 m/min). If the vibratory roller does not eliminate roller marks, its use shall be discontinued and a tandem roller, adequately ballasted to remove roller marks, shall be used.
- V_D - Vibratory roller, dynamic mode, operated at a speed to produce not less than 10 impacts/ft (30 impacts/m).
- P - Pneumatic-tired roller, max. speed 3 1/2 mph (5.5 km/h) or 308 ft/min (92 m/min). The pneumatic-tired roller shall have a minimum tire pressure of 80 psi (550 kPa) and shall be equipped with heat retention shields. The self-propelled pneumatic-tired roller shall develop a compression of not less than 300 lb (53 N) nor more than 500 lb (88 N) per in. (mm) of width of the tire tread in contact with the HMA surface.

- T_B - Tandem roller for breakdown rolling, 8 to 12 tons (7 to 11 metric tons), 250 to 400 lb/in. (44 to 70 N/mm) of roller width, max. speed = 3 1/2 mph (5.5 km/h) or 308 ft/min (92 m/min).
- T_F - Tandem roller for final rolling, 200 to 400 lb/in. (35 to 70 N/mm) of roller width with minimum roller width of 50 in. (1.25 m). Ballast shall be increased if roller marks are not eliminated. Ballast shall be decreased if the mat shoves or distorts.
- 3W- Three wheel roller, max. speed = 3 mph (5 km/h) or 264 ft/min (80 m/min), 300 to 400 lb/in. (53 to 70 N/mm) of roller width. The three-wheel roller shall weigh 10 to 12 tons (9 to 11 metric tons)."

- Page 331 Article 505.04(p). Under Range of Clearance in the first table change "in. x 10⁻⁶" to "in. x 10⁻³".
- Page 444 Article 542.03. In the Notes in Table IIIB add "CPP Corrugated Polypropylene (CPP) pipe with smooth interior".
- Page 445 Article 542.03. In the fourth column in Table IIIB (metric) change the heading for Type 5 pipe from "CPE" to "CPP".
- Page 445 Article 542.03. In the Notes in Table IIIB (metric) change "PE Polyethylene (PE) pipe with a smooth interior" to "CPP Corrugated Polypropylene (CPP) pipe with smooth interior".
- Page 449 Article 542.04(f)(2). In the third line of the second paragraph change "AASHTO T 99 (Method C)" to "Illinois Modified AASHTO T 99 (Method C)".
- Page 544 Article 639.03. In the first sentence of the first paragraph change "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, Traffic Signals," to "AASHTO "LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals,"".
- Page 546 Article 640.03. In the first sentence of the first paragraph change "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" to "AASHTO "LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals"".
- Page 548 Article 641.03. In the first sentence of the first paragraph change "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaire and Traffic Signals," to "AASHTO "LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals,"".

- Page 621 Article 727.03. In the first sentence of the third paragraph change “AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” to “AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals””.
- Page 629 Article 734.03(a). In the fourth line of the second paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”.
- Page 649 Article 801.02. In the first sentence of the first paragraph change “AASHTO’s Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals” to “AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals””.
- Page 742 Article 1003.04(c). Under Gradation in the table change “(see Article 1003.02(c))” to “(see Article 1003.01(c))”.
- Page 755 Article 1004.03(b). Revise the third sentence of the first paragraph to read “For Class A (seal or cover coat), and other binder courses, the coarse aggregate shall be Class C quality or better.”.
- Page 809 Article 1020.04(e). In the third line of the first paragraph change “ITP SCC-3” to “ITP SCC-4”.
- Page 945 Article 1069.05. In the first sentence of the tenth paragraph change ““Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals”” to “AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals””.
- Page 961 Article 1070.04(b)(1). In the third sentence of the first paragraph change ““Standard Specifications of Structural Supports for Highway Signs, Luminaires and Traffic Signals” published by AASHTO” to “AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals””.
- Page 989 Article 1077.01. In the second sentence of the first paragraph change “Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, as published by AASHTO” to “AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals””.
- Page 1121 Article 1103.13(a). In the first line of the first paragraph change “Bridge Deck Approach Slabs.” to “Bridge Deck and Approach Slabs.”.

GROOVING FOR RECESSED PAVEMENT MARKINGS (BDE)

Effective: November 1, 2012

Revised: August 1, 2014

Description. This work shall consist of grooving the pavement surface in preparation for the application of recessed pavement markings.

Equipment. Equipment shall be according to the following.

- (a) Pavement Marking Tape Installations: The grooving equipment shall have a free-floating saw blade cutting head equipped with gang-stacked diamond saw blades. The diamond saw blades shall be of uniform wear and shall produce a smooth textured surface. Any ridges in the groove shall have a maximum height of 15 mils (0.38 mm).
- (b) Liquid and Thermoplastic Pavement Marking Installations: The grooving equipment shall be equipped with either a free-floating saw blade cutting head or a free-floating grinder cutting head configuration with diamond or carbide tipped cutters and shall produce an irregular textured surface.

CONSTRUCTION REQUIREMENTS

General. The Contractor shall supply the Engineer with a copy of the pavement marking material manufacturer's recommendations for constructing a groove.

Pavement Grooving Methods. The grooves for recessed pavement markings shall be constructed using the following methods.

- (a) Wet Cutting Head Operation. When water is required or used to cool the cutting head, the groove shall be flushed with high pressure water immediately following the cut to avoid build up and hardening of slurry in the groove. The pavement surface shall be allowed to dry for a minimum of 24 hours prior to the final cleaning of the groove and application of the pavement marking material.
- (b) Dry Cutting Head Operation. When used on HMA pavements, the groove shall be vacuumed or cleaned by blasting with high-pressure air to remove loose aggregate, debris, and dust generated during the cutting operation. When used on PCC pavements, the groove shall be flushed with high pressure water or shot blasted to remove any PCC particles that may have become destabilized during the grooving process. If high pressure water is used, the pavement surface shall be allowed to dry for a minimum of 24 hours prior to the final cleaning of the groove and application of the pavement marking material.

Pavement Grooving. Grooving shall not cause ravels, aggregate fractures, spalling or disturbance of the joints to the underlying surface of the pavement. Grooves shall be cut into the pavement prior to the application of the pavement marking material. Grooves shall be cut such that the width is 1 in. (25 mm) greater than the width of the pavement marking line as specified on the plans. Grooves for letters and symbols shall be cut in a square or rectangular shape so that the entire marking will fit within the limits of the grooved area. The position of the edge of the grooves shall be a minimum of 4 in. (100 mm) from the edge of all longitudinal joints. The depth of the groove shall not be less than the manufacturer's recommendations for the pavement marking material specified, but shall be installed to a minimum depth of 110 mils (2.79 mm) and a maximum depth of 200 mils (5.08 mm) for pavement marking tapes thermoplastic markings and a minimum depth of 40 mils (1.02 mm) and a maximum depth of 80 mils (2.03 mm) for liquid markings. The cutting head shall be operated at the appropriate speed in order to prevent undulation of the cutting head and grooving at an inconsistent depth.

At the start of grooving operations, a 50 ft (16.7 m) test section shall be installed and depth measurements shall be made at 10 ft (3.3 m) intervals within the test section. The individual depth measurements shall be within the allowable ranges according to this Article. If it is determined the test section has not been grooved at the appropriate depth or texture, adjustments shall be made to the cutting head and another 50 ft (16.7 m) test section shall be installed and checked. This process shall continue until the test section meets the requirements of this Article.

For new HMA pavements, grooves shall not be installed within 14 days of the placement of the final course of pavement.

Final Cleaning. Immediately prior to the application of the pavement marking material or primer sealer, the groove shall be cleaned with high-pressure air blast.

Method of Measurement. This work will be measured for payment in place, in feet (meter) for the groove width specified.

Grooving for letter, numbers and symbols will be measured in square feet (square meters).

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for GROOVING FOR RECESSED PAVEMENT MARKING of the groove width specified, and per square foot (square meter) for GROOVING FOR RECESSED PAVEMENT MARKING, LETTERS AND SYMBOLS.

The following shall only apply when preformed plastic pavement markings are to be recessed:

Add the following paragraph after the first paragraph of Article 780.07 of the Standard Specifications.

“The markings shall be capable of being applied in a grooved slot on new and existing portland cement concrete and HMA surfaces, by means of a pressure-sensitive, precoated adhesive, or liquid contact cement which shall be applied at the time of installation. A primer sealer shall be applied with a roller and shall cover and seal the entire bottom of the groove. The primer sealer shall be recommended by the manufacturer of the pavement marking material and shall be compatible with the material being used. The Contractor shall install the markings in the groove as soon as possible after the primer sealer cures according to the manufacturer’s recommendations. The markings placed in the groove shall be rolled and tamped into the groove with a roller or tamper cart cut to fit the groove and loaded with or weighing at least 200 lb (90kg). Vehicle tires shall not be used for tamping. The Contractor shall roll and tamp the material with a minimum of 6 passes to prevent easy removal or peeling.”

LIGHT POLES (BDE)

Effective: July 1, 2016

Revise the second paragraph of Article 1069.01 of the Standard Specifications to read:

“The detailed design and fabrication of the pole shaft, arms, tenons, and attachments shall be according to AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” current at the time the project is advertised. Light poles shall be designed for ADT > 10,000 and Risk Category Typical. If Fatigue design is required, light poles shall be designed for Importance Category I.”

Revise the fifth paragraph of Article 1069.01(a) of the Standard Specifications to read:

“Deflection of the pole top as caused by the combined effect of deadload referenced above and wind speed prescribed by AASHTO shall be as required by AASHTO. Pole deflection and loading compliance, certified by the manufacturer, shall be noted on the pole submittal.”

LIGHT TOWER (BDE)

Effective: July 1, 2016

Revise the third paragraph of Article 1069.08 of the Standard Specifications to read:

“The design shall be based upon AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” in effect on the date of invitation for bids, however the width of reinforced opening requirement in Chapter 5, Section 5.6.6.1 shall not apply. Light Towers shall be designed for ADT > 10,000, Risk Category Typical, and Fatigue Importance Category I.”

MAST ARM ASSEMBLY AND POLE (BDE)

Effective: July 1, 2016

Revise Article 1077.03(a)(1) of the Standard Specifications to read:

“(1) Loading. The mast arm assembly and pole, and combination mast arm assembly and pole shall be designed for the loading shown on the Highway Standards or elsewhere on the plans, whichever is greater. The design shall be according to AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals” 2015 Edition. However, the arm-to-pole connection for tapered signal and luminaire arms shall be according to the “fillet welded, ring stiffened box connection” detail as shown in Figure C5.6.7-2. The mast arm and pole shall be designed assuming the ADT > 10,000, Risk Category Typical, and Fatigue Category I Natural Wind Gust only.”

OVERHEAD SIGN STRUCTURES – CERTIFICATION OF METAL FABRICATOR (BDE)

Effective: November 1, 2015

Revised: April 1, 2016

Revise Article 106.08 of the Standard Specifications to read:

“106.08 Certification of Metal Fabricator. All fabricators performing work on metal components of structures shall be certified under the appropriate category of the AISC Certification Program for Steel Bridge Fabricators as follows.

- (a) Fabricators of the main load carrying steel components of box girder, trusses over 200 ft (61 m) in length, arch, cable supported, moveable, and curved (radii under 1000 ft (305 m)) structures shall be certified under Category Advanced Bridges.
- (b) Fabricators of the main load carrying steel components of spliced rolled beams, welded plate girders, either simple span or continuous, trusses under 200 ft (61 m) in length, and curved (radii over 1000 ft (305 m)) structures, shall be certified under Category Intermediate Bridges.
- (c) Fabricators of the main load carrying steel components of unspliced rolled beam sections shall be certified under Category Simple Bridges.
- (d) Fabricators of overhead sign structures shall be on the Department’s list of pre-qualified Overhead Sign Structure Fabricators and certified under either (a), (b), (c) or Category Bridge and Highway Metal Component Manufacturers.
- (e) Fabricators of steel or other non-ferrous metal components of structures, not certified under (a), (b), or (c) above, shall be certified under the AISC program for Bridge and Highway Metal Component Manufacturers.

In addition, fabricators of fracture critical main load carrying steel components of bridges shall also have the Fracture Critical Endorsement.”

PAVEMENT MARKING REMOVAL (BDE)

Effective: July 1, 2016

Revise Article 783.02 of the Standard Specifications to read:

“783.02 Equipment. Equipment shall be according to the following.

Item	Article/Section
(a) Grinders (Note 1)	
(b) Water Blaster with Vacuum Recovery	1101.12

Note 1. Grinding equipment shall be approved by the Engineer.”

Revise the first paragraph of Article 783.03 of the Standard Specifications to read:

“783.03 Removal of Conflicting Markings. Existing pavement markings that conflict with revised traffic patterns shall be removed. If darkness or inclement weather prohibits the removal operations, such operations shall be resumed the next morning or when weather permits. In the event of removal equipment failure, such equipment shall be repaired, replaced, or leased so removal operations can be resumed within 24 hours.”

Revise the first and second sentences of the first paragraph of Article 783.03(a) of the Standard Specifications to read:

“The existing pavement markings shall be removed by the method specified and in a manner that does not materially damage the surface or texture of the pavement or surfacing. 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.”

Revise the first paragraph of Article 783.04 of the Standard Specifications to read:

“783.04 Cleaning. The roadway surface shall be cleaned of debris or any other deleterious material by the use of compressed air or water blast.”

Revise the first paragraph of Article 783.06 of the Standard Specifications to read:

“783.06 Basis of Payment. This work will be paid for at the contract unit price per each for RAISED REFLECTIVE PAVEMENT MARKER REMOVAL, or at the contract unit price per square foot (square meter) for PAVEMENT MARKING REMOVAL – GRINDING and/or PAVEMENT MARKING REMOVAL – WATER BLASTING.”

Delete Article 1101.13 from the Standard Specifications.

PROGRESS PAYMENTS (BDE)

Effective: November 2, 2013

Revise Article 109.07(a) of the Standard Specifications to read:

- “(a) Progress Payments. At least once each month, the Engineer will make a written estimate of the quantity of work performed in accordance with the contract, and the value thereof at the contract unit prices. The amount of the estimate approved as due for payment will be vouchered by the Department and presented to the State Comptroller for payment. No amount less than \$1000.00 will be approved for payment other than the final payment.

Progress payments may be reduced by liens filed pursuant to Section 23(c) of the Mechanics’ Lien Act, 770 ILCS 60/23(c).

If a Contractor or subcontractor has defaulted on a loan issued under the Department’s Disadvantaged Business Revolving Loan Program (20 ILCS 2705/2705-610), progress payments may be reduced pursuant to the terms of that loan agreement. In such cases, the amount of the estimate related to the work performed by the Contractor or subcontractor, in default of the loan agreement, will be offset, in whole or in part, and vouchered by the Department to the Working Capital Revolving Fund or designated escrow account. Payment for the work shall be considered as issued and received by the Contractor or subcontractor on the date of the offset voucher. Further, the amount of the offset voucher shall be a credit against the Department’s obligation to pay the Contractor, the Contractor’s obligation to pay the subcontractor, and the Contractor’s or subcontractor’s total loan indebtedness to the Department. The offset shall continue until such time as the entire loan indebtedness is satisfied. The Department will notify the Contractor and Fund Control Agent in a timely manner of such offset. The Contractor or subcontractor shall not be entitled to additional payment in consideration of the offset.

The failure to perform any requirement, obligation, or term of the contract by the Contractor shall be reason for withholding any progress payments until the Department determines that compliance has been achieved.”

STEEL SLAG IN TRENCH BACKFILL (BDE)

Effective: January 1, 2016

Revise the second sentence of Article 1003.01(a)(8) of the Standard Specifications to read:

“Crushed steel slag shall be the nonmetallic product which is developed in a molten condition simultaneously with steel in an open hearth, basic oxygen, or electric arc furnace.”

Revise Article 1003.04(a) of the Standard Specifications to read:

“(a) Description. The fine aggregate shall consist of sand, stone sand, chats, wet bottom boiler slag, slag sand, or granulated slag sand. Crushed concrete sand, construction and demolition debris sand, and steel slag sand produced from an electric arc furnace may be used in lieu of the above for trench backfill.”

TEMPORARY CONCRETE BARRIER (BDE)

Effective: January 1, 2015

Revised: July 1, 2015

Revise Article 704.02 of the Standard Specifications to read:

“**704.02 Materials.** Materials shall be according to the following.

Item	Article/Section
(a) Precast Temporary Concrete Barrier	1042
(b) Reinforcement Bars	1006.10(a)
(c) Connecting Pins and Anchor Pins (Note 1)	
(d) Connecting Loop Bars (Note 2)	
(e) Packaged Rapid Hardening Mortar or Concrete	1018

Note 1. Connecting Pins and Anchor Pins shall be according to the requirements of ASTM F 1554 Grade 36 (Grade 250).

Note 2. Connecting loop bars shall be smooth bars according to the requirements of ASTM A 36 (A 36M).”

Revise Article 704.04 of the Standard Specifications to read:

“**704.04 Installation.** The barriers shall be seated on bare, clean pavement or paved shoulder and connected together in a smooth, continuous line at the locations provided by the Engineer.

Except on bridge decks, or where alternate anchoring details are shown on the plans, the barrier unit at each end of an installation shall be anchored to the pavement or paved shoulder using six anchor pins and protected with an impact attenuator as shown on the plans. When pinning of additional barrier units within the installation is specified, three anchor pins shall be installed in the traffic side holes of the required barriers.

Where both pinned and unpinned barrier units are used in a continuous installation, a transition shall be provided between them. The transition from pinned to unpinned barrier shall consist of two anchor pins installed in the end holes on the traffic side of the first barrier beyond the pinned section and one anchor pin installed in the middle hole on the traffic side of the second barrier beyond the pinned section. The third barrier beyond the pinned section shall then be unpinned.

Barriers located on bridge decks shall be restrained as shown on the plans. Anchor pins shall not be installed through bridge decks, unless otherwise noted.

Barriers or attachments damaged during transportation or handling, or by traffic during the life of the installation, shall be repaired or replaced. The Engineer will be the sole judge in determining which units or attachments require repair or replacement.

The barriers shall be removed when no longer required by the contract. After removal, all anchor holes in the pavement or paved shoulder shall be filled with a rapid hardening mortar or concrete. Only enough water to permit placement and consolidation by rodding shall be used and the material shall be struck-off flush.”

Add the following after the first paragraph of Article 704.05 of the Standard Specifications:

“Anchor pins, except for the six anchor pins for the barrier unit at each end of an installation, will be measured for payment as each, per anchor pin installed.”

Add the following after the second paragraph of Article 704.06 of the Standard Specifications:

“Anchor pins, except for the six anchor pins for the barrier unit at each end of an installation, will be paid for at the contract unit price per each for PINNING TEMPORARY CONCRETE BARRIER.”

TRAINING SPECIAL PROVISIONS (BDE)

Effective: October 15, 1975

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 Contractor's 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 shall 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

Revised: February 1, 2014

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 funded pre-apprenticeship training programs outlined by this Special Provision.

It is the policy of IDOT to fund IDOT pre-apprenticeship training programs throughout Illinois 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 construction contracts shall include "Training Program Graduate Special Provisions." To benefit from the incentives to encourage the participation in the additional on-the-job training under this Training Program Graduate Special Provision, the Contractor shall make every reasonable effort to employ certified graduates of IDOT funded Pre-apprenticeship Training Programs 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 \$15.00 per hour for training given a certified TPG 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 applicable federal law, 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 \$15.00 per hour for certified 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 with several entities 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 funded TPG programs 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 Special Provision \$15.00 an hour incentive.

The Contractor or subcontractor shall provide each TPG with a certificate showing the type and length of training satisfactorily completed.

WARM MIX ASPHALT (BDE)

Effective: January 1, 2012

Revised: April 1, 2016

Description. This work shall consist of designing, producing and constructing Warm Mix Asphalt (WMA) in lieu of Hot Mix Asphalt (HMA) 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.

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.

"(11) Equipment for Warm Mix Technologies.

- a. Foaming. Metering equipment for foamed asphalt shall have an accuracy of ± 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.

"(e) 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."

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

Revised: April 2, 2015

The Contractor shall submit a weekly report of Disadvantaged Business Enterprise (DBE) trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) that are used for DBE goal credit.

The report shall be submitted to the Engineer on Department form "SBE 723" within ten business days following the reporting period. The reporting period shall be Monday through Sunday for each week reportable trucking activities occur.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

BITUMINOUS MATERIALS COST ADJUSTMENTS (BDE) (RETURN FORM WITH BID)

Effective: November 2, 2006

Revised: July 1, 2015

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 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.

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 that are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply to bituminous prime coats, tack coats, crack filling/sealing, joint filling/sealing, or extra work paid for at a lump sum price or by force account.

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_P = Bituminous Price Index, as published by the Department for the month the work is performed, \$/ton (\$/metric ton).

BPI_L = Bituminous Price Index, as published by the Department for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price, \$/ton (\$/metric ton).

%AC_V = Percent of virgin Asphalt Cement in the Quantity being adjusted. For HMA mixtures, the % AC_V 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_V and undiluted emulsified asphalt will be considered to be 65% AC_V.

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: $Q, \text{ metric tons} = A \times D \times (G_{mb} \times 1) / 1000$. 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_V.

For bituminous materials measured in gallons: $Q, \text{ tons} = V \times 8.33 \text{ lb/gal} \times \text{SG} / 2000$
For bituminous materials measured in liters: $Q, \text{ metric tons} = V \times 1.0 \text{ kg/L} \times \text{SG} / 1000$

Where: A = Area of the HMA mixture, sq yd (sq m).
D = Depth of the HMA mixture, in. (mm).
 G_{mb} = 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_L and BPI_P 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.

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:** _____

FUEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)

Effective: April 1, 2009

Revised: July 1, 2015

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 extra work paid for by agreed unit price will be subject to fuel cost adjustment only when the category representing the added work was subject to the fuel cost adjustment. Extra work paid for at a lump sum price or by force account 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_P = Fuel Price Index, as published by the Department for the month the work is performed, \$/gal (\$/liter)
FPI_L = Fuel Price Index, as published by the Department for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price, \$/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.

Basis of Payment. Fuel cost adjustments may be positive or negative but will only be made when there is a difference between the FPI_L and FPI_P in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(FPI_L - FPI_P) \div FPI_L\} \times 100$$

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.

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:** _____

STEEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)

Effective: April 2, 2004

Revised: July 1, 2015

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 have a contract value of \$10,000 or greater.

The adjustments shall apply to the above items when they are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply when the item is added as extra work and paid for at a lump sum price or by force account.

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 for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price,. 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.

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:** _____

STORM WATER POLLUTION PREVENTION PLAN

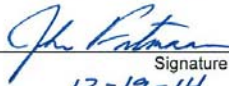


Storm Water Pollution Prevention Plan

Route	<u>Interstate 190</u>	Marked Rte.	<u>F.A.I. 90 / F.A.I. 190</u>
Section	<u>(1517R-1&1617B)13</u>	Project No.	<u>D-91-133-14</u>
County	<u>Cook</u>	Contract No.	<u>60X56</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.

<u>John Fortmann, PE</u> Print Name <u>Deputy Director of Highways, Region One Engineer</u> Title <u>Illinois Department of Transportation</u> Agency	 Signature <u>12-19-14</u> Date
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I. Site Description:

A. Provide a description of the project location (include latitude and longitude):

The project is located at Interstate 190, a distance of approximately 1.8 miles from the Des Plaines River east to the Cumberland Avenue Bridge over I-90. The latitude is 41° 59' 1.1" N and the longitude is 87° 50' 54.6" N. A legal description of the project is Sections 2 and 3, Township 40N, Range12E. The location map is included on the front sheet of the Highway Plan set.

The design, installation, and maintenance of BMPs at these locations are within an area where annual erosivity (R value) is less than or equal to 160. Erosivity is less than 5 in all two-week periods between October 12 and April 15, which would qualify for a construction rainfall erosivity waiver under the US Construction General Permit requirements. At these locations, erosivity is highest in spring to autumn, April 16 - October 11.

B. Provide a description of the construction activity which is the subject of this plan:

The project consists of the construction of a new flyover bridge from the eastbound Jane Addams Memorial Tollway (I-90) that consists of four spans for an approximate length of 845-ft spanning the CTA Blue Line and eastbound I-190. Construction of four retaining walls located east and west of the flyover bridge structure. Reconstruction of the East River Road Bridge over I-90 to accommodate the eastbound I-90 widening/CD roadway and future westbound I-90 widening. Reconstruction and widening of eastbound I-190 from the Des Plaines River to the I-190 / I-90 merge. Construction of a new eastbound CD roadway exiting to southbound Cumberland Avenue from eastbound I-90. Proposed drainage, high mast tower lighting, conventional roadway lighting, CCTV camera towers, landscaping, pavement marking and signing. Resurfacing of EB mainline I-90 from I-190 to west of Cumberland Avenue.

The project will be completed in four stages; a pre-stage and three main construction stages along eastbound I-190 and I-90.

Pre-Stage: Eastbound I-190 / I-90

- Install Erosion and Sediment Control measures for the Pre-Stage work areas.
- Reconstruct and widen the eastbound I-190 north shoulder. Maintain normal traffic flow on eastbound I-190 and all the ramps within the project limits during Pre-Stage.
- Reconstruct slotted drain at the EB I-90/EB I-190 gore.

Stage 1: Eastbound I-190 / I-90

- Install Erosion and Sediment Control measures for the Stage 1 work areas.
- Shift the two eastbound I-190 travel lanes to the newly constructed shoulder and existing lane on the north side of eastbound I-190. Maintain two 11-ft lanes for eastbound I-190. The entrance ramp from Des Plaines River Road and the southbound exit ramp to Cumberland Avenue will remain open to traffic. Start the reconstruction of the two lanes and the south shoulder of eastbound I-190; construction of the Cumberland Flyover Bridge; and east ramp approach.
- Construct temporary ditches, swales, pipe culverts and storm sewers as required to maintain drainage within the work area.
- Relocate 66" mainline storm sewer along EB I-190 and install proposed storm sewers along the EBCD roadway within the work area.

Stage 2: Eastbound I-190 / I-90

- Install Erosion and Sediment Control measures for the Stage 2 work areas.
- Shift the two eastbound I-190 lanes to the newly constructed lanes and shoulder, maintaining two 11-ft lanes along eastbound I-190. Complete the construction of eastbound I-190 and the Cumberland Flyover bridge structure and retaining walls.
- Construct temporary ditches, swales, pipe culverts and storm sewers as required to maintain drainage within the work area.
- Complete the installation of the proposed storm sewers along the EBCD roadway within the work area.

Stage 3: Eastbound I-190 / I-90

- Install Erosion and Sediment Control measures for the Stage 3 work areas.
- Install required guide signs along the Jane Addams Memorial Tollway and eastbound I-190 / I-90. Open the newly constructed Cumberland Flyover Ramp to traffic. Complete the eastbound CD road median work. Resurface of eastbound I-90 with temporary nightly lane closures along eastbound I-90 and eastbound I-190.
- Complete permanent seeding and other permanent stabilization measures.
- Remove temporary Erosion and Sediment Control measures.

East River Road Bridge Reconstruction

The Department has made a commitment with the City of Chicago that the East River Road Bridge will not be closed for more than one construction season.

Stage 1: East River Road

- Install Erosion and Sediment Control measures for the East River Road work areas.
- East River Road Bridge will be closed to through vehicle, pedestrian and equestrian traffic. Demolish the East River Road bridge superstructure and substructure by implementing nightly single lane closures on eastbound and westbound I-90. Temporary pavement will be constructed on the north side of westbound I-90 in the vicinity of the bridge for a lane shift occurring in Stage 2 for construction of the pier next to the CTA tracks.
- Construct temporary ditches, swales, pipe culverts and storm sewers as required to maintain drainage within the work area.

Stage 2: East River Road

- Maintain Erosion and Sediment Control measures for the East River Road work areas.
- Close the WB I-90 inside lane for construction of the pier next to the CTA Blue Line tracks. Shift the four through lanes of westbound I-90 traffic to the north utilizing the temporary pavement constructed in Stage 1.
- Finish reconstruction of the bridge.
- Complete permanent seeding and other permanent stabilization measures.
- Remove temporary Erosion and Sediment Control measures.

C. Provide the estimated duration of this project:

Approximately 24 months.

- D. The total area of the construction site is estimated to be 20.36 acres.
The total area of the site estimated to be disturbed by excavation, grading or other activities is 15.76 acres.
- E. The following is a weighted average of the runoff coefficient for this project after construction activities are completed:
C = 0.586 (Proposed) ; C = 0.578 (Existing)
- F. List all soils found within project boundaries. Include map unit name, slope information, and erosivity:
From the USDA Natural Resources Conservation Service Soil Survey mapping:
Primary Map Unit: 533 - Urban Land, low erosivity
Secondary Map Unit: 802A - Orthents, loamy, nearly level, relatively low erosivity (K=0.37)
- G. Provide an aerial extent of wetland acreage at the site:
No wetlands were identified within the project limits.
- H. Provide a description of potentially erosive areas associated with this project:
Potentially erosive areas for the Cumberland Flyover Project include: the embankment slopes adjacent to the new flyover ramp bridge/retaining walls (1:2.5) and the embankment slopes at the East River Road Bridge over I-90 (1:2).
- 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):
A description of soil disturbing activities by stages is included in Item I.B.
- 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:
The existing and proposed drainage system along I-190 and I-90 - Illinois Department of Transportation
The existing and proposed drainage along East River Road - City of Chicago
- L. The following is a list of General NPDES ILR40 permittees within whose reporting jurisdiction this project is located.
Illinois Department of Transportation
City of Chicago
- M. 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:
The direct receiving water for the project is the DesPlaines River. The DesPlaines River is tributary to the Illinois River. The DesPlaines River and the Illinois River are not identified by the IDNR as "biologically significant streams".
The DesPlaines River (segment IL_G-15) is listed on the 2014 IEPA 303(d) list as impaired. The 2014 303(d) List identifies the following uses of the DesPlaines River as being impaired:
- aquatic life use being impaired by chloride, total phosphorus, dissolved oxygen, pH, and sedimentation/siltation
- fish consumption use being impaired by mercury and polychlorinated bi-phenyls
- primary contact recreation use as being impaired by fecal coliform.
The Illinois River (segment IL_D-10) is listed on the 2014 IEPA 303(d) list as impaired. The 2014 303(d) List identifies the fish consumption use as being impaired by mercury and polychlorinated bi-phenyls.

No TMDLs are currently being developed for these impairments.

- N. 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.

All locations within the construction limits are expected to be disturbed through construction site activities and should be protected. The existing construction area primarily consists of existing roadway within IDOT right-of-way. Embankments associated with the East River Road Bridge and along the proposed Cumberland Flyover ramp include steep slopes. Procedures to minimize damages to these areas are described in the Controls section of the SWPPP.

- O. 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):

DesPlaines River
Illinois River

- a. The name(s) of the listed water body, and identification of all pollutants causing impairment:

The direct receiving water for the project is the DesPlaines River. The DesPlaines River is tributary to the Illinois River. The DesPlaines River and the Illinois River are not identified by the IDNR as "biologically significant streams".

The DesPlaines River (segment IL_G-15) is listed on the 2014 IEPA 303(d) list as impaired. The 2014 303(d) List identifies the following uses of the DesPlaines River as being impaired:

- aquatic life use being impaired by chloride, total phosphorus, dissolved oxygen, pH, and sedimentation/siltation
- fish consumption use being impaired by mercury and polychlorinated bi-phenyls
- primary contact recreation use as being impaired by fecal coliform.

The Illinois River (segment IL_D-10) is listed on the 2014 IEPA 303(d) list as impaired. The 2014 303(d) List identifies the fish consumption use as being impaired by mercury and polychlorinated bi-phenyls.

- 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:

The erosion and sediment control practices as described in the following section and as shown on the Erosion and Sediment Control Drawings will be installed and maintained by the Contractor. These practices will also be observed by the Resident Engineer and if necessary, instruction will be given to the Contractor to provide additional erosion and sediment control practices. The potential that construction activities performed onsite will impact the impaired DesPlaines River is reduced by the construction BMPs (on-site detention basin, temporary erosion control seeding, compost, temporary ditch checks, perimeter erosion barrier, and inlet filters) in this plan. It is unlikely for there to be quantities of soluble phosphorus, fluoride, mercury, zinc, or PCBs discharged. Portable toilets will be placed away from inlets and water courses. Chloride will discharge, especially during winter application of ice melters required for safety.

- c. Provide a description of the location(s) of direct discharge from the project site to the 303(d) water body:

The drainage system drains into an existing 66 inch storm sewer which discharges to the Des Plaines River.

- d. Provide a description of the location(s) of any dewatering discharges to the MS4 and/or water body:

The design and implementation of dewatering systems as needed to construct facilities included in this contract are the responsibility of the Contractor. At the start of construction the Contractor will be required to submit a dewatering plan which includes a description and location of dewatering discharges.

2. TMDL (fill out this section if checked above)

- a. The name(s) of the listed water body:
- 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:
- 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:

- P. 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 checked="" 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:** At a minimum, controls must be coordinated, installed and maintained to:
1. Minimize the amount of soil exposed during construction activity;
 2. Minimize the disturbance of steep slopes;
 3. Maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration, unless infeasible;
 4. Minimize soil compaction and, unless infeasible, preserve topsoil.
- B. **Stabilization 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(B)(1) and II(B)(2), stabilization measures shall be initiated **immediately** where construction activities have temporarily or permanently ceased, but in no case more than **one (1) day** 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.

1. Where the initiation of stabilization measures is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.
2. On areas where construction activity has temporarily ceased and will resume after fourteen (14) days, a temporary stabilization method can be used.

The following stabilization practices will be used for this project:

- | | |
|---|--|
| <input checked="" 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 checked="" type="checkbox"/> Protection of Trees | <input type="checkbox"/> Geotextiles |
| <input checked="" type="checkbox"/> Temporary Erosion Control Seeding | <input checked="" type="checkbox"/> Other (specify) Short Term Seeding |
| <input type="checkbox"/> Temporary Turf (Seeding, Class 7) | <input checked="" type="checkbox"/> Other (specify) Turf Reinforcement Matting |
| <input checked="" type="checkbox"/> Temporary Mulching | <input checked="" type="checkbox"/> Other (specify) Mulch Method 2 |
| <input checked="" type="checkbox"/> Permanent Seeding | <input type="checkbox"/> Other (specify) |

Describe how the stabilization practices listed above will be utilized during construction:

Stabilization controls runoff volume and velocity, peak runoff rates and volumes of discharge to minimize exposed soil, disturbed slopes, sediment discharges from construction, and provides for natural buffers and minimization of soil compaction. Existing vegetated areas where disturbance can be avoided will not require stabilization.

Where possible, temporary stabilization of the initial Stage should be completed before work is moved to subsequent stages.

1. Preservation of Mature Vegetation - Mature vegetation shall be protected by "temporary fencing" as directed by the engineer and in accordance with Article 201.05 of the Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction.
2. Temporary Erosion Control Seeding shall be applied in accordance with the Special Provision. Seed mixture will depend on the time of year it is applied. Oats will be applied from January 1 to July 31 and Hard Red Winter Wheat from August 1 to December 31.
3. Short Term Seeding — Seeding Class 2A shall be used to protect bare earth from more than just one or two summer-winter cycles. Due to the length and complexity of this project, it is necessary that short term, final graded slopes be short term seeded as directed by the Engineer.
4. Protection of Trees — Shall consist of items "temporary fencing" and "tree trunk protection" as directed by the engineer and in accordance with Article 201.05 of the Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction.
5. Permanent Seeding — All areas disturbed by construction will be stabilized as soon as permitted with permanent seeding following the finished grading, but always within seven days with Temporary Erosion Control Seeding. Erosion Control Blankets will be installed over fill slopes, which have been brought to final grade and have been seeded to protect the slopes from rill and gully erosion and allow seeds to germinate properly.
6. Temporary Mulching - Mulch method 2 shall be used as temporary stabilization on the bridge embankments.
7. Erosion Control Blankets and Mulching — Erosion control blankets will be installed over fill slopes with slopes less than 3:1. Mulch will be applied in relatively flat areas to prevent erosion.
8. Turf Reinforcement Matting (TRM) will be installed on slopes steeper than 3:1 and in ditches where flow velocities are greater than 7 feet per second.
9. Mulch Method 2 - Mulch Method 2 should be applied to slopes for temporary stabilization prior to seasons when Temporary seed will not germinate, for example in mid-July or February.

Describe how the stabilization practices listed above will be utilized after construction activities have been completed:

At the completion of grading and application of final seeding, temporary stabilization practices shall be removed.

- C. **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 checked="" 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 checked="" type="checkbox"/> Sediment Trap | <input type="checkbox"/> Slope Mattress |
| <input checked="" type="checkbox"/> Temporary Pipe Slope Drain | <input checked="" type="checkbox"/> Retaining Walls |
| <input checked="" type="checkbox"/> Temporary Sediment Basin | <input type="checkbox"/> Slope Walls |
| <input type="checkbox"/> Temporary Stream Crossing | <input type="checkbox"/> Concrete Revetment Mats |
| <input checked="" type="checkbox"/> Stabilized Construction Exits | <input type="checkbox"/> Level Spreaders |
| <input checked="" type="checkbox"/> Turf Reinforcement Mats | <input checked="" type="checkbox"/> Other (specify) Dewatering Basin |
| <input type="checkbox"/> Permanent Check Dams | <input checked="" type="checkbox"/> Other (specify) Dust Control |
| <input type="checkbox"/> Permanent Sediment Basin | <input checked="" type="checkbox"/> Other (specify) Stable Conveyance During Storm |
| <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:

1. Sediment Control, Stabilized Construction Exits – Coarse aggregate overlaying a geotextile fabric will be placed in locations necessary for contractor access. The aggregate surface of the access points will capture soil debris, reducing the amount of soil deposits placed on to the roadway by vehicles leaving the work zones.

All work associated with installation and maintenance of Stabilized Construction Entrances, concrete washouts, and in-stream work are incidental to the contract

2. Storm Drain Inlet Protection – Inlet filters will be placed in every inlet, catch basin or manhole with an open lid, which will drain water during at least a 10-year storm event. The Erosion Control Plan identifies the structures requiring Inlet filters.

3. Perimeter Erosion Barrier — A sediment control silt fence will be placed at the locations shown on the erosion control plans to intercept waterborne silt and prevent it from leaving the site.

4. Temporary Ditch Checks — Rolled excelsior ditch checks will be placed in swales at the rate of one for every 1 foot in vertical drop, or as directed by the Engineer, in order to prevent downstream erosion.

5. Sediment Control, Temporary Pipe Slope Drain – This item consists of a pipe with flared end sections, placed daily, along with anchor devices in conjunction with temporary berms that direct runoff down an unstabilized slope.

6. Sediment Trap / Sediment Basin - All surface runoff must pass through a sediment trap / sediment trap sediment basin prior to outletting into an receiving water. The maximum drainage area allowed per trap is 5 acres (including on-site and off-site tributary areas). If drainage area is over 5 acres, a sediment basin or several sediment traps in series may be used. The trap/basin should adequately be sized to store the runoff from either a 2-year storm frequency, 24-hour duration or 3,600 cubic feet

7. Sediment Control, Dewatering Basin - This item will be provided at wherever the contractor is removing and discharging water from excavated areas and the water is not being routed through a sediment trap or basin.

8. Stone Riprap - Class A4 stone riprap with filter fabric will be used as protection at the discharge end

of storm sewer outfalls to prevent soring and downstream erosion.

9. Covers will be placed on open ends of pipes in trenches.

10. Dust Control – Dust control measures will be performed for the duration of the construction.

11. Retaining Walls – Retaining walls will be used in the construction of the Balmoral Avenue Underpass.

12. Stable Conveyance During Storm Sewer Installation – Contractor is to provide a plan for conveyance of runoff during storm sewer demolition and construction. The plan will provide that runoff does not erode and convey sediment into storm sewer under construction. This plan may be by sequencing or stabilization.

Describe how the structural practices listed above will be utilized after construction activities have been completed:

When final grading is completed and all storm water management systems are in place, structural practices shall be removed. At locations where riprap is to remain from the "interim" construction condition, the contractor shall investigate each site and repair/replace the riprap as directed by the engineer in the field.

D. Treatment Chemicals

Will polymer flocculants or treatment chemicals be utilized on this project: Yes No

If yes above, identify where and how polymer flocculants or treatment chemicals will be utilized on this project.

E. Permanent Storm Water Management Controls: Provided below is a description of measures that will be installed during the construction process to control volume and 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.

1. 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.

2. 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 permanent storm water management controls:

1. Storm sewer pipe that leads to the existing 66 inch storm sewer will be oversized for detention.
2. Lengths of ditches will be maximized to aid in pollutant filtering along with the oversizing of storm sewers and ditches.
3. Sediment traps located outside the final clear zone and below the elevation of the roadway subgrade will be left in place at the completion of the project.
4. Permanent measures for storm water management controls will be placed as soon as possible during construction:
 - a. All ditches will be vegetated, where feasible, which will provide a buffering effect for run off contaminants
 - b. Ditches will receive permanent seeding after the final grading and topsoil have been placed.

- c. In turf areas where low maintenance seeding is required, native prairie grasses will be used in the final landscaping design.
- d. Wet bottom ditches will be employed before outfalls. The ditches will be oversized to contribute to detention, where feasible. If wet bottom ditches are not feasible, the ditches will be lined with riprap.

- F. **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:

See the Erosion and Sediment Control Plans and the Landscaping Plans for means and methods utilized.

- G. **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.
1. 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
 2. 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 – Identify the location of both on-site and off-site stockpiles. 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.
- Dewatering Activities – Identify the controls which will be used during dewatering operations to ensure sediments will not leave the construction site.
- Polymer Flocculants and Treatment Chemicals – Identify the use and dosage of treatment chemicals and provide the Resident Engineer with Material Safety Data Sheets. Describe procedures on how the chemicals will be used and identify who will be responsible for the use and application of these chemicals. The selected individual must be trained on the established procedures.
- 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.

Maintenance of Erosion and Sediment Control Systems will be the responsibility of the contractor. The contractor will be required to maintain the Erosion and Sediment Control Systems in accordance with the IDOT Erosion and Sediment Control Field Guide for Construction Inspection and IDOT's Best Management Practices – Maintenance Guide.

Guides can be found at the following link:

<http://www.idot.illinois.gov/transportation-system/environment/erosion-and-sediment-control>

Maintenance procedures as outlined in the Field Guide and/or BMP Maintenance Guide are also described below for each ESC measure:

Perimeter Erosion Barrier

- Repair tears, gaps or undermining. Restore PEB and ensure taut.
- Repair or replace any missing or broken stakes immediately.
- Clean PEB if sediment reaches one-third height of barrier.
- Remove PEB once final stabilization establishes since PEB is no longer necessary and should be removed.
- Repair PEB if undermining occurs anywhere along its entire length.

Temporary Erosion Control Seeding

- Reapply seed if stabilization hasn't been achieved.
- Apply temporary mulch to hold seed in place if seed has been washed away or found to be concentrated in ditch bottoms.
- Restore rills, greater than 4 inches deep, as quickly as possible on slopes steeper than 1V:4H to prevent sheet-flow from becoming concentrated flow patterns.
- Mow, if necessary to promote seed soil contact when excessive weed development occurs, a common indication of ineffective temporary seeding.
- Supplement BMP if weather conditions (extreme heat or cold) are not conducive for germination.

Mulch

- Repair straw if blown or washed away, or if hydraulic mulch washes away.
- Place tackifier or an Erosion Control Blanket if mulch does not control erosion.

Soil & Mulch Binders

- Reapply soil binders after heavy rainfall events if spot failures occur.
- Check manufacturer's specification for re-application criteria.

Erosion Control Blanket (ECB)

- Repair damage due to water running beneath the blanket and restore ECBs when displacement occurs. Reseeding may be necessary.
- Replace all displaced ECBs and restaple.

Perimeter Erosion Barrier (PEB)

- Repair tears, gaps or undermining. Restore leaning PEB and ensure taut.
- Repair or replace any missing or broken stakes immediately.
- Clean PEB if sediment reaches one-third height of barrier.
- Remove PEB once final stabilization establishes since PEB is no longer necessary and should be removed.
- Repair PEB if undermining occurs anywhere along its entire length.

Temporary Ditch Check

- Remove sediment from upstream side of ditch check when sediment has reached 50% of height of structure.
- Repair or replace ditch checks whenever tears, splits, unraveling or compressed excelsior are apparent.
- Replace torn fabric mat that may allow water to undermine the ditch check. Remove debris (garbage) when observed on check. Reestablish the flow over the center of the ditch check. Water or sediment going around the ditch check indicates incorrect installation. Device needs lengthening or the selected device is inappropriate for the site conditions.
- Remove ditch checks once all upslope areas are stabilized, seed or otherwise stabilize TDC area(s)

Storm Drain Inlet Protection (Inlet Filters)

- Remove sediment from inlet filter basket when basket is 25% full or 50% of the fabric pores are covered with silt.
- Remove ponded water on road surfaces immediately.
- Clean filter if there is water standing in the filter for more than 1 hour following a rain event.
- Remove trash accumulated around or on top of practice. Replace filter if tears are observed.

Temporary Pipe Slope Drain

- Fill eroded area at inlet with well-compacted soil immediately. Stabilize outfall to eliminate further scour.
- Repair leaks along length of pipe and re-compact soil to stabilize pipe.
- Reconnect pipe at joints when separation occurs. Restore or increase anchors along length of pipe to ensure pipe stability. If slope drain washes out it may be necessary to use aggregate-lined channels or additional drains.

Outlet Protection

- Restore dislodged protection at outlet structures and correct erosion that may occur.
- Remove sediment buildup that deposits in the protection.
- Remedy deficient areas, prone to increased erosion, immediately to prevent greater deficiencies.
- Remove sediment when voids are full and replace protection. Protection is reusable if the accumulated sediment is removed.
- Temporary devices (temporary pipe slope drains) should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.

Temporary Sediment Basin

- Remove accumulated silt when the basin becomes 50% filled.
- Maintain the outlet structure to prevent clogging. Woven monofilaments are preferred over fabrics, and produce better results.

Skimmers remove the clearest runoff first.

- Correct erosion at outlet and provide stabilization if necessary.
- Repair areas that allow seepage from the basin.
- Implement other BMPs, such as an Advance Treatment System (anionic polymers); if sediment discharges or other pollutants are identified at the discharge point to appropriately address pollutants.
- Replace/augment armoring at the outfall as needed to reestablish outfall integrity.
- The presence of stagnant water can result in mosquito larvae, requiring treatment. Mosquito larvae will trigger pumping through and Advanced Treatment System (anionic polymers) or treatment with larvicide. Contact District Environmental staff for guidance.

- Regrade base if ponding observed.

Temporary Sediment Trap

- Clean trap of silt when trap becomes 50% full.
- Implement other BMPs, such as sand filters, to filter pollutants if sediment discharges or other pollutants are identified at the discharge point.
- Regrade to drain.

Protect Existing Vegetation & Natural Features

- Replace damaged vegetation with similar species. Check with designer for appropriate replacements.
- Restore areas disturbed or damaged by the Contractors to pre-construction conditions or better at no additional expense to the contract.
- Trim any cuts, skins, scrapes or bruises to the bark of the vegetation and utilize local nursery accepted procedures to seal damaged bark.
- Prune all tree branches broken, severed or damaged during construction. Cut all limbs and branches, on-half inch or greater in diameter, at the base of the damage, flush with the adjacent limb or tree trunk.
- Smoothly cut, perpendicular to the root, all cut, broken, or severed, during construction, roots one inch or greater in diameter.
- Cover roots exposed during excavation with moist earth and/or backfill immediately to prevent roots from drying.

Stockpile Management

- Repair and/or replace perimeter controls and stabilization measures when stockpile material has potential to be discharged or leave the limits of protection.
- Remove all off-tracked material by sweeping or other methods.
- Update the SWPP anytime a stockpile location has been removed, relocated, added, or required maintenance.
- Handle contaminated soil stockpiles according to Article 669.11 Temporary Staging in the Standard Specifications.
- During summer months, water stockpiles to maintain the crop cover.

Stabilized Construction Exits

- Replenish stone or replace exit if vehicles continue to track sediment into the roadway from the construction site.
- Sweep sediment on roadway from construction activities immediately.
- Ensure culverts are free from damage.
- Use street sweeping in conjunction with this BMP to remove sediment not removed by the stabilized construction exit.

Tire Wash Station

- Adjust truck activity through better fueling operation, fixing leaks and wiping off excess grease to minimize pollutant discharge. Inspect tire wash discharge for evidence of oils, grease, petrol or other chemicals removed by the tire wash procedures. Alternatively, additional contaminant removal procedures may be required to remove petrochemicals.

Temporary Concrete Washout Facilities

- Remove washout water from high volume facilities with a vacuum truck and dispose of properly. Do not discharge wastewater into the environment. (Note: acidity, not particulates, is environmentally hazardous)
- Do not discharge washout water into the environment; facilitate evaporation of low volume washout water.
- Clean and remove any discharges within 24 hours of discovery.
- If effluent cannot be removed prior to the anticipated rainfall event, place and secure a non-collapsing, non-water collecting cover over the washout facility to prevent accumulation and precipitation overflow.
- Replace damaged liner immediately.
- Remove temporary concrete washout facilities when no longer needed and restore disturbed areas to original condition.
- Dispose of solidified concrete waste, considered Lean Construction or Demolition Debris (CCDD) as per the IEPA Act (415 ILCS5).

Material Delivery & Storage

- Document the various types of materials delivered and their storage locations in the SWPP.
- Update the SWPP anytime significant changes occur to material storage or handling locations and when they have been removed.
- Cleanup spills immediately.
- Remove empty containers.

Solid Waste Management

- If containers are full, empty them immediately.
- Update the SWPP anytime a Contractors' trash management plan significantly changes.

- Correct items discarded outside of designated areas.

Vehicle and Equipment Fueling, Cleaning and Maintenance

- Cleanup spills immediately.
- Contractor must provide documentation that spills were cleaned, materials disposed of and impacts mitigated.
- Update the SWPP when a designated location has been removed, relocated, added, or required maintenance.
- Any spills discharged through a drainage system will require the submission of an ION.
- In the event of a spill into a storm drain, waterway or onto a paved surface such as a parking lot, street, driveway or other surface connect to the storm water drainage system, the owner of the fuel must immediately take action to contain the spill.
- Once contained, clean up the spill. As initial step this may involve collecting any bulk material and placing it in a secure container for later disposal. Follow up cleaning will also be required to remove residues from paved or other hard surfaces.

Extended Work Cessation/Shutdown

- Maintain ESC during a shutdown. This includes winter shutdown and spring snowmelt prior to construction restart where the Contractor must install appropriate BMPs and provide timely regular maintenance.
- Inspection frequencies during winter or project shutdown are as required under the ILR10 Permit.
- The important aspect of winter shutdown inspection is to ensure there is limited sediment and other pollutants to escape the project site.
- Seeding is the most cost effective erosion control practice. Seeding must be laid down and mulched so the plants are viable before the first frost, through the shutdown, and are ready for the spring thaw. While snow cover is a viable winter temporary cover, spring will be a challenge if the seeding is not viable. Plants that are too young at first frost die. Most seeders are extremely busy in fall. Therefore, a good approach to winter shutdown seeding is to seed as many areas as possible as close to the fall seeding start date as possible.
- Inspect periodically for scour or dislodged stones and replace stones as needed.
- Remove woody vegetation

Dust Control

- Implement the Dust Control Plan as required by IDOT Standard Specifications for Road and Bridge Construction

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 or by the end of the following business or work day that is 0.5 inch or greater or equivalent snowfall.

Inspections may be reduced to once per month when construction activities have ceased due to frozen conditions. Weekly inspections will recommence when construction activities are conducted, or if there is 0.5" or greater rain event, or a discharge due to snowmelt occurs.

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, 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

Additional Inspections Required:

All offsite Borrow, Waste and Use areas are part of the construction site and are to be inspected according to the language in this section.

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.



Contractor Certification Statement

Prior to conducting any professional services at the site covered by this contract, the Contractor and every subcontractor must complete and return to the Resident Engineer the following certification. A separate certification must be submitted by each firm. Attach to this certification all items required by Section II.G of the Storm Water Pollution Prevention Plan (SWPPP) which will be handled by the Contractor/subcontractor completing this form.

Route	<u>Interstate 190</u>	Marked Rte.	<u>F.A.I. 90 / F.A.I. 190</u>
Section	<u>(1517R-1&1617B)13</u>	Project No.	<u>C-91-133-14</u>
County	<u>Cook</u>	Contract No.	<u>60X56</u>

This certification statement is a part of SWPPP for the project described above, in accordance with the General NPDES Permit No. ILR10 issued by the Illinois Environmental Protection Agency.

I certify under penalty of law that I understand the terms of the Permit No. ILR 10 that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

In addition, I have read and understand all of the information and requirements stated in SWPPP for the above mentioned project; I have received copies of all appropriate maintenance procedures; and, I have provided all documentation required to be in compliance with the Permit ILR10 and SWPPP and will provide timely updates to these documents as necessary.

- Contractor
- Sub-Contractor

_____	_____
Print Name	Signature
_____	_____
Title	Date
_____	_____
Name of Firm	Telephone
_____	_____
Street Address	City/State/ZIP

Items which this Contractor/subcontractor will be responsible for as required in Section II.G. of SWPPP:

APPENDIX A: CTA REQUIREMENTS FOR CONTRACTORS WORKING ALONG THE RIGHT-OF-WAY (R.O.W.)



CHICAGO TRANSIT AUTHORITY

Chicago, Illinois 60661-1498

TEL 312 664-7200

www.transitchicago.com

CTA REQUIREMENTS FOR CONTRACTORS WORKING ALONG THE RIGHT-OF-WAY (R.O.W.)

General Comments:

Contractor performing construction work adjacent to the CTA Right-of-Way (R.O.W.) can present hazards to CTA's property. The contractor shall have CTA flagmen present to assist them on the R.O.W. The CTA may also require inspectors and infrastructure trades (Linemen, Signal Maintainers, etc.). The cost of these services is the responsibility of the contractor and the must be prepaid.

Prior to the start of any work in close proximity of the CTA's R.O.W. the contractor shall meet with a CTA representative to determine the requirements for the flagmen and other trades, if required and other necessary items related to the work activities next to the CTA facilities and to receive CTA's approval for the contractor's proposed operations.

All Contractor and Subcontractor employees assigned to work on, over or near the CTA R.O.W. shall be required to attend an all-day Rail Right-of-Way Safety Training Session. The cost of this training is currently \$200 per employee, paid by the Contractor in advance.

The contractor shall notify the CTA representative at least 30 days prior to the performance of any work. The CTA's representative for all outside construction work will be:

Abdin Carrillo
Project Manager, Construction Oversight
567 West Lake Street, 9th floor
Chicago, IL. 60661-1465 (312)
681-3913
ADJConstruction@transitchicago.com
Cc: acarrillo@transitchicago.com

The Chicago Transit Authority reserves the right to restrict or prohibit work in or adjacent to the R.O.W. in an emergency and to the extent the Chicago Transit Authority determines that such work has adverse impacts on CTA Transit Operations. NO work may be performed during "Rush Hour" periods (Monday through Friday, from 0500 to 0900 and from 1500 to 1900 hours).

Workers from adjacent construction projects are prohibited to enter the CTA's R.O.W, unless CTA permission has been granted and workers have completed the Rail Right-of-Way Safety Training Session (no workers are allowed on the CTA R.O.W. without the presence of CTA Flaggers). Use of cranes or other equipment directly above the CTA's R.O.W. is also prohibited.

Contractors performing work within 50 feet of the CTA R.O.W. and/or property are required to obtain Railroad Protective Insurance coverage.

When installing deep foundations (or jacking under the CTA R.O.W.) the contractor shall continuously monitor the existing CTA's at-grade track and elevated structure footing for movement or other signs of distress. Appropriate remedial measures must be approved by CTA.

Once the excavation for any caissons that progress deeper than 8 feet, or to the water table, whichever is smallest, the work on that caisson shall be carried on continuously, 24 hours a day, including Saturday's, Sunday's, and holiday's until the caisson has been completed.

If at any time, work on any caisson is not continuous, for any reason, and not approved by the CTA, all caissons, which have been installed, shall be filled with sand or slurry at the contractor's expense.

Should any of the proposed work require the contractor to enter upon, or perform work above Chicago Transit Authority property, the contractor must first provide payment of \$1,000; this payment is the fee for the CTA to process a Right of Entry document; this fee is non-refundable.

In order for CTA to process the Right of Entry document, the contractor must furnish scope of work, insurance, Letter of Commitment, and deposit for Flagger/Inspector charges (all of these requirements are covered in this R.O.W. requirements document).

Please include a property plat or site plan that is the subject of your request, which identifies your client's property and CTA's property.

Five (5) weeks prior to the start of any work that may impact CTA Rail Operations (work in close proximity to CTA tracks that may cause service disruptions, etc.), the Contractor is required to attend a weekly Rail Operations meeting at the CTA Headquarters (date/time to be furnished); the Contractor is to bring a 5-week look-ahead schedule detailing dates/times of work, # of CTA Flaggers required, direction of track affected by work, whether track needs to be closed and/or whether power needs to be shut off (all of the aforementioned are contingent upon the prior approval of CTA).

Further, any work that affects the safety or causes disruptions of service or inconvenience to transit users, CTA Operations or impacts CTA Right-of-Way requires a "Construction Process Plan" Twenty-One (21) days PRIOR to work. A Construction Process Plan contains scope of work, timing of work (days and hours), impacts to CTA operations (and/or how you will mitigate impacts), contingency plans, weather limitations, contact info, Drawings/Sketches of work and relation to CTA tracks, Job Hazard Analysis, Hospital route map, equipment specs, lift plan, etc.

Respectfully,



Abdin Carrillo
Project Manager, Construction Oversight

copies: C. Bushell
R. Wittmann
S. Mascheri
J. Harper

File: Right of Way Requirements-Revised 10082013a REV E 10-20-14

**CHICAGO TRANSIT AUTHORITY
INSURANCE AND BOND REQUIREMENTS**
[Short Form – General Right of Entry]

ROE DESCRIPTION: **SAMPLE**

PART I. REQUIRED INSURANCE COVERAGES

A. WORKERS COMPENSATION

Coverage A: **STATUTORY** in form and in accordance with the laws of the State of Illinois.

Coverage B: Employers Liability:

\$1,000,000 Bodily Injury by Accident
\$1,000,000 Bodily Injury by Disease, Policy Limit

B. COMPREHENSIVE OR COMMERCIAL GENERAL LIABILITY:

\$2,000,000 General Aggregate (Per Location)
\$2,000,000 Products/Completed Operations Aggregate
\$1,000,000 Personal Injury and Advertising Injury
\$1,000,000 Per Occurrence

The Commercial General Liability policy shall include, without limitation: (i) Broad Form Contractual Liability, (ii) Products/Completed Operations to be maintained in full force and effect for a period of two (2) years following final completion of the work under the Contract, (iii) Independent Contractors' Protective Liability, (iv) Premises/Operations, including deletion of explosion, collapse and underground (XCU) exclusions, (v) Broad Form Property Damage, including Products/Completed Operations, (vi) Personal Injury Liability, (vii) Severability of Interest and Cross Liability endorsement and (viii) Contractor expressly agrees to waive, and will require its insurer to waive, its rights, benefits and entitlement under the "Other Insurance" clause of its Commercial General Liability policy, with respect to the CTA.

If any work is to be performed within fifty (50) feet of rail right-of-way Contractor must:

1. Provide Railroad Protective Liability Insurance policy in the amount of **\$2,000,000 per occurrence / \$6,000,000 aggregate**

C. AUTOMOBILE LIABILITY

\$1,000,000 Combined Single Limit (Bodily Injury and Property Damage)

PART II. GENERAL INSTRUCTIONS AND REQUIREMENTS

A. WAYS TO COMPLY WITH CTA INSURANCE REQUIREMENTS.

1. HOW TO COMPLY IF CGL, OWNERS PROTECTIVE LIABILITY, BUILDER'S RISK INSURANCE AND/OR PROFESSIONAL LIABILITY ARE REQUIRED BY PART III OF THIS DOCUMENT.

There are three ways to satisfy the CTA's insurance requirements for Comprehensive General Liability, Owners Protective Liability, Builder's Risk and Professional Liability. For Comprehensive General Liability, Owners Protective Liability, Builder's Risk and Professional Liability the Contractor must provide the CTA with one of the following insurance documents:

- a) Certified copy of the insurance policy,
- b) An insurance binder, *or*
- c) The CTA Certificate of Coverage on the CTA approved form. The CTA Certificate of Coverage may be completed only by an authorized representative of the insurance company, an agent, broker, or underwriter.

2. HOW TO COMPLY IF **RAILROAD PROTECTIVE INSURANCE** IS REQUIRED BY PART III OF THIS DOCUMENT.

There are two ways to satisfy the CTA's insurance requirements for Railroad Protective. The Contractor must provide the CTA with one of the following insurance documents:

- a) Certified copy of the insurance policy *or*
- b) An insurance binder

Method b) is a temporary method that is valid only for 90 days. A certified copy of the railroad protective insurance policy must be furnished prior to the expiration of this 90-day period.

3. HOW TO COMPLY FOR ALL OTHER TYPES OF REQUIRED INSURANCE.

For all other insurance required by Part III of this document, an ACORD™ certificate is acceptable.

B. DEADLINE FOR INITIAL SUBMITTAL OF CONTRACTOR'S INSURANCE AND BOND DOCUMENTS.

The Contractor must furnish all required insurance, performance, and payment bond documents within fourteen days of the date that the Contractor receives a letter (the "Insurance Submittal Letter") from the CTA's General Manager of Purchasing requesting the Contractor to submit the documents required by these Insurance and Bond Requirements. CTA will not execute the Contract until the required insurance and bond documents are delivered to CTA and approved by CTA. Failure to deliver the required documents within fourteen days of receipt of the Insurance Submittal Letter is a material failure to comply with the specifications and may result in any or all of the following at the CTA's sole discretion:

- 1) Debarment or suspension, and
- 2) Determination of Contractor non-responsibility.

C. CTA ADDRESS.

All notices and documents must be mailed to the CTA at:

Tamika Press
Insurance Coordinator
Risk Management Department
567 W. Lake Street
Chicago, IL. 60661-1498

D. OBLIGATION TO MAINTAIN CONTINUOUS COMPLIANCE

1. The Contractor expressly agrees that failure to comply and maintain compliance with all insurance and bond requirements shall constitute a material breach of the Contract which may result in default and, if uncured, termination for default under the contract. In addition, such failure, if uncured, may result in debarment and suspension.
2. The Contractor is prohibited from performing any work if Contractor has allowed any of the required insurance policies to expire.

PART III. MISCELLANEOUS INSURANCE REQUIREMENTS

- A.** The CTA must be named as an Additional Insured and Certificate Holder. When the CTA is an additional insured, the coverage shall be primary.
- B.** The CTA must be the Named Insured on the Owners Protective Liability, Railroad Protective Liability, or Builders Risk Insurance policies.
- C.** The Commercial General Liability and Owners Protective Liability, General Aggregate Limit of Liability, if any, must apply on a per location, per project basis by endorsement to the policy.
- D.** All insurance carriers must be acceptable to the CTA. All insurance companies shall have at least a B+ VII POLICY HOLDER RATING, or better, by the A.M. Best Co., Inc. Insurance companies with lower ratings will not be accepted. Carriers licensed to do business in the State of Illinois must issue all insurance, with the exception of Railroad Protective.
- E.** To the extent permitted by the Contractor's insurance policies required by the CTA, the Contractor and its insurers waive all rights of subrogation against the CTA.
- F.** The insurance to be carried shall in no way be subject to limitations, if any, expressed in the indemnity section of the General Conditions (or any statutory, judicial or common law limitations).
- G.** CTA MUST BE ADDITIONAL INSURED ON GENERAL LIABILITY.

INSURANCE CERTIFICATE OF COVERAGE

Named Insured: _____ RFP#: _____ Specification #: _____
 Address: _____ Project #: _____
 _____ (NUMBER & STREET) Contract #: _____
 _____ (CITY) (STATE) (ZIP)

Description of Operation/Location	
-----------------------------------	--

The insurance policies and endorsements indicated below have been issued to the designated named insured with the policy limits as set forth herein covering the operation described within the contract involving the named insured and the Chicago Transit Authority. The Certificate issuer agrees that in the event of cancellation, non-renewal or material change involving the indicated policies, the issuer will provide at least sixty (60) days prior written notice of such change to the Chicago Transit Authority at the address shown on this Certificate. This certificate is issued to the Chicago Transit Authority in consideration of the contract entered into with the named insured, and it is mutually understood that the Chicago Transit Authority relies on this certificate as a basis for continuing such agreement with the named insured.

Type of insurance	Insurer Name	Policy Number	Policy Period	Limits of Liability All Limits in Thousands
Commercial General Liability				
<input type="checkbox"/> Occurrence				Each Occurrence \$ _____
<input type="checkbox"/> Claims made				General Aggregate \$ _____
<input type="checkbox"/> Premise-Operations				Products/Completed Operations Aggregate \$ _____
<input type="checkbox"/> Explosion/Collapse Underground				
<input type="checkbox"/> Products/Completed Operations				
<input type="checkbox"/> Blanket Contractual				
<input type="checkbox"/> Broad Form Property Damage				
<input type="checkbox"/> Independent Contractors				
<input type="checkbox"/> Personal Injury				
<input type="checkbox"/> Pollution				
Commercial General Liability Form #: CG 00 01 _____				
Automobile Liability (Any Auto)				Each Occurrence \$ _____
Excess Liability				
<input type="checkbox"/> Umbrella Liability				Each Occurrence \$ _____
Workers' Compensation and Employer's Liability				Statutory/Illinois Employers Liability \$ _____
Builders' Risk/Course of Construction				Amount of Contract \$ _____
Professional Liability				\$ _____
Owner Contractors Protective				\$ _____
Other				_____

- a) Each insurance policy required by this agreement, except policies for workers' compensation and professional liability, will read:
 "The Chicago Transit Authority is an additional insured as respects to operations and activities of, or on behalf of the named insured, performed under contract with or permit from the Chicago Transit Authority".
- b) The General, Automobile and Excess/Umbrella Liability Policies described provide for separation of insureds applicable to the named insured and the CTA.
- c) Workers Compensation and Property insurer shall waive all rights of subrogation against the Chicago Transit Authority.
- d) The receipt of this certificate by the CTA does not constitute agreement by the CTA that the insurance requirements in the contract have been fully met, or that the insurance companies indicated by this certificate are in compliance with all contract requirements.

Name and Address of Certificate Holder and Receipt of Notice	Signature of Authorized Representative
Certificate Holder/Additional Insured	_____
Chicago Transit Authority Risk Management P.O. Box 7564 Chicago, IL 60680	Agent/Company Address _____ Telephone _____

CTA RISK MANAGEMENT 12/05



CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

Letter of Commitment

A Signed Contractual Agreement or Written Letter of Commitment serves as a formal agreement between the company and the CTA for the work to be performed.

The following Information should be included in your Letter:

1. Company's name, address, phone, and fax number
2. Company's contact person/project manager
3. Scope, Location, and Duration of the Project
4. Authorization to employ our service and bill your company
5. Authorized signature from project manager or officer of company



CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

SAMPLE: Letter of Commitment

Chicago Transit Authority
567 W. Lake
Chicago, IL 60661

Contractor: Company Name
 Address
 City, State, Zip Code
Phone: (XXX) XXX-XXXX
Fax: (XXX) XXX-XXXX

Contact person/Project Manager:

Work Location: Address
 City, State, Zip Code

Scope of Work:

Duration of Project: XXXX

To Whom It May Concern:

(Insert company name) is the Contractor for the building at **(insert address/project location)**, and intends to **(insert type of work to be performed)** at the said location. The property is adjacent to the CTA's **(i.e. Red, Brown, Purple, Blue, Orange, Yellow, or Pink)** line. The work will be completed in **(insert number)** days.

If any of CTA's services are required, I authorize the employment of and payment for such services.

Sincerely,

XXXXXX
(Company Name to be billed for services)



CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

CTA Deposit Requirements

All Contractors performing work on or near the Chicago Transit Authority's (CTA) property will be required to provide a deposit in advance equal to CTA's estimate. No contractor will be permitted to work prior to submission of the deposit. The estimated amount includes, but is not limited to the following CTA services: Flagging Charges, Slow Zone Charges (signage and initial supplies), Inspector Charges, and other services as required (i.e. electricians, signal maintainers, switch persons, etc.)

Flagging Charges

The Contractor must provide CTA with a minimum of seventy-two (72) week day hours to schedule flagmen for a project (this means that flagmen required for the following Monday must be requested by 12:00PM (Noon) the previous Wednesday). Flagmen are scheduled for a minimum of eight (8) hours. Cancellations of flagmen orders require a twenty-four (24) hour advance notice, otherwise, the Contractor will be charged for the scheduled workers.

Slow Zones and Supplies

If a project requires the use of slow zones (work that is in close proximity to CTA tracks that requires Trains to reduce speeds), CTA will supply the signage for a fee. The contractor will be charged a fee of \$1,600.00 for each set of slow zone signage and associated equipment issued. The initial set of batteries for the lighting supplies will be provided by the CTA; however the contractor will need to supply any subsequent batteries/bulbs. Additionally, the contractor will be responsible for setting up, maintaining, removing, and securing the slow zones (Note: Contractor workers must have completed the Rail Right-of-Way Safety Training Session). The contractor will be refunded the balance remaining from the slow zone charge, less \$200.00 per ninety (90) days of usage and the cost of unreturned equipment.

Inspector Charges

Projects scheduled during weekend hours count as overtime for CTA inspectors. Weekend hours begin Saturday at 5:00 AM and end Monday at 5:00 AM. CTA requires a five (5) day advance notice from Contractors to schedule inspectors for weekend projects. If the Contractor's initial deposit amount is expended prior to the completion of the project, CTA will require an additional deposit to cover the remaining work for the project. CTA will not provide services if additional funds are not provided. After official project completion, all unused funds will be returned to the contractor.

All checks must be payable to the:

Chicago Transit Authority,
567 West Lake Street
Chicago, IL. 60661

To ensure prompt service, please include the estimate sheet, your Commitment Letter, and address it to the attention of Abdin Carrillo. If you have any questions, please contact me at (312) 681.3913

Sincerely

A handwritten signature in blue ink that reads 'Abdin Carrillo'.

Abdin Carrillo
Manager, Construction Management Oversight



CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

Rail Safety Training

All Contractor/Subcontractor/Consultant personnel assigned to work on, under, above, or adjacent to the CTA Right-Of-Way (R.O.W) and inside Rail Maintenance Facilities adjacent to six-hundred (600) VDC, are required to successfully complete a one-day (8-hour) Rail Safety Training (R.S.T.) Course administered by CTA in order to qualify for a Rail Right-Of- Way Safety Card. The course identifies the dangers that exist on the Rail System, including moving trains and the 600-volt DC Traction Power Distribution System. The CTA Representative (Abdin Carrillo) will determine if specific situations may not require R.S.T. (e.g., all work will be outside CTA's R.O.W. and there is NO chance that personnel, material or equipment will penetrate CTA R.O.W. or impact Rail Operations).

The General Contractor is responsible for requesting Rail Safety Training for Contractor/Subcontractor employees by either calling or providing an email to Ora Hardaway, CTA (contact info below). The General Contractor (no Subcontractors are to contact CTA) shall give the full names and the last 4 digits of the social security numbers for each individual proposed for the training. The Contractor shall include a check payable to the "Chicago Transit Authority", for the individual charges of the "Rail Safety Training Fee" multiplied by the number of individuals proposed for training. The "Rail Safety Training Fee" is currently \$200.00 (payable in advance) and is non-refundable. Individuals that fail to report for training or are rejected for training must reschedule (additional training fees will apply).

Scheduling Procedures

1. Contact: Ora Hardaway, ohardaway@transitchicago.com, (312) 681-3951 to register for class at least two (2) weeks in advance (it is recommended that Contractors schedule even further in advance due to high volume of work).
2. Once approved, you will receive a faxed or email confirmation and information packet.

APPENDIX B: CHICAGO DEPARTMENT OF WATER MANAGEMENT (CDWM) TECHNICAL SPECIFICATIONS FOR WATER MAIN CONSTRUCTION

**APPENDIX B – CHICAGO DEPARTMENT OF WATER MANAGEMENT (CDWM)
TECHNICAL SPECIFICATIONS FOR WATER MAIN CONSTRUCTION**

This specification amends the Chicago Department of Water Management (CDWM) Technical Specifications for Water Main Construction and shall be construed to be a part thereof, superseding any conflicting provisions thereof applicable to the work under the Contract:

1. Revise all references to the Commissioner to the Engineer.
2. Section 33 11 13
 - a) Delete Article 1.2.
 - b) Delete Articles 1.6 A, B, C, D.
 - c) Modify Article 1.6 E to "All existing valves must be operated only by personnel of the Department of Water Management. Notify the Department of Water Management seventy-two (72) hours prior to the need for operation of the valve."
 - d) Modify Article 2.2 B to "Pipe joints must be restrained joints noted on the Drawings, specified here, or as directed by the Commissioner."
 - e) Delete Article 2.2 E.
 - f) Delete Article 2.6.
 - g) Delete Article 2.7.
 - h) Modify Article 3.4 B to delete "specified in Section 33 11 15 Thrust Restraint,".
 - i) Modify Article 3.4 C to delete "as per Section 33 23 19 Dewatering Excavations".
 - j) Modify Article 3.4 D to delete "in accordance with Section 31 23 10 Excavation, Trenching and Backfilling".
 - k) Delete Article 3.5.
 - l) Delete Article 3.7.
 - m) Delete Article 3.9.
 - n) Modify Article 3.13 to delete "CLSM flowable material must meet standards specified in Section 31 23 10, "Excavation, Trenching and Backfilling", paragraph 2.3, C of these specifications."
 - o) Modify Article 3.14 A to delete "as specified in Section 31 23 10, "Excavation, Trenching and Backfilling".
 - p) Modify Article 3.14 B to "All new pipe, fittings, and valves must be disinfected per requirements of the Bureau of Water Quality which may be contacted at 312.744.8190."
3. Section 33 12 20
 - a) Modify Article 1.1 A to "This Section includes requirements for construction and/or adjustment of water main valve basins using precast concrete structures."
 - b) Delete Article 1.2.
 - c) Delete Article 1.4 A.
 - d) Modify Article 1.4 B to "Shop Drawings: Submit detailed drawings of precast utility structures and related metal work."
 - e) Modify Article 2.1 A to "Fabrication standards – Circular precast concrete base and riser sections furnished for valve basins must conform to ASTM C478."

- f) Delete Articles 2.6, 2.7, 2.8, and 2.9.
- g) Delete Article 3.1, 3.3.

4. Section 33 12 16

- a. Modify Article 1.1 A to delete "resilient wedge valves".
- b. Delete Article 1.2.
- c. Modify Article 1.4 A to delete "butterfly".
- d. Modify Article 1.5 C to delete "Gate".
- e. Modify Article 2.1 M to replace "Department" with "Engineer".
- f. Modify Article 2.1 M to replace all instances of "Department" with "Engineer".
- g. Delete Article 2.2.
- h. Delete Article 2.4.
- i. Modify Article 3.1 A to "All valves will be tested as specified on the drawings".
- j. Delete Article 3.3.

Section 33 12 19 – No deletions or modifications to this section

SECTION 31 23 10

EXCAVATION, TRENCHING AND BACKFILLING

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

This specification includes the requirements for excavation, bedding, backfilling and compaction, of utility trenches for water and sewer mains and associated appurtenances.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 01 55 26 - Traffic Control and Regulations
- B. Section 02 60 00 - Special Soils Excavation and Disposal.
- C. Section 05 10 00 - Structural Steel and Miscellaneous Metal
- D. Section 31 23 19 - Dewatering Excavations.
- E. Section 32 90 00 - Landscape Restoration

1.3 REFERENCES

- A. CDOT Regulations for Openings, Construction and Repair in the Public Way (CDOT Specifications).
- B. IDOT Standard Specifications for Road and Bridge Construction (SSRBC).
- C. IDOT Supplemental Specifications and Recurring Special Provisions (SSRSP)
- D. ASTM D1557 - Laboratory Compaction Characteristics of Soil.
- E. Department of Labor, Occupational Safety and Health Administration 29 CFR Part 1926, Occupational Safety and Health Standards – Excavations; Final Rule (OSHA).
- F. Follow the latest edition of the above references.

1.4 DEFINITIONS

- A. Soil types are defined as follows.
 - 1. Trench Excavation. Excavation of soil for the purpose of installing water and sewer mains, their appurtenances, and for the restoration of surface features. The excavated material maybe classified as either clay or sandy soil, a mixture of each, and may contain varying mounts of loam, silt, gravel, organic material, or rock fragments less then one (1) cu yd in volume. Trench excavation excludes all material defined as Rock Excavation and Unsuitable Soil.

2. Rock Excavation. Excavation of naturally occurring deposits of limestone, sandstone, shale or other indigenous rock occurring as bedrock, rock ledges, outcroppings, or boulders, one (1) cu yd or larger in volume necessitating removal by the use of systematic drilling, expansive jacks, or backhoe mounted pneumatic hole punchers or rock breakers.
3. Unsuitable Soil Materials. This soil material includes varying amounts of material classified as slag, cinders, trash, debris and rubble; organic or contaminated soil and material; asphalt and concrete pavements (including aggregate sub-base); sidewalks and curbs; concrete slabs concrete or masonry foundations; metal beams, bracing, and sheet piling; or similar matter.

1.5 SUBMITTALS

- A. Submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples must be submitted in accordance with Book I – Terms and Conditions for Construction, latest edition, issued by the City of Chicago, Department of Procurement Services.
- B. Provide to the Commissioner copies of all contractual agreements, permits and/or licenses for proposed disposal sites for all material and waste removed from the job site.
- C. Shop Drawings and supporting calculations for excavation support systems must be submitted to the Commissioner for review and approval.
 1. Excavation Support Systems:
 - a. Prepare and submit a written schedule and procedure, along with detailed drawings, of the proposed excavations and excavation support systems.
 - b. Include installation procedures; method of concrete placement; excavation sequence; interface details; protection measures for existing structures and facilities; instrumentation and monitoring procedures to check performance, sequence, and method of removal; and contingency plans for excessive wall or foundation movements.
 - c. The program must take into account that excavations cannot extend beyond the right-of-way into adjacent properties above or below grade, unless otherwise indicated. Where Contractor requires the installation of part of excavation protection system on private property, the Contractor will be solely responsible for securing permission from adjacent property owners to install such temporary and permanent systems.

- (i). Any such permission from adjacent property owners must be in writing, and the owner's signature, granting such permission, must be witnessed and properly notarized. Certified copies of all such permissions must be submitted to the Commissioner for record purposes.
- 2. Shop Drawings: Submit Shop Drawings and specifications for support systems, lagging, and internal bracing. Include the following:
 - a. Specific description of field quality control measures.
 - b. Details of interface with permanent structures.
 - c. Details of bracing struts and wales, if used, and the proposed installation procedures, including method and sequence of preloading.
 - d. Details of required preloading systems, pre-stressing systems, load measuring facilities, systematic schedule of preloading and pre-stressing operations, and sequence of construction.
 - e. Method and details for securing lagging in support system openings.
 - f. Proposed method of providing for utility penetrations.
 - g. Assembly and erection details of members and connections for the system.
 - 3. Plating of Excavations: When requested submit design calculations stamped by a Structural Engineer Licensed in the State of Illinois as proof of the structural integrity of the plating provided.
 - 4. Calculations: Submit appropriate design calculations to support Shop Drawings. Include maximum theoretical deflections of supporting members. Include calculations indicating the expected magnitude of vertical and lateral movement.
 - 5. Professional Engineer's Certification: The excavation support systems program, Shop Drawings, calculations, and test reports must be prepared, sealed, and signed by a professional structural engineer currently registered in the State of Illinois.
 - a. Where CTA/METRA or other private railroad company approval for excavation support or shoring is required, submit calculations and related documents prepared, signed, and sealed by a professional structural engineer currently registered in the State of Illinois.
- D. The Contractor, before starting work, must submit to the Commissioner for approval, a layout of his construction procedures and the equipment to be used in maintaining the trees in place without damage.

- E. Provide for CLSM (Flowable Fill) backfill quality control (QC) and quality assurance (QA) in accordance with the IDOT SSRSP, Check Sheet #31 "Quality Control Quality Assurance of Concrete Mixes".

PART 2 – PRODUCTS

2.1 GENERAL

- A. Pipe bedding and trench backfill material must conform to the requirements and gradation specified in Section 1003, Fine Aggregates (FA), or Section 1004, Coarse Aggregates (CA), of the SSRBC.
- B. Coarse Aggregate (CA) material classified, as Chert or Novaculite Gravels, or Slag from any source, are not permitted for use as bedding or backfill material.
- C. Fine Aggregate (FA) material classified as Silica Sand, Slag Sand from any source, or Construction Debris Sand, are not permitted for use as bedding or backfill material.
- D. All material must be dry and free of organic matter, clay, garbage, paper, wood or similar material, boulders or large particles of frozen material.

2.2 PIPE BEDDING

- A. Pipe Bedding for Water Main Construction

Coarse aggregate (CA) material classified, as washed Crushed Limestone or Stone must conform to gradation CA-16 for water mains 16 inches in diameter or smaller, CA-11 for water mains larger than 16 inches in diameter, unless otherwise authorized by the Commissioner.
- B. Pipe Bedding for Sewer Main Construction

Coarse aggregate (CA) material classified, as crushed gravel, crushed stone or crushed concrete must conform to gradation CA-11, unless directed otherwise by the Commissioner.

2.3 BACKFILL MATERIAL

- A. Backfill Material for Water Main Construction
 - 1. Coarse aggregate (CA) material classified as washed Crushed Limestone or Stone conforming to gradation CA-16 or the ¼"

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Limestone Chips gradation in accordance with the following Table A – Gradation of Trench Backfill Material, unless authorized otherwise.

**TABLE A
 GRADATION OF TRENCH BACKFILL MATERIAL**

US SIEVE SIZE	<u>½" Limestone Chips % Passing By Weight</u>
½"	100
3/8"	100
¼"	96
#4	64
#10	4
#16	2

B. Backfill for Sewer Construction

1. Fine aggregate (FA) material classified as sand, crushed concrete sand or stone sand must conform to gradation FA 6 unless directed otherwise by the Commissioner.

C. Controlled Low Strength Material, CLSM (Flowable Fill Material)

1. Materials for Flowable Fill must meet requirements of IDOT SSRBC Sections 593 and 1019 for Controlled Low Strength Material, CLSM.
 - a. Flowable fill material placed adjacent to water mains must be of a non-fly ash type mix design, mix # 2.

2.4 GEOTEXTILE FABRIC

- A. Geotextile fabric must be Fabric for Silt Filter Fence and must conform to the requirements of Section 1080.02 in the SSRBC.

2.5 AGGREGATE FOR STABILIZATION OF TRENCH BOTTOMS

- A. When required aggregate used to stabilize trench bottoms must have an aggregate such that the majority of the material passes a 1½ to 2½-inch sieve, with no more than 10% of the material passing the No. 16 sieve. The quality of the aggregate must meet requirements established for aggregate bedding.

PART 3 - EXECUTION

3.1 WORK AREA PREPARATION

A. Existing Work Area Condition

1. All information on subsurface exploration available to the Department, if any, will be made available to the Contractor for examination. However, the Department in no way takes responsibility for, the interpretation, accuracy, or thoroughness of the information. It will be the responsibility of the Contractor to make such subsurface explorations as deemed necessary, to supplement information provided by the Department, at no additional cost to the Department.
2. Prior to excavating, thoroughly investigate the limits of the proposed trench to ascertain the existence and location of any underground structures, existing utilities or other items that might interfere with the pipe installation. Notify the Commissioner of any obstructions that will prevent the installation of the pipe or appurtenances as indicated on the Drawings.

B. Clearing Work Area

1. Before starting trench excavation, all obstructions, which must be removed or relocated, must be cleared. Pavement, curbs, walks, trees, shrubs, utility poles, and other structures, which are to be preserved, must be properly braced and protected. Unless otherwise shown or directed by the Commissioner, all trees and large shrubs must be preserved with minimal damage inflicted on the root structure. When required, small trees and shrubs may be removed and replaced with equivalent specimens if approved in advance by the Commissioner.

C. Segregation and Disposal of Soil Material

1. Topsoil suitable for final grading and landscaping, and excavated material suitable for backfilling, as described in Section 32 90 00, - Landscape Restoration, may be stockpiled separately within the Work Area if approved by the Commissioner.
2. Surplus excavated material and excavated material unsuitable for backfilling, final grading, and landscaping, must be transported off of the Site and disposed of in disposal areas obtained by the Contractor and approved by the Commissioner.

3. Excavated material must not be stockpiled along the route of the work unless authorized beforehand by the Commissioner.

D. Pavement Removal

1. The Contractor must saw cut all concrete and asphalt pavements to their full depth prior to breaking and removing the pavement. On pavements consisting of an asphalt overlay on a concrete base, the Commissioner reserves the right to order the removal of up to 6 additional inches beyond the edge of the concrete base. This additional asphalt removal must be removed to a neat saw cut edge and will be considered incidental to the Work.
2. Utilizing drop weight equipment for the purpose of breaking the pavement is not permitted.

E. Protection or Removal of Existing Trees

1. Comply with CDOT Specifications Chapter 4, "Excavation Pavement Removal" for protection of trees, shrubs, and other improvements.
2. The Contractor is not permitted to remove trees beyond the limits of the trench excavation except as specified in these Specifications, or as shown on the Plans, or as ordered by the Commissioner.
3. The Contractor must arrange his construction operations and use the necessary equipment required, so as not to remove or damage any existing trees due to the Work to be performed under this Contract.
4. To protect the trunks of existing trees from damage, the Contractor must place 2" x 4" boards, six (6) feet long, vertically and about 6 inches apart around all trees located in the parkways along the route of the work. The boards must be held in place by wire looped around the circumference of the tree trunk. After completion of all work, the protective boards and wires must be carefully removed.
5. Any pruning of trees and roots required to permit the operation of the Contractor's equipment must be kept to a minimum, subject to the approval of the Commissioner, and must be done symmetrically by a licensed arborist. The arborist is required to obtain a permit from the City of Chicago, Bureau of Forestry, Plans and Permits Section of the Department of Streets and Sanitation, to trim and spray or in any way affect the general health or structure of trees in the public way. Prior to this approval, the Bureau will conduct an investigation at the sites of the proposed sewer. They will work with the Resident Engineer and

the Contractor, and request 48-hour notice prior to starting any tree work.

- F. Trench Excavations Over 12-feet Deep
 - 1. Comply with CDOT Specifications Chapter 4, "Excavation Pavement Removal" for trenches over 12-feet deep.
- G. Excavating Over or Adjacent to Existing Utilities
 - 1. The Contractor must verify the location of existing utilities in the vicinity of the work before starting construction. The Contractor is responsible for protecting, and repairing utilities damaged by the work under of this contract, at no additional cost to the City. The Contractor must coordinate all work with the owner of the utility.
- H. Erosion Control
 - 1. Install geotextile fabric under each storm inlet, catch basin and sewer manhole cover to prohibit dirt, debris and backfill material from entering the sewer system, but to permit drainage. The geotextile fabric is to be maintained until restoration is completed. After restoration is completed, remove the geotextile fabric.
- I. Plating of Excavations
 - 1. Unattended excavations in public streets, alleys, driveways, and walkways necessitated by the work must be plated, if the excavation has not been backfilled, or a temporary paved surface has been provided, or specifically authorized otherwise by the Commissioner.
 - 2. Steel Plate(s) must be large enough to safely span the excavation with sufficient overlap beyond the edge of the excavation to provide firm support as appropriate for the type of pavement and soil encountered. Plate(s) must be firmly bedded and secured to the adjacent pavement to prevent rocking or movement, and of adequate thickness to carry anticipated loads. When plating is left in place during off-work periods, or if the Commissioner feels vehicular or pedestrian safety may be compromised, a bituminous ramp is to be provided at the perimeter of the plate(s) as appropriate to provide a smooth transition between the surface of the plate(s) and the adjacent pavement or walkway.
 - 3. Plating subjected to vehicular traffic must be capable of carrying AASHTO H-20 traffic loading without movement or excessive deflection. The plating must be secured to the adjacent paved surface

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in such manner so as to prevent rocking or other movement which could expose the excavation. The name of the Contractor must be indicated on both sides of the plating.

4. When steel plates are used and left in place beyond normal working periods, a bituminous ramp must be provided at the perimeter of the plate(s), to provide a smooth transition between the surface of the plate(s) and the adjacent street pavement or walkway, unless authorized otherwise.
5. Plating of excavations is not intended as a substitution for providing traffic control, which must be provided in accordance with Section 01 55 26 of these specifications.

J. Protection of Existing Water Main from Contamination

Protect existing water mains from contamination by groundwater, dirt, debris, or other foreign material:

1. Prevent groundwater and surface water, dirt, debris, and other foreign material from entering the open pipe.
2. Provide water tight temporary closure of pipe before leaving work site at the end of the work day.
3. Equipment, cables, hoses, supports and all appurtenant equipment placed in the water main must be thoroughly cleaned of dirt and debris, and disinfected with chlorine solution with a chlorine concentration of at least 50 parts per million.
4. Workers entering pipe must wear clean temporary disposable coveralls.
5. Install foot bath and brush and have workers entering the pipe clean footwear with chlorine solution with a chlorine concentration of at least 50 parts per million.

3.2 EXCAVATION PROTECTION

A. General Requirements

1. Excavations must be protected in accordance with applicable rules, laws and regulations of Federal, State and City ordinances applicable to underpinning, shoring of excavations, and other work affecting adjoining property and the safety of worker, but must not be less than the standards and regulations established by OSHA.
2. Structural support systems are required for all excavations exceeding five (5) feet in depth. Structural support systems are to be used in all

excavations in soils that are determined to be unstable or subject to cave-ins, regardless of the depth of the excavation.

3. Protective systems for any excavation exceeding ten (10) feet in depth must be designed and approved by an Structural Engineer licensed in the state of Illinois.
4. The Contractor must remove and replace, or provide the means to support any surface features when their location poses a hazard to workers in the excavation.
5. Whenever excavations cross the location of an existing underground utility, the Contractor must proceed with caution and use appropriate methods of excavation to avoid damaging the utility. The Contractor is responsible for coordinating all work with the owner of the utility.
6. Ramps, runways or ladders must be provided for ingress and egress by workers from excavations exceeding four (4) feet in depth in accordance with OSHA.
7. Surface or ground water entering excavations must be controlled by the use of appropriate equipment. If the trench interrupts the natural flow of surface water, diversion ditches or dikes must be used.

B. Protection of Adjacent Structures

1. When the stability of adjoining buildings, walls, sidewalks, pavements or other structures are endangered by the excavation operations, structural support systems such as shoring, bracing or underpinning must be used to ensure the stability of the structure.
2. The Contractor is responsible for posting and issuing all notices required to inform adjacent or adjoining property owners or other parties and such notice or notices must be served in sufficient time as not to delay the progress of the Work under this Contract.
3. Excavation below the foundation of an adjacent structure requires either of the following:
 - (a) A Structural Engineer or Professional Engineer licensed in the state of Illinois has determined that the structure is located far enough away from the excavation so as to be unaffected, or
 - (b) A Structural Engineer licensed in the state of Illinois has designed and approved a structural support system to provide adequate protection to the existing structure.

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C. Structural Support Systems

Structural support systems may consist of pre-engineered systems such as aluminum hydraulic shoring, trench shields, trench boxes, or systems constructed on the job site such as timber or steel shoring or steel sheet piling.

1. Pre-Engineered System

- (a) Pre-engineered structural support systems installed in accordance with the manufacturer's recommendations do not require certification by a Structural Engineer when trench depth is less than 20 feet. However, the Commissioner, at his sole discretion, may require a manufacturer's certification indicating the support system is suitable for the intended use and site conditions.
- (b) Pre-engineered structural support systems will require analysis and certification by a Structural Engineer licensed in the state of Illinois, when trench depth exceeds 20 feet.

2. Site Constructed Systems

- (a) Construct steel sheet piling system in accordance with Section 05 10 00 – Structural Steel and Miscellaneous Metal.
- (b) Structural support systems built in place and made of timber constructed in accordance with OSHA Standards, do not require certification by a Structural Engineer licensed in the state of Illinois, provided trench depths shown in the OSHA Standard, relative to the soil type at the site, are not exceeded.
- (c) If the OSHA Standard is not followed for timber shoring and the depths of trenches exceed those in the tabulated data; or soil conditions have been determined to be substantially different than those given in the OSHA Standard; the design must be performed and certified by a Structural Engineer licensed in the state of Illinois.
- (d) A structural support system built in place and consisting of materials other than a timber shoring systems will require design and certification by a Structural Engineer licensed in the state of Illinois.
- (e) When close-sheeting is used, it must be driven so as to prevent adjacent soil from entering the trench either below or through

such sheeting. Tight-sheeting must be used in that portion of the excavation in or along streets or alleys below the intersection of a 1 to 1 slope line from the nearest face of the excavation to the edge of the pavement.

- (f) Sheetting must not be in contact with existing pavement but must bear uniformly against the sides of the excavation.
- 3. Where structural support systems, such as steel or wood sheeting are used for stabilizing excavations, the width of the trench may be increased as necessary to accommodate installation of the work. When soils in the lower limits of the excavation have been determined to have adequate stability; the Contractor may end the shoring elements above the bottom of the excavation. If soil begins moving into the excavation below the shoring during construction, the Contractor is solely responsible for making corrections to the excavation and for lowering the shoring, at his own expense.
- 4. When structural support systems are required to be left in place, they must be cut off at the same elevation as the bottom of the water main, unless otherwise directed by the Commissioner. Bracing that is to remain in place must be driven up tight. The right of the Commissioner to request sheeting and bracing to be left in place, is not meant to construe any liability or obligation on behalf of the Commissioner to issue such orders.
- 5. Structural support systems that are not to be left in place may be removed only when the excavation has been backfilled to such an elevation so as to prevent the collapse of the sides of the excavation. Any voids created by the removal of the structural support system members, must be filled and compacted in an acceptable manner

3.3 EXCAVATION

A. Trench Excavation (Open Cut)

- 1. The width of the trenches must provide adequate space for workers to place and join the pipe properly, and must be kept to the minimum practical width. Unless otherwise approved by the Commissioner, the total clear width of the trench at the level of the top of the pipe and at grade must be at the Neat Lines as detailed on the Drawings.
- 2. The Contractor must excavate a minimum of 6-inches below the bottom of the pipe unless otherwise shown, specified, or directed, so bedding material can be placed in the bottom of the trench and shaped

to provide a continuous firm bearing for the pipe barrel. Bell holes must be provided for proper make-up of the joints.

3. The open excavated trench preceding the pipe laying operation and the unfilled trench with pipe in place must be kept to a minimum length causing the least disturbance. The maximum length of open trench must not exceed 300-feet unless otherwise directed by the Commissioner. Comply with Article 4G, CDOT Specifications, for other trench opening length requirements within the public right-of-way.
 4. Excavation In Arterial Streets. Comply with Article 4C, CDOT Specifications, for protection requirements when working within arterial streets.
 5. Contractor must saw cut existing pavement prior to excavating. Width of saw cut pavement must be such that any sheeting provided for excavation protection is not in contact with the pavement.
 6. Where water is encountered in the excavation, the excavation must be dewatered in accordance with Section 31 23 19 – Dewatering Excavation of these specifications.
 7. Wherever the nature of the ground will permit, the bottom of the excavation for monolithic and brick sewers must have the shape and dimensions of their outside invert and for pipe sewers the shape and dimensions of the outside of their lower quarter. If the bottom of the trench cannot be shaped to the required form and maintained until a section of the sewer is safely constructed, then the bottom and sides of the trench must be made to conform as nearly as possible to the external shape and dimensions of the sewer, and the space between the outer surface of the sewer and the bottom and sides of the trench must be filled with suitable material for stabilization of the trench bottom.
- B. Rock Excavation (open cut)
1. Whenever rock, stone, masonry or other hard, unyielding material is encountered at or above the required trench bottom elevation, remove it to provide a clearance of no less than 6-inches below and on each side of pipes and associated fittings, valves and other appurtenances. Backfill the over excavated area with granular bedding material.
 2. Removal of Rock by blasting or by use of a drop hammer is not permitted under this contract.

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3. Excavate rock as near as practicable to the outside shape of the work as shown on the Plans. Solid rock, not loosened from the adjacent solid rock, may extend within the neat outside surfaces of these shapes no more than two (2) inches, provided no single projection exceeds one and one-half (1.5) square feet in area at the neat surfaces of the excavation and provided that on any ten (10) foot section of the excavation the total area of such projection at the neat outside surfaces of the section does not exceed twenty (20) percent of the area of the section.
 4. The Contractor is required to remove all loose rock and other material from the excavation and in the event that the excavation is enlarged beyond the outside shape of the sewer or sewer structures as shown on the Plans, the Contractor will not be entitled to any payment for the additional Class SI concrete needed to fill the voids caused by such over-breakage.
 5. Where rock is encountered, excavate to eight (8) inches below the bottom of the pipe for bedding placement.
- C. Trench Excavation (Short Tunnel Construction)
1. In some instances, trees, fire hydrants, sidewalks, and other obstructions may be encountered, the proximity of which may be a hindrance to open cut excavation. In such cases, the Contractor must excavate by means of short tunnels in order to protect such obstructions against damage. Short tunnel work will be considered incidental to the construction and no additional payment will be allowed.
- D. Additional Trench Excavation
1. If the soils encountered at the elevations specified are not suitable, or it is determined necessary to go to an additional width and depth, or required to fill designated areas for work done under Section 02 60 00 - Special Soils Excavation and Disposal, the excavation must be carried to such additional width and/or depth and must fill such excavated areas with approved backfill material as required or directed by the Commissioner.
- E. Unauthorized Excavation
1. Wherever the excavation is carried beyond or below the lines and grades shown on the Drawings all such excavated space must be refilled with select fill materials and in such manner as may be directed in order to insure the stability of all affected structures.

Beneath all structures, space excavated without authority must be refilled by the Contractor with approved backfill materials and will be considered incidental to the construction and no additional payment will be allowed.

- F. Trenching Across or Over Existing Excavations or Utility Trenches
 - 1. In the event that the trench passes over or through a previous excavation, carefully compact and stabilize the bottom of the new trench or excavation to a density equal to or greater than 95% of the maximum dry density as determined by ASTM D1557. Perform this compaction carefully to avoid damaging the existing utility or structure.
- G. Special Excavation
 - 1. Remove unsuitable materials to provide 2-foot minimum horizontal and vertical clearance around water mains or related structures as applicable, unless otherwise directed by the Commissioner.
- H. Excavation in Tunnel
 - 1. The tunnel must be excavated and trimmed to such size and shape as will allow the placing of the full section of the pipe as shown on the Plans after all lining is in place.
 - 2. The Contractor must excavate the tunnel and support the surrounding earth so there is no movement of the earth over or adjacent to the work at any time. The Contractor must excavate the tunnel and support the surrounding earth so at no time there is more than 5 feet, measured horizontally, unsupported by bracing as approved by the Commissioner.
 - 3. The Contractor must use extreme care in excavating and trimming to insure that a full section will be placed without materially deviating from the correct lines and grades of the finished structure.
 - 4. In case, due to bad soil conditions, the Contractor requests that the outside outline of the sewer be changed to a minor extent to accommodate his method of construction, such a change will be allowed provided the strength of the structure is not impaired. Any such modification will not alter the price per foot specified to be paid for the completed sewer, whether such minor modification results in a minor addition or subtraction from the theoretical quantity for the section herein specified.

5. If permission is given the Contractor to excavate the tunnel for a specified distance without immediately placing the concrete lining, the proposed method of bracing the tunnel and the extra bracing necessary must be submitted for approval.
6. No additional payment or allowance of any nature will be made for timber cants, steel plates or other forms of tunnel lining used for supporting the earth during construction. All such tunnel lining must be left in place.

3.4 PLACEMENT OF PIPE BEDDING

A. Pipe Bedding

1. Pipe laid in trenches must be bedded in accordance with the details shown on the Drawings. Bedding material must consist of compacted; well-graded crushed stone fill material as shown and as specified, or as directed by the Commissioner.
2. Existing underground structures, tunnels, conduits, and pipes crossing the excavation must be bedded with compacted sand. Bedding material must be placed under and around each existing underground structure, tunnel, conduit, or pipe as required to stabilize the excavation.
3. At each joint, enough depth and width must be provided around the pipe so that joints can be properly made up.

B. Bedding Placement – Vaults and Structures

1. Pipe bedding beneath precast bases, cast-in-place bases and other foundations must be 6-inches in thickness and thoroughly compacted in place to not less than 95% of the maximum dry density as determined by ASTM D1557.

C. Bedding and Backfill for Short Tunnel

1. Pipes placed in short tunnels must be bedded in sand. The annular space between the pipe and undisturbed earth must be completely filled with compacted sand fill material. Pipelines in short tunnels must be supported to permit the placement of backfill.

3.5 BACKFILLING EXCAVATIONS

A. General

1. All excavations must be backfilled to the original surface of the ground or to such other grades shown on the Drawings or as directed by the Commissioner. For areas to be covered by topsoil, backfill must be left 6-inches below the finished grade or as shown on the Drawings, or directed by the Commissioner. All backfilling must be done as soon as possible after water main piping has been installed and inspected, and as soon as mortar for masonry or thrust blocks have sufficiently set, unless directed otherwise by the Commissioner.
2. Crushed stone fill material must be used for trench and structure backfill and other areas as shown, specified, or ordered by the Commissioner.
3. Unsuitable material and material rejected by the Commissioner must immediately be removed from the Site and disposed of by the Contractor at his expense.
4. Construction equipment used to backfill against and over cast-in-place concrete structures must not be permitted to travel over these structures until the designated concrete strength has been obtained, as verified by concrete test cylinders. In special cases where conditions warrant, as determined by the Commissioner, the above restriction may be modified if the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.

B. Backfill Procedure

1. Crushed stone fill material must be used for backfill where roadways, driveways, sidewalks, or other pavements are to be placed on the backfill or where the edge of the trench excavation is 5-feet or less from any county or state highway, any city or village street pavement, and in trenches crossing pavements or sidewalks for a distance beyond the edge of the pavement or sidewalk equal to the depth of the trench. Crushed stone fill material must be used as backfill in trenches parallel to roadways, driveways, or other pavements from the top of the bedding to a depth below the ground surface equal to the distance between the inner face of the trench and the closest edge of the pavement.
2. Where pavements and appurtenances for streets are to be placed over the trenches, the backfill material must be placed in uniform layers not

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greater than 6-inches in thickness and compacted in place. Each layer must be compacted to or not less than 95% of the maximum dry density as determined by ASTM D1557.

3. All pipe sewers must be surrounded and covered by trench backfill above the granular embedment as soon as they are laid. The trench backfill must be properly compacted and tamped to a depth of at least one foot above the top of the pipe prior to placing the remainder of backfilling.
4. For sewer pipe construction with FA 6 backfill, water jet the backfill to the depth of approximately two-thirds of the depth of cover over the sewer. The distance between jetting holes must not exceed 10-foot along the length and width of the trench, or as directed by the Commissioner. Water jetting of the trench backfill must proceed as soon as practicably, as determined by the Commissioner. The Contractor, in this manner, must place and compact the trench backfill to the level of the sub-grade.
5. Excavated material can be re-used as backfill only if directed or approved by the Commissioner.
6. Where railroad tracks or pavements for highways are to be placed over trenches, the backfill must be placed in conformance with the standards set forth by the respective agency having jurisdiction over the railroad or highway.
7. Trench backfilling work must be done in such a way so as to prevent damage to any pipe, utility, or structure.
8. On monolithic concrete sewers and structures cast-in-place, trench backfill must not be placed until the concrete has attained a compressive strength of 2,000 psi.

C. Backfill under a Supported Water Main

1. Backfill the open trench under the water main and 10-feet beyond the water main sides with approved material up to a level of 1-foot below the invert of the supported water main. The backfill material must be placed in layers of 12-inches with each layer mechanically compacted to 95% of the maximum dry density as determined by ASTM D1557.
2. Place pipe bedding material from 1-foot below the water main invert to the water main centerline and compact to achieve 95% of the maximum dry density as determined by ASTM D1557.

3. Remove the water main pipe support systems, supporting beams, and pipe support straps; and cut-off and remove soldier piles to a level at least 4-feet below finished grade.
 4. The water main pipe must be inspected for leakage and joint integrity and repaired if necessary, prior to backfilling above the water main.
 5. After approval by the Engineer, continue backfilling with approved material. The open trench must be backfilled up to the required sub grade level. The backfill material must be placed in layers of 12-inches with each layer mechanically compacted to 95% of the maximum dry density as determined by ASTM D1557.
- D. Backfilling with Controlled Low Strength Material (CLSM) - Flowable Fill
1. Do not place the mix on frozen ground, in standing water, or during wet weather conditions. Mixing and placing may begin only if the air temperature is 35 °F minimum and rising. At time of placement, the material temperature must be 40 °F minimum. Mixing and placing must stop when the air temperature is 40 °F and falling.
 2. Place the mix directly from the chute into the space to be filled. Other placement methods may be approved by the Commissioner if the mix design is appropriate.
 3. When backfilling against structures, place the mix in layers to prevent damage by lateral pressures. Side slopes must be stepped or serrated to prevent wedging action of the backfill against the structure. Allow each layer to harden prior to placing the next layer.
 4. When backfilling pipe trench, distribute the mix evenly on each side of the pipeline to prevent movement.
 5. The mix must not be exposed to freezing temperatures or wet weather conditions during the first 24 hours after placement.
 6. The mix may be subjected to loading upon approval by the Commissioner, or when a penetration of 39 mm/blow or less has been obtained with the Dynamic Cone Penetrometer test.
 7. Backfilling against water main pipe with CLSM is not allowed, unless authorized otherwise by the Commissioner. Contractor must provide a minimum of 6-inches of coarse aggregate backfill material over the water main pipe prior to placing the CLSM material.

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3.6 FINISH GRADING

1. Finish grading must be performed in accordance with the completed contour elevations and grades shown and must be made to conform to the existing ground surface. All finished graded surfaces must be left smooth and firm and graded to permit positive drainage.

3.7 TRAFFIC CONTROL

1. The Contractor is responsible for traffic control and the protection of vehicular and pedestrian traffic from the work. For detailed requirements see Section 01 55 26.

END OF SECTION 31 23 10

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SECTION 31 23 19
DEWATERING EXCAVATIONS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes requirements for dewatering excavations when necessary to provide a safe working environment and protect the Work so as to provide a satisfactory installation.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 01 11 00 – Summary of Work

1.3 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. Prior to commencing excavation work at the project site, the Contractor must submit to the Commissioner for review and comment a method for removing water which has entered the excavation either from groundwater sources, surface drainage, or other source such as the dewatering of a new or existing water or sewer main. The submittal must include a description of the source of the water, equipment to be used to dewater the excavation, the arrangement of the equipment, time needed to dewater the excavation, method of disposal, and discharge rate of the equipment expressed in gallons per minute. No excavation is to be started until authorization has been given by the Commissioner to proceed with the excavation work.
- C. When applicable for sewer projects, the Contractor is to submit the proposed method for by-pass pumping and fluming of sewage to the Commissioner for review and comment.

PART 2 - PRODUCTS (NOT APPLICABLE)

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PART 3 - EXECUTION

3.1 PREPARATION

A. Capacity of Facilities

1. Facilities for the removal and disposal of water must be of sufficient capacity to keep the excavation dry under all circumstances.

B. Standby Facilities

1. Adequate standby facilities must be provided to insure that the excavation will be kept dry in the event of power failure or mechanical breakdown.

C. Well Points

1. If well points are used, the Contractor must make provisions for removing and resetting individual well points without taking any part of the dewatering system out of service.

3.2 CONSTRUCTION

A. Dewatering

1. At all times during the excavation period and until completion of the Work and acceptance at final inspection, ample means and equipment must be provided with which to promptly remove and properly dispose of all water entering any excavation including leakage from the existing water main which is to be replaced. All excavations associated with the Work must be kept dry. Water must not be allowed to rise over, or to come in contact with, masonry and concrete until the concrete and mortar has attained a set satisfactory to the Commissioner and, in any event, no sooner than twelve (12) hours after placing the masonry or concrete.

B. Groundwater Levels

1. The Contractor must maintain the groundwater level at least 12-inches below the bottom of the excavation until the excavation until the Work has been completely and the excavation has been backfilled.

C. Water Management

1. Water pumped or drained from the Work must be disposed of in a suitable manner without damage to adjacent property, other Work under construction, street pavement, and parks. Water must not be discharged onto streets without adequate protection at the point of

discharge. No water containing settleable solids may be discharged into sewers.

2. All damages caused by dewatering the Work must be the responsibility of the Contractor and must be promptly repaired at the Contractor's expense.
3. Limit dewatering flow rates to current operating capacity of City sewers. See Section 01 11 00 for any limitations on discharge rates.

D. Pumping, Bailing and Diversion

1. The Contractor must at all times during construction provide and maintain ample means and devices for the temporary diversion of flow in existing sewers and drains and the prompt removal and proper disposal of all water or sewage entering the tunnels, trenches or other parts of the work, and must keep said excavations as dry as practicable until the structures to be built therein is completed. All water pumped or drained from the work and from existing sewers must be disposed of in a suitable manner without damage to adjacent property, or to sewers, pavements, electrical conduits or other work or property. The Contractor must provide all temporary flumes or pipe lines and pumping equipment required for the proper diversion of sewage and removal of drainage from the work.
2. Whenever the Contractor removes an existing bulkhead, he must install a screen suitable for the purpose of preventing construction debris from floating into the completed portions of the sewer system. As work progresses, Contractor must clean the completed portions of the sewer by removing rails, jacks, lumber, sandbags and all other construction equipment, excess material and debris.
3. The Contractor must place and maintain all temporary dams, flumes, bulkheads or other structures necessary to prevent water from adjacent sections of the sewer system from entering the work under this Contract in such a manner as to injure it, and must completely remove all such temporary structures from the completed portion of the work as rapidly as practicable. The Contractor must not place a dam, flume or bulkhead in any sewer without first obtaining the approval of the Commissioner. The Contractor must ascertain the possibility of sewage backing up into basements and causing damage and he will be held responsible for any such damage.
4. The City does not assume responsibility for providing the Contractor with an outlet for any storm water or sewage which must be disposed of during the construction work under this Contract. Until the acceptance of the work, the Contractor will, if so ordered by the

Commissioner, keep the entire work pumped free of water and sewage and before the acceptance of any part of the work. Contractor must clean the entire length of such finished part of the work to the satisfaction of the Commissioner.

5. Water must not be allowed to flow over or stand on the pipe or structure invert in such a manner as to cause scouring of the surface.
6. Route all water pumped from trenches or other excavations to settling basins (five feet by ten feet by two feet deep with three compartments) before entering the City of Chicago sewer system. Discharge from the settling basin must be by gravity to the catch basin.

END OF SECTION 31 23 19

SECTION 33 05 21
UTILITY PIPE JACKING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes requirements for work associated with jacking or augering casing pipe, for locations shown on the drawings.

1.2 REFERENCES

- A. ASTM A139 - Electric Fusion Arc Welded Steel Pipe.
- B. ASTM C76 - Reinforced Concrete Storm and Sanitary Sewer Pipe.
- C. AWWA C203 - Coal Tar, Enamel, and Hot-Applied Tape Coatings.
- D. AWWA C206 - Field Welding Steel Water Pipe.
- E. Follow the latest edition of the above references.

1.3 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 01 55 26 – Traffic Control and Regulations
- B. Section 31 23 10 – Excavation, Trenching and Backfilling
- C. Section 03 30 00 – Cast in Place Concrete

PART 2 - PRODUCTS

2.1 GENERAL

Casing pipe must be either steel pipe or reinforced concrete pipe, as specified here, unless otherwise shown on the Plans, or approved by the Commissioner.

2.2 STEEL PIPE

All casing pipes must be smooth welded steel pipe meeting the requirements of ASTM A139, Grade B. The exterior of casing pipe must have coal-tar enamel in accordance with AWWA C203 and must be of the following diameters and wall thickness:

<u>Carrier Pipe Nominal Diameter</u>	<u>Casing Pipe Outside Diameter</u>	<u>Casing Pipe Wall Thickness</u>
6"	20"	0.344"
8"	20"	0.344"
12"	24"	0.375"
16"	30"	0.469"
24"	42"	0.625"
36"	54"	0.781"
48"	72"	1.000"

2.3 CONCRETE PIPE

Concrete pipe must conform to ASTM C76, Class V, straight wall reinforced concrete pipe. Pipe must have "O" ring joints conforming to ASTM C361. Concrete pipe will not be permitted for use as casing pipe where the required casing pipe diameter is less than 36 inches in diameter.

2.4 CARRIER PIPE SPACERS

Spacers for carrier pipes must be either the two-piece metal band type with 2-inch wide non-metallic runners or units manufactured entirely out of high-density polyethylene. On two-piece metal band type spacers, bands and fasteners must be of corrosion resistant material. All spacers must be rated for heavy-duty service, manufactured by (PSI) Pipeline Seal & Insulator, Incorporated, Cascade Waterworks Manufacturing Company or RACI Spacers North America.

PART 3 - EXECUTION

3.1 GENERAL

- A. Where shown on the Plans, directed by the Commissioner, or otherwise specified, the pipeline must be installed in a casing pipe beneath roadways, railroads or other structures, which prohibit excavation by open cut.
- B. Excavate jacking and receiving pits in locations as shown on the Plans or as directed by the Commissioner and as specified in Section 31 23 10 – "Excavation, Trenching and Backfilling".
- C. Provide a minimum 4-inch concrete mud slab, as specified in Section 03 30 00 – "Cast in Place Concrete", in the jacking pit as a working surface. All casing pipes installed by augering and jacking must conform to the lines and grades shown on the Plans, specified, or as directed by the Commissioner.
- D. The casing pipe must be installed by simultaneously augering and jacking the casing pipe into place in the location shown on the Drawings. All operations

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must conform to the regulations of the railroad, highway department, or other agency having jurisdiction over the crossing installation. After approval of the crossing, the Contractor must give a one (1) week advanced notice to the Commissioner and all other authorities having jurisdiction over the installation, before starting construction. The Contractor is responsible for complying with all permits associated with the casing pipe installation. All insurance requirements must be submitted prior to starting construction.

3.2 INSTALLATION OF CONCRETE CASING PIPES

- A. In general, the use of reinforced concrete pipe for casing pipe must have prior approval from the Commissioner.
- B. Before installing the casing pipe, it must be inspected for damage or manufacturing defects such as cracks or damaged joints. Such defect if found is cause for rejection of the pipe, and rejected pipe is to be removed from the site at the Contractor's expense.
- C. The casing pipe must be installed so as not to create any voids between the surrounding soil and the casing pipe. Any voids must be filled in accordance with the requirements set forth by the permitting agency having jurisdiction over the crossing. If no such requirements exist, void spaces are to be grouted to the satisfaction of the Commissioner.
- D. To avoid concentrated loads at the joints from pipe to pipe, a resilient cushioning material should be inserted around the circumference of the pipe between the joints as each pipe is placed ahead of the thrust ring. Resilient materials must also be used between the pipe end and the thrust ring.

3.3 INSTALLATION OF STEEL CASING PIPES

- A. Steel casing pipes must be joined together in the field prior to jacking them in place and must be seamless pipe or pipe having not more than one longitudinal weld. All joints must be fully butt-welded together per AWWA C206. After welding, the welded area must be covered and treated with hot tar 1/8-inch thick. The tar must then be allowed to cool prior to jacking the casing pipe in place.
- B. The casing pipe must be installed so as not to create any voids between the surrounding soil and the casing pipe. Any voids must be filled in accordance with the requirements set forth by the permitting agency having jurisdiction over the crossing. If no such requirements exist, void spaces are to be grouted to the satisfaction of the Commissioner.

3.4 INSTALLATION OF CARRIER PIPES IN CASING PIPES

- A. Prior to insertion in the casing, each length of pipe must be supported on casing spacers in such a manner that at no time will the weight of the pipe bear on the bell or any part of the pipe touch the casing.
- B. All pipes must be jointed prior to being pushed or pulled through the casing pipe. After placement of the carrier pipe through the casing, the ends of the casing are to be sealed with brick and mortar, rubber end seal, or other appropriate method, to the satisfaction of the Commissioner and completely leak-tight. Backfilling of the casing pipe must be as detailed on the Plans, directed by the railroad or other authority having jurisdiction over the installation, or as directed by the Commissioner.

3.5 PEDESTRIAN AND VEHICLE PROTECTION

- A. Provide traffic control and protection to provide a safe and convenient public traveled way per the requirements of Section 01 55 26 – Traffic Control and Regulations. The Contractor must provide any flagmen required for warning and directing vehicular or railroad traffic as required.
- B. The Contractor will be held responsible for all damage or injury regardless of barricades, signs, lights, reflectors, and flagmen furnished during the installation of the casing pipe, Jacking and Receiving Pits, and Carrier Pipe.

END OF SECTION 33 05 21

SECTION 33 11 13

DUCTILE IRON WATER PIPE & FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes requirements for the installation of ductile iron water pipe and fittings as shown on the drawings and specified here.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 31 23 19 - Dewatering Excavations
- B. Section 31 23 10 - Excavation, Trenching and Backfilling
- C. Section 33 11 15 - Thrust Restraint
- D. Section 33 13 00 - Disinfection and Testing of Water Mains

1.3 REFERENCES

- A. AWWA C104 - Cement Mortar Lining for Ductile Iron Pipe and Fittings.
- B. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
- C. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
- D. AWWA C111 - Rubber Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- E. AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
- F. AWWA C116 - Protective Fusion-Bonded Epoxy Coatings Int. and Ext. Surf. Ductile-Iron/Gray-Iron Fittings.
- G. AWWA C150 - Thickness Design of Ductile-Iron Pipe.
- H. AWWA C151 - Ductile Iron Pipe, Centrifugally Cast.
- I. AWWA C153 - Ductile Iron Compact Fittings for Water Service.
- J. ASME/ANSI B16.1 - Flanges and Flanged Fittings.
- K. ANSI B16.21 - Metallic Gaskets for Pipe Flanges.
- L. ASME B18.2.1 - Square and Hex Bolts and Screws.
- M. ASME B18.2.2 - Square and Hex Nuts.
- N. ASTM A123 - Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
- O. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel.
- P. ASTM A240 - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip, for Pressure Vessels and for General Applications.
- Q. ASTM A307 - Carbon Steel Bolts and Studs.
- R. ASTM A536 - Ductile Iron Castings.
- S. ASTM A767 - Zinc Coated (galvanized) Steel.
- T. ASTM A775 - Epoxy Coated Steel.

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- U. ASTM A780-93 – Repair of Zinc Coated (Galvanized) Steel.
- V. ASTM B308 – Stainless Steel Alloy Standard Structural Shapes, Rolled, or Extruded.
- W. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- X. ANSI A21.5/AWWA C105 - Polyethylene Encasement.
- Y. Follow latest edition of the above references, unless noted by year of issue.

1.4 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. The Contractor must give notice in writing to the Commissioner, sufficiently in advance of his intention to purchase or place a special order for any pipe required to be installed under this contract. Fully dimensioned drawings and/or manufactures catalog cuts are to be submitted for review.
- C. The Contractor must submit to the Commissioner certified copies of all test reports for test conducted on the pipe by the manufacture when so requested by the Commissioner.
- D. The Contractor must provide the Commissioner with a notarized statement that all tests have been made and met as specified.

1.5 QUALITY ASSURANCE

- A. Each manufacturer supplying pipe for water mains under this contract must furnish all facilities, personnel, and materials to conduct tests required as applicable to the type of pipe being supplied, when requested by the Commissioner. The cost of all plant tests required as proof of the acceptability of the water main pipe will be considered incidental to the Work and no additional payment will be allowed.
- B. **The Work performed on joining all pipe and fittings, must be performed by a plumber licensed in the State of Illinois or the City. This Work must include, but not be limited to, joining all pipe and fittings, installing joint gaskets, assembling all joints, installing continuity wedges, and tightening all gland nuts and bolts, as applicable for the installation.**

1.6 NOTIFICATION AND LIMITATIONS OF WATER MAIN SHUT DOWNS

- A. **Whenever an existing water main or a section thereof is to be shut down during the course of construction, every individual consumer must be notified at least seventy-two (72) hours prior to the shut down. The Contractor must never operate, under any circumstances, an existing valve for a shut down or other purpose without first notifying and obtaining approval from the Commissioner.**

- B. **The time for a consumer shut down must not exceed eight (8) hours. Absolutely no shut downs will be permitted before 8:00 AM without approval from the Commissioner.**
- C. In case of emergency shut downs, the Contractor must notify customers immediately. Notification may be verbal on a door-to-door basis. However, if a consumer cannot be contacted, a written notice must be placed at the property site showing all pertinent information regarding the shut down. The notice must show a telephone number the consumer may call for information or to express any problem that the consumer may have with the shut down.
- D. If a consumer cannot withstand a planned shut down due to a dialysis machine being present or other medical reason, the Commissioner must be notified immediately.
- E. All valves 16 inches in diameter and larger must be operated only by personnel of the Department. Notify the Commissioner seventy-two (72) hours prior to the need for operation of the valve.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE

- A. Ductile iron pipe must conform to the requirements of AWWA C151 and with the additions or substitutions specified in this Section.
- B. Pipe bells must be designed to provide a watertight joint without leakage and must be capable of withstanding pressures exceeding those that will rupture pipe of this class and thickness without requiring additional jointing material.
- C. Electrical conductivity must be provided at each joint on all push-on and mechanical jointed pipe 16-inches in diameter and smaller, to facilitate thawing of frozen pipe and building water services. It must also be provided on pipe 24-inches in diameter and larger when building services are directly connected to the water main. Conductivity is to be accomplished by installing serrated silicon wedges as recommended or supplied by the pipe manufacture. **The use of lead tip gaskets will not be allowed.** Wedges are to be installed in accordance with the requirements of paragraph C in Articles 3.6 and 3.7 of this specification.
- D. All pipes must be manufactured so that where a cut is made at any point along the barrel, the cut end will fit properly into a standard mechanical joint bell and be drip tight at hydrostatic test pressure.

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- E. Exterior of pipe must be coated with a petroleum asphaltic material in conformance with AWWA C110, Section 10-10. Interior of pipe must be cement lined in accordance with AWWA C104.
- F. Pipe thickness and classes must conform to standards shown in Table A.

TABLE A PIPE THICKNESS AND CLASS

Pipe Size	Nominal Wall Thickness	Thickness Class
3-inch	0.34-inch	54
4-inch	0.38-inch	55
6-inch	0.40-inch	55
8-inch	0.45-inch	56
10-inch	0.47-inch	56
12-inch	0.49-inch	56
14-inch	0.48-inch	55
16-inch	0.46-inch	54
18-inch	0.44-inch	53
20-inch	0.45-inch	53
24-inch	0.50-inch	54
30-inch	0.47-inch	52
36-inch	0.53-inch	52
42-inch	0.59-inch	52
48-inch	0.65-inch	52
54-inch	0.73-inch	52
60-inch	0.77-inch	52

2.2 JOINTS

- A. **LEAD JOINTS ARE NOT TO BE USED UNDER ANY CIRCUMSTANCES.**
- B. Pipe joints must be push-on type joints unless otherwise noted on the drawings, specified here, or directed by the Commissioner. Push-on type joints must conform to AWWA C111.
- C. Restrained joints when specified are to meet the following requirements:
 - 1. Mechanical joint pipe with mechanical joint restraint glands. Mechanical joints must conform to AWWA C110. Gaskets must conform to Section 2.4 of this specification.

2. Restrained joint pipe with manufactured weldment, field weldments or manufactured locking rings, locking segments and runner retainers and appurtenances conforming to AWWA C110. Acceptable products are Super-Lock Pipe manufactured by Clow Water Systems Company; FlexRing Pipe or Lok-Ring Pipe manufactured by American Ductile Iron Pipe; or TRFLEX manufactured by United States Pipe and Foundry Company.

D. Mechanical Joint Restraint Glands.

1. Provide restraint glands at all mechanical joints.
2. Restraint glands must be designed for use with the standardized mechanical joint bell pipe conforming to AWWA C110 and AWWA C153. Restraint is to be incorporated into the design of the gland. Acceptable products for this use are Mega Lugs manufactured by EBAA Iron Works; Uniflange manufactured by Ford Meter Box; or Star Grip manufactured by Star Pipe Products.
3. Restraint is to be accomplished by the use of multiple, wedge style restraints. Proper actuation of the wedges is to be ensured with torque limiting twist off nuts.
4. Glands 3-inches through 16-inches are to be pressure rated at 350-psi; glands 18-inch through 48-inch are to be rated at 250 psi.
5. The gland body and restraint components are to be made from ductile iron conforming to ASTM A536, 65-45-12. Ductile iron wedges are to be heat-treated within a range of 370 to 470 BHN.
6. The joint is to be capable of full deflection during assembly and joint deflection after assembly
7. Provide glands with minimum weights and number of wedges as shown in Table B.
8. Retainer glands are not acceptable.

**TABLE B – MINIMUM WEIGHT & NUMBER OF WEDGES
 PER RESTRAINED JOINT**

Pipe Size.	Number of Wedges	Minimum Weight
3-inch	2	6.0-lbs
4-inch	2	7.0-lbs
6-inch	3	11.0-lbs
8-inch	4	14.5-lbs
10-inch	6	23.0-lbs
12-inch	8	28.5-lbs
14-inch	10	46.0-lbs
16-inch	12	52.0-lbs
18-inch	12	63.6-lbs
20-inch	14	71.0-lbs
24-inch	16	90.0-lbs
30-inch	20	190.7-lbs
36-inch	24	226.5-lbs
42-inch	28	400.0-lbs
48-inch	32	488.0-lbs

- E. Flanged joints, when shown on the Drawings, specified, or directed by the Commissioner, must conform to the following:
1. Flanged joints must conform to AWWA C115. Flanges must be the long hub type, screwed on the threaded end of the pipe in the shop. There must be no leakage through the pipe threads. The flanges must be designed to prevent corrosion of the threads from the outside.
 2. Flanges must be drilled according to the requirements of ANSI/ASME B16.1, Class 125 unless special drilling is called for on the Drawings, specified, or directed by the Commissioner. Bolt holes must be equally spaced, drilled smooth and true. When stud bolts are used flanges must be drilled and tapped to accommodate the studs.
 3. The face of the screwed-on flange and plain-end of the pipe must be accurately refaced together, at right angles to the pipe axis. After facing and drilling, the face of the screwed-on flange must immediately be covered with an appropriate rust-preventive coating.
 4. Flanged joints must be secured with either bolts and nuts, or stud bolts with a nuts. Bolts, stud bolts, and nuts must meet the requirements of ASTM A307, Grade B. Bolts and stud bolts must conform to ANSI/ASME B18.2.1. Nuts must conform to ANSI/ASME B18.2.2.

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All bolts, stud bolts, and nuts must be primed with bitumastic paint after the bolts and nuts have been installed and tightened.

5. Gaskets must conform to Section 2.4 of this specification.

2.3 FITTINGS

- A. Fittings to be furnished and installed as specified or shown on the Drawings must be mechanical joint, ductile iron in accordance with AWWA C110. Laying length of mechanical joint castings must be as shown in AWWA C110. Wall thickness and allowable variation in the thickness of mechanical joint castings must conform to AWWA C110 and have a 250-psi pressure rating.
- B. Compact fittings may not be used unless otherwise approved by the Commissioner.
- C. Plain ends of mechanical joint fittings must be beveled and gauged to properly seat in push-on joint bells.
- D. The fittings must be smooth and free from defects of every nature that would make them unfit for the use that they were intended. Plugging of fittings is not allowed. Repairing of defects by welding will be allowed if such repairs will not adversely affect the serviceability of the fittings or their ability to meet the strength requirements of the referenced AWWA standards.
- E. All castings must be coated inside and outside with a petroleum asphaltic material in conformance with Section 4.3 of AWWA C110. A cement-mortar lining is not required.
- F. Flanged fittings must conform to AWWA C110, and have a 150-pound per square inch pressure rating.

2.4 GASKETS

- A. All gaskets for pipe, fittings and appurtenances must be vulcanized natural or vulcanized synthetic rubber, non-porous, free of foreign materials and visible defects. Recycled rubber may not be used.
- B. When soil conditions do not permit the use of natural or synthetic rubber gaskets and when directed by the Commissioner, all gaskets for pipe, fittings and appurtenances must be Nitrile (acrylonitrile butadiene), nonporous, free of foreign materials and visible defects.
- C. Gaskets for flanged joints must be of the ring type, 1/16-inch thick, and meet the requirements of ANSI Standard B16.21. Acceptable manufactures for gaskets type as manufactured by the Crane Company; Garlock Packing Company; or U.S. Rubber Company.

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- D. Gaskets must be stored in a cool place and protected from light, heat, oil, or grease until installed. Any gasket showing signs of cracking, weathering, abrasion or other deterioration will be rejected.

2.5 POLYETHYLENE ENCASEMENT

- A. Polyethylene encasement material must be 4-mil, cross-laminated, high-density polyethylene tubing in accordance with AWWA C105.

2.6 TRANSITION SLEEVES

- A. Transition sleeves for pipe 16-inches in diameter and smaller must be of type as manufactured by Dresser, Style 253 Modular Cast Couplings; Smith Blair, Type 441 Cast Transition Couplings; Ford, Style FC2A Transition Couplings; or JCM Industries Model 212 Transition Couplings. Transition sleeves for pipe diameter greater than 16-inches must be of type as manufactured by Ford, Style FC2A or Style FC5 Transition Couplings; Romac Industries, Style 501 Transition Couplings; Dresser Style 38, Style 62, or Style 138 Transition Couplings; or Power Seal, Model 3501 Transition Couplings.
- B. Transition sleeves must be designed to join class "B" pit cast iron pipe to AWWA C111/C151 standard ductile iron pipe. They must provide for pipe misalignment and settlement deflection and make a leak proof non-soldered joint, which allows for limited line movement due to expansion and contraction. Design couplings for a minimum rated working pressure of 150-pounds per square inch.
- C. Transition sleeves pipe 16-inches in diameter and smaller must be constructed of ductile iron conforming to ASTM A536. Transition sleeves for pipe diameters greater than 16-inches must be constructed of ductile iron conforming to ASTM A536 or carbon steel conforming to ASTM A36. Ends must have a smooth inside taper for uniform gasket seating. The follower flanges must be ductile iron conforming to ASTM A536 or carbon steel conforming to ASTM A36.
- D. Transition sleeves must be shop coated inside and outside with fusion bonded epoxy coating conforming to AWWA C-213.
- E. Gaskets must be of molded rubber conforming to ASTM C564 for potable water service.
- F. Bolts and nuts must be 5/8-inch in size and must be Grade 304L stainless steel, annealed. Nuts must be Teflon coated to prevent galling during storage.
- G. Each transition sleeve must be supplied with four electrical continuity brackets electrical continuity across the sleeve. The angle bracket must be made from ASTM A240-T304 stainless steel with a stainless steel set screw.

H. Contractor must field measure the existing cast iron water main for exact size of outer dimension and degree of out-of-roundness at the location to install the transition sleeve prior to ordering and installing the transition sleeve for that location.

2.7 PIPE SUPPORT SYSTEMS AND HANGERS (INTENDED FOR PERMANENT INSTALLATIONS)

- A. Manufactured pipe support systems, fasteners, and miscellaneous hardware must be fabricated from high strength stainless steel conforming to ASTM B308, or hot-dipped galvanized steel conforming to ASTM 123 and ASTM 153. Pipe support systems must be designed to have a minimum load safety factor of three (3) times the anticipated loading.
- B. Field fabricated pipe support systems, fasteners, and miscellaneous hardware must be cold-galvanized by painting metal surfaces with a 2-mil thick coating of ethyl silicate in-organic zinc-rich paint primer per manufacture's directions. Galvanized primer must be completely dry before backfilling the excavation. Field fabricated pipe support systems must be designed to have a minimum load safety factor of three (3) times the anticipated loading.
- C. Repair damaged galvanized coated surfaces in accordance with ASTM A780-93. Apply 2-mil thick coating of ethyl silicate in-organic zinc-rich paint primer per manufacturer's directions. Zinc primer must be allowed to completely dry before backfilling the excavation.
- D. Cold-galvanizing zinc primer paint must be of the inorganic, ethyl silicate type, containing at least 60% zinc dust and 40% adhesive binders, and conform to ASTM 780-93, type as manufactured by Tnemec Products, Kansas City, MO., Brite Products, Detroit, Mich., or Valspar Coatings, Minneapolis, MN.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All ductile iron pipe, fittings, and appurtenances must be installed in accordance with the manufacturer's recommendations and requirements.
- B. All pipe, fittings, and accessories must be delivered, unloaded, strung, and laid as specified here.
- C. The water mains must be laid with depths of cover as indicated under Article 3.12 of this specification, unless otherwise shown on the drawings, or directed by the Commissioner. The pipes must be laid true to line and grade.

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- D. Fittings as specified must be used where shown on the drawings and where grade or alignment changes require offsets greater than those recommended by the pipe manufacturer.

3.2 TRANSPORTATION AND DELIVERY

- A. Every precaution must be taken to prevent damage to the pipe during transportation and delivery. Extreme care must be taken in loading and unloading the pipe and fittings. Such work must be done slowly with skids or suitable power equipment and the pipe must be under complete control at all times. Under no conditions may the pipe be dropped, bumped, dragged, pushed, or moved in any way that will cause damage to the pipe. When handling the pipe with a crane, a suitable pipe hook or rope sling around the pipe must be used. Under no condition may the sling be allowed to pass through the pipe unless adequate measures are taken to prevent damage to the pipe ends and lining.
- B. If in the process of transportation, handling, or installation, any pipe or fitting is damaged, such pipe or fitting must be replaced by the Contractor and be considered incidental to the construction and no additional payment will be allowed.
- C. The Contractor must prevent the pipe from rolling. The procedures used to prevent rolling must be approved by the Commissioner.

3.3 PREPARATION FOR LAYING PIPE

- A. Materials, coatings, and linings must be as specified herein, shown on drawings, or directed by the Commissioner. Water mains and services must be installed where shown on the drawings. Installation must be in accordance with standards as recommended by the pipe manufacturer, and as specified herein.
- B. Proper and suitable tools and appliances for the safe and convenient cutting, handling, and laying of the pipe and fittings must be used.
- C. Before lying, all pipe and fittings must be thoroughly examined for defects and no piece may be installed which is known to be defective. If defects are discovered after pipe or fittings have been installed, the Contractor must remove the defective pipe and/or fitting and replace it with a sound one at his expense and to the satisfaction of the Commissioner.
- D. The pipe and fittings must be thoroughly cleaned before they are laid and must be kept clean until they are accepted in the finished work. Care must be exercised to avoid leaving bits of wood, dirt, rock and other foreign particles in the pipe. If any such materials are discovered before the final acceptance of the work, they must be removed and the pipe and fittings replaced, if necessary. All pipes must be kept absolutely clean during construction and

must be stopped off with night plugs at the end of each day's work. Exposed ends of uncompleted lines and existing water mains and services cut and not abandoned must be capped or otherwise temporarily sealed at all times when pipe laying is not in progress.

- E. When cutting ductile iron pipe, it must be neatly cut perpendicular to the longitudinal axis of the pipe without damaging the pipes lining or coating or jointing surface area.

3.4 LAYING WATER MAIN PIPE

- A. All pipelines must be laid in trench excavations on bedding or other foundations, as shown on the drawings, specified herein, or ordered by the Commissioner. The pipe must be properly secured against movement and pipe joints must be made in the excavation as required. Pipes must have solid bearing throughout their entire length.
- B. At locations where pipe thrust is anticipated to occur, pipe and fittings must be anchored or restrained as shown on the drawings, specified in Section 33 11 15 – Thrust Restraint, or as directed by the Commissioner. **Polyethylene encasement is to be installed on all new water main pipe and fittings before pipe is installed and braced against movement.** Care must be taken so as not to damage the polyethylene encasement during the installation or blocking of the pipe and fittings. If damage occurs, the Contractor must repair or replace the polyethylene encasement at his expense to the satisfaction of the Commissioner.
- C. Pipe laying will be permitted only in dry trenches having a stable bottom. Groundwater or water from other sources must be removed as per Section 31 23 19 – Dewatering Excavations. If the trench bottom is unsuitable for the pipes foundation, the kind of stabilization to be utilized will be ordered in writing.
- D. If, in the opinion of the Commissioner, the Contractor has failed to obtain an acceptably dry trench bottom using conventional methods of dewatering, the Commissioner may order the Contractor to excavate below the intended grade and to place sufficient sub-grade material as may be suitable over the trench bottom in accordance with Section 31 23 10 – Excavation, Trenching and Backfilling.
- E. The Contractor must also take such required precautions to prevent flotation of the new pipeline.

3.5 ASSEMBLY OF FLANGED JOINTS

- A. Flanged joints must be made with bolts or bolt studs with nuts as specified in Section 2.2 of this specification.

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- B. Tighten flange bolts as recommended by the gasket manufacturer to ensure an evenly compressed gasket and leak tight joint.
- C. After the bolts and nuts have been properly installed, tightened, and cleaned, prime them with bitumastic paint.

3.6 ASSEMBLY OF MECHANICAL JOINTS

- A. Thoroughly brush the surfaces with which the rubber gasket comes in contact with a wire brush just prior to assembly of the joint. Brush lubricant over the gasket and the plain end just prior to installation. In making up mechanical joints, the spigot must be centered in the bell.
- B. The gasket and gland must be placed in position, the bolts inserted, and the nuts tightened finger tight. The nuts must be tightened by means of a torque wrench in such a manner that the gland must be brought up evenly into the joint.
- C. Joints are to be made up to allow electrical continuity from one pipe to another by installing wedges as specified in Article 2.1, paragraph C of this specification and are to be installed in the following manner:
 - 1. Use two (2) wedges per joint for 3-inch to 12-inch diameter pipes. Wedges must be placed on opposite sides of the joint at an equal distance apart (9 and 3 o'clock positions) around the joint.
 - 2. Use four (4) wedges per joint for 16-inch to 24-inch diameter pipes. Wedges must be installed side by side in pairs placed on opposite sides of the joint at an equal distance apart (9 and 3 o'clock positions) around the joint.
 - 3. Use six (6) wedges per joint for pipes larger than 24-inches in diameter only if building services are directly connected to the main. Wedges must be installed side by side in pairs 120 degrees apart at the 12, 4, and 8 o'clock positions around the joint.
- D. The following range of bolt torques must be applied as specified in Table C. If sealing is not obtained at the maximum torque requirements listed in Table C, the joint must be disassembled, thoroughly cleaned, and reassembled.

TABLE C – BOLT TORQUE REQUIREMENTS

Bolt Size	Torque Range
5/8-inch	45-60 ft-lbs
¾-inch	75-90 ft-lbs
1-inch	85-100 ft-lbs
1 1/4inches	105-120 ft-lbs

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3.7 ASSEMBLY OF PUSH-ON RUBBER GASKET JOINTS

- A. Thoroughly brush the gasket seat in the bell with a wire brush and wipe the gasket and gasket seat with a cloth. Place the gasket in the socket with the large round end entering first so that the groove fits over the bead in the seat. Apply a thin film of NSF 61 approved joint lubricant to the inside surface of the gasket that will come into contact with the entering pipe.
- B. Thoroughly brush the plain end of the pipe with a wire brush and placed it in alignment with the bell of the pipe to which it is to be joined. Make up the joint by exerting sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket.
- C. Joints are to be made up to provide electrical continuity from one pipe to another by installing wedges as specified in Article 2.1, paragraph C of this specification and are to be installed in the following manner:
 - 1. Use two (2) wedges per joint for 3-inch to 12-inch diameter pipes. Wedges must be placed on opposite sides of the joint at an equal distance apart (9 and 3 o'clock positions) around the joint.
 - 2. Use four (4) wedges per joint for 16-inch to 24-inch diameter pipes. Wedges must be installed side by side in pairs placed on opposite sides of the joint at an equal distance apart (9 and 3 o'clock positions) around the joint.
 - 3. Use six (6) wedges per joint for pipes larger than 24-inches in diameter only if building services are directly connected to the main. Wedges must be installed side by side in pairs 120 degrees apart at the 12, 4, and 8 o'clock positions around the joint.
- D. Assemble restrained joint pipe in accordance with manufacture's instructions.

3.8 TEMPORARY BULKHEADS

- A. At ends of constructed sections where adjoining water mains or structures have not been completed and are not ready to be connected, temporary bulkheads must be used.

3.9 SHORT TUNNEL CONSTRUCTION

- A. Pipes to be placed in short tunnels must be jointed prior to being pulled into position. Pipe must be pushed or pulled into position in a manner arranged to keep joints tight and to prevent deflection.

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3.10 ENCASING DUCTILE IRON PIPE IN POLYETHYLENE

- A. All cast and ductile iron pipe and fittings must be encased in polyethylene tubing before being installed, blocked, or braced.

3.11 USE OF DAMAGED, DEFECTIVE, OR NON-SPECIFIED CASTINGS AND FITTINGS

- A. All construction castings and pipe fittings that are determined to be damaged, defective or do not meet these specifications and are stored within the Work area must be marked for non-use and removed and replaced with fittings that conform to these Specifications.

3.12 DEPTH OF PIPE COVER

- A. Unless otherwise shown on the Plans or directed by the Commissioner, all water mains and services must be installed so a minimum pipe cover is achieved as shown in Table D.

TABLE D – MINIMUM DEPTH OF COVER FOR WATER MAINS

Size of Pipe	Depth of Cover
3/4 to 3-inches	5-ft 6-inches ± 3-inches
4-inch	5-ft 6-inches ± 3-inches
6-inch	5-ft 6-inches ± 3-inches
8-inch	5-ft 3-inches ± 3-inches
12-inch	5-ft + 2-inches
16-inch	4-ft 6-inches ± 2-inches
24-inch	4-ft + 1-inch
30 to 42-inches	3-ft 6-inches (min) or as detailed on drawings
48-inches & Larger	3-ft (min) or as detailed on drawings

3.13 ABANDONMENT OF EXISTING WATER MAINS

- A. All openings on abandoned pipe or conduit are to be sealed with a concrete mortar plug of a minimum of one (1) foot in length within the pipe. Pipe 16-inches in diameter and larger must be filled with fine graded aggregate or controlled low strength material (CLSM) flowable fill, as appropriate, or directed by the Commissioner. CLSM flowable material must meet standards specified in Section 31 23 10, "Excavation, Trenching and Backfilling", paragraph 2.3, C of these specifications.

3.14 DISINFECTION OF PIPE AND FITTINGS

- A. Protect new and existing pipe and fittings from water, debris and foreign materials as specified in Section 31 23 10 – “Excavation, Trenching and Backfilling”.
- B. All new pipe, fittings, and valves must be disinfected in accordance with Section 33 13 00 – “Disinfection and Testing of Water Mains”, and the requirements of the Bureau of Water Quality which may be contacted at 312.744.8190.
- C. Swab all pipe and fittings that will not be pressure tested or chlorinated with a chlorine solution during installation. Extra precautions must be taken to prevent debris or ground water from entering the section of water main to be swabbed. Incorporate untested section of water main into the flushing routine when the work is necessitated, or part of, a water main replacement project. When connecting pipes to the existing city water system use normal operating pressure to visually inspect for leaks. If feasible, inspect for leaks prior to backfilling the excavation. Comply with all standards and requirements of the Bureau of Water Quality.

3.15 WATER MAIN SUPPORT SYSTEMS

- A. Support and anchor all piping in proper position and alignment with due allowance for expansion and contraction.
- B. The type, location, and arrangement of hangers and supports must be as shown on the drawings, or as directed by the Commissioner. Pipe supports and hardware must be appropriate to meet installation conditions, anticipated loading, and fabricated from corrosion resistant materials described in paragraph 2.7 - Pipe Support and Hangers, of this specification. All support systems whether pre-manufactured or field fabricated must have a minimum load safety factor of three (3) times the anticipated loading. Corrosion protective coatings damaged during installation of the pipe support system must be repaired per the manufactures requirements, or as directed by the Commissioner to maintain corrosion protection.

3.16 SEPARATION BETWEEN WATER AND SEWER MAINS

- A. When a water main crosses above a sewer main and the vertical separation is between 18 and 6-inches, as measured between the bottom of the water main and crown of sewer pipe, the sewer must be constructed of ductile iron pipe with rubber gasketed joints to a distance one foot beyond the wall of the trench excavation. Flexible transition coupling must be used to join the

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ductile iron pipe to the sewer pipe and be encased in betonite as shown on the drawings.

- B. When a water main crosses below a sewer main, the sewer pipe must be constructed of ductile iron pipe with rubber gasket joints for a perpendicular distance of 10-feet on either side of the center line of the water main, and an 18-inch vertical separation must be maintained. Flexible transition couplings must be used to join the ductile iron pipe to the sewer pipe.

END OF SECTION 33 11 13

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SECTION 33 11 15

THRUST RESTRAINT FOR WATER MAIN PIPING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes the requirements for providing thrust restraint for the installation of water mains and services as shown on the Drawings and specified here.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 33 11 13 – Ductile Iron Pipe and Fittings

1.3 Design Requirements

- A. Calculated thrust restraint must be based on the frictional force and bearing resistance between the pipe and the surrounding soil, with an allowance made for the polyethylene wrap on ductile iron pipe installations.

1.4 REFERENCES

- A. ANSI B1.1 - Unified Inch Screw Threads.
- B. ASTM A193 – Steel and Stainless Steel Bolting Materials
- C. ASTM A194 – Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both
- D. ASTM A325 - Heat Treated Structural Steel Bolts.
- E. ASTM A449 – Quenched and Tempered Steel Bolts and Nuts
- F. ASTM A536 - Ductile Iron Castings.
- G. ASTM A563 – Carbon and Alloy Steel Nuts
- H. ASTM A615 – Standard Specification for Deformed and plain Billet Steel Bars for Concrete Reinforcement.
- I. IDOT Standard Specifications for Road and Bridge Construction (SSRBC).
- J. Follow the latest edition of the above references.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE RESTRAINT

- A. Mechanical joint thrust restraint glands must be used unless otherwise directed. Where such glands cannot be used to provide sufficient thrust

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restraint, concrete thrust blocks must be used, unless directed by the Commissioner.

2.2 CONCRETE THRUST BLOCK RESTRAINT

- A. All concrete used in the construction of thrust blocks must be Class SI of the SSRBC.
- B. All reinforcing steel used in the construction of thrust blocks must conform to the requirements of ASTM A615.

2.3 TIE ROD PIPE RESTRAINT

- A. Where the use of tie rods to restrain thrust is approved by the Commissioner, they must meet the following ASTM Designations:

<u>Tie Rod Diameter</u>	<u>Rods</u>	<u>Nuts</u>	<u>Washers</u>
Up to 1-1/2"	A449	A563 Grade D	A325
Over 1-1/2"	A193	A194 Grade 2H	A325

- B. Tie rod threads must be the Unified Coarse Thread Series conforming to ANSI B1.1 for rods 1-inch in diameter and smaller and 8-inch pitch thread series for larger diameters. Nuts must be hexagonal. Harness tie rod nuts must have a standard chamfer on the back face with finished spherical bearing surface. The nuts must seat in steel plate washers having similar finished concave spherical seats. Where the use of mechanical joint retainer glands are called for on the Plans or approved by the Commissioner, they must conform to ASTM A536. All special castings must be made of good quality ductile iron of such character and so adapted in chemical composition to produce spheroidal graphite structure. The iron must be of such character to provide superior mechanical properties of strength and ductility; the iron must be soft enough to satisfactorily allow drilling and cutting.
- C. The minimum physical properties will be as follows:
 - 1. Tensile strength- 60,000 pounds per square inch.
 - 2. Yield strength- 42,000 pounds per square inch.
 - 3. 2-inch Elongation.-10%
- D. In addition to the standard required tests, the following requirements must be met: Keel Block Tests as detailed in ASTM A536-Standard 0.50-inch

diameter tensile test bars must be machined from keel block coupons cast from each heat and of the same hardness range as the special castings. Minimum test requirements are as specified above.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install all joint anchorage in accordance with the requirements of Section 33 11 13-Ductile Iron Pipe and Fittings. Install all joint anchorage for concrete pipe and fittings in accordance with manufacturer's installation instructions unless directed otherwise by the Commissioner.

3.2 DUCTILE IRON PIPE

- A. All fittings and conditions, which result in tangential forces on the piping, must be provided with thrust restraints, unless otherwise specified or approved by the Commissioner.

3.3 CONCRETE PIPE

- A. Whenever the harnessing of pipe joints by itself does not provide sufficient thrust restraint, the Contractor must provide additional thrust restraint as required. The Contractor must provide anchorage against thrust for water mains and appurtenances wherever the deflection of the pipeline exceeds six (6) degrees. The anchorage must be accomplished by placing concrete thrust blocks adjacent to the fittings to be anchored. All anchorage must be designed to withstand working pressure plus surge pressure. The Contractor must submit to the Commissioner complete design calculations and plans for all thrust restraints bearing the seal of a Professional Engineer licensed in the State of Illinois.

END OF SECTION 33 11 15

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SECTION 33 12 16
WATER MAIN CONTROL VALVES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes requirements for the installation of gate valves, resilient wedge valves, and butterfly valves.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 33 13 00 - Disinfection and Testing of Water Mains.

1.3 REFERENCES

- A. ASTM A48 - Gray Iron Castings.
- B. ASTM A126 - Gray Iron Castings for Valves, Flanges.
- C. ASTM A436 - Austenitic Gray Iron Castings.
- D. ASTM A439 - Austenitic Ductile Iron Castings.
- E. ASTM B584 - Copper Alloy Sand Castings for General Application.
- F. AWWA C110 - Ductile Iron and Gray Iron Fittings.
- G. AWWA C111 - Rubber Gasket Joints for Ductile Iron.
- H. AWWA C500 - Metal-seated Gate Valves for Water Supply Service
- I. AWWA C504 - Rubber Seated Butterfly Valves.
- J. AWWA C509 - Resilient Seated Gate Valves.
- K. AWWA C550 - Standard for Protective Epoxy Interior Coatings for Valves and Hydrants.
- L. Federal Specification FF-B-575C - Bolts; Hex and Square.
- M. Federal Specification FF-N-836E - Nut; Square, Hex, Cap.
- N. Follow the latest edition of the above references.

1.4 SUBMITTALS

- A. Contractor must provide an affidavit stating that all Butterfly Valves, valve operators, and torque overload protectors comply with all applicable provisions shown on the drawings and as specified in this specification.
- B. Provide manufactures catalog cuts and/or certified drawings of all valves, valve operators, and torque overload protectors to be furnished. The manufactures catalog cuts and/or certified drawings must provide all necessary information regarding dimensions and materials used and conformance to requirements stated in these specifications.

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- C. All submittals must be reviewed and approved by the Commissioner prior to installation.

1.5 QUALITY ASSURANCE

- A. Each valve must be hydrostatically tested at the manufacturer's shops and proven hydraulically tight at all pressures up to 200-pounds per square inch.
- B. For gate valves, the following tests are required:
 - 1. The first test consists of applying a 200-pound per square inch hydrostatic pressure between the discs through an opening in the bonnet casting.
 - 2. The second test consists of applying a 200-pound per square inch hydrostatic pressure against the outside of each disc in the manner prescribed below:
 - a. The valves must be plugged or capped on both ends. The caps or plugs must be drilled and tapped to accept the pressure test piping.
 - b. With the pressure test piping in place, open the gates of the valve, the test-piping valve, and remove the plug in the bonnet. Fill the valve with water. When a discharge occurs at the outlet side, close the water supply line and insert the bonnet plug.
 - c. Close the gates of the valves, open test-piping valve, and apply a 200-pound per square inch hydrostatic pressure on the inlet side.
 - d. Hold test pressure for one (1) minute. During this time no water should discharge from the outlet end of the test piping. If no leak occurs, release pressure, reverse the test piping, and repeat the test procedures for the other gate. If a leak occurs, repair and/or replace the valve as directed by the Commissioner. Repeat the test procedures.
 - 3. An affidavit must be furnished from the manufacturer to attest to the fact that each of the valves furnished under this Contract were proven hydrostatically tight in accordance with the specified test procedures.
- C. Valves that do not meet the requirements of this Section will be rejected and removed by the Contractor, and replaced with valves that conform to this Section, within the time period allowed by the Commissioner. Gate valve removal and replacement will be considered incidental to the installation of the valves and no additional payment will be allowed.

- D. The Work performed for installing valves must be performed by a plumber licensed in the State of Illinois or the City. The Work may include, but not be limited to, setting the valve; cutting and joining all pipe; installing test taps, fittings, adapters, joint gaskets, and continuity wedges; and tightening all gland nuts and bolts, as applicable for the installation.

PART 2 - PRODUCTS

2.1 GATE VALVES

- A. All gate valves are to be Chicago Standard Gate Valves of the size shown on the drawings that are designed, manufactured, tested, and inspected in accordance with AWWA C500, and in accordance with the exceptions noted here. All valves are to be delivered fully assembled.
- B. The following characters must be cast in ½-inch letters on the bonnet of each valve:
- Chicago
 - Year of Manufacture
 - Manufacture's Name
- C. Gate valves must be of mechanical joint type double disk and in the following sizes: 4-inch, 6-inch, 8-inch, 12-inch, and 16-inch. Larger size valves must be of a butterfly style.
- D. Material used must meet the requirements as to physical and chemical properties, as specified in this Section.
- E. Valves found to contain defects such as blowholes, shrinkage or slag holes, cold shuts, or cracks will be rejected.
- F. The thickness of metal in castings, whose standard thickness is less than 0.8-inch, must not be more than 0.08-inch less than the standard thickness. The deficiency in thickness of castings, whose standard thickness is 0.8-inch or more, must not exceed 10% of the standard thickness. The above allowable deficiencies in thickness, however, must not extend over more than one-half of the area of the casting.
- G. After being cleaned and tested, every assembled valve and all metallic parts must be coated inside and outside with coal tar pitch varnish. It must produce a smooth and non-tacky coating tough and tenacious when cold and not brittle nor with any tendency to scale off.
- H. The brass castings must comply with ASTM B584, Copper Alloy UNS No. C83600.

- I. The bronze in the valve stem and in the stem nut must be manganese bronze, complying with ASTM B584, Copper Alloy UNS No. C86700. Stem seals are to be double o-rings complying with ASTM D2000 and ASTM 568A
 - J. The gaskets used between the flanges must be fully faced, 1/32-inch thick and made of heavy-duty, asbestos-free, fiber composition, suitable for water service.
 - K. Bolts and nuts must be made of cast iron or steel. Heads of seal plate bolts must conform to the dimensions shown on the Drawings (an alternate of hex or square head bolt is acceptable) while all other requirements of seal plate bolts must conform to Federal Specification FF-B-575C and nuts must conform to FF-N-836E. Heads of bolts must be unfinished and nuts must be semi-finished. Both bolts and nuts must be hot dipped galvanized as specified in the applicable Federal Specification.
 - L. The valves herein specified must be furnished complete with mechanical joint accessories. The mechanical joint accessories must consist of mechanical joint thrust restraint glands, rubber gaskets, and tee head bolts and hex nuts, all conforming to AWWA C110. Dimensions and tolerances for mechanical joints must conform to table 1 of AWWA C110.
 - M. It will be the manufacturer's responsibility to provide the patterns and gauges necessary to perform the work to be done hereunder. The Department will not furnish these items.
 - N. The Department reserves the right to make at any time such tests as it may deem proper to determine that the materials used are proper for the Work and that the valves are of good mechanical construction. The manufacturer must give the authorized inspectors of the Department free access to all places where valves are being made. At the Department's request, the manufacturer must furnish properly prepared standard test specimens of the materials used and must provide facilities for testing them.
 - O. All valves must open by turning the operating stem clockwise.
 - P. Operating nuts must be 2 1/2-inches square at the base of the nut.
- 2.2 RESILIENT SEATED WEDGE GATE VALVES
- A. The Contractor must furnish and install resilient-seated gate valves that are designed, manufactured, tested, and inspected in accordance with AWWA C509, with following exceptions, deletions, or additions:
 - I. Exceptions for Section 4.4.7. Valves are to be supplied with 2 1/2-inch square operating stem wrench nuts.

2. Exception for Section 4.4.7.2. All valves must open by turning the operating stem clockwise as viewed from top of the valve.
- B. Resilient seated wedge gate valves must be of the mechanical joint type supplied complete with joint thrust restraint glands, vulcanized natural or synthetic rubber gaskets, and tee head bolts and hex nuts, all conforming to AWWA C110. Dimensions and tolerances for mechanical joints must conform to Table 1 of AWWA C110.
- C. All valves must provide an unobstructed waterway of full size when open. Gates or stems must not extend into the waterway. Valves are to be supplied in sizes between 4 and 12-inches as noted on the drawings.
1. The bronze in the valve stem and in the stem nut must be manganese bronze, complying with ASTM B584, Copper Alloy UNS No. C86700. Stem seals are to be double o-rings complying with ASTM D2000 and ASTM 568A.
 2. After being cleaned and tested, every assembled valve and all metallic parts must be coated inside and outside with coal tar pitch varnish. It must produce a smooth and non-tacky coating tough and tenacious when cold and not brittle nor with any tendency to scale off.

2.3 BUTTERFLY VALVES

- A. Butterfly valves, as specified here, must be designed, manufactured, tested, and inspected in accordance with AWWA C504, Class 150Band with the requirements of this Section as listed hereafter:
1. Body Type: Short bodied mechanical joint, as specified.
 2. Maximum Non-shock Shut-off Pressure: 100psi.
 3. All valves must have flow through discs.
 4. Each valve furnished must be subjected to the performance, leakage and hydrostatic tests described in Section 5.2 of AWWA C504.
 5. A minimum of two (2) weeks prior to the test dates, the manufacturer must notify the Commissioner in writing when the shop testing of the valve will occur. Failure to notify the Commissioner will not be grounds for rejection.
 6. The manufacturer must submit to the Commissioner records of all tests performed under Sections 2.3, 3.8.5, and 5.2 of AWWA C504.

7. Shaft seals must be either split V type packing or "O" ring seals. Shaft seals consisting of a stuffing box with pull down packing are not acceptable.
8. The shaft seal area must not be exposed to the environment. Should the valve design utilize an open packing bonnet area, that area must be enclosed with a 304 series type 18-8 stainless steel, minimum 1/4-inch thick removable shroud. The shroud must be fully sealed and rated for buried service. An access cover must be provided on the shroud with a minimum opening of 6-inches x 8-inches.
9. The valve shaft must be 304 or 316 stainless steel.
10. The valve body must be made of cast iron conforming to ASTM A126, Class B or ASTM A48, Class 40 alloy cast iron ASTM A436, Type 1 and 2 or ASTM A439, type D2 with maximum of 0.003% lead. The valve disc must be cast iron conforming to ASTM A48, Class 40 and it must have a seating edge of 304 or 316 stainless steel. The seating edge may be installed in the valve body if the rubber seat is applied to the valve disc. The valve seats for 24-inch and larger butterfly valves must be capable of adjustment or replacement at the installation site.
11. Valve discs must be secured to shafts by means of solid, smooth-sided stainless steel or monel taper pins or dowel pins having a circular cross section. Each taper pin or dowel pin must be extended through the shaft and mechanically secured in place. The use of bolts, setscrews, knurled or fluted dowel pins, flat sided taper pins, expansion pins, roll pins, tension pins, spring pins, or other devices in lieu of the pins specified herein will not be acceptable.
12. The valves and valve operators must be rated for buried service, except electric actuators.
13. Valve operators must conform to AWWA C504 for Class 150B. Manual operators must be worm gear, self-locking type designed to hold the valve in any intermediate position without creeping or fluttering. Operators must be equipped with torque overload protection to prevent over travel of the disc in the open and closed position. Spur gear must be furnished with an operator to increase the number of turns and reduce operating torque. A separate limit stop device must also be installed in accordance with "Torque Overload Protection", described below. Operators must provide position indication on the housing of the operator. Valves must open with a clockwise rotation of the nut. The valve and valve operator must be rated for bi-directional flow.

14. Valve operators must be equipped with a Chicago standard style hub nut. The hub nut must be attached to the input shaft of the operator by means of a shear pin. The shear pin must be sized such that it fails when 350 foot-pounds of input torque is applied to the hub nut. Three (3) additional shear pins must be furnished as replacement part for each valve ordered.
 15. Corrosion resistant nameplates, as described in Section 6.1 of AWWA C504, must be permanently attached to both the valve and valve operator. There must be two (2) valve nameplates. One must be affixed to the valve body and the other must be affixed to the valve operator in a prominent location. In addition to the normal valve data, the plate must also include the number of turns required to operate the valve and the direction to open (clockwise to open). There must be one (1) operator nameplate affixed to the valve operator. The minimum number of turns to close the valve must be no less than 2 turns per inch (5 turns per centimeter) of valve size in order to minimize water hammer.
 16. The manufacturer must provide all nuts, bolts, gaskets, and glands required to make connections.
- B. Torque Overload Protection
1. Contractor must furnish torque overload protection devices. The device must be installed on top of the Chicago standard hub nut on butterfly valve operators and in conformance to the following requirements.
 2. Purpose: The over torque protector must prevent butterfly valve and operator from damage due to excessive operating torque.
 3. Operation: The device must transmit applied torque in either direction only up to a preset amount and automatically disengage if greater torque is applied. It must automatically reset if the applied torque is below the preset amount.
 4. Description: The device must be of overall rugged and of durable construction suitable for long-term reliable operation and suitable for buried service.
 5. The upper end must have an integral 2 1/2-inch square operating nut and the lower end must have a matching socket. The socket must have one (1) 2-inch square head set screw in each of two (2) adjacent faces.
 6. The operating mechanism must employ spring-loaded tapered rollers engaged in matching tapered detents. A ball bearing type design will not be accepted.

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7. The manufacturer's identification must be cast in 3/8-inch or larger letters on an upper surface.
8. Corrosion Protection and Lubrication: The entire housing must be coated inside and outside with two-part epoxy. The outside must have a topcoat of two-part polyurethane similar in color to U.S. Paint #G9337 "Sun Yellow".
9. The operating mechanism must be permanently lubricated and sealed to withstand 50-feet of water head.
10. There must be no water-retaining external cavities.
11. Service Life: The device must have a minimum life of one-thousand (1000) trips from rated capacity.
12. Trip Torque Set Point: The device must be factory set to trip at 200-foot-pounds of applied torque.
13. Trip Torque Adjustment: Trip torque must be adjustable from 10% to 100% of rated capacity without disassembling the unit. The adjustment means must be sealed and concealed to prevent tampering.

2.4 QUARTER TURN AWWA ELECTRIC VALVE ACTUATORS (OPEN-CLOSE SERVICE)

- A. When shown on the Plans, specified, or as directed by the Commissioner, the Contractor must furnish electric valve actuators in conformance with the following requirements.
 1. The electric valve actuator must include the motor, actuator unit gearing, position limit switches, torque switches, declutch lever, and hand wheel, as self-contained unit. The actuator must meet the latest revision of the applicable AWWA specification. The actuator must be of sufficient capacity to operate the attached butterfly valve in a modulating action against 100-pounds per square inch pressure.
 2. The motor must be rated for continuous duty, specifically designed for valve actuator service, and must be of high starting torque, totally enclosed, non-ventilated construction. Motor insulation must be a minimum NEMA Class F, with a maximum continuous temperature rating of 311° F (rise plus ambient) for the duty cycle specified. Provide optional insulation classes where specified or where service conditions warrant.
 3. The motor must be of sufficient size to open or close the valve at the maximum torque. The motor must be capable of operating at plus or minus 10% of specified voltage. The motor duty rating must be sufficient for one (1) complete cycle (open-close-open, or reverse)

without exceeding its temperature rating. Motor bearings must be of the anti-friction type, and permanently lubricated.

4. The motor must be an independent sub-assembly such that the power gearing must not be an integral part of the motor assembly, to allow for motor or gear changes dictated by system operation changes. The motor must be equipped with internal thermal contact, to protect against motor overload, and 120-volt heaters. The motor must be designed to operate on 230/460 VAC.
5. The actuator must be a multiple reduction unit with power gearing consisting of spur or helical and worm gearing. There must be a self-locking worm gear set in the drive train to maintain valve position. The spur or helical gearing and worm gear must be of hardened alloy steel, and the worm gear must be alloy bronze. All power gearing must be accurately cut; non-metallic, aluminum, or cast gearing must not be allowed. Anti-friction bearings with caged balls or rollers must be used throughout.
6. All rotating power train components must be immersed in grease with provisions for inspection and re-lubrication without disassembly. Lubricants must be suitable for ambient conditions between 20° F and 150° F. Adequate seals must be provided on all shafting.
7. The actuator must have a built-in device, which allows the motor to reach full speed before engaging the valve load when required by unseating applications.
8. A metallic hand wheel must be provided for manual operation, with an arrow to indicate "open" rotation. The hand wheel must not rotate during motor operation. A fused motor must not prevent manual operation. When in manual operating mode, the actuator must remain in this mode until the motor is energized, at which time the actuator will automatically return to electric operation. Changing from motor operation to manual operation must be accomplished by a positive, padlockable declutching lever, which mechanically disengages the motor and related gearing. It must be impossible for simultaneous manual and motor operation to occur. Friction type declutching mechanisms are not acceptable.
9. Position limit switches and associated gearing must be an integral part of the valve actuator. Limit switch gearing must be of the intermittent type, made of bronze or stainless steel, lubricated, and totally enclosed to prevent dirt and foreign matter from entering the gear train. Limit switch contacts must be heavy duty and silver-plated with wiping action. Where specified, the actuator must have sixteen (16) contacts, four (4) contact/four (4) rotor types, all of the same basic design. As an alternative, a limit switch assembly may be directly coupled to the

valve stem, eliminating the need for intermittent gearing, and eight (8) single pole, double throw (SPDT) or eight (8) double pole, double throw, (DPDT) contacts. Contacts must be convertible from normally open, to normally closed, or reverse.

10. Switches must be adjustable, allowing for trip points from fully open to fully closed positions of valve travel. They must not be subject to breakage or slippage due to over-travel.
11. Switch design must permit visible verification of switch position without disassembly.
12. Each valve actuator must be equipped with a switch that will interrupt the control circuit in both the opening and closing directions when valve torque overload occurs. Contacts must be silver-plated. The torque switch must have graduated dials for both open and close directions of travel, and each must be independently adjustable. The torque switch must include a positive means to limit adjustability so as not to exceed the actuator output torque capability. The activating spring back must be of the Belleville spring design.
13. The position limit switch and torque switch contact must be rated 600 volts per NEMA standard ICS 2-125, heavy duty.
14. The control compartment must be provided with a 120-volt space heater.
15. The valve and operator must be aligned in such a manner that when installed, the manual hand wheel is in a horizontal plane.
16. The operating time must be two (2) minutes for 90 °-valve travels.

PART 3 - EXECUTION

3.1 FIELD TESTING

- A. All valves will be tested as specified in Section 33 13 00 - Disinfection and Testing of Water Mains.

3.2 SETTING OF VALVES

- A. Valves must be carefully installed in their proper positions, free from all distortion and strain, with mechanical or flanged joints, and must be packed and left in satisfactory operating condition.

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3.3 SETTING OF VALVE BOXES

- A. Valve boxes must be installed where shown on the drawings, or where ordered by the Commissioner, and must be set vertical and concentric with the valve box. Any valve box which has been moved from its original position by direct or indirect actions of the Contractor, so as to prevent the operation of the valve key extension, must be reset and/or replaced as applicable, by the Contractor. This work will be considered incidental to the construction and not considered for additional payment. Any valve key extension or stem, which has been damaged so that it is inoperable, must also be replaced, and will also be considered incidental to the construction and no additional payment will be allowed.

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SECTION 33 12 17

WATER MAIN TAPPING CONNECTIONS AND VALVES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes the requirements for tapping iron and concrete water mains while maintaining the water main under line pressure without disrupting service to customers as shown on the drawings and specified here.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 03 30 00 – Cast In Place Concrete
- B. Section 33 11 13 – Ductile Iron Water Main Pipe and Fittings

1.3 REFERENCES

- A. ANSI A21.11 - Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
- B. ASME/ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
- C. ASTM A126 - Gray Iron Castings for Valves.
- D. ASTM A240 - Stainless Steel for Pressure Vessels.
- E. ASTM A242 - High Strength - Low Alloy Structural Steel.
- F. ASTM A285 - Carbon Steel for Pressure Vessels.
- G. ASTM A351 - Castings for Pressure Containing Parts.
- H. ASTM A536 - Ductile Iron Castings.
- I. AWWA C213 - Fusion Bonded Epoxy Coatings.
- J. AWWA C500 - Gate Valves for Water Supply.
- K. ANSI/AWWA-C110/A21.0 – Ductile Iron Flanged Fittings
- L. MSS-SP60 - Connecting Flange Joint Between Tapping Sleeve and Valve.
- M. Follow the latest edition of the above references.

1.4 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. Provide an affidavit stating that tapping valves, tapping sleeves, and all appurtenances comply with all applicable provisions of the Drawings and the Specifications.
- C. Provide manufacturer certified drawings (in triplicate) of the valves and sleeves that are proposed for the installation. The drawings must provide all

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necessary information regarding dimensions and materials used, including the tapping machine.

1.5 QUALITY CONTROL

- A. The City reserves the right to make at any time such tests as it may deem proper to determine that the materials used are proper for the Work and that the sleeve and valve are of good mechanical construction. The manufacturer must provide authorized inspectors of the City free access to all places where sleeves and valves are being manufactured, furnish standard test specimens of materials specified for use, and access to testing facilities for testing material samples.
- B. **The Work necessary for direct tapping of iron or concrete pipe must be performed by a plumber licensed in the State of Illinois or the City. This Work may include, but not be limited to, the installation of tapping machinery and tapping of the pipe; the installation of tapping sleeves and taps; the installation of joint gaskets; the tightening of all gland nuts and bolts; and the tightening of continuity bolts, as applicable for the installation.**

PART 2 - PRODUCTS

2.1 GENERAL

- A. The tapping connection and valve must provide a branch connection at right angles to the existing water main being tapped without shutting down the main.

2.2 TAPS 12" X 12" AND SMALLER

- A. The tapping connection must be the split sleeve, all stainless steel, full gasket type featuring low profile lugs with separate, replaceable bolts for assembly. All welds must be fully passivated to restore the original high corrosion resistance and appearance of the stainless steel. The sleeve sections must be connected with nuts and bolts, and must be designed to fit iron water pipe of the sizes as determined by field inspections. The inside diameter of the branch connection must be of full size so as to allow the free passage of a standard cutter.
- B. The branch outlet of the sleeves (connection) must be either CF8 stainless steel per ASTM A351, type 304 stainless steel per ASTM A240, 125-pounds drilling per ANSI B16.1, recessed for tapping valve per MSS-SP60, bonded flanged gasket.

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- C. All bolts and nuts must be type 304 stainless steel. Bolts must be separate, self-aligning, and replaceable. Nuts must be impregnated with anti glaring lubricant. Integral bolts welded to the sleeve are not permitted.
- D. The side flange gaskets for bolted sleeves to be furnished with each connection must be made of vulcanized natural or synthetic rubber.
- E. The body of each connection must be stenciled with a range of pipe diameters that the connection will fit and also the diameter of the branch.
- F. All sleeves must be designed for 150-pounds per square inch pressure rating.

2.3 TAPS LARGER THAN 12" X 12"

- A. This tapping connection must be of the split sleeve, cast or ductile iron, mechanical joint end type, or the fabricated steel type with epoxy coating and stainless steel nuts and bolts. Sleeves must be sized to compensate for a normal amount of oversize and out-of-roundness in the pipe. In the mechanical joint type, the use of two (2) gaskets of different cross-sections to accomplish this will be acceptable. Supply all necessary mechanical joint accessories. The sleeve sections must be connected by means of bolts and nuts and must be designed to fit iron water pipe of the sizes as determined by field inspections.
- B. The sleeve must be designed to fit Class "B" water pipe. The inside diameter of the branch connection must be full size so as to allow the free passage of standard cutters.
- C. Sleeve Body
 - 1. Mechanical joint type: must be gray cast iron conforming to ASTM A126 Class "B" or ductile iron conforming to ASTM A536.
 - 2. Fabricated Steel type: Must be steel conforming to ASTM A285 Grade "C". A 10-mil minimum thickness of fusion-applied epoxy must coat the body. This epoxy coating must meet the requirements of AWWA C213.
- D. The branch outlet of the sleeves must be flanged, 125-pound drilling per ASME/ANSI B16.1, and recessed for tapping valve as per MSS-SP60.
- E. Bolts and Nuts
 - 1. Mechanical joint type: High strength, low alloy steel conforming to ASTM A242 or stainless steel of the type 300 series Austenitic.
 - 2. Fabricated steel type: Stainless steel 18-8 type 304.

F. All bolts must be separate, self-aligning, and replaceable. Stainless steel nuts must be impregnated with anti-galling lubricant.

G. Gaskets

1. Mechanical joint types: Side flange gaskets must be furnished with each connection.
2. Fabricated steel type: A minimum 7/8-inch wide, recessed, BUNA-N gasket around the outlet.

H. The tapping sleeve must have a 3/4-inch diameter bronze NPT test plug located in the branch outlet.

I. The body of the tapping sleeve must be stenciled with the range of pipe diameters the sleeve will fit and also the diameter of the branch.

J. All sleeves must be designated for 150-pounds per square inch pressure rating.

2.4 TAPPING VALVES

A. The valves must be double-disc gate valves of a standard design and must open by turning in a clockwise direction.

B. Valves are subject to approval by the Commissioner and must conform to AWWA C500 for valves of sufficient strength to withstand 150-pounds working pressure. Body ring lugs must be cut out leaving an oversized circular waterway suitable for use with a standard sized cutter head.

C. Valves must have flange inlet by mechanical joint outlet. Furnish all accessories required for completing connections at both ends of the valve. The companion flange for the mechanical joint outlet must be designed to accept standard tapping machines.

D. Valve operating nuts must be 2 1/2 -inches square at the base of the nut.

E. The valve stem must show an ultimate tensile strength of not less than 60,000-pounds per square inch and a minimum elongation of 15% in 2-inches.

F. The castings must be of gray iron conforming to ASTM A126 Class "B" and must be free from defects such as blow holes, blisters; cold shuts, cracks, etc. Castings must be true pattern, boldly filleted at angles, and free from flaws. Castings must not be filled or plugged in any manner.

G. All iron castings must be coated with petroleum asphaltic material and must be given two (2) coats outside and one (1) coat inside. All surfaces to be painted must be free from all rust, residues, and debris and must be in proper, dry condition immediately prior to paint application.

- H. The diameter of the castings must not vary from the diameter given on the drawings by more than 0.08-inch for castings 16-inches or less in diameter, 0.10-inch for 20-inch and 24-inch castings; 0.13-inch for 30-inch, 36-inch, and 42-inch castings; and 0.16-inch for 48-inch castings.
- I. Tapping connections and valves found on inspection to contain defects, such as blowholes, shrinkage, slag holes, cold shuts, cracks, etc., will be rejected, removed from the Work area and replaced with tapping connections and valves that conform to this Section. This process will be considered incidental to the construction of the tapping connections and valves and no additional payment will be allowed.
- J. Designs of sleeves to be utilized for use in tapping concrete pipe must be submitted for approval by the Commissioner for the particular pipe and circumstance for which they will be utilized.

2.5 FLANGES AND BOLTS

- A. Provide flanged fitting on tapping saddle and provide Ductile Iron Blind Flange meeting ANSI/AWWA-C110/A21.0. Conform to Section 33 11 13 – Ductile Iron Pipe and Fittings. Class 125 rated for 250 psig working pressure.
- B. Provide gaskets bolts, nuts and washers as required meeting requirements of Section 33 11 13 – Ductile Iron Pipe and Fittings

2.6 CONCRETE ENCASEMENT

- A. Provide concrete encasement as noted on the Plans as specified in Section 03 30 00 – Cast-In-Place Concrete. Concrete for encasement of water main and appurtenances must **NOT INCLUDE FLY ASH IN THE MIX**.

PART 3 - EXECUTION

3.1 TAPPING REINFORCED CONCRETE CYLINDER PIPE

- A. Prior to tapping PCCP (Prestressed Concrete Cylinder Pipe) Mains in this work, coordinate with CDWM for isolation of each pipe section from system pressure using existing system isolation valves. Contractor may relieve pressure of isolated pipe section prior to tapping.
- B. Coordinate with DWM details.
- C. Tap reinforced concrete cylinder pipe to provide flanged outlets as follows:
 - 1. Wire rubber gaskets (part #4, Detail 5-1) under edges of saddle (part #2, Detail 5-1). Assemble saddle on concrete cylinder pipe (part #1,

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Detail 5-1) with U-bolts (part #3, Detail 5-1). Draw up saddle lightly against gaskets to seal space between saddle and pipe.

2. Pour mortar grout into space between saddle plate and pipe through grout holes (part #5, Detail 5-1). After grout between saddle and pipe has taken its initial set, tighten saddle firmly against grout. Cut circumferential steel wires (part #7, Detail 5-1) or rods away from outside of cylinder, even with edge of hole in saddle.
3. If area of cylinder to be tapped includes a longitudinal seam, carefully file weld down to sheet metal and fill recess with hot or cold solder.
4. For outlets larger than 12-inches attach concrete lining of pipe to steel cylinder.
5. Place rubber gland gasket (part #8, Detail 5-1) into groove of gland (part #9, Detail 5-1). Insert gland through hole in saddle. Using studs and nuts (part #10, Detail 5-1) pull gland toward the cylinder, compressing the gasket to make a watertight seal.
6. Place special blind flange on gland flange.
7. Fill outlet with water and apply pressure to check tightness of gland gasket. Remove blind flange.
8. For outlets with diameters 12-inches and larger, wire form around outside of gland flange and saddle flange and pour mortar grout into space between flanges and between necks of saddle and gland. Allow mortar to set-up before cutting. For outlets with diameters less than 12-inches, this operation can be done after completing the cut.
9. Fill recess between inner end of gland and surface of cylinder with neat cement or mortar.
10. Attach tapping valve and tapping machine equipped with pilot drill and carbide tipped cutter. Drill and cut through cylinder and concrete pipe core. Retract drill and cutter, close valve, and remove tapping machine.
11. Encase all buried metal parts (saddle and U-Bolts) in 1:3 concrete or mortar mix with a minimum cover of 3 inches.
12. After placing the saddle and removing the outside concrete and circumferential reinforcement to expose the section of the core through which the tap is to be made, toggle bolts and stiffening ribs are installed under pressure.

13. Insert the toggle bolts, under pressure, as follows:

Mount frame, shown as part #1, Detail 5-2 on the details, firmly on the flange of the saddle. A gland (part #2, Detail 5-2) with a corporation stop (part #3, Detail 5-2) attached and jacking bolts (part #4, Detail 5-2) are then mounted between the frame and the exposed steel cylinder. Jack the bolts against the frame to compress a rubber gasket between the gland and the steel cylinder and to hold the gland and corporation cock firmly in place. A standard drilling machine is then mounted on the corporation stop. With the corporation stop open, the drill is advanced through the stop and gland and a hole is then drilled through the steel and concrete core. After retracting the drill, the corporation is closed and the drilling machine removed.

14. A toggle inserting machine, part #5, Detail 5-2 on the details, is then mounted on the corporation stop with a specially designed toggle bolt in place in the machine. A detailed sketch of the toggle bolt is shown on the details. The machine is designed so that it will push the toggle bolt through the corporation stop, gland and core, pull it back engaging the toggles against the inner surface of the pipe and rotate the bolt so that it firmly tightens and holds the concrete core to the steel cylinder.

Referring to Appendix A showing the details of the toggle bolt, and Appendix A, it will be noted that a conically shaped rubber stopper achieves the seal. The tightness of this seal is checked by a small cock attached to the gland, (part #6, Detail 5-2) on the details. Water stops coming out of the open cock when the seal is achieved. The conical pilot nut shown on the details helps center the toggle so that it will not "hang up" going through the hole in the core. The specially designed head of the toggle bolt allows it to be pushed, pulled, rotated, and released after the toggle bolt is tightened in place. Two (2) toggle bolts can be installed at each frame setting. As many toggle bolts can be placed as appear necessary to hold the concrete core. Two (2) have been found sufficient in 14-inch, 20-inch, 24-inch, and 30-inch taps; four (4) in 16-inch taps.

15. After completing the installation of the toggle bolts, the stiffening ribs are installed. The ribs (part #7, Detail 5-3) are circumferentially apposed as shown on the top view on the details. Each rib assembly consists of two (2) curved steel bars held parallel by one (1) or more welded steel cross members and they are curved to a radius-less than that of the outside of the cylinder so that they contact the cylinder only at their ends. Each rib is placed so that the two curved bars straddle a pair of toggle bolts, and two (2) screws (part #9, Detail 5-3) on the details, passing through the clamp plates (part #8, Detail 5-3) into holes threaded in the heads of the toggle bolts, hold the ribs tight to the cylinder.

- D. The intent of the toggle bolts is to tie the concrete lining or sections of the concrete, if there is any cracking, to the cylinder so that the concrete portion of the core will be retracted with the steel cylinder portion of the core.

3.2 TAPPING IRON PIPE

- A. Excavate and expose all iron pipes to be tapped and measure the outside diameter prior to ordering the taps. Install tapping connections per manufacturer's instructions.

END OF SECTION 33 12 17

SECTION 33 12 19
FIRE HYDRANTS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes requirements for supplying materials for and the installation of fire hydrants, as shown on the drawings and specified here.

1.2 REFERENCES

- A. ASTM A108 - Standard Quality Carbon Steel Bars.
- B. ASTM A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- C. ASTM A153 - Hot Dip Zinc Coating for Iron and Steel Hardware.
- D. ASTM A307 - Carbon Steel Bolts and Studs.
- E. ASTM A536 - Ductile Iron Castings.
- F. ASTM B62 - Composition Bronze or Ounce Metal Castings.
- G. ASTM B584 - Copper Alloy Sand Castings.
- H. ASTM B633 - Electrodeposited Zinc Coatings on Iron and Steel.
- I. ASTM C700 - Vitified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
- J. ASTM D395 - Test Methods for Rubber Property Compression Set.
- K. ASTM D412 - Test Methods for Rubber and Elastomers.
- L. ASTM D2000 - Classification of Rubber Products in Automotive Applications.
- M. ASTM D2240 - Durometer Test for Rubber Hardness.
- N. AWWA C502 - Dry Barrel Fire Hydrants.
- O. Federal Specification FF-B-575C - Bolts; Hexagon and Square.
- P. Federal Specification RR-C 271D - Chains and Attachments.
- Q. Follow the latest edition of the above references.

1.3 SUBMITTALS

- A. Provide an affidavit from the manufacturer to attest to the fact that all hydrants furnished under this Contract were tested and proven hydrostatically tight and mechanically sound in accordance with the specified test procedures.

1.4 QUALITY ASSURANCE

- A. After each hydrant is completely assembled, it must be mechanically and hydrostatically tested in conformance with AWWA C502, Sec 5.1.
- B. **The Work performed for the hydrant installation must be performed by a plumber licensed in the State of Illinois or the City. The Work may include, but not be limited to, setting hydrants; joining all pipe, fittings,**

**and valves; installation of joint gaskets and continuity wedges; and
tightening of all gland nuts and bolts, as applicable for the installation.**

PART 2 - PRODUCTS

2.1 GENERAL

- A. The hydrants must be of the City of Chicago standard design with mechanical joint bottom. The completed hydrants must be delivered finished, painted, and fully assembled.

2.2 FIRE HYDRANTS

- A. The standpipe must include the manufacturer's name, year of manufacturing, and the letters "C.W.W." in letters 1-inch high. This lettering must be positioned approximately 1-foot below the top flange.
- B. Materials from which the various parts of the hydrants are constructed must be of the kind designated on the details. Each kind of material used must meet the requirements as to physical and chemical properties hereafter specified. Test bars required to established quality grade or strength under the ASTM standards must be made and machined by the manufacturer as part of the work.
- C. 3/4-inch x 2 3/4-inch unfinished hex head machine bolts and 3/4-inch American Standard regular hot press hex nuts must conform to Federal Specification FF-B-575C, Class B Steel, Class 1 fit or, hex head bolts and hex nuts must conform to ASTM A307 Grade A. All nuts and bolts to be hot dipped galvanized conforming to ASTM A153 or must be coated by the rust proof electrozinc process ASTM B633, Type G.S., or SS Type 18-8SS, ANSI Type 302, 303, or 304.
- D. Iron castings must conform to ASTM A126 Class B. The thickness of metal castings, whose standard thickness is less than 0.8-inch, must not be more than 0.08-inch less than the standard thickness. The deficiency in thickness of castings, whose standard thickness is 0.8-inch or more, must not exceed 10% of the standard thickness. The above allowable deficiencies in thickness must not extend over more than one-half of the area of any casting. The diameter of the castings must not vary from the standard dimensions by more than .08-inch.
- E. All bronze castings, with the exception of the stem nut, stem screw, and valve seats must conform to ASTM B62 for Leaded Red Brass Copper Alloy UNS No. C83600. The valve seat must conform to ASTM B584 for Leaded Manganese Bronze, Copper Alloy UNS No. C86700. The stem nut and stem

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screw must conform to ASTM B584 for Silicon Brass, Copper Alloy UNS No. C87600 with the following mechanical properties:

1. Minimum Tensile Strength - 45,000-psi
 2. Minimum Yield Strength - 25,000 psi
 3. Minimum Elongation - 16% of length
 4. Brinell Hardness - 110
- F. The stem nut and stem screw must be stamped SI for identification purposes.
- G. Wrench nuts made of ductile iron must be marked "D.I." on the flange portion opposite the arrow indicating the direction of turn to open.
- H. Ductile iron castings must comply with compositions and physical properties in accordance with ASTM A536 Grade 65-45-12.
- I. The City will furnish neoprene-seating valves if requested by the Contractor. The Contractor's charges for transporting the neoprene seating valves must be considered incidental to the construction and no additional payment will be allowed.
- J. Full face gasket of suitable material, 1/16-inch thick, 8 1/2-inches X 13 1/2-inches, with eight (8) 7/8-inch diameter holes on an 11 3/4-inch bolt circle must be provided for the hydrant flange gaskets.
- K. Steel hydrant chain must comply with Federal Specification RR-C-271D (1), Type II, Class 2, with an approximate weight of 25-pounds per 100-feet, and have a hot galvanized coating. This chain, approximately 26-inches long, must be connected to hydrant cap hooks and fastened at its center to the hydrant by means of the 1/2-inch X 1-inch cap screw with chain angle and "S" hook of 1/2-inch mild steel stock "S" hook and cap hooks which engage the chain, must be securely welded in the closed position or fastened in a suitable manner to hold the hooks securely in a closed position.
- L. Where the Plans call for finish and drilling, all such work must accurately comply with the dimensions shown, so that all parts are interchangeable from one hydrant to another. It will be the manufacturer's responsibility to provide the patterns and gauges necessary to perform the work specified.
- M. Where machining tolerances are not indicated on the drawings, the following must be used where applicable:
1. If dimension is in decimals, tolerance is ± 0.005 -inch
 2. If dimension is in inches, tolerance is $\pm 1/64$ -inch

- N. Appropriate lubricant must be applied to threads on hydrant bottom, ½-inch X 1-inch cap screw and valve seat before assembly.
- O. Operating stem must be of cold rolled steel, ASTM A108 Grade 1018. Stem must be coated, excluding bottom 3 7/8-inch of the section below shoulder including threads, with a bituminous coating.
- P. Rubber Gaskets must comply with ASTM D2000; Type SC-715B, as follows:
 - 1. Shore A Durometer Hardness - 70 ± 5 ASTM D2240.
 - 2. Tensile Strength - 1500-psi minimum ASTM D412.
 - 3. Compression Set - 35% maximum ASTM D395.
- Q. The City reserves the right to make at any time such tests as it may deem proper to determine that the materials used are proper for the work and that the hydrants are of good mechanical construction. The contractor must give the authorized inspectors of the City free access to all places where hydrants are being made. At the City's request the manufacturer must furnish properly prepared standard test specimens of the materials used and must provide facilities for testing them.
- R. Fire Hydrants that do not meet the requirements of this Specification will be rejected and, when so ordered by the City, the Contractor must remove all inferior hydrants not meeting the Specification and replace rejected items within the time limits as specified. The removal and replacement of the hydrants will be considered incidental to the construction and no additional payment will be allowed.

2.3 PAINT

- A. All ferrous metal parts of the hydrant, inside and outside, must be thoroughly cleaned before coating. Coatings used on interior surfaces of the hydrant that are in contact with potable water must be suitable for contact with drinking water. Prepare hydrant surfaces and apply paint in accordance with paint manufacturer's recommendations. Do not paint exposed hydrant nozzle threads or other useable threads.
- B. Primer must be red oxide primer; acceptable products are W. C. Richards Metal primer #WRFA-13-127; or Benjamin Moore Universal Metal Primer #M07.
- C. Top coat must be alkyd high-gloss enamel; acceptable produces are Benjamin Moore Impervo #C13320 (Brilliant Red), or Sherwin Williams Industrial Enamel Safety Red #617-4064.
- D. Paint for color coding flange must be as follows:

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1. White colored pigment; acceptable products are Seymour Stripe #16-652 Spray (White), Rustoleum High Performance Acrylic 5200 System (#5292 Gloss White), or Sherwin Williams PM 200 AES Pure White #5178-99993.
 2. Yellow colored pigment; acceptable products are Benjamin Moore Impervo #C133 Alkyd High-Gloss Metal and Wood Enamel (Safety Yellow), or Sherwin Williams Industrial Enamel Safety Yellow #617-4072, #617-8000, or #617-50320.
 3. Blue colored pigment; accept products are Seymour Stripe #16-653 Spray (Precaution Blue), or Rustoleum High Performance Acrylic 5200 System (#5225 Safety Blue), or equal.
- E. Shop Coating of Fire Hydrants.
1. Exterior ferrous surfaces of the hydrant must be painted with a coat of primer to two feet below the top flange.
 2. Exterior ferrous surfaces of the hydrant must be given a topcoat of alkyd high-gloss enamel to two feet below the top flange.
 3. All exterior ferrous surfaces below the ground line not coated with primer and topcoat must be shop coated with two (2) coats of asphaltic coating, each a minimum of 1 mil thick. The first coat must be allowed to dry thoroughly before applying the second coat.

2.4 HYDRANT DRAIN

- A. Hydrant drains must be constructed of 6-inch diameter, extra strength, perforated clay pipe, conforming to ASTM C700, with mortared bell and spigot type joints.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install fire hydrants and hydrant drain with drainage bedding, and connect to hydrant drain outlet as detailed on the drawings.
- B. Securely connect fire hydrant to the water main using mechanical joint thrust restraint glands or other restrained joint fittings as shown on the drawings.
- C. Pressure test the fire hydrant installation with full line pressure to the fire hydrant without blocking behind the fire hydrant.

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- D. Hydrant leads must be 8-inches in diameter, or as otherwise specified or shown on the Plans.
- E. Spool pieces are not allowed for the vertical adjustment of hydrants. If a vertical adjustment is required due to the depth of the water main, an offset must be utilized prior to installing the hydrant.

3.2 COLOR CODING HYDRANT FLANGES

- A. Contractor must color code the vertical edge of the hydrants top flange, (located approximately 6-inches from the centerline of the nozzle cap), on all installed hydrants in accordance with the Department's "Color Code for Fire Hydrants".

END OF SECTION 33 12 19

SECTION 33 12 20

WATER MAIN VALVE BASINS & METER VAULTS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes requirements for construction and/or adjustment of water main valve basins and meter vaults using precast concrete or masonry structures.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 31 23 10 - Excavation, Trenching and Backfilling
- B. Section 03 20 00 – Concrete Reinforcing
- C. Section 03 30 00 – Cast-In-Place Concrete

1.3 REFERENCES

- A. ASTM A48 – Standard Specification for Gray Iron Castings
- B. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete Reinforcement
- C. ASTM A197 - Standard Specification for Cupola Malleable Iron
- D. ASTM A536 - Standard Specification for Ductile Iron Castings
- E. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- F. ASTM C32 - Standard Specification for Sewer and Manhole Brick
- G. ASTM C55 - Standard Specification for Concrete Building Brick
- H. ASTM C139 - Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
- I. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets
- J. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections

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- K. ASTM C857 – Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
- L. ASTM C858 – Standard Specification for Underground Precast Concrete Utility Structures.
- M. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants.
- N. IDOT Standard Specification for Road and Bridge Construction (SSRBC)
- O. American Association of State Highway Transportation Officials, Standard Specifications for Highway (AASHTO)
- P. Follow the latest edition of the above references.

1.4 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. Shop Drawings: When not indicated on the Contract Drawings in sufficient detail or definition, submit detailed drawings of cast-in-place and precast concrete utility structures and related metal work.
- C. Product Data: Submit manufacturers' product data for standard manufactured precast concrete sections and structures, for metal gratings and covers, and for other, related miscellaneous metal items.
- D. Certification: Submit certification or other acceptable evidence that covers and grates to be provided for roadways and parking areas meet proof-testing requirements for AASHTO H2O traffic loading.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE STRUCTURES

- A. Fabrication standards - Circular precast concrete base and riser sections furnished for manholes, valve basins and other structures must conform to ASTM C478. Non-circular precast concrete monolithic and sectional structures for meter vaults, riser manholes and other structures must conform to ASTM C858.
- B. Furnish riser sections in various heights, including an offset tapered section, as detailed on the Drawings, or as directed by the Commissioner.

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- C. Precast reinforced concrete flat slab tops for manholes must conform to ASTM C857, and be designed to accommodate a minimum AASHTO loading of H 20, unless directed otherwise by the Commissioner.

2.2 JOINT SEALANTS

- A. Rubber gaskets must conform to ASTM C443.
- B. Preformed butyl rubber flexible rope type gaskets must conform to ASTM C990.

2.3 ADJUSTING RINGS

- A. Adjusting rings are to be precast concrete in conformance with ASTM C478.
- B. Mating Faces:
 - 1. Smooth
 - 2. Parallel
 - 3. Free from cracks, chips, spalls or casting irregularities interfering with watertight mating to structure top or casting.
 - 4. Provide grooves in faces to contain extrudible preformed gasket material when possible.

2.4 CASTINGS

- A. Iron castings are to be ductile iron castings conforming to ASTM A536, Grade 60-40-18, or gray iron conforming to ASTM A48, free from blowholes, shrinkage, cracks and other defects.
- B. Allowance for shrinkage must be made in the patterns to meet the specified thickness. Frames and lids are to seat at all points.
- C. Malleable castings are to conform to ASTM A197.
- D. All castings are to be made accurately to dimensions shown on the plans, and planed, filed, or ground where otherwise necessary to secure flat and true surfaces.

2.5 STEPS

- A. Steps are to be polypropylene plastic encased Grade 60 steel reinforcement conforming to ASTM C478.

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2.6 CAST-IN-PLACE CONCRETE

- A. Concrete in accordance with Section 03 30 00 – Cast In Place Concrete.
- B. Concrete reinforcing in accordance with Section 03 20 00 – Concrete Reinforcing.

2.7 CONCRETE AND MASONRY BLOCKS AND BRICKS

- A. Precast concrete brick must conform to ASTM C55 quality designated Grade N-1.
- B. Clay brick must be best quality sewer brick conforming to the qualifications of ASTM C32, except where modified here.
 - 1. Brick must be uniform, sound, hard burned, of compact texture, free from lime and cracks with a clear ringing sound when struck, whole and with edges full and square, and of standard dimensions.
 - 2. Brick, when thoroughly dried and immersed in water for twenty-four (24) hours, must not absorb more than 15% by weight of water.
 - 3. If in any load of brick more than 10% are inferior, the whole load is rejected.
 - 4. If in any load of brick less than 10% are inferior, the brick is accepted provided the Contractor pulls out all inferior bricks, and immediately removes them from the Site of the Work.

2.8 MORTAR

- A. Mortar for brickwork is to be composed of one (1) part Portland cement and two (2) parts screened sand.
 - 1. Portland cement must conform to the requirements of Section 1001 of the SSRBC.
 - 2. Sand must be class A quality and gradation FA-9 as specified in Article 1003.02 of the SSRBC.
- B. The cement and sand must be proportioned by volume and thoroughly mixed in a tight box.

- C. After the initial mixing, water is to be added gradually and the ingredients mixed until the mortar is of proper consistency. The amount of water must be no more than necessary to produce a workable, plastic mortar.
- D. Prepare only a sufficient amount of mortar for immediate use and any mortar that has begun to set must not be retempered or used in any way in the Work

2.9 REINFORCING STEEL

- A. Reinforcing steel in accordance with Section 03 30 00 – Cast-In-Place Concrete.

PART 3 - EXECUTION

3.1 GENERAL

- A. Excavate, backfill and compact in accordance with Section 31 23 10 - Excavation, Trenching and Backfilling.
- B. All brick must be thoroughly wetted immediately before being laid.
- C. Old brickwork must be thoroughly cleaned and wetted before new work is jointed thereto.
- D. No masonry work is to be done when the temperature is below 33° F unless otherwise approved, and then only under conditions for protecting it from frost.

3.2 PRE-CAST STRUCTURE INSTALLATION

- A. Carefully place precast sections for all structures on prepared bedding so as to fully and uniformly support the structure and allow pipes to be laid to proper grade.
- B. All lift holes on precast sections must be completely filled with mortar, smoothed on both inside and outside surfaces.
- C. Seal joints between riser sections with approved mastic sealant or rubber gaskets, or as directed by the Commissioner.
- D. Place one adjusting ring (only) on manhole top. Select thickness of adjusting ring to bring completed structure to required elevation.

- E. Seal joints between adjusting rings and frames with approved mastic sealant before backfilling structures.
- F. Install manhole frame and cover.

3.3 MASONRY STRUCTURE INSTALLATION

- A. Install precast concrete or cast in place base as shown on the Drawings.
- B. Lay brick courses to the line, straight and parallel, breaking joints with those in adjacent courses.
- C. Lay brick radially as headers in a full bed of mortar with joints not exceeding 3/8-inch in thickness.
- D. Fill joints with mortar. Interior joints must be trowel-struck.
- E. Fresh masonry must be plastered inside and outside and must be protected from damage of all kinds.
- F. New work, unless immediately covered with earth or brick backing, or an approved form of curing compound, must be kept moist until the mortar has hardened.
- G. Install manhole frame and cover.

3.4 FINAL ADJUSTMENT OF STRUCTURES

- A. After the base course and binder course have been placed, and prior to placing the surface course, the structures must be adjusted to match the final pavement elevation.
- B. Remove the binder and base course adjacent to and for a distance not exceeding 12-inches outside the base of the castings.
- C. Adjust the castings to final pavement elevation with adjusting rings set in mortar.
- D. Fill the space around the casting with Class SI concrete to the elevation of the surface of the binder course.

3.5 ABANDONMENT OF VALVE BASINS AND OTHER STRUCTURES.

- A. Valve basins and other structures being abandoned, the Contractor must remove the existing frame and lid and return it to the City as requested by the Commissioner. The remaining parts of the structure are to be removed to a depth of 36-inch below grade and filled with fine graded aggregate or controlled low strength material (CLSM) flowable fill, as appropriate, or directed by the Commissioner. CLSM flowable material must meet standards specified in Section 31 23 10, "Excavation, Trenching and Backfilling", paragraph 2.3, C of these specifications.

END OF SECTION 33 12 20

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SECTION 33 13 00

**HYDROSTATIC TESTING AND DISINFECTING
WATER MAINS**

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes requirements for hydrostatic testing and disinfecting water mains as shown on the drawings and specified here.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 33 11 13 – Ductile Iron Water Pipe and Fittings
- B. Section 33 12 16 – Water Main Control Valves

1.3 REFERENCES

- A. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances
- B. AWWA C651 - Disinfecting Water Mains
- C. AWWA C509 - Resilient Seated Gate Valves for Water Supply Service
- D. Follow the latest editions of the above references.

1.4 SUBMITTALS

- A. Prior to starting work, furnish the Commissioner a detailed outline of the proposed sequence of operation. Include the manner of filling and flushing the water main, the method of disposing of the water flushed from the main, the hydrostatic testing procedure, the disinfecting procedure, relevant safety procedures and other relevant procedures to be used. Include the name of the Contractor that will be disinfecting the water main.
- B. All submittals will be subject to review by the Water Quality Surveillance Section (WQSS) of the Department.

1.5 QUALITY ASSURANCE

- A. Hydrostatic testing of water mains must be performed in accordance with AWWA C600 and the Department's requirements specified here. The disinfection of water mains must be performed in accordance with IEPA Regulations, AWWA C651, and the Department's requirements specified here.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PRESSURE TESTING AND FLUSHING WATER MAINS

- A. All flushing and pressure testing of water mains must meet the requirements of AWWA Specification C600.

3.2 TEST SECTIONS

- A. New water pipe must be tested in sections isolated from the existing city water system. All existing valves must be tested to determine if they are water tight when in the closed position. If valves are not found to be water tight, they must be repaired or replaced before proceeding with the testing and chlorination procedure.

3.3 INITIAL FILLING

- A. Each valved section of pipeline must be slowly filled with water. The test sections may be filled through the isolation valves via the test taps if they are available. Before applying the specified test pressure, all air must be expelled completely from the pipeline section to be tested. When venting air from the pipeline, it is important to limit the pipeline fill rate to avoid excessive surge pressures when the water reaches the air venting opening(s). When the pipeline has been filled, do not permit water to backflow into existing water mains.

3.4 PRELIMINARY FLUSHING

- A. All new water mains, extensions, connections, and hydrant branches must be flushed prior to the hydrostatic testing so that water flows clear from all hydrants and test taps. The flushing operation must continue uninterrupted for a minimum of eight (8) hours or until the water flows clear. Flushing operations may be extended longer when directed by the Commissioner.

3.5 HYDROSTATIC TESTING

- A. Setup

Water-pressure testing is the only method allowed for performing hydrostatic tests. Compressed-air testing methods are not permitted. Ensure that all air has been expelled after the preliminary flushing. Use a suitable pump connected to the existing water main system to apply the test pressure. Allow the pipeline to stabilize at the test pressure before conducting the hydrostatic test.

B. Testing

The test must subject the water main to a minimum hydrostatic pressure of 100 psi for a minimum period of two (2) hours. The minimum hydrostatic pressure is to be maintained at the highest point of the pipe in the test section. The test pressure may not vary by more than ±5 psi for the duration of the test. Test pressure is to be maintained within this tolerance by adding makeup water into the pipeline through the pressure test pump. The amount of makeup water added must be accurately measured in gallons (accurate to two decimal places) by suitable methods.

C. Allowable Makeup Water

The amount of makeup water added during the test must not exceed the amount calculated using the following equations:

$$L = \frac{S \times D \times T \times \sqrt{P}}{148000} \quad \text{Equation 1}$$

- L = allowable makeup water, gallons
- S = length of pipe tested, feet
- D = nominal diameter of pipe tested, inches
- T = duration of the test, hours
- P = average test pressure, pounds per square inch (gauge)

When testing against closed metal-seated valves, additional makeup water is allowed per valve, as follows:

$$L_v = D \times T \times .0078 \quad \text{Equation 2}$$

- L_v = allowable makeup water per metal-seated valve, gallons
- D = nominal diameter of valve, inches
- T = duration of the test, hours

For a 1,000' section of pipe tested for 2 hours at 100 psi against one closed metal-seated valve, the allowable makeup water is equal to:

Table 1
Allowable Makeup Water per 1,000 feet of Pipe, gallons
Tested at 100 psi for 2 hours

Nominal Pipe Diameter									
8"	12"	16"	24"	30"	36"	42"	48"	54"	60"
1.21	1.81	2.41	3.62	4.52	5.43	6.33	7.24	8.14	9.04

D. Visual Examination

Any and all exposed pipe, fittings, valves, hydrants, and joints must be examined carefully during the pressure test. Any damaged or defective pipe, fittings, valves, hydrants, or joints that are discovered during or following the pressure test must be repaired or replaced with reliable material. All visible leaks are to be repaired regardless of the allowance used for testing.

E. Acceptance

Hydrostatic testing is to be repeated until all visible leaks are repaired and the amount of makeup water used is below the allowable amount. After all visible leaks have been repaired, acceptance will be determined on the basis of allowable makeup water only. If any test of a new pipeline discloses a small amount of makeup water greater than that specified above, repairs or replacements are to be accomplished in accordance with the contract documents or directed by the Commissioner.

3.6 SECONDARY FLUSHING

- A. After each test section has satisfactorily passed the hydrostatic pressure test, a secondary flushing must be performed. The secondary flushing must be performed before the pipeline is disinfected. The Contractor must give a minimum forty-eight (48) hour notice to the Commissioner before performing the secondary flushing procedure.
- B. For water mains less than 24-inches in diameter, the test section must be flushed at a minimum velocity of 2.5 feet per second for a minimum of four (4) hours until the water flows clear. Flushing operations may be extended longer when directed by the Commissioner.
- C. For water mains 24-inches in diameter and larger, the test section must be flushed for a minimum of twenty-four (24) hours while maintaining a discharge flow of approximately 2,500 gallons per minute through at least one fire hydrant within the test section until the water flows clear. Flushing operations may be extended longer when directed by the Commissioner.

3.7 DISINFECTING WATER MAINS

- A. After the secondary flushing has been completed and the water flows clear from the pipeline being tested, the water main must be disinfected. The disinfection procedure must be performed by a Contractor qualified to conduct such work. The Water Quality Surveillance Section (WQSS) of the Department of Water Management will observe the disinfection procedure.

3.8 FINAL FLUSHING

After completion of the chlorination process, the chlorination water must be thoroughly flushed from all pipelines. The water main must be flushed until the water flows clear and has representative distribution system chlorine residual as determined by the WQSS of the Department.

3.9 SAMPLING

When the WQSS of the Department has determined that the pipeline is ready to be sampled, the samples are to be collected under the direction of the WQSS. The samples are tested for bacterial content before the pipeline can be approved for service.

3.10 APPROVAL

Final approval of the water main rests with the WQSS of the Department.

3.8 DISPOSAL OF FLUSHING WATER

For all types of flushing, limit flow rates to existing City sewers as specified in Section 01 11 00 – Summary of Work of this specification.

3.9 SAFETY

The Contractor must have sufficient equipment to properly carry out the hydrostatic testing and disinfecting operations and have the necessary safety equipment on hand; including a Chlorine Institute Emergency Kit "A" and self contained breathing apparatus. Failure to provide such equipment will be cause for not allowing the disinfection operation to be performed.

3.10 CONTRACTOR RESPONSIBILITY

The Contractor must have overall responsibility for hydrostatic testing, disinfecting, and sampling. The Contractor must provide all the necessary personnel to: assist in the disinfection operation; perform the final flushing operation; and assist the WQSS of the Department in the water sampling. The Contractor must be responsible for guaranteeing that sufficient and necessary sanitary precautions are taken during construction to ensure approval of the main for service.

3.11 DISINFECTION PROCEDURES WHEN CUTTING INTO OR REPAIRING
EXISTING MAINS

Swab pipe and fittings that will not be pressure tested or chlorinated with chlorine solution during installation and use extra precaution to prevent soil and debris from entering the pipe. Incorporate untested pipe into the flushing routine when possible. When connecting new pipe to the existing water system, use operating pressure to visually inspect for leaks. When feasible, perform inspection prior to backfilling. Comply with all standards and requirements of the WQSS of the Department.

END OF SECTION 33 13 00

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DWM

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.

Contract Provision - Cargo Preference Requirements

In accordance with Title 46 CFR § 381.7 (b), the contractor agrees—

“(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.”

Provisions (1) and (2) apply to materials or equipment that are acquired solely for the project. The two provisions do not apply to goods or materials that come into inventories independent of the project, such as shipments of Portland cement, asphalt cement, or aggregates, when industry suppliers and contractors use these materials to replenish existing inventories.

**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.