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Letting January 16, 2026

Notice to Bidders, Specifications and Proposal



**Contract No. 62U12
COOK County
Section FAI 290 22 BRIDGE 3
Route FAI 290
Project NHPP-1REM(318)
District 1 Construction Funds**

Prepared by

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Checked by

(Printed by authority of the State of Illinois)



- 1. TIME AND PLACE OF OPENING BIDS.** Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). All bids must be submitted to the iCX system prior to 12:00 p.m. January 16, 2026 at which time the bids will be publicly opened from the iCX SecureVault.
- 2. DESCRIPTION OF WORK.** The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

**Contract No. 62U12
COOK County
Section FAI 290 22 BRIDGE 3
Project NHPP-1REM(318)
Route FAI 290
District 1 Construction Funds**

(520-Ft) Bridge Superstructure replacement, approach slab replacement, lighting ADA improvement and traffic signal modernization. The project is located at Structure No. 016-2114 on Loomis Street over I-290 in the City of Chicago in Cook County.

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

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

By Order of the
Illinois Department of Transportation

Gia Biagi,
Secretary

INDEX
 FOR
 SUPPLEMENTAL SPECIFICATIONS
 AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2026

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

ERRATA Standard Specifications for Road and Bridge Construction
 (Adopted 1-1-22) (Revised 1-1-26)

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STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction," adopted January 1, 2022, the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways," and the "Manual of Test Procedures for Materials" in effect on the date of invitation for bids, and the Supplemental Specifications and Recurring Special Provisions indicated on the Check Sheet included herein which apply to and govern the construction FAI Route 290 (I-290), Project NHPP-1REM(318), Section FAI 290 22 Bridge 3, Cook County, Contract No. 62U12 and in case of conflict with any part or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

FAI Route 290 (I-290)
Project NHPP-1REM(318)
Section FAI 290 22 Bridge 3
Cook County
Contract No. 62U12

LOCATION OF PROJECT

The project is located at Structure No. 016-2114 on Loomis Street over I-290 in the City of Chicago in Cook County. The improvement is approximately 0.85 miles west of the I-90 Circle Interchange and downtown Chicago. Loomis Street is under the jurisdiction of the City of Chicago and I-290 (FAI 290 is under the jurisdiction of the State of Illinois. The improvements extend from approximately Congress Parkway to Van Buren Street along Loomis Street for 520 feet (0.10 miles). In addition, the improvements are also located along Congress Parkway for approximately 215 feet (0.04 miles) and along Van Buren Street for 225 feet (0.04 miles).

DESCRIPTION OF PROJECT

The work to be performed under this contract consists of the removal and replacement of the Loomis Street superstructure with modifications to the geometric cross section. The geometric modifications will consist of the implementation of one 11' through lane, 6' bicycle lane with 2' buffer and sidewalk widening. Additional improvements include traffic signal modernization at the intersection of Loomis Street and Van Buren Street, intersection resurfacing, ADA ramp upgrades, and lighting improvements along the roadway as well as underpass lighting and all incidental and collateral work necessary to complete the project as shown on the plans and as described herein.

RESTRICTIVE START DATE

The Contractor will not be allowed to proceed with any work which will require permanent lane closures on Loomis Street or I-290 (Eisenhower Expressway) prior to July 1, 2026.

Temporary lane closures for any advance work may be allowed at the discretion of the Engineer.

COOPERATION BETWEEN CONTRACTORS

Add the following to Article 105.08:

The Department reserves the right to have work performed by other contractors and by Department forces and to permit public utility companies and others to perform work during the progress and within the limits of or adjacent to the work. The Contractor shall conduct its work in a manner and shall cooperate with such other parties to cause as little interference as possible with such other work and as the Department may also direct. If there is a difference of opinion as to the respective rights of the Contractor and others doing work within the limits of or adjacent to the work, the Engineer will decide the order and coordination of the work. The Engineer's decision shall be final and binding on the Contractor. The Contractor shall make no claims against the Department for additional compensation due to delays or other conditions created by the operations of such other parties.

Coordination with Other Contractors. The Contractor is advised that certain operations will involve coordination with Department personnel and Contractors currently performing work on or adjacent to this project for the Department and other agencies. The Contractor shall cooperate to the fullest extent with the Department and the Contractors working on adjacent projects in compliance with Articles 105.07 and 105.08 of these Specifications.

The Department and the Engineer shall be notified in writing by the Contractor at least 48 hours prior to the start of any operation requiring cooperating with others. All other agencies, unless otherwise noted, will be notified in writing by the Contractor ten (10) days prior to the start of any such operation. The Contractor shall make no claims against the Department for additional compensation due to delays or other conditions created by the operations of such other parties.

COORDINATION WITH ADJACENT AND/OR OVERLAPPING CONTRACTS

The Contractor's attention is directed to the fact that adjacent and overlapping contracts may be under construction during the duration of this Contract. These contracts may consist of, but are not limited to, the following bridge rehabilitation projects:

- Contract 62R61 – F.A.I. 290 (Interstate 290) at Laramie Avenue
- Contract 62U43 – F.A.I. 290 (Interstate 290) at Kostner Avenue
- Contract 62U41 – F.A.I. 290 (Interstate 290) at Keeler Avenue
- Contract 62U42 – F.A.I. 290 (Interstate 290) at Pulaski Road
- Contract 62K62 – F.A.I. 290 (Interstate 290) at Central Park Avenue
- Contract 62K65 – F.A.I. 290 (Interstate 290) at Sacramento Boulevard
- Contract 62U05 – F.A.I. 290 (Interstate 290) at Western Avenue
- Contract 62P43 – F.A.I. 290 (Interstate 290) at Leavitt Street
- Contract 62P75 – F.A.I. 290 (Interstate 290) at Ogden Avenue
- Contract 62K64 – F.A.I. 290 (Interstate 290) at Paulina Street
- Contract 62P44 – F.A.I. 290 (Interstate 290) at Ashland Avenue

The I-290 Drainage Improvements contract (Contract No. T.B.D.) from the Des Plaines River to east of Austin Boulevard may be under construction during the duration of this contract as well.

The Contractor shall coordinate proposed project start dates and sequence of construction with the Engineer and other Contractors to present an effective and timely schedule for successful completion of the project.

OFFICE OF UNDERGROUND COORDINATION

Description. This work shall consist of the coordination with and submittals to the Chicago Department of Transportation (CDOT) Office of Underground Coordination (OUC) for the Existing Facility Protection (EFP) Process.

CONSTRUCTION REQUIREMENTS

Submittals. The following submittals to OUC have been identified by OUC as being required for this contract:

- Chicago Department of Buildings – Geotechnical Section for deep excavation.
- Chicago Department of Water Management – Water Section for temporary trench support.
- Chicago Transit Authority (CTA) for work within CTA right-of-way.

Method of Measurement. All costs for complying with OUC requirements and preparing OUC submittals shall be included in the price for the associated items of work.

Basis of Payment. No separate payment will be made for the costs to comply with OUC requirements and preparing OUC submittals.

MAINTENANCE OF ROADWAYS (D1)

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.

STATUS OF UTILITIES (D-1)

Effective: June 1, 2016

Revised: April 1, 2025

Utility companies and/or municipal owners located within the construction limits of this project have provided the following information regarding their facilities and the proposed improvements. The tables below contain a description of specific conflicts to be resolved and/or facilities which will require some action on the part of the Department's contractor to proceed with work. Each table entry includes an identification of the action necessary and, if applicable, the estimated duration required for the resolution.

Utilities To Be Adjusted: Conflicts noted below have been identified by following the suggested staging plan included in the contract. The company has been notified of all conflicts and will be required to obtain the necessary permits to complete their work; in some instances, resolution will be a function of the construction staging. The responsible agency must relocate, or complete new installations as noted below; this work has been deemed necessary to be complete for the Department's contractor to then work in the stage under which the item has been listed.

Pre-Stage

STAGE / LOCATION	TYPE	DESCRIPTION	RESPONSIBLE AGENCY	DURATION OF TIME
Loomis Street STA. 600+06 / 11.5' LT	Underground Duct Vault	The existing frame and lid is in conflict with the roadway resurfacing. Frame and lid will need to be adjusted.	AT&T Comms.	730 DAYS
Loomis Street STA. 600+51 / 13' LT	Underground Duct	The existing communication duct is in conflict with the proposed storm sewer. The duct will need to be relocated prior to construction	AT&T Comms.	730 DAYS
Loomis Street STA. 601+64 to STA. 604+64 12' LT	Underground Duct	The existing communication duct is in conflict with the superstructure replacement. The duct will need to be relocated prior to construction.	AT&T Comms.	730 DAYS
Loomis Street STA. 604+71 / 14' LT	Underground Duct	The existing communication duct is in conflict with the proposed storm sewer. The duct will need to be relocated prior to construction	AT&T Comms.	730 DAYS
Loomis Street STA. 605+25 / 13' LT	Underground Duct Vault	The existing frame and lid is in conflict with the roadway resurfacing. Frame and lid will need to be adjusted.	AT&T Comms.	730 DAYS
Loomis Street Sta.605+18 / 11' LT	Underground Duct Vault	The existing frame and lid is in conflict with the roadway resurfacing. Frame and lid will need to be adjusted.	AT&T Comms.	730 DAYS

Loomis Street STA. 600+36 / 36' LT	Water Vault	The existing frame and lid is in conflict with the roadway resurfacing. Frame and lid will need to be adjusted.	Chicago Department of Water Management Water Section	
Congress Parkway STA. 2056+86 / 4.5' RT	Water Vault	The existing frame and lid is in conflict with the roadway resurfacing. Frame and lid will need to be adjusted.	Chicago Department of Water Management Water Section	
Van Buren Street STA. 1055+25 / 16.0' LT	Water Vault	The existing frame and lid is in conflict with the roadway resurfacing. Frame and lid will need to be adjusted.	Chicago Department of Water Management Water Section	
Van Buren Street STA. 1056+42 / 18' LT	Water Vault	The existing frame and lid is in conflict with the roadway resurfacing. Frame and lid will need to be adjusted.	Chicago Department of Water Management Water Section	
Loomis Street STA. 600+46 / 12' RT	Underground Electric Duct	The existing electric duct is in conflict with the proposed storm sewer. The duct will need to be relocated prior to construction	ComED	
Loomis Street STA. 600+55 / 15' LT	Underground Electric Duct	The existing electric duct is in conflict with the proposed storm sewer. The duct will need to be relocated prior to construction	ComED	
Loomis Street STA. 600+62 / 16' LT	Underground Electric Duct	The existing electric duct is in conflict with the proposed storm sewer. The duct will need to be relocated prior to construction	ComED	
Loomis Street STA. 600+62 / 16' RT	Underground Electric Duct	The existing electric duct is in conflict with the proposed storm sewer. The duct will need to be relocated prior to construction	ComED	

Loomis Street STA 601+62 / 12' RT	Electric Vault	The existing frame and lid is in conflict with the roadway resurfacing. Frame and lid will need to be adjusted.	ComED	
Loomis Street STA. 601+64 to STA. 604+64 12' RT	Underground Electric Duct	The existing electric duct is in conflict with the superstructure replacement. The duct will need to be relocated prior to construction.	ComED	
Loomis Street STA. 604+53 / 12' RT	Electric Vault	The existing electric vault is in conflict with the approach slab and pavement connector replacement. The vault will need to be relocated prior to construction.	ComED	
Loomis Street STA. 604+61 / 11' RT	Underground Electric Duct	The existing electric duct is in conflict with the proposed storm sewer. The duct will need to be relocated prior to construction	ComED	
Loomis Street STA. 601+07 / 25' LT	Electric Vault	The existing electric vault is in conflict with the superstructure replacement. The vault will need to be relocated prior to construction	City of Chicago CDOT Division of Eng. Electrical Constr. Mgmt. (Electric)	
Loomis Street STA 604+20 / 25' LT	Electric Vault	The existing electric vault is in conflict with the superstructure replacement. The vault will need to be relocated prior to construction	City of Chicago CDOT Division of Eng. Electrical Constr. Mgmt. (Electric)	

Loomis Street STA. 604+59 / 14' RT	Underground Electric Duct	The existing electric duct is in conflict with the proposed storm sewer. The duct will need to be relocated prior to construction	City of Chicago CDOT Division of Eng. Electrical Constr. Mgmt. (Electric)	
Loomis Street STA. 604+90 / 21.8' LT	Electric Vault	The existing frame and lid is in conflict with the roadway resurfacing. Frame and lid will need to be adjusted.	City of Chicago CDOT Division of Eng. Electrical Constr. Mgmt. (Electric)	
Loomis Street STA. 605+08 / 35' LT	Electric Vault	The existing frame and lid is in conflict with the proposed sidewalk. Frame and lid will need to be adjusted.	City of Chicago CDOT Division of Eng. Electrical Constr. Mgmt. (Electric)	
Loomis Street STA. 605+08 / 29' RT	Electric Vault	The existing frame and lid is in conflict with the proposed sidewalk. Frame and lid will need to be adjusted.	City of Chicago CDOT Division of Eng. Electrical Constr. Mgmt. (Electric)	
Van Buren Street STA, 1056+25 / 24' LT	Electric Vault	The existing frame and lid is in conflict with the proposed sidewalk. Frame and lid will need to be adjusted.	City of Chicago CDOT Division of Eng. Electrical Constr. Mgmt. (Electric)	

Pre-Stage:___Days Total Installation

The following contact information is what was used during the preparation of the plans as provided by the Agency/Company responsible for resolution of the conflict.

Agency/Company Responsible to Resolve Conflict	Name of contact	Phone	E-mail address
AT&T Communication	Stan Plodzien, Tom Laskowski, & Jamie Gwin	(312) 576-7118, (630) 573-6414, (630) 408-7267, (630) 573-5453, (630) 573-5423, & (630) 573-6496	sp3264@att.com, tl7895@att.com, g05256@att.com, & jg8128@att.com
City of Chicago Department of Water	Jason McCubbin (CDWM PMO), Brian Santi (CDWM PMO),	(312) 217-7928, (312) 742-3619 & (312) 744-5070	IDOT Construction or the IDOT Contractor should send an e-mail to the CDWM - Water CTR general email FACM@ctrwater.net and
Management Water Section	Hans Krueger (CDWM), Consuelo Venegas		carbon copy Jason McCubbin at Jason.mccubbin@dwmpmo.net at least a couple of days prior to needing a CDWM- Water inspector on site. Jason McCubbin can be contacted directly by telephone at (312) 217-7928. Jason.mccubbin@dwmpmo.net , brian.santi@dwmpmo.net , hans.krueger@cityofchicago.org , and consuelo.venegas@cityofchicago.org
ComED	Vincent Mazzaferro, John Leibforth (Large Customer Accounts)	(779) 231-1027, (872) 395 1872, & (312) 758-8838	Vincent.MazzaferroPE@ComEd.com , Plansubmittalsandmaprequests@exeloncorp.com , john.leibforth@comed.com
City of Chicago CDOT Division of Engineering Electrical Constr. Management	Stephen Ingram, Chris Quinlan, Bernard Fiorito, & Anthony Vieu	(312) 446-2096, (312) 743-1697, (312) 746-4636 or (312) 743-1175 or 312-742-8556	Stephen.Ingram@cityofchicago.org , christopher.quinlan@cityofchicago.org Bernard.Fiorito@cityofchicago.org , & Anthony.Vieu@CityofChicago.org ,
Illinois State Police	M/Sgt. Emily Sandberg	847-257-6333	emily.sandberg@illinois.gov

Utilities To Be Watched And Protected: The areas of concern noted below have been identified by following the suggested staging plan included for the contract. The information provided is not a comprehensive list of all remaining utilities, but those which during coordination were identified as ones which might require the Department's contractor to take into consideration when making the determination of the means and methods that would be required to construct the proposed improvement. In some instances, the contractor will be responsible to notify the owner in advance of the work to take place so necessary staffing on the owner's part can be secured.

Pre-Stage

STAGE LOCATION	TYPE	DESCRIPTION	OWNER
Loomis Street STA. 600+08 / 22' LT	Gas	The contractor is alerted to the 2" gas line and valve crossing Loomis Street and adjacent to the curb / sidewalk replacement. There are no conflicts with the proposed improvements	Peoples Gas
Loomis Street STA. 1053+50 to STA. 1058+00 LT/RT	Water main	The contractor is alerted to the 24" water main. There are no conflicts with the proposed improvements	CDWM
Loomis Street STA. 1053+50 to STA. 1058+00 LT/RT	Storm sewer	The contractor is alerted to the 60" storm sewer. There are no conflicts with the proposed improvements	CDWM
Loomis Street STA. 1053+50 to STA. 1058+00 LT/RT	Electric	The contractor is alerted to the COC electric cables. There are no conflicts with the proposed improvements.	City of Chicago
Congress Parkway STA. 2054+00 to 2059+00, LT/RT	Water main	The contractor is alerted to the 12" water main. There are no conflicts with the proposed improvements	CDWM
Congress Parkway STA. 2054+00 to 2059+00, LT/RT	Storm sewer	The contractor is alerted to the 60" storm sewer. There are no conflicts with the proposed improvements	CDWM
Congress Parkway STA. 2054+00 to 2059+00, LT/RT	Fiber	The contractor is alerted to the Comcast fiber cable. There are no conflicts with the proposed improvements	COMCAST
Congress Parkway STA. 2054+00 to 2059+00, LT/RT	Telephone	The contractor is alerted to the telephone cables. There are no conflicts with the proposed improvements	AT&T
Congress Parkway STA. 2054+00 to 2059+00, LT/RT	Electric	The contractor is alerted to the electrical cable. There are no conflicts with the proposed improvements	COMED

No facilities requiring extra consideration *(or listed as noted above)*

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	Phone	E-mail address
Peoples Gas	Blanca Campos, Annie-Beryl Akuamoah, Catriana Farr,	(312) 240-4016, (312) 240-7394 &	blanca.campos@peoplesgasdelivery.com , annie-beryl.akuamoah@peoplesgasdelivery.com , catriana.farr@peoplesgasdelivery.com ,
	Eric Stall, Sandy Salinas, Randy Perez, & Shirgena Washington	(866) 556-6002	erstall@integrysgroup.com ; erin.emhoff@peoplesgasdelivery.com ; sandra.salinas@peoplesgasdelivery.com ; randy.perez@peoplesgasdelivery.com ; shirgena.washington@peoplesgasdelivery.com
Comcast	Bob Schulter, Robert Stoll, & Martha Gieras	(224) 229-5861 or (224) 229-5849	Bob_Schulter@comcast.com , Robert_Stoll@comcast.com , Martha_Gieras@comcast.com , & htinspector@comcast.net

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 considered 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.

Estimated duration of time provided above for the first conflicts identified will begin on the date of the executed contract regardless of the status of the utility relocations. The responsible agencies will be working toward resolving subsequent conflicts in conjunction with contractor activities in the number of days noted.

The estimated relocation duration must be part of the progress schedule submitted by the contractor. A utility kickoff meeting will be scheduled between the Department, the Department's contractor, and the utility companies when necessary.

The contractor is responsible for contacting JULIE (or DIGGER within the City of Chicago) prior to any excavation work. Please note that IDOT electrical facilities are not part of the one-call locating services, such as JULIE or DIGGER.

If the contract requires the services of an electrical contractor, it is the contractor's responsibility, at their own expense, to locate existing IDOT electrical facilities before commencing work. For contracts that do not require an electrical contractor, the contractor may request one free locate of IDOT electrical facilities by contacting the Department's Electrical Maintenance Contractor. Additional locate requests will be at the contractor's expense.

The Department's Electrical Maintenance Contractor must be notified at least 72 hours in advance of the work by calling 773-287-7600 or emailing dispatch@meade100.com to arrange for the locating of underground electrical facilities.

Please note, the marking of underground facilities does not absolve the contractor of their responsibility to repair or replace any facilities damaged during construction at their expense.

PUBLIC CONVENIENCE AND SAFETY (D1)

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."

COMPLETION DATE PLUS WORKING DAYS (D1)

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, Oct 29, 2027 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.

Article 108.09 or the Special Provision for "Failure to Complete the Work on Time", if included in this contract, shall apply to both the completion date and the number of working days.

FAILURE TO COMPLETE THE WORK ON TIME (D1)

Should the Contractor fail to complete the work on or before the completion date as specified in the Special Provision for “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 \$6,775, 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.

HOT-MIX ASPHALT BINDER AND SURFACE COURSE (D1)

Effective: November 1, 2019

Revised: January 1, 2025

Revise Article 1004.03(c) to read:

“(c) Gradation. The coarse aggregate gradations shall be as listed in the following table.

Use	Size/Application	Gradation No.
Class A-1, A-2, & A-3	3/8 in. (10 mm) Seal	CA 16 or CA 20
Class A-1	1/2 in. (13 mm) Seal	CA 15
Class A-2 & A-3	Cover Coat	CA 14
HMA High ESAL	IL-19.0; Stabilized Subbase IL-19.0	CA 11 ^{1/}
	SMA 12.5 ^{2/}	CA 13 ^{4/} , CA 14, or CA 16
	SMA 9.5 ^{2/}	CA 13 ^{3/4/} or CA 16 ^{3/}
	IL-9.5	CA 16, CM 13 ^{4/}
	IL-9.5FG	CA 16
HMA Low ESAL	IL-19.0L	CA 11 ^{1/}
	IL-9.5L	CA 16

- 1/ CA 16 or CA 13 may be blended with the CA 11.
- 2/ The coarse aggregates used shall be capable of being combined with the fine aggregates and mineral filler to meet the approved mix design and the mix requirements noted herein.
- 3/ The specified coarse aggregate gradations may be blended.
- 4/ CA 13 shall be 100% passing the 1/2 in. (12.5mm) sieve.”

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

“(e) Absorption. For SMA the coarse aggregate shall also have water absorption $\leq 2.0\%$.”

Revise the “High ESAL” portion of the table in Article 1030.01 to read:

“High ESAL	Binder Courses	IL-19.0, IL-9.5, IL-9.5FG, IL-4.75, SMA 12.5, Stabilized Subbase IL-19.0
	Surface Courses	IL-9.5, IL-9.5FG, SMA 12.5, SMA 9.5”

Revise Note 2. and add Note 6 to Article 1030.02 of the Standard Specifications to read:

“Item	Article/Section
(g)Performance Graded Asphalt Binder (Note 6)	1032
(h)Fibers (Note 2)	

Note 2. 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 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 6. 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 a SBS PG 76-22 for IL-4.75, except where modified herein..”

Revise table in Article 1030.05(a) of the Standard Specifications to read:

"Mixture Composition (% Passing)" ^{1/}												
Sieve Size	IL-19.0 mm		SMA 12.5		SMA 9.5		IL-9.5mm		IL-9.5FG		IL-4.75 mm	
	min	max	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		100
3/8 in. (9.5 mm)				65	90	100	90	100	90	100		100
#4 (4.75 mm)	40	60	20	30	36	50	34	69	60	75 ^{6/}	90	100
#8 (2.36 mm)	20	42	16	24 ^{4/}	16	32 ^{4/}	34 ^{5/}	52 ^{2/}	45	60 ^{6/}	70	90
#16 (1.18 mm)	15	30					10	32	25	40	50	65
#30 (600 μm)			12	16	12	18			15	30		
#50 (300 μm)	6	15					4	15	8	15	15	30
#100 (150 μm)	4	9					3	10	6	10	10	18
#200 (75 μm)	3.0	6.0	7.0	9.0 ^{3/}	7.5	9.5 ^{3/}	4.0	6.0	4.0	6.5	7.0	9.0 ^{3/}
#635 (20 μm)			≤ 3.0		≤ 3.0							
Ratio Dust/Asphalt Binder		1.0		1.5		1.5		1.0		1.0		1.0

- 1/ Based on percent of total aggregate weight.
- 2/ The mixture composition shall not exceed 44% 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/ 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.
- 5/ When establishing the AJMF the percent passing the #8 (2.36 mm) sieve shall not be adjusted below 34%.
- 6/ When the mixture is used as a binder, the maximum shall be increased by 0.5% passing."

Revise Article 1030.05(b) of the Standard Specifications to read:

- (b) Volumetric Requirements. The target value for the air voids of the HMA shall be 4.0%, for IL-4.75, for SMA mixtures it shall be 3.5%, and for stabilized subbase it shall be 3.0% at the design number of gyrations. The voids in the mineral aggregate (VMA) and voids filled with asphalt binder (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.

Mix Design	Voids in the Mineral Aggregate (VMA), % Minimum for Ndesign				
	30	50	70	80	90
IL-19.0		13.5	13.5		13.5
IL-9.5		15.0	15.0		
IL-9.5FG		15.0	15.0		
IL-4.75 ^{1/}		18.5			
SMA-12.5 ^{1/2/5/}				17.0 ^{3/} /16.0 ^{4/}	
SMA-9.5 ^{1/2/5/}				17.0 ^{3/} /16.0 ^{4/}	
IL-19.0L	13.5				
IL-9.5L	15.0				

- 1/ Maximum draindown shall be 0.3% according to Illinois Modified AASHTO T 305.
 2/ The draindown shall be determined at the JMF asphalt binder content at the mixing temperature plus 30°F.
 3/ Applies when specific gravity of coarse aggregate is ≥ 2.760 .
 4/ Applies when specific gravity of coarse aggregate is < 2.760 .
 5/ 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"

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

"IL-4.75 and SMA mixtures which contain aggregate having absorptions greater than or equal to 2.0%, or which contain steel slag sand, shall have minimum surge bin storage plus haul time of 1.5 hours."

Revise the first and second paragraphs of Articles 1030.06(c)(2) of the Standard Specifications to read:

- "(2) Personnel. The Contractor shall provide a QC manager who shall have overall responsibility and authority for quality control. This individual shall maintain active certification as a hot-mix asphalt level II technician.

In addition to the QC manager, the Contractor shall provide sufficient personnel to perform the required visual inspections, sampling, testing, and documentation in a timely manner. Mix designs shall be developed by personnel with an active certification as a hot-mix asphalt level III technician. Technicians performing mix design testing and plant sampling/testing shall maintain active certification as a hot-mix asphalt level I technician. The Contractor may provide a technician trainee who has successfully completed the Department's "Hot-Mix Asphalt Trainee Course" to assist in the activities completed by a hot-mix asphalt level I technician for a period of one year after the course completion date. The Contractor may also provide a gradation technician who has successfully completed the Department's "Gradation Technician Course" to run gradation tests only under the supervision of a hot-mix asphalt level II Technician. The Contractor shall provide a HMA density tester who has successfully completed the Department's "Nuclear Density Testing" course to run all nuclear density tests on the job site."

Add Article 1030.06(d)(3) to the Standard Specifications to read:

"(3) The Contractor shall take possession of any department unused backup or dispute resolution HMA mixture samples or density specimens upon notification by the Engineer. The Contractor shall collect the HMA mixture samples or density specimens from the location designated by the Engineer. The HMA mixture samples or density specimens may be added to RAP stockpiles according to Section 1031."

Revise the second paragraph of Articles 1030.07(a)(11) and 1030.08(a)(9) of the Standard Specifications to read:

"When establishing the target density, the HMA maximum theoretical specific gravity (Gmm) will be based on the running average of four available department test results for that project. If less than four Gmm test results are available, an average of all available department test results for that project will be used. The initial Gmm will be the last available department test result from a QMP project. If there is no available department test result from a QMP project, the department mix design verification test result will be used as the initial Gmm."

Revise the following table and notes in Article 1030.09 (c) of the Standard Specifications to read:

CONTROL LIMITS						
Parameter	IL-19.0, IL-9.5, IL-9.5FG, IL-19.0L, IL-9.5L		SMA-12.5, SMA-9.5		IL-4.75	
	Individual Test	Moving Avg. of 4	Individual Test	Moving Avg. of 4	Individual Test	Moving Avg. of 4
% Passing: ^{1/}						
1/2 in. (12.5 mm)	± 6 %	± 4 %	± 6 %	± 4 %		
3/8 in. (9.5mm)			± 4 %	± 3 %		
# 4 (4.75 mm)	± 5 %	± 4 %	± 5 %	± 4 %		
# 8 (2.36 mm)	± 5 %	± 3 %	± 4 %	± 2 %		
# 16 (1.18 mm)			± 4 %	± 2 %	± 4 %	± 3 %
# 30 (600 µm)	± 4 %	± 2.5 %	± 4 %	± 2.5 %		
Total Dust Content # 200 (75 µm)	± 1.5 %	± 1.0 %			± 1.5 %	± 1.0 %
Asphalt Binder Content	± 0.3 %	± 0.2 %	± 0.2 %	± 0.1 %	± 0.3 %	± 0.2 %
Air Voids ^{2/}	± 1.2 %	± 1.0 %	± 1.2 %	± 1.0 %	± 1.2 %	± 1.0 %
Field VMA ^{3/}	-0.7 %	-0.5 %	-0.7 %	-0.5 %	-0.7 %	-0.5 %

1/ Based on washed ignition oven or solvent extraction gradation.

2/ The air voids target shall be a value equal to or between 3.2% and 4.8%.

3/ Allowable limit below minimum design VMA requirement.

Revise Article 1030.09(g)(2) of the Standard Specifications to read:

“(2)The Contractor shall complete split verification sample tests listed in the Limits of Precision table in Article 1030.09(h)(1).”

In the Supplemental Specifications, replace the revision for the end of the third paragraph of Article 1030.09(h)(2) with the following:

“When establishing the target density, the HMA maximum (Gmm) will be the Department mix design verification test result.”

Add after third sentence of Article 1030.09(b) to read:

“If the Contractor and Engineer agree the nuclear density test method is not appropriate for the mixture, cores shall be taken at random locations determined according to the QC/QA document "Determination of Random Density Test Site Locations". Core densities shall be determined using the Illinois Modified AASHTO T 166 or T 275 procedure.”

Revise Table 1 and Note 4/ of Table 1 in Article 406.07(a) of the Standard Specifications to read:

	Breakdown/Intermediate Roller (one of the following)	Final Roller (one or more of the following)	Density Requirement
IL-9.5, IL-9.5FG, IL-19.0 ^{1/}	V _D , P, T _B , 3W, O _T , O _B	V _S , T _B , T _F , O _T	As specified in Section 1030
IL-4.75 and SMA _{3/ 4/}	T _B , 3W, O _T	T _F , 3W	As specified in Section 1030
Mixtures on Bridge Decks ^{2/}	T _B	T _F	As specified in Articles 582.05 and 582.06.

“4/ The Contractor shall provide a minimum of two steel-wheeled tandem rollers (T_B), and/or three-wheel (3W) rollers for breakdown, except one of the (T_B) or (3W) rollers shall be 84 inches wide and a weight of 315 pound per linear inch (PLI), and one of the (T_B) or (3W) rollers can be substituted for an oscillatory roller (O_T). T_F rollers shall be a minimum of 280 lb/in. The 3W and T_B rollers shall be operated at a uniform speed not to exceed 3 mph, with the drive roll for T_B rollers nearest the paver and maintain an effective rolling distance of no more than 150 ft behind the paver.”

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}.”

Revise first paragraph of Article 1030.10 of the Standard Specifications to read:

“A test strip of 300 ton, except for SMA mixtures it will be 400 ton, will be required for each mixture on each contract at the beginning of HMA production for each construction year according to the Manual of Test Procedures for Materials “Hot Mix Asphalt Test Strip Procedures”. At the request of the producer, the Engineer may waive the test strip if previous construction during the current construction year has demonstrated the constructability of the mix using department test results.”

Revise fourth paragraph of Article 1030.10 of the Standard Specifications to read:

“When a test strip is constructed, the Contractor shall collect and split the mixture according to the document “Hot-Mix Asphalt Test Strip Procedures”. The Engineer, or a representative, shall deliver split sample to the district laboratory for verification testing. The Contractor shall complete mixture tests stated in Article 1030.09(a). Mixture sampled shall include enough material for the Department to conduct mixture tests detailed in Article 1030.09(a) and in the document “Hot-Mix Asphalt Mixture Design Verification Procedure” Section 3.3. The mixture test results shall meet the requirements of Articles 1030.05(b) and 1030.05(d), except Hamburg wheel tests will only be conducted on high ESAL mixtures during production.”

DETECTABLE WARNINGS (SPECIAL) IN CITY OF CHICAGO (D1)

Effective: July 20, 2017

Description: Work under this item shall consist of installing cast iron detectable warning tiles on ADA curb ramps as shown on the plans and according to IDOT District Detail BD-58. Work shall be performed according to Section 424 of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, except as herein modified.

Materials: Detectable warning tiles shall be cast iron. The color of the detectable warning tiles is to be approved by the Engineer.

The cast iron detectable warnings shall be of uniform quality and free of surface defects. The detectable warnings shall meet requirements of ASTM A 48 Class 30 or better.

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

Basis of Payment: This work will be paid for at the contract unit price per SQUARE FOOT for DETECTABLE WARNINGS (SPECIAL).

STORM SEWERS AND SEWER CONNECTIONS TO CITY OF CHICAGO SEWERS

Created: September 30, 1985

Revised: March 10, 2021

This work consists of constructing storm sewers or sewer connections to City of Chicago sewers, in accordance with Section 550 of the Standard Specifications and the details shown in the plans at the locations shown on the plans.

All storm sewers and sewer connections 21 inches (525 mm) in diameter and smaller shall be best quality tile socket pipe conforming to the specifications for Extra Strength Clay Pipe, ASTM C 700, except as otherwise specified on the plans. Sewer pipes shall be gasketed in such a manner as to produce a compression type joint conforming to the requirements of ASTM C 425.

All storm sewer 24 inches (600 mm) in diameter or larger shall be reinforced concrete pipe conforming with ASTM Designation C76. All reinforced concrete pipe used must be gasketed. Each length of pipe must be provided with bell and spigot or tongue and groove ends of concrete formed on machined rings to insure accurate joint surfaces. The physical properties of the gasket materials must conform to the requirements of those specified under ASTM Designation C443, ASTM Designation C361 and AASHTO Designation M198. Joints for catch basin and inlet connections shall be packed with oakum, caulked and beveled off with portland cement mortar.

Ductile iron pipe shall be used to meet IEPA clearance requirements or other specific issues and must conform to the requirements of AWWA C151, Class 52 and with the additions or substitutions specified in this Section. Fittings must be gray or ductile iron conforming to AWWA C110. Polyethylene encasement must be installed around all buried pipe. Encasement material must be 4-mil, cross-laminated, high-density polyethylene tubing. The tubing must comply with AWWA C105.

Basis of Payment: This work will be measured and paid for at the contract unit price per FOOT (meter) for STORM SEWER in accordance with Articles 550.09 and 550.10 of the Standard Specifications.

ADJUSTMENTS AND RECONSTRUCTIONS (D1)

Effective: March 15, 2011

Revised: October 1, 2021

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-2 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-2 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-2 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-2 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.”

DRAINAGE AND INLET PROTECTION UNDER TRAFFIC (D1)

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 ± 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."

ENGINEER'S FIELD OFFICE TYPE A (SPECIAL) (D1)

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).

FRICTION AGGREGATE (D1)

Effective: January 1, 2011

Revised: December 1, 2021

Revise Article 1004.03(a) of the Standard Specifications to read:

“1004.03 Coarse Aggregate for Hot-Mix Asphalt. 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 or Shoulders	<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

Use	Mixture	Aggregates Allowed	
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 Binder IL-9.5 IL-9.5FG or IL-9.5L	<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 Binder IL-9.5 or IL-9.5FG	<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/}	
		<u>Other Combinations Allowed:</u>	
		<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/} : Crushed Gravel Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag No Limestone.	
		<u>Other Combinations Allowed:</u>	

Use	Mixture	Aggregates Allowed	
		<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/}	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/} 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.

3/ Crushed concrete will not be permitted in SMA mixes.

4/ Crushed steel slag shall not be used as 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."

HOT-MIX ASPHALT – MIXTURE DESIGN VERIFICATION AND PRODUCTION (D1)

Effective: January 1, 2019

Revised: December 1, 2021

Add to Article 1030.05 (d)(3) of the Standard Specifications to read:

“During mixture design, prepared samples shall be submitted to the district laboratory by the Contractor for verification testing. The required testing and number and size of prepared samples submitted shall be according to the following tables.

High ESAL – Required Samples for Verification Testing	
Mixture	Hamburg Wheel and I-FIT Testing ^{1/ 2/}
Binder	total of 3 - 160 mm tall bricks
Surface	total of 4 - 160 mm tall bricks

Low ESAL – Required Samples for Verification Testing	
Mixture	I-FIT Testing ^{1/ 2/}
Binder	1 - 160 mm tall brick
Surface	2 - 160 mm tall bricks

- 1/ The compacted gyratory bricks for Hamburg wheel and I-FIT testing shall be $7.5 \pm 0.5\%$ air voids.
- 2/ If the Contractor does not possess the equipment to prepare the 160 mm tall brick(s), twice as many 115 mm tall compacted gyratory bricks will be acceptable.

Revise the fourth paragraph of Article 1030.10 of the Standard Specifications to read:

“When a test strip is not required, each HMA mixture shall still be sampled on the first day of production: I-FIT and Hamburg wheel testing for high ESAL; I-FIT testing for low ESAL. Within two working days after sampling the mixture, the Contractor shall deliver gyratory cylinders to the district laboratory for department verification testing. The high ESAL mixture test results shall meet the requirements of Articles 1030.05(d)(3) and 1030.05(d)(4). The low ESAL mixture test results shall meet the requirements of Article 1030.05(d)(4). The required number and size of prepared samples submitted for the Hamburg wheel and I-FIT testing shall be according to the “High ESAL - Required Samples for Verification Testing” table in Article 1030.05(d)(3) above.”

Add the following to the end of Article 1030.10 of the Standard Specifications to read:

“Mixture sampled during first day of production shall include approximately 60 lb of additional material for the Department to conduct Hamburg wheel testing and approximately 80 lb) of additional material for the Department to conduct I-FIT testing. Within two working days after sampling, the Contractor shall deliver prepared samples to the district laboratory for verification testing. The required number and size of prepared samples submitted for the Hamburg wheel and I-FIT testing shall be according to the “High ESAL - Required Samples for Verification Testing” table in Article 1030.05(d)(3) above.”

GENERAL ELECTRICAL REQUIREMENTS

Effective: July 1, 2025

This special provision replaces Articles 801.01–801.07 and 801.09–801.16 of the Standard Specifications. Codes, standards, and industry specifications cited for electrical work shall be by definition the latest adopted version thereof, unless indicated otherwise.

Materials 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. 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.

Within 30 calendar days after contract execution, the Contractor shall submit, for approval, through the method as directed in the pre-construction meeting. 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.

Submittals shall be provided for all items used, temporary and permanent, for review and approval.

Equipment which will be owned and maintained by a local agency other than the State shall be reviewed and approved by that agency prior to submittal to the State. The submittal to the State shall include any comments made by the local agency.

Each PDF document must be a vector format PDF from the originating supplier or program and not scanned images.

The submittal must clearly identify the specific model number or catalog number of the item being proposed. Submittals must be the Manufacturers current published information. Out of date submittal material will be grounds for rejection.

The submittal shall be properly identified by contractor, pay item number, route, section, county, and contract number. Example:

Contractor: Contractor Name Pay Item: X0327607 Route: I-00 Section: 2013-xxx-yzx County: Cook Contract: 12Z34

The Contractor shall have reviewed the submittal material and affixed the Contractor's stamp of approval, with date and signature, for each individual item prior to submittal. The Contractor's approval stamp shall be the first page of 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 Department may provide a list of pay items broken out by discipline upon request for a particular contract. In general, the disciplines are as follows:

Discipline	Typical Items
ITS	CCTV CCTV structures Communication vaults Fiber optic Fiber optic duct Network equipment
Lighting	Breakaway devices Light poles Light tower Lighting cables Lighting controllers Luminaires Unit duct
Pump Station	All pump station equipment
Signing	Signing
Surveillance	Loop cables Detector equipment & associated structures Ramp metering & associated structures Wireless pavement sensors and assoc. structures Radar detection Data Probing Handholes Dynamic Message Signs (DMS)
Traffic Signal	Controllers/Cabinets Handholes Illuminated signs Pedestrian Push Buttons Signal Cable Signal Detectors Signal Heads Signal Loop Cable Signal Modules Signal Structures
Local Roads Lighting	Same as lighting
Local Roads Traffic Signal	Same as traffic signal
Discipline with the predominate amount of work in contract or ask Engineer.	Raceways Electric cables Junction boxes

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", "Incomplete", 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", "Incomplete" 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.

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: 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 electrical systems (lighting, ITS, pump station, surveillance, and 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 14 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 the electrical systems which may be affected by the work.

Marking of Existing Cable Systems. The party responsible for maintenance of any existing electrical 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 1 foot (304.8 mm) 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 their 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."

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.

Electrical Infrastructure During Construction. The scope of work shall include locating and marking the proposed underground infrastructure installed in this contract.

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.

Marking Proposed Locations. 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.

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
- Resistance of Grounding Electrodes
- 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 shall be measured and recorded with all loads disconnected. Prior to performance of the insulation resistance test, the Contractor shall remove all fuses within all light pole bases on a circuit to segregate the luminaire loads.

On tests of new cable runs, the readings shall exceed 50 megohms for phase and neutral conductors with a connected load over 20A and shall exceed 100 megohms for conductors with a connected load of 20A 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 10% 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.

Surveillance. The following tests 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 continuity test of the loop and loop lead-in shall not have a resistance greater than 2 ohms. The quality factor (Q) shall be 5 or greater. Loops which fail to test satisfactorily shall be repaired or replaced.

Telecommunication Cable. Once the telecommunication cable is installed complete with all cable terminations complete the Contractor shall request an end-to-end test. The Contractor shall request the end-to-end test at least seven days in advance to the TSC Engineer. Any lane closures and/or any other safety measures that need to be taken shall be provided for by the Contractor and shall be considered incidental to the cost of this item. The type of test performed shall be an end-to-end test with Halcyon type equipment transmitting and receiving at each end of the cable. Each pair shall be tested, and the results shall be recorded and submitted to the Engineer. If any results don't fall within the requirements set forth in (REA) PE-39, the Contractor shall correct and re-test that cable pair. Traffic systems will tolerate only one pair out of every 100 pair of cable that doesn't meet or exceed specifications set forth in (REA) PE-39.

Wireless in-pavement detection systems shall be tested in accordance with the approved testing procedures provided in the catalog cut submittal.

Fiber Optic Systems. 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 OTDR and a power meter with an optical source. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

Fibers which are not to be terminated shall be tested with a temporary fusion spliced pigtail fiber. Mechanical splice or bare fiber adapters are not acceptable.

The Contractor shall provide the date, time and location of any tests required by this specification to the Engineer at least five working (seven 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 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 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 or USB Drive.

At the completion of the test, the Contractor shall provide copies of the documentation of the test results to the Engineer. The test documentation shall be submitted as two bound copies and three CD ROM, or USB drive 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	

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 GR-196-CORE Issue 2, OTDR Data Standard, GR 196, Revision 1.0, GR 196, Revision 1.1, GR 196, Revision 2.0 (SR-4731) in a ".SOR" file format. A copy of the test equipment manufacture'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>1/1/00</i>
Fiber Number	Event Type	Event Location	Event Loss (dB)	
			1310 nm	1550 nm
<i>1</i>	<i>Splice</i>	<i>23500 Ft.</i>	<i>.082</i>	<i>.078</i>
<i>1</i>	<i>Splice</i>	<i>29000 Ft.</i>	<i>.075</i>	<i>.063</i>
<i>2</i>	<i>Splice</i>	<i>29000 Ft.</i>	<i>.091</i>	<i>.082</i>
<i>3</i>	<i>Splice</i>	<i>26000 Ft.</i>	<i>.072</i>	<i>.061</i>
<i>3</i>	<i>Bend</i>	<i>27000 Ft.</i>	<i>.010</i>	<i>.009</i>

The following shall be the criteria for the acceptance of the cable:

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.

- When splices are made between identical cables (same manufacturer and cable type) the average optical loss of each splice shall not exceed 0.10 dB. The average is determined by measuring the splice loss in both directions with an OTDR, adding the two readings, and dividing by two. Testing should be performed for both the 1310 and 1550 nm wavelengths. No individual splice loss measured in a single direction shall exceed 0.15 dB.
- When splices are made between cables containing fibers of different mode field diameters, the average optical loss of each splice shall not exceed 0.50 dB. The average is determined by measuring the splice loss in both directions with an OTDR, adding the two readings, and dividing by two. Testing should be performed for both the 1310 and 1550 nm wavelengths. No individual splice loss measured in a single direction shall exceed 0.6 dB.

The Contractor shall measure the end-to-end attenuation of each fiber, from connector to connector, using an optical power meter and source. This loss shall be measured at from both directions and shall not exceed 0.5 dB per installed kilometer of single mode cable. Measurements shall be made at both 1300 and 1550 nm for single mode cable.

For multimode cable, power meter measurements shall be made at 850 and 1300 nm. The end-to-end attenuation shall not exceed 3.8 dB/installed kilometers at 850nm or 1.8 dB per installed kilometer at 1300nm for multimode fibers.

If the total loss exceeds these specifications, the Contractor shall replace or repair the cable run at the no additional cost to the state, both labor and materials. Elevated attenuation due to exceeding the pulling tension, or any other installation operation, during installation shall require the replacement of the cable run at no additional cost to the State, including labor and materials.

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 LED modules, including the maintained minimum luminance, shall cover a minimum of 120 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 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 made on the PDF copy of the as-Let documents using a PDF editor. Hand drawn notations or markups and scanned plans are not acceptable. These drawings shall be updated daily and shall be available for inspection by the Engineer during the work. The record drawings shall include the following:

- Cover sheet
- The electrical maintenance contract management system (EMCMS) location designation, i.e. "L", "TS", "S", "A" number.
- Summary of Quantities, electrical items only
- Legends, schedules, and notes
- Plan sheets
- Final fiber assignment tables
- Pertinent details
- Single line diagrams; electrical, communications, surveillance and fiber optic.
- 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 programming
- 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, marked "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 via a mutually agreed to electronic format 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 (bookmarks) the respective pay item number. Specific part or model numbers of items which have been selected shall be clearly visible.

If the electric service is new or modified, documentation as required in the Electric Utility Service Installation and Connection shall be submitted.

During the final inspection, the Contractor shall provide three 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 equipment designations and clearly identified.

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 three hardcopies and two CD-ROMs or USB Drives of the final documentation shall be submitted. The identical material shall also be submitted in the same manner as the catalog cut submittals utilizing the following final documentation pay item numbers:

Pay Code	Description	Discipline
FDLRD000	Record Drawings - Lighting	Lighting
FDSRD000	Record Drawings - Surveillance	Surveillance
FDTRD000	Record Drawings - Traffic Signal	Traffic Signal
FDIRD000	Record Drawings - ITS	ITS
FDLCC000	Catalog Cuts - Lighting	Lighting
FDSCC000	Catalog Cuts – Surveillance	Surveillance
FDTCC000	Catalog Cuts – Traffic Signal	Traffic Signal
FDICC000	Catalog Cuts - ITS	ITS
FDLWL000	Warranty - Lighting	Lighting
FDSWL000	Warranty - Surveillance	Surveillance
FDTWL000	Warranty - Traffic Signal	Traffic Signal
FDIWL000	Warranty - ITS	ITS
FDLTR000	Test Results - Lighting	Lighting
FDSTR000	Test Results - Surveillance	Surveillance
FDTTR000	Test Results - Traffic Signal	Traffic Signal
FDITR000	Test Results - ITS	ITS
FDLINV00	Inventory - Lighting	Lighting
FDSINV00	Inventory - Surveillance	Surveillance
FDTINV00	Inventory - Traffic Signal	Traffic Signal
FDIINV00	Inventory - ITS	ITS
FDLGPS00	GPS - Lighting	Lighting
FDSGPS00	GPS - Surveillance	Surveillance
FDTGPS00	GPS - Traffic Signal	Traffic Signal
FDIGPS00	GPS - ITS	ITS
FDLES00	Electric Service - Lighting	Lighting
FDSES00	Electric Service - Surveillance	Surveillance
FDTES00	Electric Service - Traffic Signal	Traffic Signal
FDIES00	Electric Service - ITS	ITS

Record drawings shall include marked up plans, controller info, electric service info, equipment settings, manuals, wiring diagrams for each discipline.

Test results shall be all electrical test results, fiber optic OTDR, and fiber optic power meter as applicable for each discipline.

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.
- Junction boxes
- 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.
- Fiber Optic Cables. Coordinates shall be recorded along each fiber optic cable route every 200 feet.
- Fiber optic utility markers
- 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.
- All wireless in-pavement vehicle detectors

Datum to be used shall be North American 1983.

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

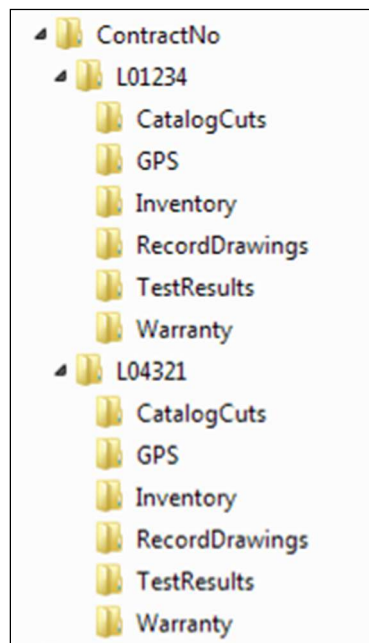
1. District
2. Description of item
3. Designation
4. Use
5. Approximate station
6. Contract number
7. Date
8. Owner
9. Latitude
10. Longitude
11. Comments

A spreadsheet template will be available from the Engineer for use by the Contractor.

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 six years.”

The documents on the CD ROM, or USB Drive 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.

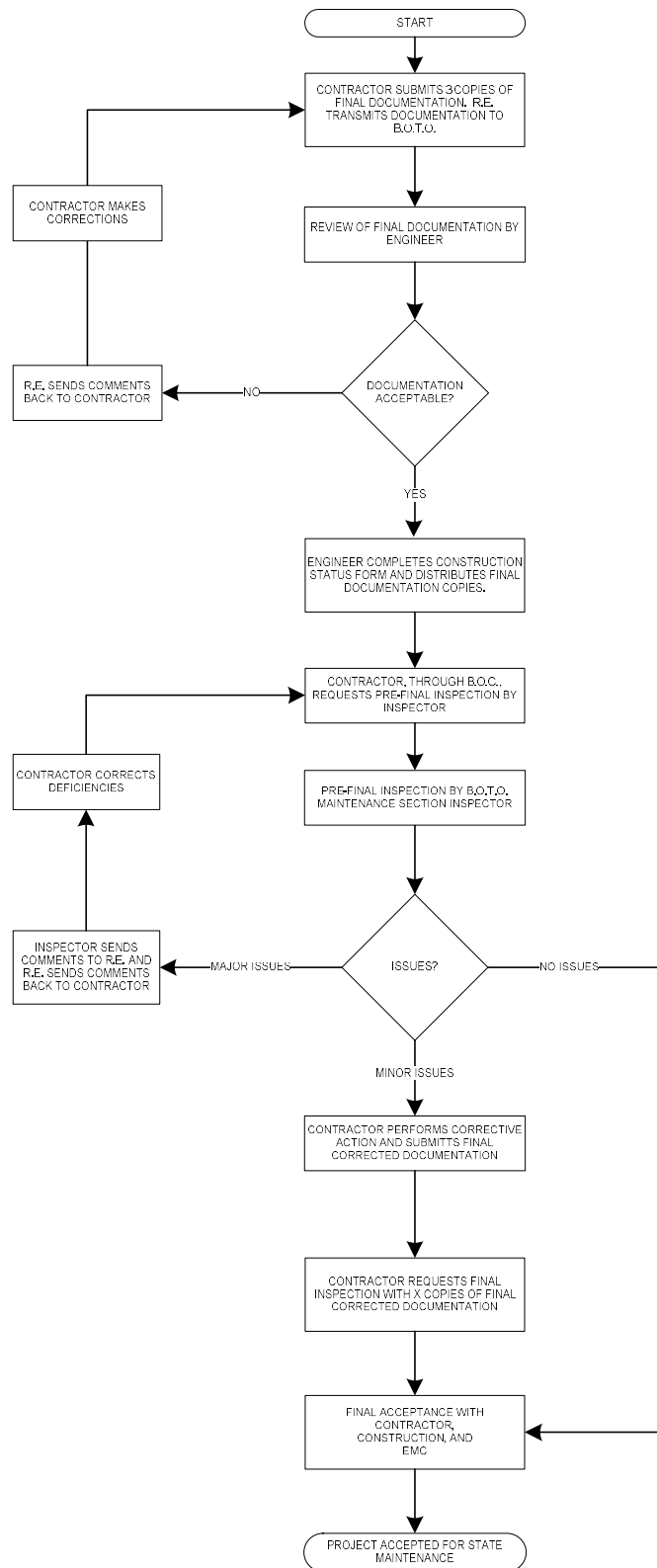
If CD's are used they shall be labeled as illustrated in the CD Label Template contained herein.

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.

FAI Route 290 (I-290)
Project NHPP-1REM(318)
Section FAI 290 22 Bridge 3
Cook County
Contract No. 62U12



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 -Three hardcopies (11" x 17") -PDFs as required elsewhere	☐ ☐	☐ ☐
Field Inspection Tests -Voltage -Amperage -Cable Insulation Resistance -Continuity -Controller Ground Rod Resistance (Three Hardcopies & PDFs as required)	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
GPS Coordinates -Excel file (Check Special Provisions, Excel file required.)	☐	☐
Job Warranty Letter (Three Hardcopies & PDFs as required)	☐	☐
Catalog Cut Submittals -Approved & Approved as Noted (PDFs as required)	☐	☐
Lighting Inventory Form (Three Hardcopies & PDFs as required)	☐	☐
Lighting Controller Inventory Form (Three Hardcopies & PDFs as required)	☐	☐
Electric Service Documentation (Three Hardcopies & PDFs as required)	☐	☐
Light Tower Inspection Form (If applicable, Three Hardcopies & PDFs as required)	☐	☐

Three hardcopies & PDFs as required shall be submitted for all items above. If a CD ROM is used it shall be labeled as shown in the example contained herein.

General Notes:

Record Drawings – The record drawings should contain contract cover sheet, summary of quantities showing all lighting pay item sheets, proposed lighting plans and lighting detail sheets. Submit hardcopies shall be 11” x 17” size. Temporary lighting plans and removal lighting plans should not be part of the set.

Field Inspection Tests – Testing should be done for proposed cables. Testing shall be per standard specifications. Forms shall be neatly filled out.

GPS Coordinates – Check special provisions “General Electrical Requirements”. Submit electronic “EXCEL” file.

Job Warranty Letter – See standard specifications.

Cutsheet Submittal – See special provisions “General Electrical Requirements”. Scan approved and approved as noted cutsheets.

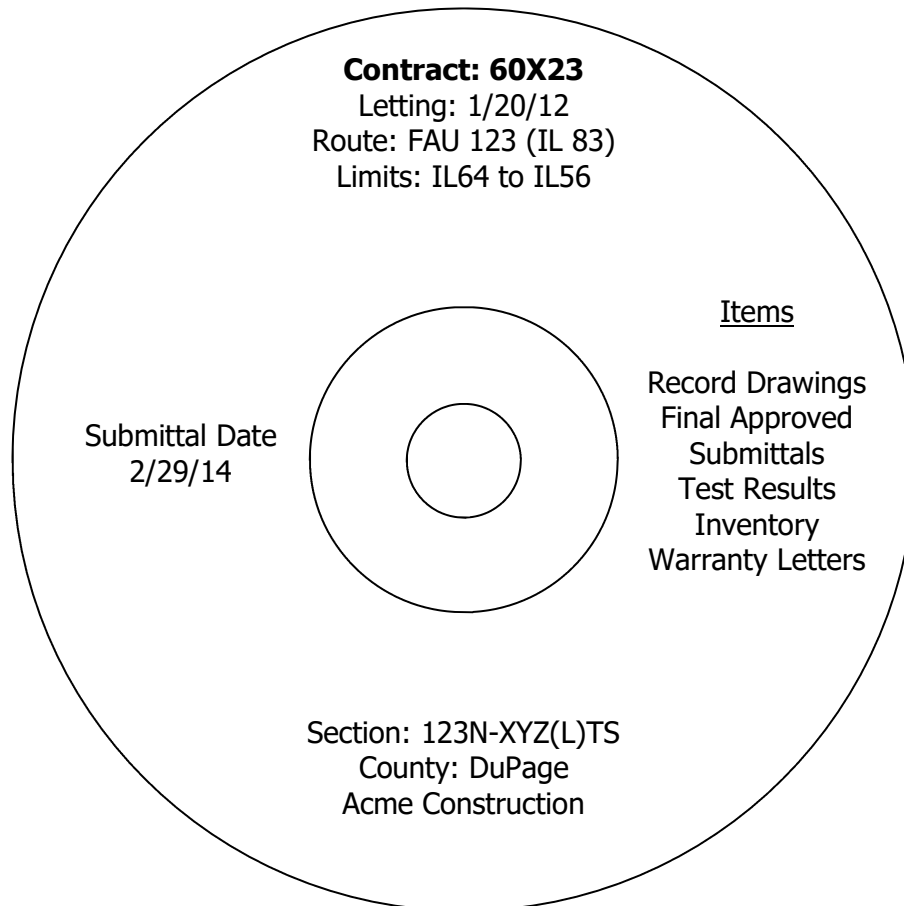
Lighting Inventory Form – Inventory form should include only proposed light poles, proposed light towers, proposed combination (traffic/light pole) lighting and proposed underpass luminaires.

Lighting Controller Inventory Form – Form should be filled out for only proposed lighting controllers.

Light Tower Safety Inspection Form – Form should be filled out for each proposed light tower.

CD LABEL FORMAT TEMPLATE.

Label must be printed; hand written labels are unacceptable and will be rejected.



MAINTENANCE OF LIGHTING SYSTEMS

Effective: December 1, 2024

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 jobsite 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. During the maintenance preconstruction inspection, the party responsible for existing maintenance shall perform testing of the existing system in accordance with Article 801.13a. The Contractor shall request a date for the preconstruction inspection no less than 14 days prior to the desired date of the inspection.

The Engineer will document all test results and note deficiencies. All substandard equipment will be repaired or replaced by the existing maintenance contractor, or the Engineer can direct the Contractor to make the necessary repairs under Section 109.04.

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. Contract documents shall indicate the circuit limits.

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 regardless of the number of lighting controllers involved. 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 each controller and the controller is not part of the contract work, the Contractor needs only to maintain the affected circuits within the project limits. The project limits are defined as those limits indicated in the contract plans. Equipment outside of the project limits, on the affected circuits shall be maintained and paid for under Article 109.04. The affected circuits shall be isolated by means of in-line waterproof fuse holders as specified elsewhere and as approved by the Engineer. The unaffected circuits and the controller will remain under the maintenance of the State.

Full Maintenance. If the number of circuits affected by the contract is greater than 40% of the total number of circuits in each 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 within the project limits. Equipment outside of the project limits shall be maintained and paid for under Article 109.04.

If the existing equipment is damaged by normal vehicular traffic, not the Contractor's operations, and 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, and 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.

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 regardless of the project limits indicated in the plans.

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's 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.

The Contractor shall be responsible for locating cables installed under this contract to prevent damage from construction operations.

Lighting System Maintenance Operations. The Contractor's responsibility shall include all applicable responsibilities of District 1's electrical maintenance contract. These responsibilities shall include the maintenance of lighting units (including sign lighting), cable runs and lighting controls. Responsibilities shall also include the coordination and installation of replacement equipment for existing equipment which has failed within the warranty period for that equipment. The coordination shall include correspondence with the manufacturer regarding the warranty claim. 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 existing equipment is 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, and 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. Payment shall not be made retroactively for months in which lighting systems were not operational.

Basis of Payment. This work will be paid for at the contract unit price per CALENDAR MONTH for MAINTENANCE OF LIGHTING SYSTEM.

EXPOSED RACEWAYS

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 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 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 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 1/2 inch apart and 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 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 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 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 FOOT for CONDUIT ATTACHED TO STRUCTURE, of the diameter specified, RIGID GALVANIZED STEEL or CONDUIT ATTACHED TO STRUCTURE, of the diameter specified, PVC COATED GALVANIZED STEEL.”

UNDERPASS LUMINAIRE, LED

Effective: April 1, 2024

Description. This work shall consist of furnishing and installing an underpass LED luminaire as shown on the plans, as specified herein.

The luminaire including the housing, driver and optical assembly shall be assembled in the U.S.A. The luminaire shall be assembled by and manufactured by the same manufacturer. The luminaire shall be mechanically strong and easy to maintain. All electrical and electronic components of the luminaire shall comply with the requirements of Restriction of Hazardous Materials (RoHS) regulations. The luminaire shall be listed for wet locations by an NRTL and shall meet the requirements of UL 1598 and UL 8750

Submittal Requirements. The Contractor shall also the following manufacturer's product data for each type of luminaire:

1. Descriptive literature and catalogue cuts for luminaire, LED driver, and surge protection device. Completed manufacturer's luminaire ordering form with the full catalog number provided
2. LED drive current, total luminaire input wattage and total luminaire current at the system operating voltage or voltage range and ambient temperature of 25 C.
3. LED efficacy per luminaire expressed in lumens per watt (l/w).
4. Initial delivered lumens at the specified color temperature, drive current, and ambient temperature.
5. IES file associated with each submitted luminaire in the IES LM-63 format.

6. Computer photometric calculation reports as specified and in the luminaire performance table.
7. TM-15 BUG rating report.
8. Isofootcandle chart with max candela point and half candela trace indicated.
9. Documentation of manufacturers experience and verification that luminaires were assembled in the U.S.A. as specified.
10. Written warranty.

Upon request by the Engineer, submittals shall also include any or all the following:

- a. TM-21 calculator spreadsheet (XLSX or PDF format) and if available, TM-28 report for the specified luminaire or luminaire family. Both reports shall be for 50,000 hours at an ambient temperature of 77 °F.
- b. LM-79 report with NVLAP current at the time of testing in PDF format inclusive of the following: isofootcandle diagram with half candela contour and maximum candela point; polar plots through maximum plane and maximum cone; coefficient of utilization graph; candela table; and spectral distribution graph and chromaticity diagram.
- c. LM-80 report for the specified LED package in PDF format and if available, LM-84 report for the specified luminaire or luminaire family in PDF format. Both reports shall be conducted by a laboratory with NVLAP certification current at the time of testing.
- d. AGi32 calculation file matching the submittal package.
- e. In situ temperature measurement test (ISTMT) report for the specified luminaire or luminaire family in PDF format.
- f. Vibration test report in accordance with ANSI C136.31 in PDF format.
- g. ASTM B117/ASTM D1654 (neutral salt spray) test and sample evaluation report in PDF format.
- h. ASTM G154 (ASTM D523) gloss test report in PDF format.
- i. LED drive current, total luminaire input wattage, and current over the operating voltage range at an ambient temperature of 77 °F.
- j. Power factor (pf) and total harmonic distortion (THD) at maximum and minimum supply and at nominal voltage for the dimmed states of 70%, 50%, and 30% full power.
- k. Ingress protection (IP) test reports, conducted according to ANSI C136.25 requirements, for the driver and optical assembly in PDF format.
- l. Installation, maintenance, and cleaning instructions in PDF format, including recommendations on periodic cleaning methods.
- m. Documentation in PDF format that the reporting laboratory is certified to perform the required tests.

A sample luminaire shall also be provided upon request of the Engineer. The sample shall be as proposed for the contract and shall be delivered by the Contractor to the District Headquarters. After review, the Contractor shall retrieve the luminaire.

Manufacturer Experience. The luminaire shall be designed to be incorporated into a lighting system with an expected 20 year lifetime. The luminaire manufacturer shall have a minimum of 15 years of experience manufacturing LED roadway luminaires; parking lot, architectural, or residential luminaires are not applicable to this requirement. The manufacturer shall have a minimum of 100,000 total LED roadway luminaires installed on a minimum of 100 separate installations, all within the U.S.A.

Housing Material. The luminaire shall be a single device not requiring on-site assembly for installation. The power supply for the luminaire shall be integral to the unit. The housing shall be either stainless-steel or cast aluminum.

Aluminum Housing. The housing shall be extruded or cast aluminum; or a combination of both and shall have a copper content of less than 1.0%. The housing shall be painted grey or silver unless specified otherwise. A epoxy base coat shall applied to the aluminum after the aluminum is properly treated with a conversion coating. The finish coat shall be polyester powder coat with a minimum thickness of 2.0 mil.

The luminaire surfaces exposed to the environment shall exceed a rating of six, according to ASTM D1654, after 1000 hours of ASTM B117 testing. The coating shall exhibit no greater than 30% reduction of gloss, according to ASTM D523, after 500 hours of ASTM G154 Cycle 6 QUV® accelerated weathering testing.

Stainless-Steel Housing. The housing shall be constructed from 16-gauge minimum, 304 stainless steel. The stainless-steel housing does not need to be painted. The manufacturer may paint the luminaire at no additional cost.

The luminaire shall be optically sealed, mechanically strong and easy to maintain. The luminaire shall be designed for wall mounting to a pier or abutment. It shall be provided with a suitable mounting bracket which allows for +90° adjustment from horizontal in 5° increments.

The luminaire shall be gasketed and sealed and shall be UL listed for wet locations. The luminaire optical assembly shall have a minimum IEC ingress penetration rating of IP66. When furnished with a lens and frame, the lens shall be made of crystal clear, impact and heat resistant flat glass. The lens and frame shall be securely attached to the main housing and be readily removable for servicing the LED optical assembly.

All external surfaces shall be cleaned in accordance with the manufacturer's recommendations and be constructed in such a way as to discourage the accumulation of water, ice, and debris.

The total weight including accessories, shall not exceed 75 lbs.

A passive cooling method with no moving, rotating parts, or liquids shall be employed for heat management.

Vibration Testing. All luminaires shall be subjected to and pass vibration testing requirements at “3G” minimum zero to peak acceleration in accordance with ANSI C136.31 requirements using the same luminaire. To be accepted, the luminaire housing, hardware, and each individual component shall pass this test with no noticeable damage and the luminaire must remain fully operational after testing.

Labels. An internal label shall be provided indicating the luminaire is suitable for wet locations and indicating the luminaire is an NRTL listed product to UL1598 and UL8750. The internal label shall also comply with the requirements of ANSI C136.22.

An external label consisting of two black characters on a white background with the dimensions of the label and the characters as specified in ANSI C136.15 for HPS luminaires. The first character shall be the alphabetical character representing the initial lumen output as specified in Table 1 of Article 1067.06(c). The second character shall be the numerical character representing the transverse light distribution type as specified in IES RP-8 (i.e. types 1, 2, 3, 4, or 5).

Hardware. All hardware shall be stainless steel or of other corrosion resistant material approved by the Engineer.

Luminaires shall be designed to be easily serviced, having fasteners such as quarter-turn clips of the heavy spring-loaded type with large, deep straight slot heads, complete with a receptacle and shall be according to military specification MIL-f-5591.

All hardware shall be captive and not susceptible to falling from the luminaire during maintenance operations. This shall include lens/lens frame fasteners as well hardware holding the removable driver and electronic components in place.

Circuiting shall be designed to minimize the impact of individual LED failures on the operation of the other LED's.

Wiring. Wiring within the electrical enclosure shall be rated at 600v, 105°C or higher. The power connection to the luminaire shall be via liquid tight metallic conduit or an armored flexible cable assembly. The power connection, including any external shielding, must be secured to the luminaire and connected source. The location of the opening shall be coordinated with the installation to minimize the length of flexible conduit required. The length of the cable or flexible conduit shall not exceed 6 feet.

Mounting Brackets. 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. The brackets shall be constructed of 304 stainless steel. The mounting brackets shall be fully coordinated with the luminaire mounting method indicated in plans.

Driver. The driver shall be integral to the luminaire shall be capable of receiving an indefinite open and short circuit output conditions without damage.

The driver shall incorporate the use of thermal foldback circuitry to reduce output current under abnormal driver case temperature conditions and shall be rated for a lifetime of 100,000 hours at an ambient temperature exposure of 77 °F to the luminaire. If the driver has a thermal shut down feature, it shall not turn off the LEDs when operated at 104 °F or less.

The driver shall have an input voltage range of 120 to 277 volts ($\pm 10\%$) or 347 to 480 volts ($\pm 10\%$) according to the contract documents. When the driver is operating within the rated input voltage range and in an un-dimmed state, the power factor measurement shall be not less than 0.9 and the THD measurement shall be no greater than 20%.

The driver shall meet the requirements of the FCC Rules and Regulations, Title 47, Part 15 for Class A devices with regard to electromagnetic compatibility. This shall be confirmed through the testing methods in accordance with ANSI C63.4 for electromagnetic interference.

The driver shall be dimmable using the protocol listed in the Luminaire Performance Table shown in the contract.

Surge Protection. The luminaire shall comply the requirements of ANSI C136.2 for electrical transient immunity at the “Extreme” level (20KV/10KA) and shall be equipped with a surge protective device (SPD) that is UL1449 compliant with indicator light. An SPD failure shall open the circuit to protect the driver.

LED Optical Assembly. The optical assembly shall have an IP66 or higher rating in accordance with ANSI C136.25. The circuiting of the LED array shall be designed to minimize the effect of individual LED failures on the operation of other LEDs. All optical components shall be made of glass or a UV stabilized, non-yellowing material.

The optical assembly shall utilize high brightness, long life, minimum 70 CRI, 4,000K color temperature ($\pm 300K$) LEDs binned in accordance with ANSI C78.377. Lenses shall be UV-stabilized acrylic or glass.

Lumen depreciation at 50,000 hours of operation shall not exceed 15% of initial lumen output at the specified LED drive current and an ambient temperature of 25° C.

The luminaire may or may not have a glass lens over the LED modules. If a glass lens is used, it must be a flat lens. Material other than glass will not be acceptable. If a glass lens is not used, the LED modules may not protrude lower than the luminaire housing.

The assembly shall have individual serial numbers or other means for manufacturer tracking.

Photometric Performance. Luminaires shall be tested according to IESNA LM-79. This testing shall be performed by a test laboratory holding accreditation from the National Institute of Standards and Technology (NIST) NVLAP for the IESNA LM-79 test procedure.

Data reports as a minimum shall yield an isofootcandle chart, with max candela point and half candela trace indicated, maximum plane and maximum cone plots of candela, a candlepower table (house and street side), a coefficient of utilization chart, a luminous flux distribution table, spectral distribution plots, chromaticity plots, and other standard report outputs of the above-mentioned tests.

The luminaire shall have a BUG rating of back light B3 or less, Up light rating of U0, and a glare rating of G3 or less unless otherwise indicated in the luminaire performance table.

Photometric Calculations. Submitted report shall include a luminaire classification system graph with both the recorded lumen value and percent lumens by zone along with the BUG rating according to IESNA TM-15.

Complete point-by-point luminance and veiling luminance calculations as well as listings of all indicated averages and ratios as applicable shall be provided in accordance with IESNA RP-8 recommendations. Lighting calculations shall be performed using AGi32 software with all luminance calculations performed to one decimal place (i.e. x.x cd/m²). Uniformity ratios shall also be calculated to one decimal place (i.e. x.x:1). Calculation results shall demonstrate that the submitted luminaire meets the lighting metrics specified in the project Luminaire Performance Table(s). Values shall be rounded to the number of significant digits indicated in the luminaire performance table(s).

All photometry must be photopic. Scotopic or mesopic factors will not be allowed. The AGi32 file shall be submitted at the request of the Engineer.

The luminaire may have an initial lumen value lower than the specified lumen range in the performance tables provided that the resulting calculations demonstrate that the performance requirements are being met.

IDOT DISTRICT 1 LUMINAIRE PERFORMANCE
TABLE 5 ROADWAY UNDERPASS LIGHTING
5 LANE

GIVEN CONDITIONS

ROADWAY DATA	Pavement Width	60 (ft)
	Number of Lanes	5
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
MOUNTING DATA	Mounting Height	16 (ft)
	Orientation	Perpendicular to roadway
	Set-Back from Edge Of Pavement	4 (ft)
LUMINAIRE DATA	Lumens	7690-8646
	Total Light Loss Factor	0.65
LAYOUT DATA	Spacing	44 (ft)
	Luminaire Overhang over EOP	-4 (ft)

Tilt _____

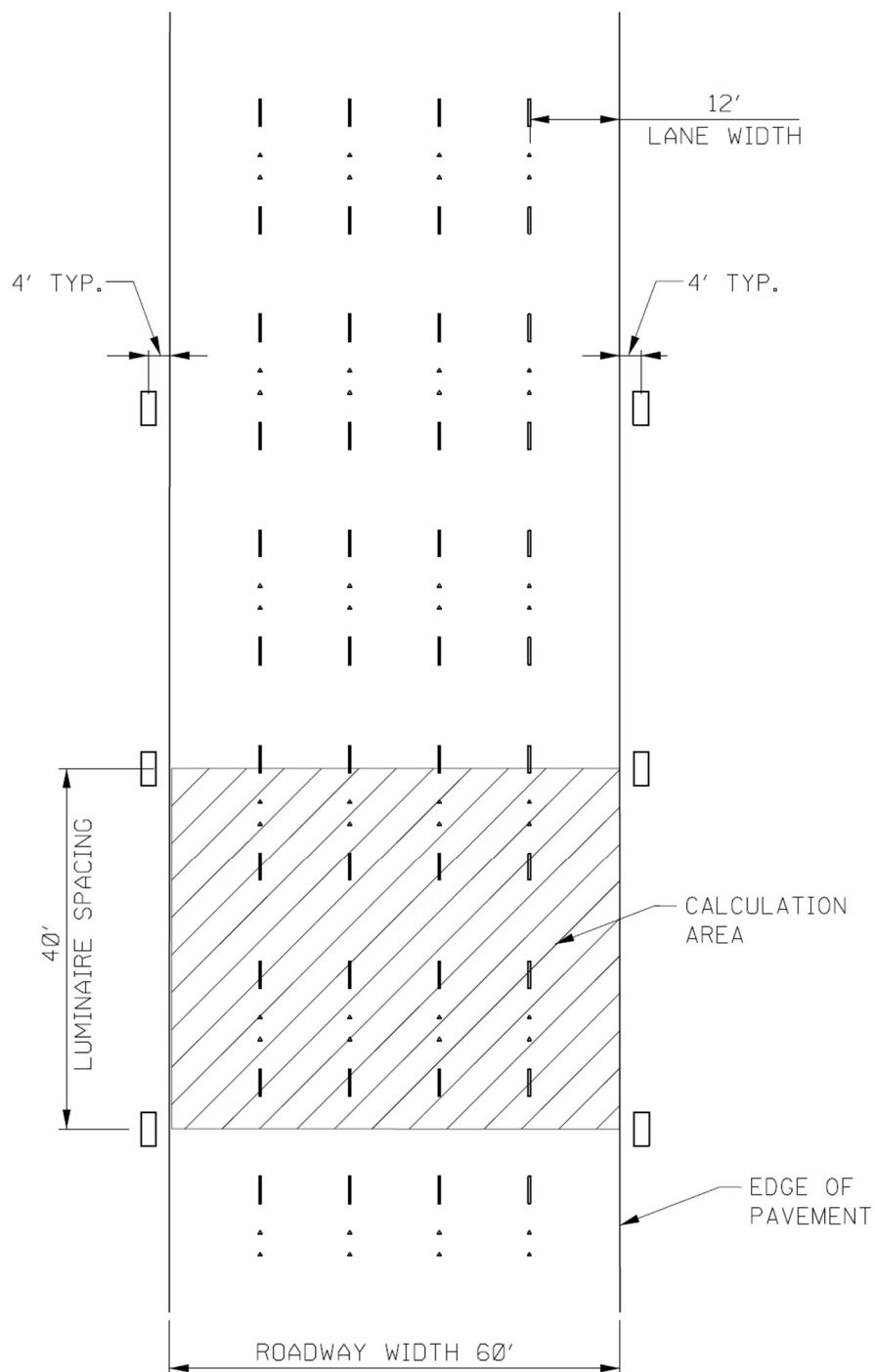
Configuration _____

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS

NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ROADWAY	Average Luminance, L_{AVE}	1.6 Cd/m ² (Max)
		1.2 Cd/m ² (Min)
LUMINANCE	Uniformity Ratio, L_{AVE}/L_{MIN}	3:1 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5:1 (Max)
	Veiling Luminance Ratio, L_v/L_{AVE}	0.30:1 (Max)



Independent Testing. When a contract has 30 or more luminaires of the same type (distribution type and lumen output/wattage), that luminaire type shall be independently tested, unless otherwise noted. The quantity of luminaires to be tested shall be as specified in the following table.

Contract Quantity	Luminaires to be Tested
1-49	0 (unless otherwise noted)
50-100	2
101-150	3
151-200	4
201-250	5
251-300	6
301-350	7

Testing is not required for temporary lighting luminaires.

The Contractor shall coordinate the testing with the contract schedule considering submittal, manufacturing, testing, and installation lead-times and deadlines.

The electrical engineer shall select from all the project luminaires at the Contractor's or distributor's storage facility, within District 1, the luminaires for testing. In all cases, the selection of luminaires shall be a random selection from the entire completed lot of luminaires required for the contract. Selections from partial lots will not be allowed. An additional luminaire shall also be selected for physical inspection by the Engineer at the district headquarters. This luminaire will be available for the Contractor to pick up at a later date to be installed under this contract. This luminaire is in addition to the luminaire required as a part of the submittal process specified elsewhere.

Alternative Selection Process. With the Engineer's prior approval, the Contractor shall provide a list of luminaire serial numbers for all the luminaires. The Engineer shall make a random selection of the required number of luminaires for testing from the serial numbers. That luminaire must then be photographed clearly showing the serial number prior to shipment to the selected and approved testing laboratory. The testing laboratory shall include a photograph of the luminaire along with the test results directly to the Engineer.

Luminaires shall be tested at a NVLAP accredited laboratory approved for each of the required tests. The testing facility shall not be associated in any way, subsidiary or otherwise, with the luminaire manufacturer. All costs associated with luminaire testing shall be included in the bid price of the luminaire.

The selection of the proposed independent laboratory shall be presented with the information submitted for review and approval.

The testing performed shall include photometric and electrical testing. All tests shall be conducted at the luminaire system operating voltage of 240 volts unless specified differently in the contract plans.

Photometric testing shall be according to IES recommendations, performed with a goniophotometer and as a minimum, shall yield an isofootcandle chart, with max candela point and half candela trace indicated, an isocandela diagram, maximum planned and maximum cone plots of candela, a candlepower table (house and street side), a coefficient of utilization chart, a luminous flux distribution table, BUG rating report, and complete calculations based on specified requirements and test results.

Electrical testing shall conform to NEMA and ANSI standards and, as a minimum shall include a complete check of wiring connections and a table of characteristics showing input amperes, watts, power factor, total harmonic distortion, and LED drive current.

The summary report and the test results including IES photometric files shall be sent directly to the Engineer, the electrical engineer, and the Contractor via email or other mutually agreeable means.

Photometric performance shall meet or exceed that of the specified values. If the luminaire does not meet the specified photometric values, the luminaire has failed regardless of whether the test results meet the submitted factory data.

Should any of the tested luminaires of a given type, and distribution fail to satisfy the specifications and perform according to approved submittal information, the luminaire type of that distribution type and wattage shall be unacceptable and be replaced by alternate equipment meeting the specifications with the submittal and testing process repeated in their entirety; or corrections made to achieve required performance.

In the case of corrections, the Contractor shall advise the Engineer of the proposed corrections and shall request a repeat of the specified testing and, if the corrections are deemed reasonable by the Engineer, the testing process shall be repeated in its entirety. The number of luminaires to be tested shall be the same quantity as originally tested as required in the above table.

Retesting, should it become necessary, shall not be grounds for additional compensation or extension of time.

Submittal information shall include a statement of intent to provide the testing as well as a request for approval of the chosen laboratory.

Installation. Each luminaire shall be installed according to the luminaire manufacturer's recommendations.

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 appurtenant items, shall be included as part of this item. Luminaires shall be configured with the luminaire tilt as identified in the submitted documents.

Unless otherwise indicated, suspended underpass luminaires shall be installed 1-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.

No luminaire shall be installed prior to approval. Where independent testing is required, full approval will not be given until complete test results, demonstrating compliance with the specifications, have been reviewed and accepted by the Engineer.

Luminaire wiring shall be provided with the luminaire. The wiring shall run from the junction box to the luminaire.

Luminaire wire shall be sized No. 10, rated 600 V, RHW/USE-2, and have copper conductors, stranded in conformance with ASTM B 8. Luminaire wire shall be insulated with cross-linked polyethylene (XLP) insulation. The wire shall include a phase, neutral, and green ground wire. Wires shall be trained within any raceways to avoid abrasion or damage to the insulation.

Included with the luminaire wiring shall be fusing located in the handhole or primary junction box. Fusing shall be according to Article 1065.01 with the exception that fuses shall be 6 amperes.

Each luminaire and optical assembly shall be free of all dirt, smudges, etc. Should the optical assembly require cleaning, a luminaire manufacturer approved cleaning procedure shall be used.

Warranty. The entire luminaire shall be covered by a ten-year warranty. Failure is when one or more of the following occur:

- 1) Negligible light output from more than 10% of the discrete LEDs.
- 2) Significant moisture that deteriorates performance of the luminaire.
- 3) Driver that continues to operate at a reduced output due to overheating.

The warranty period shall begin on the date of luminaire delivery. The Contractor shall verify that the Engineer has noted the delivery date in the daily diary. Copy of the shipment and delivery documentation shall be submitted.

The replacement luminaire shall be of the same manufacturer, model, and photometric distribution as the original.

The rated initial minimum luminous flux (lumen output) of the light source, as installed in the luminaire, shall be according to the following table for each specified output designation.

Designation Type	Minimum Initial Luminous Flux	Designation Type	Minimum Initial Luminous Flux
A	2,200	E	9,450
B	3,150	F	12,500
C	4,400	G	15,500
D	6,300	H	25,200

Where delivered lumens is defined as the minimum initial delivered lumens at the specified color temperature. Luminaires with an initial luminous flux less than the values listed in the above table will not be acceptable even if they meet the requirements given in the Luminaire Performance table shown in the contract.

Basis of Payment. This work will be paid for at the contract unit price per EACH for LUMINAIRE, LED, UNDERPASS, of the mount type and output designation specified.

WIRE AND CABLE

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.”

LIGHTING UNIT COMPLETE (SPECIAL) (CDOT)

Description. This item will consist of retrieving, installing, and setting plumb a steel anchor base pole with mast arm and luminaire. The mast arm of specific length to support a streetlight luminaire shall be installed on the light pole. The LED street luminaire shall be installed on a streetlight mast arm attached to a streetlight pole and connecting the unit to an underground cable distribution system at the location shown on the plans.

Material. The contractor shall make arrangement to pick up light poles, mast arms, and luminaires from CDOT. Contractor must start this coordination as early as possible to avoid any delay. The light poles obtained from CDOT shall be anchor base 7 gauge 34'6" mounting height. The mast arm shall be steel 12'. The roadway luminaire shall be LED type model GE LED ERL2 019 B3 3000K Cobra head or equivalent provided by CDOT.

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

The contractor will utilize non-abrasive slinging materials and will otherwise exercise due care in erecting the pole and mast arm to minimize any possible damage to the finish. When necessary, the contractor will utilize, at his own expense, factory approved touch-up materials and methods to restore the finish to like new appearance and durability. Mast arm 8' will be installed with two bolts to mast arm attachment on the pole. The pole must have mast arm attachment to properly mount the arm (standard drawing 659). Bolts will be supplied with the arm.

The luminaire must be securely installed on the mast arm. The vertical axis of the luminaire must be in a vertical plane, and the longitudinal axis must be leveled as specified in shop drawings supplied by the manufacturer to produce the desired distribution pattern with the lamp socket secured in the required position for that distribution.

A cartridge type fuse, type KTK, rated at 10 amperes must be installed in each of the fuse holders.

All splice methods must be approved by the Engineer before implemented. All splices, tapes and grounding connections must be inspected by the Commissioner's authorized representative before wires are permanently trained in the light pole.

Current, insulation resistance, and voltage readings must be taken and tabulated by the Contractor for each circuit. These readings are to be witnessed by the Commissioner's authorized representative. Any indication of grounds, open, or crossed conductors must be thoroughly investigated and remedied before acceptance of the installation. Line voltage must be taken at any in-line fused location, within the pole designated by the Commissioner's authorized representative. Locations and voltage must be tabulated as directed. Three (3) copies of the tabulated voltage insulation resistance, and current readings must be submitted to the Commissioner's authorized representative. Maximum voltage drop must not exceed 10% of nominal source voltage. The insulation resistance must not be less than 2 Megohms, when tested to ground with 500 volts a.c.

After the lighting installation has been completed and satisfactory current and voltage readings recorded, a field test must be made to insure that all lighting and control equipment are in proper operating condition. This field test must be witnessed by the Engineer.

The Contractor will furnish special test devices, tools and miscellaneous items that will be required for the testing of cables and control equipment, all as herein specified.

Method Of Measurement. This item will be measured per each unit installed, complete with anchor bolt covers, pole cap, handhole cover mast arm and luminaire and all wiring to the underground feeder cable including splices.

Basis Of Payment. This work will be paid for at the contract unit price per EACH for LIGHTING UNIT COMPLETE (SPECIAL) which will be payment in full for installing the lighting unit complete in place. Mast arms, and luminaires will not be paid for separately.

MAINTENANCE OF STREET LIGHTING SYSTEM (CITY OF CHICAGO) (CDOT)

Revised: 10/31/2021

Material Specifications: 1447, 1 613 Standard Drawings: none

Description. This work consists of furnishing all labor, equipment, and incidental materials for maintaining existing street lighting systems owned by the Chicago Department of Transportation (CDOT) until the proposed new equipment is installed, energized, tested, and accepted for operation by CDOT.

The work shall include any necessary temporary devices to maintain existing illumination. The location and protection of devices necessary to comply with these requirements shall be subject to the approval of the Engineer. The Engineer will be the sole judge of satisfying existing illumination levels.

Any temporary wire or cable which may be required to be installed overhead between existing poles or temporary devices shall be furnished, installed, terminated, and maintained in service until the proposed lighting equipment is installed, tested and accepted for operation by the Engineer.

Existing Lighting Systems to be Maintained: Atlas M-23 District 7

Materials. Materials shall be according to the following CDOT Division of Electrical Operations (DEO) Specifications and Articles of Standard Specifications Section 1000 - Materials:

Item	Requirement
(a) Cable Splicing and Termination	Standard Specifications Article 1066.06
(b) Fuse holders and Fuses	Standard Specifications Article 1065.01
(c) Pole Wire	Material Specification 1351
(d) Aerial Cable Assembly	Material Specification 1601
(e) Thermal Magnetic Circuit Breaker	Material Specification 1428
(f) Metal Light Poles	Material Specification 1447
(g) Luminaires	Standard Specifications Article 1067

Material Acceptance. The Contractor shall provide a Manufacturer's written certification that the materials comply with these specifications.

General Requirements. General requirements shall be in accordance with Section 801 of the Standard Specifications, and in accordance with Division of Electrical Operations Standards and the City of Chicago Electrical Code, except as herein modified.

The Contractor shall maintain existing lighting systems (temporary and permanent) and proposed lighting systems, as well as receptacles and other ancillary devices connected to the applicable street lighting controllers. Effective the day the Contractor starts work (including non-electrical work), the Contractor shall maintain the existing lighting equipment located within the project limits as it then exists. The Contractor shall also maintain any street lighting equipment outside of the project limits but connected to a controller situated within the project limits. The Contractor shall also maintain any street lighting equipment inside of the project limits but connected to a controller situated outside the project limits.

The Scope of Work shall include the assumption of responsibility for the continuing operation of existing, temporary, or other lighting-systems affected by the work as may be specified elsewhere herein. Existing lighting systems, when depicted on the Plans, are intended only to indicate the general nature of the systems 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 nature of systems to be maintained.

Preconstruction Inspection. Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall initiate a request for preconstruction inspection, to be held in the presence of the Engineer and a representative of the Chicago Department of Transportation Division of Electrical Operations. The request for the maintenance preconstruction shall be made no less than seven (7) calendar days prior to the desired inspection date. The maintenance preconstruction inspection shall:

- Establish details of any formal transfers of maintenance responsibility required for the construction period.
- Establish approximate locations of known lighting and/or traffic control systems, which may be affected by the work.
- Establish the condition of lighting and/or traffic control systems which may be affected by the Work.

Lighting System Maintenance Operations. To ensure a prompt response to incidents involving the integrity of the work zone street lighting devices, the Contractor shall provide a telephone number where a responsible individual can be contacted on a 24-hour-a-day basis. When the Commissioner is notified or determines a deficiency exists, (s)he will be the sole judge as to whether the deficiency is an immediate safety hazard. The Contractor shall dispatch sufficient resources within 12 hours of notification to make needed corrections of deficiencies that constitute an immediate safety hazard. Other deficiencies shall be corrected within 24 hours. If the Contractor fails to restore the required street light within the time limits specified above, the Commissioner will impose a daily monetary deduction for each 24-hour period (or portion thereof) the deficiency exists. This time period will begin with the time of notification to the Contractor and end with the Commissioner's acceptance of the below. In addition, if the Contractor fails to respond the Commissioner may correct the deficiencies and the cost thereof will be deducted from monies due or which may become due the Contractor. This corrective action will in no way relieve the Contractor of his/her contractual requirements or responsibilities.

Installation Requirements for Temporary Lighting Units. The Contractor shall furnish and install a temporary lighting unit to replace any existing lighting unit that is removed prior to the new lighting system being operational.

Temporary lighting unit shall include pole, mast arm, luminaire, and temporary wiring connections. The Contractor shall furnish and install temporary lighting units and all associated electrical equipment to ensure compliance with the applicable codes, standards, and Specifications.

The Contractor shall coordinate temporary lighting with the sequence of construction and maintenance of traffic for this Project.

The wiring on the pole shall consist of aerial electric cables and waterproof splices at each light pole.

All equipment furnished shall be functional and new in appearance and shall be maintained. The Contractor shall own all the temporary lighting equipment furnished and installed.

The Contractor shall disconnect and remove temporary lighting and all associated electrical equipment upon energizing and acceptance of the permanent lighting system.

Temporary Wiring. The Contractor shall furnish and install aerial electric cable, including messenger wire, in accordance with Section 818 of the Standard Specifications. The conductor size shall be Number 6 AWG minimum. The messenger wire shall be steel and of adequate size to support the cables from structure to structure under normal and adverse weather conditions.

The electric cables shall be secured to the steel messenger wire with binding strips continuous throughout each span of cable and shall be of adequate strength to support the size of electric cables required for this Project.

Temporary Poles. Temporary lighting poles may be used metal poles in accordance with Article 1069.01 of the Standard Specifications. Metal poles shall be similar in type, size and finish.

Temporary lighting poles may be used steel poles that comply with Division of Electrical Operations Specification Number 1447 if already owned by the Contractor and in stock.

The Contractor shall provide and remove temporary foundations for the metal poles that will be adequate to support the poles during normal and adverse weather conditions and as directed by the Engineer.

Temporary Luminaires. Each luminaire shall be a LED unit that meets the requirements of Material Specification 1613. Each luminaire shall be mast arm or bracket arm mounted on the top of the pole. Each luminaire shall be provided with a leveling surface and a leveling device and shall be capable of being tilted by plus or minus 30 degrees and rotated to any degree with respect to the supporting bracket. Each luminaire shall have a pipe arm barrier to limit the amount of inflection.

Installation. Location of cables and fixtures for temporary lighting shall be adjusted and supported to accommodate field conditions encountered, including any potential interferences with other construction or equipment to be installed.

The Contractor shall determine the exact route and location of each temporary lighting fixture and associated wiring, prior to installation.

Temporary lighting shall be installed to permit removal (without damage to other parts) of parts requiring periodic replacement or maintenance.

Temporary wiring/lighting shall be removed immediately upon acceptance of permanent lighting.

Method of Measurement. Maintenance Of Street Lighting System (City of Chicago) will not be measured for payment but will be paid on a lump sum basis.

Basis of Payment. This work will be paid for the contract unit price per LUMP SUM for MAINTENANCE OF STREET LIGHTING SYSTEM (City of Chicago) which will be payment in full for maintaining the existing street lighting system until the proposed new equipment is installed, energized, tested, and accepted for operation by CDOT, furnishing, installing, and removing all temporary lighting units, aerial cable and ancillary equipment required to maintain the existing lighting system as described herein.

CABLE IN CONDUIT, TRIPLEX, 2-1/C NO. 6 AND 1-1/C NO. 8 GROUND (CDOT)

Description. This work shall consist of furnishing and installing electric conductors that are in a triplex cable assemblies. The conductors shall be rated at 600 volts and must consist of two #6 AWG conductors and one #8 AWG conductor for the triplex cable assembly. The cable will be installed underground in conduit between CDOT owned and maintained light poles as indicated on the plans.

Material. The cable shall meet all requirements of Material Specification 1534 of the Division of Engineering - Electrical Section. Cable splices shall meet the requirements of Section 800 and Section 1066.06 of the Standard Specifications. All materials shall be approved by the Engineer before implementation.

Construction Method. All cables shall be installed with care to prevent damage to the cable. Any defects found in the cable shall be reported to the resident engineer. Damaged cable shall be replaced.

The cable shall be pulled into the conduit with a minimum of dragging on the ground or pavement. This shall be accomplished by means of reels mounted on jacks or other suitable devices located for unreeling cable directly into duct. Lubricants shall be used to facilitate installation if deemed necessary by the Contractor.

Bends in the cable shall conform to the recommended minimum radii as outlined in the National Electric Code.

Cable passing through manholes shall be trained and racked around the sides of the manhole into a permanent position. If are no existing racks or if the existing are in poor condition, the Contractor shall install new racks. The material shall be approved by the resident engineer. Any material and labor involved in training and racking the cable shall be considered incidental to the cost of this pay item.

Where cable runs continue from manhole to manhole without tapping within a light pole, they shall be continuous without splices unless authorized by the resident engineer.

The cable installation shall be color coded so that each lead of all circuits may be easily identified and are connected to the proper leg of the luminaires circuits. The lighting triplex cable assembly shall have one phase conductor color coded black and the other color coded red. The equipment grounding conductor (#8) shall be color coded green, and neutral conductors shall be color coded white or grey as indicated on the plans.

All wire or cable in the distribution panels and control cabinets shall be properly trained and shall have sufficient slack provided for any rearrangement of equipment or future additions

Splices shall be located in light pole base. Splices shall be made with materials that are compatible with conductors and insulation. The connectors shall be UL listed, and sized properly for the quantity and size of the conductors to be spliced. Splices shall be as shown on the plans. The Contractor shall label all wires with wire markers indicating the circuit identifier in every controller, pole base, manhole, handhole and splice/connection point.

Method of Measurement. The length of triplex cable installed in place. Measurements will be made in straight lines between changes in direction and to the center of equipment and boxes. 3 feet of extra cable will be allowed when terminating at a controller or light pole, 5 feet of extra cable will be allowed at handholes, and 10 feet of extra cable will be allowed at manholes.

The vertical distance of cable will be measure in feet. Changes in direction shall assume perfect straight line runs, ignoring actual raceway sweeps.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for CABLE IN CONDUIT, TRIPLEX, 2-1/C NO. 6 AND 1-1/C NO. 8 GROUND, which shall include all material, labor, splices, terminations, and incidentals necessary to complete the work as described herein.

LUMINAIRE (SPECIAL) (CDOT)

Description. This item will consist of installing, mast arm and luminaire on combination signal/lighting pole. The mast arm of specific lengths to support a LED streetlight luminaire shall be installed on the combination signal/ light pole and connecting the unit to an underground cable distribution system at the location shown on the plans.

Color. The color of mast arm shall match the color of the combination signal/lighting pole and must be gloss black unless otherwise noted. A color sample must be submitted to the Engineer for approval.

Material. The contractor shall make arrangement to pick up mast arms, and luminaires from CDOT. The contractor must start this coordination as early as possible to avoid any delay. The mast arm shall be steel 12'. The roadway luminaire shall be LED type model GE LED ERLH 016 B3 3000K Cobra head or equivalent provided by CDOT.

Installation. The contractor will utilize non-abrasive slinging materials and will otherwise exercise due care in erecting the pole and mast arm to minimize any possible damage to the finish. When necessary, the contractor will utilize, at his own expense, factory approved touch-up materials and methods to restore the finish to like new appearance and durability. Mast arm 12' will be installed with two bolts to mast arm attachment on the pole. The pole must have mast arm attachment to properly mount the arm (standard drawing 659). Bolts will be supplied with the arm.

The luminaire must be securely installed on the mast arm. The vertical axis of the luminaire must be in a vertical plane, and the longitudinal axis must be leveled as specified in shop drawings supplied by the manufacturer to produce the desired distribution pattern with the lamp socket secured in the required position for that distribution.

A cartridge type fuse, type KTK, rated at 10 amperes must be installed in each of the fuse holders.

All splice methods must be approved by the Engineer before implementation. All splices, tapes and grounding connections must be inspected by the Commissioner's authorized representative before wires are permanently trained in the light pole.

Current, insulation resistance, and voltage readings must be taken and tabulated by the Contractor for each circuit. These readings are to be witnessed by the Commissioner's authorized representative. Any indication of grounds, open, or crossed conductors must be thoroughly investigated and remedied before acceptance of the installation. Line voltage must be taken at any in-line fused location, within the pole designated by the Commissioner's authorized representative. Locations and voltage must be tabulated as directed. Three (3) copies of the tabulated voltage insulation resistance, and current readings must be submitted to the Commissioner's authorized representative. Maximum voltage drop must not exceed 10% of nominal source voltage. The insulation resistance must not be less than 2 Megohms, when tested to ground with 500 volts a.c.

After the lighting installation has been completed and satisfactory current and voltage readings recorded, a field test must be made to insure that all lighting and control equipment are in proper operating condition. This field test must be witnessed by the Engineer.

The Contractor will furnish special test devices, tools and miscellaneous items that will be required for the testing of cables and control equipment, all as herein specified.

Method Of Measurement. This item will be measured per each unit installed, complete with anchor bolt covers, pole cap, handhole cover mast arm and luminaire and all wiring to the underground feeder cable including splices.

Basis Of Payment. This work will be paid for at the Contract unit price per EACH for LUMINAIRE (SPECIAL) which will be payment in full for installing the Luminaire Special in place. Mast arms and luminaires will not be paid for separately.

TRAFFIC CONTROL AND PROTECTION (ARTERIALS) (D1)

Effective: February 1, 1996

Revised: March 1, 2011

Specific traffic control plan details and Special Provisions have been prepared for this contract. This work shall include all labor, materials, transportation, handling and incidental work necessary to furnish, install, maintain and remove all traffic control devices required as indicated in the plans and as approved by the Engineer.

When traffic is to be directed over a detour route, the Contractor shall furnish, erect, maintain and remove all applicable traffic control devices along the detour route according to the details shown in the plans.

Method of Measurement: All traffic control (except "Traffic Control and Protection (Expressways)" and temporary pavement markings) indicated on the traffic control plan details and specified in the Special Provisions will be measured for payment on a lump sum basis.

Basis of Payment: All traffic control and protection will be paid for at the contract unit price per LUMP SUM for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

Temporary pavement markings will be paid for separately unless shown on a standard.

TRAFFIC CONTROL PLAN (D1)

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.

Standards:

- 701101 Off-Rd Operations, Multilane, 15' to 24" From Pavement Edge 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
- 701427 Lane Closure, Multilane, Intermittent or Moving Operations Speeds < 40 MPH
- 701428 Traffic Control Setup and Removal Freeway/Expressway
- 701446 Two Lane Closure, Freeway/Expressway 701501 Urban Lane Closure, 2L, 2W, Undivided
- 701502 Urban Lane Closure, 2L, 2W with Bidirectional Left Turn Lane
- 701601 Urban Lane Closure, Multilane, 1W OR 2W with Nontraversable Median 701701 Urban Lane Closure, Multilane Intersection
- 701801 Sidewalk, Corner or Crosswalk Closure 701901 Traffic Control Devices
- 704001 Temporary Concrete Barrier

Details:

- TC-08 Entrance and Exit Ramp Closure Details
- TC-09 Traffic Control Details for Freeway Single & Multi-lane Weave
- TC-10 Traffic Control and Protection for Side Roads, Intersections, and Driveways TC-11 Typical Applications Raised Reflective Markers (Snow-Plow Resistant)
- TC-12 Multi-Lane Freeway Pavement Marking TC-13 District One Typical Pavement Markings
- TC-16 Short-Term Pavement Marking Letters and Symbols
- TC-17 Traffic Control for Freeway Shoulder Closures and Partial Ramp Closures
- TC-18 Freeway/Expressway Signing for Flagging Operations at Work Zone Openings on Freeways/Expressways
- TC-21 Detour Signing for Closing State Highways TC-22 Arterial Road Information Sign
- TC-24 City of Chicago Typical Pavement Markings TC-26 Driveway Entrance Signing

Special Provisions:

- Maintenance of Roadways
- Public Convenience and Safety (D1) Keeping the Expressway Open to Traffic
- Failure to Open Traffic Lanes to Traffic Traffic Control & Protection (Expressway)
- Traffic Control & Protection (Arterials)
- Temporary Information Signing
- Traffic Control for Work Zone Areas Speed Display Trailer (D-1)
- Temporary Traffic Signal Timing (D-1)
- Short Term and Temporary Pavement Markings (BDE)
- Temporary Concrete Barrier (BDE)
- Vehicle and Equipment Warning Lights (BDE)
- Work Zone Traffic Control Devices (BDE)

KEEPING THE EXPRESSWAY OPEN TO TRAFFIC

Effective: March 22, 1996

Revised: October 9, 2020

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-290: WB DIRECTION Wells to Loomis

WEEK NIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS		
Sunday - Thursday	1-Lane	10:00 PM	to	5:00 AM
	2-Lane	11:59 PM	to	5:00 AM
	3-Lane	1:00 AM	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)
	3-Lane	1:00 AM	to	5:00 AM
Saturday	1-Lane	11:00 PM (Sat)	to	10:00 AM (Sun)
	2-Lane	11:59 PM (Sat)	to	8:00 AM (Sun)
	3-Lane	1:00 AM	to	7:00 AM

No tapers are allowed between Halsted and Racine. Two sets of Road Construction Ahead signs with flashing beacons on SB Kennedy exit to WB 290 ramp are required at all times when closing lanes on WB 290. Speed Display trailer and WZ 45 mph sign arrays are required on WB prior to Des Plaines Avenue when lanes are closed on WB in this area. One RCA sign with flashing beacon is required on the NB Ryan to WB 290 ramp at the gore separating WB and EB 290.

Full stops on WB I-290 requires setting triple left lane closures. Lane closures will also be required on the Dan Ryan and Kennedy.

Triple Left Lane closures in the WB direction will also require closing a single lane of 2- lane ramp from NB I-90/94 to WB I-290.

LOCATION: I-290: EB DIRECTION Central to Peoria

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

*3 Lane closures will only be allowed from the left and may be approved for specific operations only with allowable hours to be determined. Contractor must coordinate with IDOT Expressway section prior to approval – Please call 1-847-705-4151 to initiate review process.

LOCATION: I-90/94 Kennedy: Ohio to I-290

WEEK NIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS		
Sunday - Thursday	1-Lane/ramp	10:00 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	10:00 PM (Sat)	to	10:00 AM (Sun)
	2-Lane	11:59 PM (Sat)	to	8:00 AM (Sun)

LOCATION: I-90/94 Dan Ryan: Roosevelt to I-290

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

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 or as approved by the Expressway Traffic Operations Engineer.

Narrow Lanes and permanent shoulder closures will not be allowed between Dec. 1st and April 1st. Permanent shoulder closures per District Detail TC-17 will only be permitted if called for in the plans or as approved by the Expressway Traffic Operations Engineer.

Full Expressway Closures 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.

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 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 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 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 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 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

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 Keeping the Expressway Open to Traffic special provision, the Contractor shall be liable to the Department for the amount of:

One lane or ramp blocked = \$3,000

Two lanes blocked = \$5,000

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.

TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS)

Effective: March 8, 1996

Revised: January 25, 2024

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 1 Expressway details, standards and Supplemental Specifications, these special provisions, or as directed by the Engineer.

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 their 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 them 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.

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 Standard 701428 and Section 701 of the Standard Specifications. 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.

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.

- (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 55 mph or Higher. The initial work zone speed limit assembly, located approximately 4200' before the closure, shall be as shown in Standard 701400. Additional work zone 45 mph 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 65 mph, then additional signage should be installed per Standard 701400.
 - b. Existing Speed Limit of 45 mph. The advance 55 mph work zone speed limit assembly shown in Standard 701400 shall be replaced with a 45 mph assembly. Additional work zone 45 mph 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 1 inch. Signs shall be placed 500' in advance of the drop-off, within 500' of every entrance, and a minimum of every mile.

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 working room, the Contractor shall furnish and install vertical barricades, 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.

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.

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).

Flaggers. One flagger will be required for each separate activity of an operation that requires frequent construction vehicles to enter or leave a work zone to or from a lane open to traffic. Temporary traffic control and flagger position shall be according to District 1 Detail TC-18 – Expressway Flagging, or as directed by the Engineer.

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 1 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 1 Expressway Traffic Control Supervisor (847-705-4151) shall be contacted at least three 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 Standards 701101, 701400, 701401, 701402, 701406, 701411, 701416, 701426, 701428, 701446, 701901 and District Details TC-8, TC-9, TC-17, TC-18 and TC-25 will be included with this item.

Basis of Payment. This work will be paid for at the contract unit price per LUMP SUM 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 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" =	$\frac{\text{Difference between original and final sum total value of all work items for which traffic control and protection is required}}{\text{Original sum total value of all work items for which traffic control and protection is required.}}$

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.

Temporary traffic control costs due to delay will be paid for according to the Compensable Delay Costs (BDE) special provision.

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.

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.

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

Impact attenuators, temporary bridge rail, and temporary rumble strips will be paid for separately.

Temporary pavement markings shown on the Standard will be measured and paid for according to Section 703 and Section 780. All pavement marking removal will be measured and paid for according to Section 703 or Section 783. Temporary pavement marking on the lower slope of the temporary concrete barrier wall will be measured and paid for as Temporary Pavement Marking, 6".

The changeable message sign required for full expressway closures shall not be paid for separately.

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 inspections. The inspections shall start within four 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. This work 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

Effective: November 13, 1996

Revised: January 29, 2020

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, skid mount, truss mount, and 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 (Note 1)	1090
b.)	Sign Face (Note 2)	1091
c.)	Sign Legends	1091
d.)	Sign Supports	1093
e.)	Overlay Panels (Note 3)	1090.02

Note 1. The Contractor may use 5/8 inch instead of 3/4 inch thick plywood.

Note 2. The sign face material shall be in accordance with the Department's Fabrication of Highway Signs Policy.

Note 3. The overlay panels shall be 0.08 inch 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 above the near edge of the pavement and shall be a minimum of 2 ft beyond the edge of the paved shoulder. A minimum of two posts shall be used.

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

Method of Measurement. This work shall be measured for payment in square feet 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 will be paid for at the contract unit price per SQUARE FOOT for TEMPORARY INFORMATION SIGNING.

TRAFFIC CONTROL FOR WORK ZONE AREAS

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 their trucking operations into and out of the work zone as well as on 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.

KEEPING ARTERIAL ROADWAYS OPEN TO TRAFFIC (WITH 15 MIN FULL STOPS)

Effective: January 22, 2003

Revised: August 10, 2017

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 Details.

Arterial lane closures shall be in accordance with the Standard Specifications, Highway Standards, District Details, and the direction of the Engineer. The Contractor shall request and gain approval from the Engineer seventy-two (72) hours in advance of all long-term (24 hrs. or longer) lane closures.

Arterial lane closures not shown in the staging plans will not be permitted during **peak traffic volume hours**.

Peak traffic volume hours are defined as weekdays (Monday through Friday) from **5:00 AM to 9:00 PM**.

Full closure of all arterial lanes in one or both directions will only be permitted for a maximum of 15 minutes at a time Sunday through Thursday between the hours of 10:00 PM and 5:00 AM. During full roadway closures, the Contractor will be required to reduce the roadway to only one open traffic lane in the affected direction(s) of travel using the appropriate State Standard(s) and District Detail(s). Police forces shall be notified and requested to close the remaining lane to facilitate the necessary work activities, except that a flagger may be substituted for daytime closures with the approval of the Engineer. The Contractor shall notify the District One Arterial Traffic Control Supervisor at 847-705-4470 at least three (3) working days (weekends and holidays DO NOT count into this notification time) in advance of the proposed road closures.

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 locations approved by the Engineer in accordance with Articles 701.08 and 701.11 of the Standard Specifications.

Should the Contractor fail to completely open and keep open all the traffic lanes to traffic in accordance with the limitations specified above, the Contractor shall be liable to the Department for the amount of:

- One lane or ramp blocked = \$ 3,000.00
- Two lanes blocked = \$ 5,000.00

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.

OVERHEAD SIGN STRUCTURE – BRIDGE MOUNTED

Effective: July 1, 2015

Revised: March 1, 2017

Revise Article 733.10(b) of the Standard Specification to read:

“Sign Structure – Bridge Mounted. Bridge mounted overhead sign structures will be measured for by payment in feet (meters) of the overall width of the sign panel or total width of adjacent sign panels, including spacing between adjacent sign panels, to be installed on the sign structure.”

RAISED REFLECTIVE PAVEMENT MARKER, REFLECTOR REMOVAL

Effective: August 1, 2023

Description: This work shall be completed in accordance with Section 783 of the Standard Specifications. This work shall consist of removing the reflector unit from existing raised reflector pavement markers that will remain in place at the end of construction activities. Existing reflectors that conflict with revised traffic patterns shall be removed immediately to facilitate a change in lane assignment. If darkness or inclement weather prohibits the removal operations, such operation shall be resumed the next morning of when weather permits.

The base casting shall remain in place in areas where no pavement rehabilitation is required, therefore only the reflector shall be removed. Debris from the removal operations shall be removed from the pavement prior to opening the roadway to traffic.

Basis of Payment: This work will be measured for payment at the contract unit price per EACH for RAISED REFLECTIVE PAVEMENT MARKER, REFLECTOR REMOVAL. Payment shall be full compensation for materials, labor and equipment required to complete this work.

RAISED REFLECTIVE PAVEMENT MARKER, REFLECTOR REPLACEMENT

Effective: August 1, 2023

Description: This work shall be completed in accordance with Section 781 of the Standard Specifications for Road and Bridge Construction. This work shall consist of reinstallation of reflectors into the raised pavement marker castings upon completion of staging in which the markers were in conflict with temporary lane usage.

Basis of Payment: This work will be measured for payment at the contract unit price per EACH for RAISED REFLECTIVE PAVEMENT MARKER, REFLECTOR REPLACEMENT. Payment shall be full compensation for materials, labor, and equipment required to complete this work.

TEMPORARY TRAFFIC SIGNAL TIMING

Effective: May 22, 2002

Revised: July 1, 2015

Description. This work shall consist of developing and maintaining appropriate traffic signal timings for the specified intersection for the duration of the temporary signalized condition, as well as impact to existing traffic signal timings caused by detours or other temporary conditions.

All timings and adjustments necessary for this work shall be performed by an approved Consultant who has previous experience in optimizing Closed Loop Traffic signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants.

The following tasks are associated with TEMPORARY TRAFFIC SIGNAL TIMING.

- Consultant shall attend temporary traffic signal inspection (turn-on) and/or detour meeting and conduct on-site implementation of the traffic signal timings.
- Consultant shall be responsible for making fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.
- Consultant shall provide monthly observation of traffic signal operations in the field.
- Consultant shall provide on-site consultation and adjust timings as necessary for construction stage changes, temporary traffic signal phase changes, and any other conditions affecting timing and phasing, including lane closures, detours, and other construction activities.
- Consultant shall make timing adjustments and prepare comment responses as directed by the Area Traffic Signal Operations Engineer.

Return original timing plan once construction is complete.

Basis of Payment. The work shall be paid for at the contract unit price per EACH for TEMPORARY TRAFFIC SIGNAL TIMING, which price shall be payment in full for performing all work described herein per intersection. When the temporary traffic signal installation is turned on and/or detour implemented, 50 percent of the bid price will be paid. The remaining 50 percent of the bid price will be paid following the removal of the temporary traffic signal installation and/or detour.

EXPANSION JOINT (SPECIAL)

Description. This item consists of replacing the expansion joint at the interface between the CTA Loomis Station and the East Sidewalk of the Loomis Street Bridge according to Articles 520 and 1051 of the Standard Specifications and as detailed in the plans. This work shall also include any materials for the installation of embedded plates, slide plates, screws, and compression seals as required by the Engineer.

Materials. Steel plates and screws shall be stainless steel (S.S.)

Compression Seal material shall be approved by CTA prior to installation.

Construction. Contractor shall install the 4" Compression Seal per manufacturers requirements. Contractor shall then position the S.S. bottom plate into the Loomis Street east sidewalk. after positioning the bottom plate the contractor shall position and level the CTA SS top plate. Engineer shall inspect the positioning for alignment and function. Once positioning is approved, contractor shall install plates into final position utilizing SS Countersunk Concrete Screws. Cost of material to level the top plate shall be included with the pay item EXPANSION JOINT (SPECIAL).

Method of Measurement. This work will be measured in place per foot of expansion joint and accepted by the Engineer after plates are installed into final position.

Basis of Payment. This work shall be paid for per FOOT as EXPANSION JOINT (SPECIAL).

PREFORMED BRIDGE JOINT SEAL

Description. This work shall consist of furnishing all labor, equipment and materials necessary to prepare the joint opening and install preformed bridge joint seal(s) at the locations specified. Unless otherwise detailed on the plans or specified herein, the maximum rated movement for this joint type is 4 inches.

Materials: Unless otherwise specified, one of the following prefabricated joint seals will be permitted:

Preformed Pre-compressed, Silicone Coated, Self-Expanding Sealant System. This Sealant system shall be comprised of three components: 1) cellular polyurethane foam impregnated with hydrophobic 100% acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone; 2) field-applied epoxy adhesive primer, 3) field-injected silicone sealant bands.

The preformed, pre-compressed silicone joint seal shall, as a minimum, be according to the following:

- The joint seal shall be held in place by a non-sag, high modulus silicone adhesive.
- The joint seal shall be compatible with the epoxy and header material.
- The joint seal shall withstand the effects of vertical and lateral movements, skew movements and rotational movement without adhesive or cohesive failure.
- The joint seal shall be designed so that, the material is capable of movement of +50%, -50% (100% total) of nominal material size. The gland shall not contain any open, unsealed joints along its length in its final condition.
- Changes in plane and direction shall be executed using factory fabricated transition assemblies fabricated to the angle(s) specified on the plans. The transitions shall be watertight at the inside and outside corners through the full movement of the product.
- The depth of the joint shall be recessed 3/4 in. below the riding surface throughout the normal limits of joint movement.
- The joint seal shall be resistant to ultraviolet rays.
- The joint seal shall be resistant to abrasion, oxidation, oils, gasoline, salt, and other materials that may be spilled on or applied to the surface.
- The manufacturer shall certify that the joint composition shall be free of any waxes or wax compounds; asphalts or asphalt compounds.

The joint material shall meet the following physical properties:

Property	Requirement	Test Method
Tensile Strength of Silicone Coating (min)	140 psi	ASTM D 412
UV Resistance of Joint System	No Changes--2000 Hours	ASTM G155-00A
Density of Cellular Polyurethane Foam (Unconfined)	4.0 lb/ cu ft (200kg/cu m)	ASTM D545
Heat Aging Effects (Silicone Coating)	No cracking, chalking	ASTM C 792
Joint System Operating temp range (min)	-40° F to 185° F	ASTM C 711

The adhesive shall be a two-component, 100% solid, modified epoxy meeting the requirements of ASTM C881, Type I, Grade 3, Class B & C. The adhesive shall also have the following properties:

Property	Requirement	Test method
Tensile Strength	2,500 psi min.	ASTM D638
Compressive Strength	7000 psi min.	ASTM D695
Bond Strength (Dry Cure)	2000 psi min	ASTM C882
Water Absorption	0.1% by weight	ASTM D570

The silicone band adhesive shall have the following properties:

Property	Requirement	Test Method
Movement Capability	+50/-50%	ASTM C 719
Elongation at Break	>600%	ASTM D 5893
Slump	≤0.3"	ASTM D 2202
Hardness (Shore A) max.	20	ASTM C 661
Tack free time (max)	60 minutes	ASTM C 679
Heat Aging Effects	No cracking, chalking	ASTM C 792
Resilience	≥ 75%	ASTM D5329
Bond	0% Adhesive or Cohesive Failure after 5 cycles @100%extension	ASTM D 5329

Preformed Inverted EPDM Joint Seal. The preformed inverted EPDM joint seal used for this item shall conform to the following specifications:

Table 1
Physical Properties of Preformed Silicone Gland

Property	Requirement	Test Method
Rated Movement Capability	Up To 5 inch total	N/A
Tensile Strength, psi.	1200 psi min	ASTM D 412
Elongation	400 % min	ASTM D 412
Tear (Die C)	150 pli. min	ASTM D 624
Durometer Content	50 +/- 5 max	ASTM D 2240
Water Resistance (70 hrs @ 100c)	10% max	ASTM D 471
Ozone Resistance	100 min	ASTM D 1171
Color	Black	Visual

V-Epoxy-R adhesive meets the requirements of ASTM C881 Type III, Grade 2. The adhesive shall also have the following properties:

Table 2
Physical Properties of the V-Epoxy-R

Property	Requirement	Test Method
Color	Gray	Visual
Viscosity	45,000 CP (typ.)	N/A
Gel Time (minutes)	30 min.	ASTM C 881
Shelf Life (Separate Sealed Containers)	12 Months	N/A
Resistance to U.V.	No cracking, chalking, or degradation	ASTM C793
VOC (g/L)	55	ASTM D 3960

Any rips, tears, or bond failure will be cause for rejection.

Any additional installation materials and adhesive for splicing joint sections shall be as supplied by the manufacturer of the preformed joint seal.

The Contractor shall submit the Manufacturer's material certification documentation stating that their materials meet the applicable requirements of this specification for the joint seal(s) installed.

CONSTRUCTION REQUIREMENTS

General. The Contractor shall furnish the Engineer with the manufacturer's product information and installation procedures at least two weeks prior to installation.

The minimum ambient air temperature in which the joint seal can be installed is 40° F and rising, except for bonded preformed joint seals which shall not be installed when temperatures below 50 °F are predicted within a 48-hour period.

The joint surface shall be completely dry before installing the Joint Seal. For newly placed concrete, the concrete shall be fully cured and allowed to dry out a minimum of seven additional days prior to placement of the seal. Cold, wet, inclement weather will require an extended drying time.

The Joint Seal shall not be installed immediately after precipitation or if precipitation is forecasted for the day. Joint preparation and installation of Joint Seal shall be done during the same day.

Surface Preparation. Surface preparation shall be according to the joint seal manufacturer's written instructions.

After surface preparation is completed, the joint shall be cleaned of debris using compressed air with a minimum pressure of 90 psi. The air compressor shall be equipped with traps to prevent the inclusion of water and/or oil in the air line. The compressed air shall be according to the cleanliness requirements of ASTM D 4285.

When priming is required per the manufacturer's instruction, this operation shall immediately follow cleaning.

Joint Installation. The Joint installation shall be per the manufacturer's instructions; special attention shall be given to ensure the joint seal is properly recessed below the top of the riding surface as recommended by the manufacturer.

For bonded joint seals the seal shall be inserted into the joint and held tightly against both sides of the joint until sufficient bond strength has been developed to resist the expected expansion forces.

Opening to traffic. As these joint systems are supposed to be recessed below the top of the riding surface, there should be no restriction, based on the joint seal installation, on when these joints can be reopened to traffic.

Method of Measurement. The installed preformed bridge joint seal will not be measured for payment.

Basis of Payment. The preformed bridge joint seal will not be paid for separately but shall be considered included in the cost of the adjacent concrete work involved.

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES (PROJECT SPECIFIC)

Description. This work shall consist of the removal and disposal of regulated substances according to Section 669 of the Standard Specifications as revised below.

Contract Specific Sites. The excavated soil and groundwater within the areas listed below shall be managed as either “uncontaminated soil”, hazardous waste, special waste or non-special waste. For stationing, the lateral distance is measured from centerline and the farthest distance is the offset distance or construction limit, whichever is less.

Soil Disposal Analysis. When the waste material requires sampling for landfill disposal acceptance, the Contractor shall secure a written list of the specific analytical parameters and analytical methods required by the landfill. The Contractor shall collect and analyze the required number of samples for the parameters required by the landfill using the appropriate analytical procedures. A copy of the required parameters and analytical methods (from landfill email or on landfill letterhead) shall be provided as Attachment 4A of the BDE 2733 (Regulated Substances Final Construction Report). The price shall include all sampling materials and effort necessary for collection and management of the samples, including transportation of samples from the job site to the laboratory. The Contractor shall be responsible for determining the specific disposal facilities to be utilized; and collect and analyze any samples required for disposal facility acceptance using a NELAP certified analytical laboratory registered with the State of Illinois.

Site 3054V2-85: Rush Specialty Hospital, 1516 S. Loomis Street, Chicago, Cook County

- Station 600+05 to Station 600+50 (CL Loomis Street), 0 to 115 feet LT. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Part 669.05(a)(1). Contaminants of concern sampling parameters: Lead, Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, and Dibenzo(a,h)anthracene.
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Site 3054V2-92: Bridge, 400 Block of S. Loomis Street, Chicago Intersection of I-290 and Loomis Street, Cook County

- Station 600+50 to Station 601+10 (CL Loomis Street), 0 to 115 feet LT. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Part 669.05(a)(5). Contaminants of concern sampling parameters: Lead, Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Carbazole, Chrysene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Naphthalene Phenanthrene.

At the Bridge property, Benzo(a)pyrene, Benzo(b)fluoranthene, and Naphthalene, were detected at concentrations exceeding the TACO Tier 1 Soil Remediation Objectives for the Construction Worker Ingestion/ Inhalation exposure routes in soil Boring 92-1 from the sample interval 0 to 5 feet deep, as noted in the Final Preliminary Site Investigation Report for this project, submitted October 17, 2025 by Arcadis U.S., Inc. Procedures shall be implemented to protect site workers and observers from hazards encountered during construction activities in locations containing contaminated materials, pursuant to Article 669 of the Standard Specifications for Road and Bridge Construction manual.

- Station 600+50 to Station 601+10 (CL Loomis Street), 0 to 115 feet RT. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Part 669.05(b)(1).
- Station 600+50 to Station 601+10 (CL Loomis Street), 0 to 115 feet RT. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Part 669.05(b)(1).
- Station 604+20 to Station 604+80 (CL Loomis Street), 0 to 115 feet LT. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Part 669.05(a)(1). Contaminants of concern sampling parameters: Benzo(a)pyrene.
- Station 604+20 to Station 604+80 (CL Loomis Street), 0 to 120 feet RT. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Part 669.05(a)(1). Contaminants of concern sampling parameters: Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, and Indeno(1,2,3-cd)pyrene.

Site 3054V2-93: Whitney M. Young Magnet High School, 211 S. Laflin Street, Chicago, Cook County

- Station 604+80 to Station 605+25 (CL Loomis Street), 0 to 115 feet LT. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Part 669.05(a)(5). Contaminants of concern sampling parameters: Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, and Indeno(1,2,3-cd)pyrene.

Site 3054V2-95: Residential Building, 319 S Loomis Street Street, Chicago, Cook County

- Station 604+80 to Station 605+25 (CL Loomis Street), 0 to 120 feet RT. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Part 669.05(a)(5). Contaminants of concern sampling parameters: Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene.

Work Zones: Three distinct OSHA HAZWOPER work zones (exclusion, decontamination, and support) shall apply to projects adjacent to or within sites with documented leaking underground storage tank (LUST) incidents or sites under management in accordance with the requirements of the Site Remediation Program (SRP); Resource Conservation and Recovery Act (RCRA); Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); or as deemed necessary.

ENGINEERED BARRIER

An engineered barrier shall be installed in storm sewer, sanitary sewer, water main trenches and/or other construction excavations (as deemed appropriate), 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 at the following locations:

- Station 600+50 to Station 601+10 (CL Loomis Street), 0 to 115 feet LT. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Part 669.05(a)(5). Contaminants of concern sampling parameters: Lead, Benz(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Carbazole, Chrysene, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Naphthalene and Phenanthrene.

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 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 mils. The geomembrane liner shall line the entire trench and installed in accordance with the manufacturer's recommendations.

No equipment will be allowed on the engineered barrier until it is covered by a minimum of 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: The 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 yard for ENGINEERED BARRIER.

SIGNAL TIMING (CITY OF CHICAGO)

Description: This item shall consist of coordination and payment for work performed by the City of Chicago – Division of Electrical Operations and/ or Division of Traffic Safety related to engineering services in support of this contract. For the CDOT (Chicago Department of Transportation) owned signals at intersections listed in this specification, CDOT will perform, inspection of a temporary signal controller prior to installation in the field.

General: It shall be the Contractor's responsibility to arrange and coordinate all required signal services for intersections listed herein with CDOT in accordance with the timeframes and procedures described herein. All work to be performed by CDOT is subject to CDOT work schedules and availability.

The following tasks are associated with SIGNAL TIMING

- (a) The Contractor shall contact CDOT and schedule the signal cabinet inspection to be performed by CDOT. The Contractor shall contact CDOT a minimum of 4 weeks prior to the temporary signal implementation. No extra compensation will be allowed for delays associated with late requests by the contractor. The contractor must retain records of CDOT's coordination. If all required approvals are obtained by the contractor for the temporary signal implementation, the temporary signals implementation will not be delayed if CDOT does not respond within 4 weeks regarding payment. The CDOT contact is

Arturo Rodriguez
CDOT Superintendent of Electrical Operations
arturo.rodriguez2@cityofchicago.org
O: 312-746-4063
M: 312-617-2452

- (b) The total estimated cost for inspection of a temporary signal cabinet and associated engineering services for the duration the temporary signals are in-service shall include all intersections listed below. The Contractor will promptly submit payment within 30 calendar days to CDOT following receipt of the final invoice from CDOT. This payment shall be made using certified check and payment will occur at the City or it shall be paid via certified mail with receipt notification.

Total Estimated Cost for all Intersections Listed Herein: \$6,000

The Contract Administrative Fee for the Contractor shall follow Article 109.05 and is \$300.

For bidding purposes, this item shall be estimated cost plus administration fee for total bid price of = \$6,300.

Submit payment to:

City of Chicago
Department of Transportation (Finance) 2 N. LaSalle Street
Suite 1110
Chicago, IL 60602

Reference: IDOT Contract 62U12 DEO Traffic Signal Timing

- (c) CDOT will provide the contractor the final cost that must be paid to CDOT for this work. The Contractor shall secure invoices from CDOT for services provided by CDOT. These invoices shall be submitted to the Engineer as documentation before the Contractor reimbursement may be processed.
- (d) The estimated cost of the engineering services provided by CDOT may change based on field conditions encountered. If actual final costs provided by CDOT are higher than the original estimate included herein, the Contractor shall submit additional payment to CDOT as required and documented. Additional payment to CDOT shall not occur unless written approval is obtained by the Engineer.

Locations: The following intersections will be inspected by CDOT as described in this specification.

- Loomis Street and Van Buren Street

Method of Measurement. Signal Timing will not be measured for payment. The contractor will be reimbursed the exact amount of money billed by CDOT for its services.

Basis of Payment. SIGNAL TIMING will be paid per LUMP SUM for costs invoiced by CDOT for all intersections requiring traffic signal cabinet inspection, which price shall be payment in full for performing all work described herein per listed.

ELECTRIC UTILITY SERVICE CONNECTION

Effective: March 9, 2024

Description. This work shall consist of providing a service connection from City cable to a Commonwealth Edison secondary cable. For an aerial service, this will be on a wood pole. For an underground service, this will be in a Commonwealth Edison manhole or ground mounted transformer enclosure.

General Requirements. This work shall consist of splicing or terminating City service cable to a Commonwealth Edison secondary cable, as directed by the Engineer. The contractor must obtain permission from Edison for the service at the required location. The contractor will inform Edison of the load required. Edison will make the connections unless Edison gives the contractor permission to make the connections. All costs associated with the connection will be borne by the contractor.

Basis of Payment. This work will be paid for at the contract unit price per EACH for ELECTRIC UTILITY SERVICE CONNECTION.

UNDERGROUND CONDUIT

Effective: March 9, 2024

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

- Material Specifications: 1462, 1533
- Standard Drawings: 579, 813

This work shall consist of furnishing and installing conduit, fittings, and accessories as part of a raceway laid in trench, pushed, or directionally bored.

Materials. Galvanized rigid steel conduit and PVC coated galvanized rigid steel conduit shall conform to the requirements of Material Specification 1462. Polyvinyl chloride (PVC) conduit shall conform to the requirements of Material Specification 1533. Coilable non-metallic conduit shall be a high-density polyethylene meeting the requirements of Material Specification 1533. Conduit color shall be as determined by the Resident Engineer. Aluminum conduit shall be rigid wall conduit with a minimum wall thickness of 0.099". The conduit shall be extruded from 6063 aluminum alloy and tempered to T-1. Aluminum conduit shall meet the requirements of UL 6 and ANSI C80.5.

Construction Requirements. Galvanized rigid steel conduit shall be installed in a trench or pushed underground. PVC conduit shall normally be installed in a trench. Coilable conduit shall be installed in a trench for short distances only. The normal installation method for coilable conduit is directional boring. The Contractor shall exercise care in installing the conduit to ensure that it is smooth, free from sharp bends or kinks, and has the minimum practicable number of bends. Crushed or deformed conduit shall not be accepted. All conduit and fittings shall have the burrs and rough places smoothed, and all conduit runs shall be cleaned and swabbed before installation of electric cables. If cable is not to be installed immediately after cleaning of the conduit, a light weight pulling line such as 1/8" polyethylene line shall be placed in the conduit and shall remain in the conduit for future work. The excavation for pushing conduit shall be located at least two feet (2') from the edge of pavement. All underground conduits shall have a minimum cover of thirty inches (30") below grade. If conduit cannot be installed with a minimum cover of thirty inches (30"), the conduit shall be encased in concrete for protection. The method of encasement and protection shall be approved by the engineer. Concrete encasement shall be paid for as a separate pay item.

When multiple conduits are installed in a common trench, no more than three (3) three inch (3") or smaller conduit laterals shall be laid on a single, horizontal level. Four or more conduit laterals shall be installed on two (2) or more levels in accordance with instructions of the Resident Engineer.

Threaded fittings and bends of the same material as conduit shall be furnished and installed as required. Threadless couplings may be used only for splicing existing conduit. All conduit splices, where required, shall be included in the cost of this work.

Method of Measurement. This work will be measured for payment in feet in place. Measurements will be made in straight lines along the centerline of the conduit between ends and changes in direction. Vertical conduit will be measured for payment. The vertical distance required for breakaway devices, barrier wall, concrete pedestals, etc., and the depth of any burial will be measured. Changes in direction shall assume perfect straight line runs, ignoring actual raceway sweeps.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for CONDUIT IN TRENCH, CONDUIT PUSHED, or CONDUIT, DIRECTIONAL BORED of the type and size specified.

TRENCH AND BACKFILL WITH SCREENINGS

Effective: March 9, 2024

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

- Material Specifications: Not Applicable Standard Drawings: 579, 813

This work shall consist of excavating a trench for the installation of conduit and backfilling with limestone screenings as a portion of the total backfill of the trench, all as shown in Division of Electrical Operations Standard Drawings No. 579 and No. 813. This work shall meet all applicable requirements of Article 810.04(a) of the Standard Specifications.

Materials. Underground Cable Marking Tape shall meet the requirements of Section 1066.05 of the Standard Specifications. Backfill shall meet the requirements of Section 1003.04 of the Standard Specifications.

Construction Requirements. The trench shall be deep enough to provide 30 inches of cover over the conduit to be installed. The trench shall not exceed 12 inches in width unless approved by the Engineer. The bottom of the trench shall be tamped, and the trench inspected by the Engineer before conduit is installed. All trenches shall be backfilled as soon as possible after the installation of the conduit or cable. Any material excavated from the trenches that in the opinion of the Engineer is satisfactory backfill, may be used for backfill above the layer of screenings. The limestone screenings shall be used to fill the bottom of the trench to a depth of one foot above the top of the conduit or duct encasement. Cinders, rocks, or other inappropriate materials shall not be permitted to be used as backfilling material. Backfilling material, beginning with limestone screenings shall be deposited in the trench in layers not to exceed 6 inches in depth, and shall be thoroughly compacted with a mechanical tamper before the next layer is deposited in the trench. All trenches for conduit shall be backfilled as per this specification. Unsuitable material shall be disposed of according to the requirements of Section 202.03 of the Standard Specifications. Underground cable marking tape shall be installed 12 inches below the finished grade for all conduit runs.

Method of Measurement. This work will be measured in feet along the centerline of the trench. Trench and backfill will not be measured for payment for conduit which is installed by pushing or by directional boring. Where more than one conduit is installed in a single trench, only one run will be measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per FOOT, measured with conduit in place, for TRENCH AND BACKFILL WITH SCREENINGS. This price shall include the cost of all excavation, furnishing and placing all backfill material, and disposal of all surplus excavated material. If sidewalk, driveway pavement or pavement must be removed and replaced, such work will be paid for separately.

JUNCTION BOX, POLE OR POST MOUNTED

Effective: March 16, 2024

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

- Material Specifications: 1407
- Standard Drawings: 834, 954, 11984

This item shall consist of furnishing and installing a Junction Box on each traffic signal post, traffic signal pole, or street light pole on which a signal head is mounted, as shown on the plans, specified herein, or directed by the Engineer.

Materials. The Junction Box shall conform to the requirements of Material Specification Number 1407 and Drawing Number 954. The box shall contain a 20-conductor terminal strip, securely fastened to an aluminum channel. Two #10 stainless steel machine screws shall be used to mount the channel to the junction box.

Construction Requirements. The junction box shall be mounted to the side of the pole away from the roadway, or as directed by the Engineer. The center of the box shall be located approximately 58 inches above the adjacent sidewalk. Two long sweep elbows shall be attached to the box, one to the top and one to the bottom, unless otherwise directed by the Engineer. Each shall be attached with four #10-24x3/4" stainless steel screws. The lower long sweep elbow shall be properly positioned over a hole 1 1/2 inches in diameter drilled in the pole approximately 48" above the sidewalk, for the installation of cable. Another 1 1/2-inch hole shall be drilled for the upper elbow. The holes shall be reamed or filed to remove all sharp edges or burrs which might damage cable during installation, or through vibration when the signals are in operation. A stainless steel, banding bracket per Drawing Number 11984, shall be attached to the center of the back of the box with a 5/16"-18 x 1" stainless steel machine screw. The entire unit shall be banded to the pole with five 3/4" stainless steel bands, one through the banding bracket and one each at the top and bottom of each elbow. The banding and clips shall have a baked-on black finish.

Basis of Payment. This work shall be paid for at the contract unit price per EACH for a JUNCTION BOX, POLE OR POST MOUNTED, which price shall be payment in full for furnishing and installing the junction box complete with its component parts and appurtenances. Connection of cables and wires to the terminal strip shall not be part of the cost of the junction box but shall be considered part of the installation of the underground cable and the installation of signal heads.

HANDHOLE, ELECTRIC, WITH FRAME AND COVER

Effective: March 16, 2024

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

Material Specifications: 1458, 1528

Standard Drawings: 866, 867, 871, 872, 874, 10927

This item shall consist of furnishing and installing or constructing an electrical handhole with frame and cover in pavement, parkway, driveway, or sidewalk.

Materials. Frames and covers shall meet the requirements of Material Specification 1458. Handholes shall meet the requirements of Material Specification 1528. 24" frames and covers shall meet the requirements of Standard Drawing 872. 30" frames and covers shall meet the requirements of Standard Drawing 874 and 10927. Bricks shall meet the requirements of Section 1041 of the IDOT Standard Specifications for Road and Bridge Construction. All other materials used shall meet the appropriate material requirements of the Standard Specifications.

General Requirements. The handhole shall be a precast concrete structure, or, if conditions merit, a cast in place concrete structure, complete with cast iron frame and cover, and conforming in detail with Standard Drawing 867 for 30" handholes, Standard Drawings 866 or 871 for heavy-duty handholes, except that the number of conduit openings shall be as shown on the construction plans.

Each handhole shall be installed at the location specified on the plans or at the location identified by the Resident Engineer.

Construction Requirements. The area where the handhole is to be placed shall be properly excavated. All disposable material shall be properly disposed of per Article 202.03 of the SSRBC. Each handhole shall be set or constructed on a foundation of loose stone not less than eight inches (8") deep. The 36" handhole for pavement installation shall have a floor as shown in Drawing Number 871. The frame casting shall be accurately set on a full bed of mortar to the finished elevation so that no subsequent adjustment shall be necessary. It is desirable not to use a neck for the frame. However, if approved by the Resident Engineer, mortar and brick, or mortar and concrete rings, may be used to adjust to the proper grade. Adjustment rings, bricks, and frames shall be set in a full mortar bed. Use of partial bricks will not be allowed. Bricks shall be laid in full header courses only. Mortar shall be mixed in a proportion of one (1) part of cement to three (3) parts sand by volume of dry materials. After entering ducts have been installed in place in the handhole, the openings in the wall shall be plugged in an approved manner flush with the inner surface. If backfill is required, screenings shall be used and properly compacted. Parkway shall be restored to the proper grade. Pavement shall be properly restored to finished grade. Patching of the pavement shall be done with high early strength concrete meeting the requirements of Articles 1001 and 1020 of the Standard Specifications. Sidewalks shall be restored to the proper grade using a 5-inch thickness of concrete. The inside of the handhole shall be clean of all debris.

Basis of Payment. This work will be paid for at the contract unit price per EACH for HANDHOLE, ELECTRIC, WITH FRAME AND COVER of the size specified.

MANHOLE, ELECTRIC

Effective: March 9, 2024

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

Material Specifications: 1458, 1528

Standard Drawings: 729, 730, 732, 733, 872, 874, 10927

This item shall consist of furnishing and installing an electrical manhole of the dimensions indicated with either a 24" or 30" frame and lid.

Materials. The concrete manhole shall meet the applicable requirements of Material Specification 1528. The frame and lid shall meet the requirements of Material Specification 1458. A 24" frame and lid shall meet the requirements of Standard Drawing 872. A 30" frame and lid shall meet the requirements of Standard Drawings 874 and 10927. Bricks shall meet the requirements of Section 1041 of the IDOT Standard Specifications for Road and Bridge Construction. All other materials used shall meet the appropriate material requirements of the Standard Specifications.

Construction Requirements. The manhole shall be a precast concrete structure, or, if conditions merit, a cast in place concrete structure, complete with cast iron frame and lid. A 3' x 4' x 4' manhole with a 24" frame and lid shall conform to the requirements of Drawing 730. A 3' x 4' x 4' manhole with a 30" frame and lid shall conform to Drawing 729. A 4' x 6' x 6' manhole with a 24" frame and lid shall conform to Drawing 732. A 4' x 6' x 6' manhole with a 30" frame and lid shall conform to Drawing 733. The number and size of conduit openings shall be as shown on the construction plans.

Each manhole shall be installed in paved sidewalk, earth parkway, or in pavement at the location specified on the construction plans or at a location as directed by the Engineer.

The area where the manhole is to be placed shall be properly excavated. All disposable material shall be properly disposed of per Article 202.03 of the SSRBC. Each manhole shall be set or constructed to conform with the appropriate City of Chicago drawings, except that the number and size of conduit openings shall be in accordance with the construction plans. The frame casting shall be accurately set on a full bed of mortar to the finished elevation so that no subsequent adjustment shall be necessary. Mortar and brick, or mortar and concrete rings, may be used to adjust to the proper grade. Adjustment rings, bricks, and frames shall be set in a full mortar bed. Use of partial bricks will not be allowed. Bricks shall be laid in full header courses only. In no instance shall the neck of the manhole exceed 2 feet in height. Mortar shall be mixed in a proportion of one part cement to three parts sand by volume of dry materials. After entering laterals have been installed in place in the manhole, the openings in the wall shall be plugged in an approved manner flush with the inner surface. If backfill is required, screenings shall be used and properly compacted. Parkway shall be restored to the proper grade. Pavement shall be restored to the correct grade. Patching of the pavement shall be done with high early strength concrete meeting the requirements of Sections 1001 and 1020 of the SSRBC. Sidewalks shall be restored to the proper grade using a 5-inch thickness of concrete. The inside of the manhole shall be clean of all debris.

Basis of Payment. This work will be paid for at the contract unit price per EACH for MANHOLE, ELECTRIC, of the size and frame and lid specified.

DRILL EXISTING ELECTRIC HANDHOLE OR MANHOLE

Effective: March 16, 2024

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

Material Specifications: None Applicable

Standard Drawings: 814

This work will consist of drilling a hole in an existing handhole or manhole for the installation of a new conduit. This work shall meet the requirements of Section 879 of the IDOT Standard Specifications for Road and Bridge Construction.

Construction Requirements. The size of the hole shall be as close as possible to the size of the conduit to be installed. The conduit shall be installed in the drilled hole with a bushing before the hole is grouted. Conduit will be paid for separately. The space between the conduit and the handhole or manhole wall must be caulked with a waterproof grout. See Standard Drawing 814 for additional details.

Method of Measurement. This work will be measured per each conduit installed into an existing handhole or manhole.

Basis of Payment. This work will be paid for at the contract unit price per EACH for DRILL EXISTING ELECTRIC HANDHOLE OR MANHOLE.

ELECTRIC CABLE IN CONDUIT, 600V

Effective: March 16, 2024

Revised: August 2, 2024

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

Material Specifications: 1534

Standard Drawings: None Applicable

This work shall consist of furnishing and installing electric cable as specified in raceways, complete with all splicing, identifications, and terminations.

Materials. Cable shall meet all requirements of Material Specification 1534.

Construction Requirements. All cables shall be installed with care to prevent damage to the cable. Any defects found in the cable shall be reported to the Engineer. Damaged cable shall be replaced.

Cable shall be pulled into the conduit with a minimum of dragging on the ground or pavement. This shall be accomplished by means of reels mounted on jacks or other suitable devices located for unreeling cable directly into duct. Lubricants shall be used to facilitate installation if deemed necessary by the contractor.

Bends in the cable shall conform to the recommended minimum radii as outlined in the National Electric Code.

Cable passing through manholes shall be trained and racked around the sides of the manhole into a permanent position. If racks are non-existent or in poor condition, the contractor shall install racks. Installation of racks will be paid for as Install Rack In Handhole Or Manhole.

Where cable runs continue from manhole to manhole without tapping within a light pole, cable shall be continuous without splices unless authorized by the Engineer.

All cable within the distribution panels and control cabinets shall be properly trained and have sufficient slack provided for any rearrangement of equipment or future additions. There shall be at least two feet of slack in a street light pole base or street light controller base. A handhole shall have at least five feet of slack and a manhole, at least ten feet of slack.

Method of Measurement. The length of cable furnished and installed will be measured per foot as the length of conduit plus three feet for cable entering and leaving a light pole or street light control cabinet, plus any slack in manholes or handholes.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for ELECTRIC CABLE IN CONDUIT, 600V of the size specified.

POLE, STEEL, ANCHOR BASE, 34.5 FT

Effective: March 9, 2024

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

Material Specifications: 1447

Standard Drawings: 808, 824, 827, 837

This item will consist of furnishing and installing a steel anchor base pole complete with all hardware and accessories required for the permanent use of the pole.

Materials. Poles shall meet the requirements of Material Specification 1447. Ten-inch diameter poles shall meet the requirements of Standard Drawing 808. Eleven-inch diameter poles shall meet the requirements of Standard Drawing 824. Twelve and one-half inch diameter poles shall meet the requirements of Standard Drawing 827.

Construction Requirements. Installation shall be in accordance with Sections 801 and 830 of the IDOT Standard Specifications for Road and Bridge Construction and Standard Drawing 837 to provide ventilation within the pole and the ability to plumb the pole.

Any exposed portions of anchor rods extending above the nuts which interfere with the installation of the bolt covers must be cut off to provide the necessary clearance for installation. The excess shall not be burned off.

The contractor shall use non-abrasive slinging materials and exercise care in erecting the pole to minimize damage to the finish. When necessary, and approved by the Engineer, the contractor will utilize, at his own expense, factory approved touch-up materials and methods to restore the finish to a like new appearance and durability.

Basis of Payment. This work will be paid for at the contract unit price per EACH for POLE, STEEL, ANCHOR BASE, 34.5 FT, of the diameter, gauge, and bolt circle specified.

CONCRETE FOUNDATIONS

Effective: March 17, 2024

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

Material Specifications: 1465, 1467, 1533

Standard Drawings: 565, 709, 816, 817, 818, 937A, 953, 956

This work shall consist of furnishing and installing a concrete foundation to support a light pole, traffic signal pole, traffic signal post, or other pedestal mounted equipment. The foundation shall be poured in place and be complete with reinforcement, anchor rods, raceways, and grounding, as shown in the Standard Drawings referenced below.

Pay Item	Standard Drawing	Usage
Concrete Foundation, 20" Diameter, 3/4" Anchor Rods, 13" Bolt Circle, 5 Feet	709	traffic signal post
Concrete Foundation, 20" Diameter, 1" Anchor Rods, 10" Bolt Circle, 5 Feet	565	residential light poles
Concrete Foundation, 24" Diameter, 1 1/4" Anchor Rods, 15" Bolt Circle, 7 Feet	818	arterial light poles
Concrete Foundation, 24" Diameter, 1 1/4" Anchor Rods, 15" Bolt Circle, 9 Feet	818	traffic signal poles with 16', 20' or 26' mast arms
Concrete Foundation, 24" Diameter, Offset, 1 1/4" Anchor Rods, 15" Bolt Circle	937A	arterial light poles and traffic signal poles with 16', 20' or 26' mast arms
Concrete Foundation, 28" Diameter, 1 1/4" Anchor Rods, 15" Bolt Circle, 7 Feet	953	Chicago 2000 Gateway or Pedestrian poles
Concrete Foundation, 28" Diameter, Offset, 1 1/4" Anchor Rods, 15" Bolt Circle	937A	Chicago 2000 Gateway or Pedestrian poles
Concrete Foundation, 30" Diameter, 1" Anchor Rods, 15" Bolt Circle, 7 Feet	956	Loop and Extended Loop poles
Concrete Foundation, 30" Diameter, Offset, 1" Anchor Rods, 15" Bolt Circle	937A	Loop and Extended Loop poles
Concrete Foundation, 30" Diameter, 1 1/4" Anchor Rods, 17 1/4" Bolt Circle, 9 Feet	816	traffic signal poles with 30' mast arm
Concrete Foundation, 30" Diameter, 1 1/2" Anchor Rods, 16 1/2" Bolt Circle, 11 Feet	817	traffic signal poles with 35', 40' or 44' mast arms

Materials. Concrete shall be Portland cement concrete meeting the requirements of Section 1020 of the IDOT Standard Specifications for Road and Bridge Construction for Class SI concrete. Anchor rods shall meet the requirements of Material Specification 1467. Ground rods shall meet the requirements of Material Specification 1465. Conduit shall be PVC and meet the requirements of Material Specification 1533.

Construction Requirements. The top surface of foundation shall be at an elevation of two inches above grade or as directed by the Engineer. Care shall be taken to install a level foundation and to ensure adequate anchor rod projections for double nut installation. The foundation top shall be chamfered 3/4 of an inch. The foundation shall be centered back from the face of the curb in accordance with dimensions shown on the construction plans. When the foundation is in a solid sidewalk area, the foundation shall be installed level, with the height of the foundation as close to the height of the sidewalk as possible, or as directed by the Engineer. An expansion joint shall be installed between the sidewalk and the foundation.

Anchor rods shall be set in accordance with applicable standard drawing so that when poles are installed on the foundations, the mast arms are oriented as shown in the plans. The anchor rods shall be set by means of a metal template which shall be submitted for approval before any foundation work is begun. The template must hold the rods vertical, and in proper position.

Foundation raceways shall consist of large radius conduit elbow(s) in quantity, size and type specified in the applicable Standard Drawing or as indicated in the plans. Elbow ends above ground shall be capped with standard conduit bushings.

Method of Measurement. Concrete foundations will be measured for payment in feet in place or per each, as designated in the contract. Offset foundations will be measured along the vertical and horizontal centerlines of the foundation without overlap.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for CONCRETE FOUNDATION, of the diameter and bolt circle specified or per EACH for CONCRETE FOUNDATION, of the diameter, bolt circle, and length specified.

FOUNDATION, CONCRETE, SIGNAL CABINET

Effective: March 23, 2024

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

Material Specifications: 1465, 1467, 1533 Standard Drawings: 888, 888A

This work shall consist of furnishing and installing a concrete foundation for a "P" or "Super P" traffic signal cabinet. The foundation shall be poured in place and be complete with anchor rods, raceways, and grounding.

Materials. Concrete shall be Portland cement concrete, Class SI, meeting the requirements of Section 1020 of the IDOT Standard Specifications for Road and Bridge Construction. Ground rods shall meet the requirements of Material Specification 1465. Conduit shall be PVC meeting the requirements of Material Specification 1533. Anchor rods shall meet the applicable requirements of Material Specification 1467.

Construction Requirements. The Contractor shall install a concrete foundation for a base mounted traffic signal controller cabinet, as shown on City of Chicago Drawing Number 888 for a "P" cabinet, or as shown on Drawing 888A for a "Super P" cabinet. Work under this item shall be performed in accordance with Section 800 of the Standard Specifications.

The foundation shall have a minimum depth of at least 40 inches below grade and shall have large radius conduit elbows in quantity, size and type shown. The elbow ends above ground shall be capped with standard conduit bushings. The ground rod shall be installed adjacent to the foundation and shall be driven straight down with the top to be no higher than 30 inches below finished grade. The Contractor shall furnish anchor bolts, hardware, conduit elbows, and all other material shown on the foundation construction drawing.

All excavation and restoration of parkway shall be considered as part of this item. If the foundation is in sidewalk, an expansion joint shall be required between the sidewalk and the foundation.

Basis of Payment. This work will be paid for at the contract unit price per EACH for CONCRETE FOUNDATION FOR BASE MOUNTED “P” OR “SUPER P” CABINET.

CONTROLLER, ATC, TRAFFIC, 16 LOAD BAY, “SUPER P” CABINET

Effective: March 23, 2024

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

Material Specifications: 1560

Standard Drawings: None Applicable

This work shall consist of furnishing and installing an Advanced Transportation Controller (ATC) with a battery powered back-up system and associated equipment in a cabinet onto a foundation and making all necessary connections.

Materials. The cabinet shall meet the requirements of Material Specification 1560, “Advanced Transportation Controller and Cabinet with Uninterruptible Power Supply”.

General Requirements.

Procurement. The contractor shall provide Request for Inspection of Material forms for traffic signal controllers and cabinets. The Division of Electrical Operations will review and comment on the submitted material. The Division of Electrical Operations will approve the purchase of the material from a supplier. Final material approval will be made in accordance with Chicago Department of Transportation specifications. The Contractor must provide proof of purchase to the Engineer within seven days following approval by the Division of Electrical Operations. Payment will be withheld in accordance with the terms and conditions of this contract, until such time that the Commissioner determines the requirements are met.

The controllers and cabinets shall be delivered to the Division of Electrical Operations within 90 days of purchase. If the controllers and cabinets are not delivered, payment shall be withheld until such time that the controllers and cabinets are delivered.

The Division of Electrical Operations will notify the Contractor when the material has been inspected and approved. If a railroad interconnect is involved, a representative from the Illinois Commerce Commission will also need to review and inspect the controller at the Division’s facilities. Within 48 hours of notification, the Contractor must pick-up the controllers and cabinets from the Division. The controllers and cabinets will be stored at a facility, approved by the Commissioner, at the contractor’s expense.

Construction Requirements. The controller shall be programmed to provide the sequencing and timing of operation as shown on the plans. The controller shall be enclosed in a housing and installed in a completely wired cabinet. The model and serial numbers of the controller shall be affixed on the front of the controller housing and be readily visible.

The cabinet shall be set onto a pad foundation designed specifically for the cabinet and affixed with bolts provided with the foundation. Electric cables inside the cabinet shall be neatly trained along the base and back of the cabinet. Each conductor used shall be connected individually to the proper terminal, and the spare conductors must be insulated and bound into a neat bundle. Each cable shall be marked with suitable identification and recorded on a copy of the plans for the intersection and submitted to the Engineer. Signal indications for each direction shall be wired to a separate circuit whether or not the signal plans call for a split movement. The absolute zero for time coordination shall be set in the field by city personnel after obtaining the appropriate city time-tone reference.

All conduit entrances into the cabinet shall be sealed with a pliable waterproof material to restrict moisture entrance into the cabinet.

Division of Electrical Operations and Division of Traffic Safety personnel from the Chicago Department of Transportation must be present during the cutover to the new control equipment. If a railroad interconnect is part of the signal project, a representative from the Illinois Commerce Commission must be invited to be present for the cutover.

Basis of Payment. This work will be paid for at the contract unit price per EACH for CONTROLLER, ATC, TRAFFIC, 16 LOAD BAY, "SUPER P" CABINET.

INTERSECTION TECHNOLOGY ENHANCEMENTS

Effective: June 5, 2024

Revised: June 3, 2025

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

Material Specifications: 1620, 1622

Standard Drawings: None

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

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

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

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

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

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

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

Final equipment selection, procurement, and provisioning shall be coordinated with DTI and COOT. Identical and completely interchangeable equipment shall be used at each field location. All equipment shall include the manufacturer's installation and operations manuals in hardcopy and electronic PDF formats.

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

Construction Requirements.

General

- 1.) Installation shall be done in accordance with manufacturer recommendations.
- 2.) Contractor shall securely mount the intersection communications node equipment inside the signal cabinet in designated locations as shown on the plans.
- 3.) Contractor shall securely mount the video detection camera(s) to the designated city infrastructure and route cabling within city raceways as shown on the plans. Drip loops shall be used for all exposed cabling.
- 4.) Cabling length shall remain within required Ethernet and serial communications limits. Cable slack shall be provided at pull points and at the cabinet for maintenance access of equipment.
- 5.) If an integrated cellular modem is used, the Contractor shall perform the associated survey and installation work as specified in the Cellular Modem special provision. Contractor shall neatly route and secure all cabling within the cabinet.
- 6.) Contractor shall configure the communications node equipment with enabled security and interoperability within the existing City network as directed by the Engineer, including VPN settings and local IP address. Administrative account login credentials shall be provided to the Engineer.
- 7.) Contractor shall provide field troubleshooting support during integration and testing by the CDOT Advanced Traffic Management System (ATMS) administrator.

Integration

1. Contractor shall develop a Device Integration Plan (DIP) and submit it to the Engineer for approval at least 14 days prior to field installation. Equipment shop drawing approvals shall be obtained prior to submitting the DIP.
2. The Contractor shall contact the original equipment manufacturer (OEM) and the CDOT ATMS administrator to facilitate the sharing of device information. Contractor shall obtain recommendations and support services from these parties and incorporate them into the DIP.
3. Contractor shall set up a bench test if recommended by the equipment manufacturer or CDOT ATMS administrator. Configuration support is to be provided by the OEM, their representative, or the and CDOT ATMS administrator with support from the OEM. Location of the bench test shall be proposed by the Contractor for approval by the Engineer.
4. Contractor shall coordinate with CDOT Division of Electrical Operations (DEO) for all work affecting existing city infrastructure and equipment.
5. The DIP shall include the following:
 - a. Updated communications node locations and layouts inside cabinets
 - b. Current device communications interconnect schematics
 - c. Proposed technical steps for integration and validation
 - d. Configuration settings for each communications interface for each equipment

6. Support from the OEM shall include on-site installation guidance, equipment configuration settings, and troubleshooting. Physical installation work shall be performed by the Contractor.
7. Support from the CDOT ATMS administrator shall include modifications and software programming necessary to integrate the data from the DCN equipment.
8. Contractor shall provide field support for equipment at the intersection and shall coordinate with the CDOT traffic signal management software vendor, Kapsch, and the CDOT ATMS administrator to assist with integration.

Acceptance Testing

- Contractor shall develop an Acceptance Test Plan (ATP) and submit it to the Engineer for approval. The Contractor shall obtain the recommendations from the equipment manufacturer and CDOT ATMS administrator and incorporate them in the ATP.
- The ATP shall document detailed steps to verify each required functional performance of the equipment.
- The ATP shall include checklists for each test. Each checklist item shall have defined pass/fail criteria with a reserved space to record the results.
- Corrective actions shall be documented in detail on checklist forms.
- Testing shall be witnessed by representatives of the Contractor and the Engineer.
- Each checklist shall include areas for signatures by representatives of the Contractor's representative and the Engineer's representative. Completed checklists shall be provided to the Engineer in hardcopy and electronic PDF formats.
- The ATP shall include three levels of testing:
 - Local – Verification that each individual equipment of the ITE is installed and functioning properly. A City (DTI) provided SIM card is installed in the DCN and the DCN is communicating with the OEM's cloud server and the city networks. The detection zones are configured in the DCN and vehicles/ped actuation detection is working correctly. All approaches of the intersection shall be clearly visible on the video camera.
 - Subsystem – Verification that connected field devices are properly communicating with the DCN and the signal controller. The signal controller shall be receiving the detections from the ITE and the DCN shall be receiving the signal phasing data (telemetry) from the controller.
 - System – Verification that the connected field devices are properly configured and communicating with the Chicago ATMS, central signal software. ATMS Administrator shall be able to access the signal controller's website through the DCN. ATMS shall receive detection data from the OEM's portal, OEM's portal shall display signal telemetry, live and historical video, traffic counts, and signal performance measures.

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

Licensing

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

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

ELECTRIC CABLE IN CONDUIT, SIGNAL

Effective: June 5, 2024

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

Material Specifications: 1475, 1537, 1641

Standard Drawings: None

This work shall consist of furnishing and installing electric cable for traffic signals of the type, size and number of conductors as specified on the plans. The cable shall be rated 600 volts and comply with the following requirements.

Materials. Harness cable shall conform to the requirements of Material Specification 1475. Ten, nineteen, and twenty-two conductor cable shall conform to the requirements of Material Specification 1537. Shielded conductors for railroad preemption circuits, pedestrian actuate push button circuits, and other traffic signal related circuits shall conform to the requirements of Material Specification 1641.

Installation. All cable shall be installed in conduit, as indicated on the plans, with care to prevent damage to the insulation or cable. Suitable devices shall be used in pulling the cable, and only approved lubricants should be used. All cables installed in conduit shall be from the power source to the traffic signal controller cabinet, from the traffic controller cabinet to the traffic signal junction box, or from junction box to junction box. For cable terminating in a traffic signal controller cabinet or traffic signal junction box the following procedures shall be followed:

Controllers.

- Remove 36" of neoprene jacket.
- Wrap vinyl electrical tape on 2 inches of the neoprene jacket and 2 inches on the exposed conductors.
- Remove 1 inch of insulation and scrape copper conductor.
- Train cables neatly along the base and back of cabinet.
- Connect conductors to proper terminal lugs.

Traffic Signal Junction Box.

- Remove 24 inches of neoprene jacket.
- Wrap vinyl electrical tape on 2 inches of neoprene jacket and 2 inches on the exposed conductors.
- Remove 1 inch of insulation and scrape copper conductor.
- Train cables neatly along the side and back of the box.

Connect all conductors to terminal strip.

Cable Slack.

The length of cable slack that shall be provided shall be in accordance with the following schedule:

Location	Length of Slack Cable (feet)
Base of Controller	7
Detector, Junction Box	1
Base of Traffic Signal Post or Traffic Signal Pole	4
City Handhole	6
City Manhole	12
ComEd Manhole	25

Cable slack in manholes and handholes shall be trained and racked in the holes. If racks are non-existent, racks shall be provided, and are included in the cost of this pay item.

No cable splices shall be allowed for traffic signal cable, with the exception of 7 conductor interconnect cable. These splices shall be as indicated on the plans.

Method of Measurement. The length of measurement shall be the distance horizontally measured between changes in direction and shall include cable slack. All vertical cables shall not be measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for ELECTRIC CABLE IN CONDUIT, SIGNAL of the size indicated.

TRAFFIC SIGNAL POST, ALUMINUM

Effective: June 6, 2024

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

Standard Drawings: 526

Material Specifications: 1385

This item shall consist of furnishing and installing an aluminum post for supporting a traffic signal on a concrete foundation at the location shown on the plans, as specified herein, or as directed by the Engineer. The post installation shall be in accordance with Standard Drawing 526 for the installation of a post for a traffic signal.

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

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

The height of the post shall be as indicated on the plans.

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

MAST ARM, STEEL, MONOTUBE

Effective: June 6, 2024

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

Material Specifications: 1454

Standard Drawings: 834, 870

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

Materials. The mast arm shall be 7-gauge steel and conform to the requirements of Material Specification 1454 and to Drawing 870.

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

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

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

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

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

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

Basis of Payment. This work will be paid for at the contract unit price per EACH for MAST ARM, STEEL, MONOTUBE of the length indicated.

SIGNAL HEAD, LED, 1-FACE

Effective: June 6, 2024

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

Material Specifications: 1463, 1475, 1493, 1543
Standard Drawings: 740, 741, 834, 835, 11984, 112268A

This item shall consist of furnishing and installing a traffic signal head on a signal pole, signal post, monotube mast arm, CTA beam or column, or other structure as shown on the plans, as specified herein, or as directed by the Engineer. Specific installations and configurations are shown on Drawing 834 entitled "Standard Traffic Signal Mounting Details".

Each signal face shall be pointed in the direction of the approaching traffic that it is to control and shall be aimed to have maximum effectiveness for an approaching driver at a distance from the stop equal line to the normal distance traversed while stopping. The optically programmed signal face shall be programmed in accordance with the visibility requirements of the Traffic Engineer.

During construction, and until the installation is placed in operation, all signal faces shall be hooded. The hooding material shall be securely fastened so it shall not be disturbed by normal inclement weather or wind.

Materials. The traffic signal head construction shall meet the requirements of Material Specification 1493 for LED traffic signals. The material for a programmed LED traffic signal head shall meet Material Specification 1543. The mast arm bracket shall meet the requirements of Material Specification 1463. The cable shall meet the requirements of Material Specification 1475.

General Requirements.

Bracket Installation. The signals shall be mounted using pole mounting brackets banded to the pole with two strips of 3/4" stainless steel banding single wrapped, one at the top and one at the bottom of the brackets, each secured with a stainless-steel banding clip. The banding and clips shall be coated with a baked-on black finish. The mounting configuration connecting the signals to the mounting bracket shall consist of polycarbonate brackets specifically made for mounting signal heads to the side of poles, to create the designated structure. When the signals are to be mounted on a square pole or flat surface, the bracket used shall be bolted to the flat pole or surface using 3/8" drive studs where permissible or using a 3/8" studs in a tapped hole.

The bottom mounting bracket shall be accurately located to cover an opening 1" in diameter, for cable entrance, drilled into the pole or standard at a calculated height to position the bottom signal face at a standard height of 10 feet, or a height indicated on the plans. The opening shall be reamed or filed to remove all sharp edges or burrs which might damage cable during installation, or through vibration when the signals are in operation.

Mast Arm Installation. The signal shall be mounted on the mast arm at the position indicated on the drawing in the manner shown on Drawing 834. The bracket shall be banded to the mast arm with the 5/8" banding as shown on Drawing Number 834. The banding and clips shall have a baked-on black finish. The bracket shall be located over a hole drilled into the mast arm for the installation of cable. The hole shall be reamed or filed to remove any sharp edges or burrs which might damage cable during installation, or through vibration when the signals are in operation.

Structure Installation. Signals shall be mounted to existing beams or structures as shown on plan details using "C" clamps and channel strut hardware, or as directed by the Commissioner. When the signals are to be mounted on a square pole or flat surface, the bracket used shall be bolted to the flat pole or surface using 3/8" drive studs where permissible or using a 3/8" studs in a tapped hole.

Cable. The contractor shall provide and install a length of 8/C #16 flexible electrical cord, of sufficient length to extend without strain or stress from the terminal strip in the "Green" section of the signal head to the terminal strip in the junction box mounted on the pole. The number of conductors in the cord, and the color coding of the conductors, shall be sufficient to match the requirements of the signal head being installed, and shall be connected in accordance with Material Specification 1493 for LED traffic signals, or Material Specification 1543 for optically programmed LED traffic signals. Both ends of the cable length shall be carefully stripped of 6 inches of jacket and 1 inch of insulation, and each conductor properly tinned. The service cable from the signal heads shall enter the traffic signal mast arm through the hole from the mounting bracket, whence it shall continue and enter the pole through the hole for mast arm wiring, then extend downward through the pole to enter the long sweep elbow to terminate by attachment to the terminal strip in the junction box in accordance with the terminal strip connector schematic, Standard Drawing 12268A.

Brackets shall have a gloss black finish.

Basis of Payment. This work shall be paid for at the contract unit price per EACH for SIGNAL HEAD, POLYCARBONATE, LED, 1-FACE or OPTICALLY PROGRAMMED SIGNAL HEAD, LED, 1-FACE of the mounting and number of sections specified.

PEDESTRIAN SIGNAL HEAD, LED, 1-FACE, BRACKET MOUNTED WITH COUNTDOWN TIMER

Effective: June 6, 2024

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

Material Specifications: 1475, 1495, 1545
Standard Drawings: 834, 835, 12668A

This item shall consist of furnishing and installing a pedestrian signal on a street light pole, a traffic signal pole or a traffic signal post as shown on the plans, as specified herein, or as directed by the Engineer. The signal may be installed as a single unit on a pole or in combination with other pedestrian signals or with traffic signals of various types and sizes. Specific installations and configurations are shown on Standard Drawing 834 and 835 entitled "Standard Traffic Signal Mounting Details".

The method of mounting shall be indicated on the plans, or as directed by the engineer. Each signal face shall be pointed in the direction of the marked cross walk area for the pedestrians it is intended to control.

Materials. Pedestrian signal heads shall conform to the requirements of Material Specification 1545. Mounting hardware shall conform to the requirements of Material Specification 1495. Harness cable shall conform to the requirements of Material Specification 1475.

General Requirements. The signal shall be mounted using pole mounting brackets banded to the pole with two strips of 3/4" stainless steel banding, single wrapped, one at the top and one at the bottom of the bracket, each secured with a stainless-steel banding clip. The banding and clips shall have a baked-on black finish. The mounting configuration connecting the signals to the mounting bracket shall consist of polycarbonate brackets specifically made for mounting signal heads to the side of poles, to create the designated structure.

The bottom mounting bracket shall be accurately located to cover a hole 1" in diameter for the cable entrance drilled into the pole at a height calculated to position the bottom signal face at a standard height of 10 feet, or a height indicated on the plans. The hole shall be reamed or filed to remove all sharp edges or burrs which might damage cable during installation, or through vibration when the signals are in operation.

When the pedestrian signal is attached below a traffic signal head, the separate opening for cable may be omitted to eliminate additional weakening of the pole and the pedestrian signal cord shall be installed using the same opening as the traffic signal cord.

Cable. The Contractor shall provide and install a length of 8/C #16 AWG flexible electric cord, of sufficient length to extend without strain or stress from the terminal strip in the signal head to the terminal strip in the junction box mounted on the pole. The number of conductors in the cord, and the color coding of the conductors, shall be sufficient to match the requirements of the signal head being installed, and shall be so connected in accordance with Material Specification 1494. Both ends of the cable shall be carefully stripped of 6 inches of jacket and 1 inch of insulation, and each conductor properly tinned. The service cord from the signal head shall enter the pole through the bottom mounting bracket and enter the long sweep elbow to terminate by attachment to the terminal strip in accordance with the terminal strip connector schematic, Standard Drawing 12268A.

During construction and until the installation is placed in operation, all signal faces shall be hooded. The hooding material shall be securely fastened so it shall not be disturbed by inclement weather or wind

Basis of Payment. This work shall be paid for at the contract unit price per EACH for PEDESTRIAN SIGNAL HEAD, LED, 1-FACE, BRACKET MOUNTED WITH COUNTDOWN TIMER.

ACCESSIBLE PEDESTRIAN SIGNAL

Effective: July 25, 2024

Revised: October 17, 2024

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

Material Specifications: 1617, 1618

Standard Drawings: Not applicable

This work shall consist of furnishing and installing an accessible pedestrian signal (APS) on a traffic signal pole or post.

Materials. The APS shall meet the requirements of Material Specification 1617. Cable for the APS shall meet the requirements of Material Specification 1618.

General Requirements. The location of the APS shall be as shown on the plans or as directed by the Engineer and shall meet the requirements of the MUTCD Part 4.

The power supply shall be installed in the associated WALK/DONT WALK signal head compartment and be securely attached. The input wires to the power supply shall be terminated to the correct terminals in the signal head. The output wires of the power supply shall be connected to the APS cable with quick disconnect plugs. The APS cable shall be properly terminated at the APS.

The APS cable is the six-conductor cable that shall connect the power supply to the APS. The cable length shall vary depending upon the relative location of the APS to its associated WALK/DONT WALK signal head. Care shall be taken to ensure the correct wires are connected to the correct terminals. In all cases, the white wire shall be the neutral and the green wire shall be the ground. The cable should have sufficient slack so that there is no tension in the cable and there is enough extra cable to make or break connections easily. If the cable goes through a manhole/handhole, it shall be trained along the sides.

The APS shall be located as indicated on the plans. A ¾ inch to 1 inch diameter hole shall be drilled into the pole at the proper height for the cable entrance. The size of the hole shall be as directed by the Engineer. The hole shall be reamed or filed to remove all sharp edges or burrs which might damage the cable. A weatherproof flexible caulking shall be applied between the hole in the pole and the APS housing to protect the cable. The APS bracket shall be attached to the pole with ¾" steel banding or with two stainless steel screws. The APS shall be attached to the bracket with two stainless steel screws. The height of the push-button shall be 42" above the sidewalk grade where the pedestrian shall be located when at the APS, according to ADA requirements. The front face of the APS shall be parallel to the associated crosswalk. When required, a push button extension bracket shall be provided to position the button within reach of the accessible path. The tactile arrow shall be aligned parallel to the direction of travel on the associated crosswalk.

The APS shall be programmed in accordance with the Chicago Department of Transportation's Accessible Pedestrian Signal (APS) Operation Guidelines. The sound levels and any vocal messages shall be programmed as indicated in these guidelines, the contract plans, or as directed by the Commissioner.

A sign shall be mounted to the back-plate of the APS. The sign size and message shall be as indicated on the plans or as directed by the Commissioner.

Basis of Payment. This work will be paid for at the contract unit price per EACH for ACCESSIBLE PEDESTRIAN SIGNAL.

TEMPORARY TRAFFIC SIGNAL INSTALLATION

Effective: April 19, 2023

Revised: June 5, 2025

Description. This work shall consist of furnishing, installing, maintaining, and removing temporary traffic signals to maintain continuous traffic signal operation until staged construction is complete, and the permanent traffic signal system can be placed into service. This work shall include, but is not limited to, any required temporary signal poles, temporary traffic signal equipment, temporary relocation, and wiring of traffic signal heads or pedestrian signal heads to adjacent poles to maintain visibility and continuous traffic signal operation during construction.

Material and Installation. The Contractor shall ensure at least two primary signal heads are always visible from each approach. The Contractor shall select an aerial wiring scheme based on the specific requirements of each intersection. The Contractor shall ensure temporary cable connection is in place before intercepting existing conduits. The Contractor may use multi conductor self-supporting cable or cable requiring messenger wire of sufficient voltage and rating to handle the intersection electrical requirements as approved by the Commissioner and the CDOT Division of Electrical Operations (DEO).

Any cables or wires utilized for this work below an elevation of 10 feet above the sidewalk shall be protected from access and view by split duct or PVC conduit and shall be properly secured to existing pole(s) through banding or other method as approved by the Commissioner and the DEO. All split ducts shall be securely tied with cable ties or other approved method at intervals of not more than 3 feet. Drilling or notching of poles, cabinets or junction boxes is expressly prohibited.

When directed by the Commissioner, the Contractor shall provide a temporary base for the existing traffic signal controller during the temporary traffic signal installation. The temporary location of the traffic signal controller shall be approved by the Commissioner. Entry into poles at the pole tops is permissible. Entry into junction boxes by removing the top cover plate is also permissible provided that the cover plate and all screws shall be re-installed at the end of the project. Entry of poles through the pole cap, removal and replacement of the top plate of the junction box, installation of split duct or PVC conduit below 10 feet shall all be included in the cost of Temporary Traffic Signal Installation.

Temporary wiring or the temporary relocation of traffic signal and pedestrian heads may be connected to the existing controller and cabinet. After intersection operation is transferred to the new signal controller and equipment, the temporary aerial wiring and any relocated traffic or pedestrian signal heads shall be removed. Removed temporary wiring shall remain the property of the Contractor. Removal of said wiring and any relocated traffic or pedestrian signal heads shall be included in the cost of Temporary Traffic Signal Installation.

The Contractor shall maintain the temporary traffic signal system at each intersection where a temporary traffic signal installation is provided in this Contract. The maintenance shall commence at the time during construction, when the Contractor, in the course of his Work, begins construction at the intersection. Maintenance shall continue in force until the expiration of the time allotted for the project, or until the permanent signals are accepted by the sponsoring agency, whichever comes first. If signal installation is not completed and accepted within the time allotted for the project, signals shall be maintained by the Contractor at no additional cost to the sponsoring agency. A properly operating temporary traffic signal system shall be maintained by the Contractor at each intersection in the Contract until such date as the existing or proposed permanent traffic signal system is returned to service.

Material Acceptance. The Contractor shall provide a Manufacturer's written certification that the material complies with these specifications.

General Requirements. Perform work in accordance with Division 800, Sections 801, 850, 890, and 1086 of the Standard Specifications, CDOT Division of Electrical Operations Standards and the City of Chicago Electrical Code, except as herein modified.

Maintenance Procedure. The Contractor shall perform the following maintenance program. The Contractor shall inspect the signal installation at least once each week for proper alignment of signal heads, lamp outages, and general operation of the traffic signals.

The Contractor shall provide immediate corrective action to replace burned out lamps or damaged sockets with new lamps or sockets meeting CDOT requirements. At the time of replacement, the reflector and lens shall be cleaned.

The Contractor shall respond to emergency calls within two hours after notification and provide immediate corrective action. The Contractor shall maintain in stock enough material and equipment to provide temporary and permanent repairs. Any damage to the signal installation from any cause whatsoever shall be repaired or replaced by the Contractor at his own expense. The Contractor may institute action to recover damages from a responsible third party.

The Contractor shall install STOP signs on all approaches to the intersection as a temporary means of regulating traffic during the time of repair. Signs shall be MUTCD Sign Designation R1-1 (36" x 36") with R1-3P (18" x 6").

The Contractor shall provide the Commissioner the names and telephone numbers of two technicians who shall be available 24 hours a day, 7 days a week, to perform any necessary work on the signal installation.

If at any time, the Contractor fails to perform any Work deemed necessary by the Commissioner to keep the traffic signals in proper operating condition, or if the Commissioner finds it impossible to contact the designated technicians to perform any work, the Commissioner reserves the right to have other Electrical Contractors perform the needed Work. The cost of such work shall be deducted from the amount due the Contractor.

Method of Measurement. Temporary traffic signals that are installed and removed shall be measured per each intersection. Weekly maintenance for temporary traffic and permanent signal installations shall not be measured for payment. Maintenance of Traffic Signal is included in this item and shall not be measured separately. Each intersection installation shall be measured for payment as one unit.

Basis of Payment. This work will be paid for at the contract unit price per EACH for TEMPORARY TRAFFIC SIGNAL INSTALLATION, which price will be payment in full for all materials, equipment, and labor necessary to install temporary traffic signals at each location where existing traffic signal equipment shall be relocated or removed to install proposed equipment. This price shall include maintaining the same until the existing permanent traffic signals are returned to service. This work also includes relocating the existing traffic signal controller to its temporary location, and installation and removal of any required temporary traffic signal equipment.

No weekly maintenance will be paid for temporary traffic signal installations. Payment will be made according to Article 890.04; 60% of the bid unit price will be paid following approval of each installation. The remaining forty percent will be paid for the removal of each installation.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT

Effective: May 8, 2024

Revised: June 7, 2024

Description. This work shall consist of removing all existing traffic signal equipment at the intersections listed on the plans.

General Requirements. The items to be removed shall include traffic signal arms, traffic signal poles, traffic signal heads, traffic signal controllers, and all associated equipment and cable.

All traffic signal items, except for traffic signal cable, are to remain the property of the City of Chicago. The Contractor shall deliver removed traffic signal equipment to Division of Electrical Operations yard at 2451 South Ashland Avenue, or as directed by the Engineer. Twenty- four-hour advance notice is necessary before delivery. The traffic signal cable shall be removed and become the property of the Contractor and shall be disposed outside the right of way, at their sole expense.

The Contractor shall provide three copies of a list of equipment that is to remain the property of the City, including model and serial numbers where applicable. The Contractor shall also provide a copy of the contract plan, or special provisions, showing the quantities and type of equipment. The Contractor shall be responsible for the condition of the traffic control equipment from the time of removal until its acceptance by a receipt drawn by the City indicating that the items have been returned.

Method of Measurement. This item shall be measured as one unit per project contract, or per signalized intersection, depending upon the contract conditions. The breaking down of foundations and manholes shall not be considered part of this item.

Basis of Payment. This work will be paid for at the contract unit price per EACH for REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT. This price shall be payment in full for removing the equipment and disposing of it as required. The salvage value of the cable retained by the Contractor shall be reflected in this unit price.

BREAKDOWN CONCRETE FOUNDATION

Effective: June 7, 2024

Description. This work shall consist of removing and disposing an existing concrete foundation for lighting, traffic signal, or other electrical equipment.

General Requirements. Removal shall consist of completely removing a foundation or breaking a foundation down to a point 3 feet below grade, disposing of the debris offsite in an approved manner, backfilling the excavation with screenings or other approved backfill material, and reconstructing the surface area. For foundations removed from within the parkway, the parkway shall be restored with topsoil to match the existing grade. For foundations removed from within sidewalk, the sidewalk shall be restored. Restoration of sidewalk shall be paid for separately. Debris shall be disposed of according to Section 202.03 of the Standard Specifications. Backfill shall meet the requirements of Section 1003.04 of the Standard Specifications.

Basis of Payment. Breakdown of foundations will be paid for at the contract unit price per EACH for BREAKDOWN CONCRETE FOUNDATION, of the type specified.

BREAKDOWN HANDHOLE OR MANHOLE

Effective: June 7, 2024

Description. This work consists of breaking down an existing handhole or manhole and filling in the affected area to grade.

General Requirements. This work shall consist of removing the frame and cover of an existing handhole or manhole, breaking down the handhole/manhole walls, removing large debris, and backfilling the hole with screenings or other approved material. Backfill shall be installed in 6-inch layers and tamped. If the handhole or manhole is in a parkway, the hole shall be filled level to the existing grade. The top 6 inches of fill shall be of an approved soil mixture. If the handhole/manhole is in sidewalk or in pavement, the sidewalk or pavement shall be restored under a different pay item. If the frame or cover is deemed re-useable by the Engineer, the frame and/or cover shall be delivered to the CDOT Division of Electrical Operations at a location identified by the Engineer. Any debris, including the frame and cover shall be disposed of off-site in an approved manner. The contractor shall pay for all disposal fees.

Basis of Payment. This work will be paid for at the contract unit price per EACH for BREAKDOWN HANDHOLE, or BREAKDOWN MANHOLE.

RELOCATE EXISTING SIGN PANEL (SPECIAL)

Description. This work shall consist of the removing and temporary ground mounting of the existing bridge mounted sign panels in a location determined by the Engineer. The work shall be completed in accordance with Sections 505, 724, 733, and all other applicable sections of the Standard Specifications.

As part of this work, the Contractor shall construct and erect the sign temporarily on sign supports using the existing sign hole locations for the duration of the bridge replacement. Prior to relocation of the sign, the Contractor shall submit shop drawings for the temporary sign support for review by the Engineer. These shop drawings shall be sealed by a structural engineer licensed in the State of Illinois. Temporary sign supports signs shall meet MUTCD requirements.

Prior to the removal of any sign or appurtenance, the Contractor shall schedule an inspection with the Engineer to review the condition of the equipment. Any deficiencies shall be corrected prior to removal. A minimum of 7 days advanced notice shall be provided prior to the inspection. The Contractor shall be responsible for any damage that occurs related to construction activities. Repairs or replacement of sign in temporary location will not be paid for separately.

Upon completion of the stage construction the signs shall be returned to the Department, unless otherwise indicated by the Engineer. If the signs are to be disposed of per direction of the Engineer, the disposal cost shall be included in the Relocate Existing Sign Panel (Special) pay item.

Basis of Payment. This work shall be paid for at the contract unit price per EACH for RELOCATE EXISTING SIGN PANEL (SPECIAL) which price shall include all labor, equipment and materials to remove the existing sign panels, temporary installation via structure mounted or post mounted, and removal of the temporary signs and appurtenances when complete.

WASHOUT BASIN

Description: The washout basin(s) as identified and approved by the Engineer prior to construction are used to contain concrete liquids when the chutes of concrete trucks are rinsed out after the delivery of concrete to the construction site. These washout facilities function to consolidate soils for disposal and prevent runoff liquids associated with concrete.

General Requirements:

- The Contractor must submit a plan of his/her proposed temporary concrete washout facility to the Engineer for his/her approval at least 10 days prior to the first concrete pour.
- Temporary concrete washout facilities are to be in place prior to any delivery of concrete to the construction site.
- Temporary concrete washout facilities are to be located at least 50 feet from storm drain inlets, open drainage facilities, or water bodies. Each facility is to be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign is to be installed adjacent to each temporary concrete washout facility to inform concrete equipment operations of the designated washout facility.

Design: The type of concrete washout facilities available for use on this project (unless otherwise approved): Prefabricated non-portable facilities (as approved by the Engineer)

Non-Portable Facilities:

- Above Grade: Constructed using barrier wall & polyethylene sheeting. Barrier walls are constructed to create a berm with a single sheet of 10-mil polyethylene sheeting which is free of holes, tears, or other defects which may compromise the impermeability of the material. Sandbags are used to hold the sheeting in place on top of the berm. Sheeting must extend over the entire basin and berm to prevent escape of material discharge.
- Below Grade: Constructed via excavation and the use of polyethylene sheeting and sandbags. A pit is first excavated in a designated location with a single sheet of 10-mil polyethylene sheeting which is free of holes, tears, or other defects, which may compromise the impermeability of the material. Sandbags are then used to hold the sheeting in place.

Size of Washouts: Number and size of washout facility is to be determined by the Contractor. It is his/her responsibility to provide enough storage for the excess concrete and water produced on the target. Non-portable facilities are to have a minimum length and width of 10' unless otherwise approved by the Engineer.

Inspection/Maintenance/Removal:

- Temporary concrete washout facilities are to be inspected by the Engineer during his/her weekly erosion and sediment control inspection per the requirements of the SWPPP. The inspector is to ensure there are no leaks, spills, and the capacity of the facility has not yet been compromised.
- Any overflowing of the washout facility onto the ground must be cleaned up and removed within 24 hours of discovery.
- If a rain or snow event is forecasted, a non-collapsing, non-water collecting cover shall be placed over the washout facility and secured to prevent accumulation and overflow of precipitation.
- Contents of each facility are not to exceed 75% of design capacity. If contents reach 75% capacity, discontinue pouring concrete into the facility until it has been cleaned out.
- Allow slurry to evaporate or remove the site in a safe manner (i.e. vacuum truck). All hardened material can then be removed or disposed of properly.
- If a lined basin is used, immediately replace the liner if it becomes damaged.
- Remove temporary concrete washout facilities when they are no longer required and restore the disturbed areas to their original condition.
- Note locations of these facilities and any changes to these locations on the SWPPP.

Basis of Payment: This work shall be paid for at the contract unit price per LUMP SUM for WASHOUT BASIN, which price shall be payment in full for all material, labor, excavation, maintenance, material replacement and disposal of all basins to be utilized for this contract.

PAINT CURB

Description. This work shall consist of painting curb.

Materials. Materials shall be in accordance with Article 780.02 for paint pavement markings.

Equipment. Equipment shall be in accordance with Article 780.03. Paint. Article 780.07 is supplemented with curb shall be painted yellow at the locations shown in the plans.

Method of Measurement. Curb painting will be measured in accordance with Article 780.14 for lines.

Basis of Payment. Curb painting will be paid for in accordance with Article 780.15 at the contract unit price per FOOT for PAINT CURB.

ADJUST FRAME AND LID (CDOT)

Description: This item will consist of adjusting or replacing an existing or new 24 inch or 30 inch frame and lid for an existing manhole or handhole to the new or existing grade. The existing manhole or handhole may be in the street, in the sidewalk, or in the parkway.

Material: The 24 inch frame and lid must be as shown in Standard Drawing 872. The 30 inch frame and lid must be as shown in Standard Drawings 874 and 10927. All frames and lids must conform to Material Specification 1458. Bricks must meet the requirements of Article 1041 of the Standard Specifications.

Installation: Pavement, sidewalk, and dirt must be removed to the extent necessary to adjust the frame. Material must be disposed of according to the requirements of Section 202.03 of the Standard Specifications. Mortar and brick, or mortar and concrete rings, must be used to adjust to the proper grade. With the approval of the Resident Engineer, the contractor may use precast adjusting rings. Adjustment rings, bricks, and frames are to be set in a full mortar bed. Mortar must be mixed in a proportion of one part cement to three parts sand by volume of dry mix. The interior of the adjustment must be smooth. Use of partial bricks will not be allowed. Bricks must be laid in full header courses only. In no instance will the neck of the manhole or handhole exceed 2 feet in depth.

The pavement, sidewalk, or parkway must be restored to the proper grade after adjustment. Patching of pavement around a structure must be with high early strength concrete meeting the requirements of Articles 1001 and 1020 of the Standard Specifications. The bituminous concrete layer must be properly restored. Sidewalk must be replaced to the nearest full slab, or expansion joint, and must be a minimum of 5 inches in thickness. Parkways must be properly backfilled and topped with appropriate soil material. .

Method of Measurement: This work will be measured on a per each basis.

Basis of Payment: This work will be paid for at the contract price per EACH for FRAMES AND LIDS TO BE ADJUSTED (SPECIAL), or ELECTRICAL FRAME AND LID 24", or ELECTRICAL FRAME AND LID 30", or REPLACE 24" FRAME AND LID WITH 30" FRAME AND LID,. All excavation and restoration, as well as bricks, concrete, mortar, backfill, soil, disposal of surplus excavated material, reinforcement bars, frames and lids, etcetera will be included in the unit price.

CHAIN LINK FENCE REMOVAL

Description: This work consists of the removal and satisfactory disposal of existing chain link fence at the locations shown on the plans or as directed by the Engineer. This work shall be performed in accordance with the applicable portions of Section 201 of the Standard Specifications and as herein specified.

General: Removal shall include posts, fence fabric, fittings, appurtenances, attachments and concrete foundations. Any holes created by removal of the foundation shall be filled with clean earth fill to eliminate any hazard to the public and shall be included in the cost of Chain Link Fence Removal.

Disposal of removed materials shall be in accordance with Article 202.03.

Method of Measurement: Chain link fence removal shall be measured in linear feet along the top of the fence.

Basis of Payment: This work will be paid for at the contract unit price per FOOT for CHAIN LINK FENCE REMOVAL, which price shall be payment in full for all labor, tools, equipment and materials necessary to remove and dispose of existing chain link fence as herein specified.

HOT-MIX ASPHALT SURFACE REMOVAL, VARIABLE DEPTH

Description: This work consists of the HMA surface removal in accordance with the applicable portions of Section 440 of the Standard Specifications, as shown on the plans and as directed by the Engineer.

Basis of Payment: This work will be paid for at the contract unit price per SQUARE YARD FOR HOT-MIX ASPHALT SURFACE REMOVAL, VARIABLE DEPTH, which shall include all equipment, labor, and material to perform the work.

SIGN SUPPORT (SPECIAL)

Description. This work shall be performed as detailed in the plans, standard drawings, work order and/or as directed by the Engineer, and according to Section 729 of the IDOT Standard Specifications for Road and Bridge Construction, except as herein modified. Work under the item shall consist of furnishing sign poles of various lengths or extending sign poles and installation either by dig or drill method. The "CDOT Field Manual for Sign Installation" should be adhered to and is available for review at 2 N. LaSalle St., Suite 820, Chicago, IL. The poles installed using dig method shall be 11'-6" in length while poles using drill method shall be 10'-6" in length. The cost of wedges, sleeves, pole bases and all other required hardware to install will be included in the cost of these items.

Materials. The material for the poles furnished shall be in accordance with Article 1006.29 of the SSRBC. The material shall be hollow steel tubes, 2-3/8 inches outside diameter, conforming to ASTM A500 Grade B and coated for resistance to corrosion and outdoor weathering. Nominal wall thickness of the pole shall be 0.08". The sign pole must be formed to the size and type required per the "CDOT Field Manual for Sign Installation" and/or the contract drawings. Holes shall be drilled prior to coating to prevent indentations and dimples in the poles.

Finish. The poles shall be galvanized, straight and have a smooth, black, uniform powder coating finish as specified below. The interior of the sign poles shall be coated with a minimum of an 81% zinc-rich primer. The exterior of the poles shall be galvanized with material conforming to AASHTO M120 with a minimum weight of 1.00 ounce per square foot. The weight of the exterior galvanizing may be reduced to 0.65 ounces per square foot of high grade material conforming to AASHTO M120 if applied with a chromate conversion coating and a clear high performance organic polymer coating. Powder coating of the poles and extensions shall meet the following requirements:

- Color: Black
- Resin type: TGIC Polyester
- Gloss: Medium

Pretreatment Process.

- Cleaning: All parts shall be cleaned, utilizing spray washers and alkaline cleaner to remove any remaining grease, dirt, or other contaminants.
- Rinsing: All parts shall be spray rinsed in a continuously overflowing rinse stage to remove any remaining cleaning solution.
- Phosphating: All parts shall be spray phosphated with a heated phosphate solution to provide a transition coating between metal and powder.
- Rinse: All parts shall be spray rinsed in a continuously overflowing rinse stage to remove any remaining phosphate / sealant solution.

Powder Coating Process.

- Drying: All parts shall be preheated to totally eliminate moisture and prevent off gassing of casting.
- Powder Coating: A premium TGIC polyester powder shall be electrostatically applied to provide a uniform coating to a thickness of 1-3 mils (1 mil minimum). To achieve proper mil thickness, the powder shall be applied with one application. The manufacturer shall be responsible for ensuring proper adhesion to the metal surface.
- Curing: All parts shall be heated to the exact time and temperature requirements, recommended by the powder coat material manufacturer, in precisely controlled gas ovens.

Sleeve and Locking Wedge. Pole sleeve (pipe socket): Material must be hollow steel tubes conforming to ASTM A500 Grade B or ASTM A501, and galvanized according to AASHTO M111, nominal wall thickness of 0.109", 2-5/8" inside diameter that allows for a minimum of 13-1/4" of sign pole to nest inside the sleeve. The overall length must be 27". A drawing detail as shown in the "CDOT Manual for Sign Installation" shall govern.

Locking Wedge. Material shall be 11 GA. Steel tube conforming to ASTM A500 Grade B or ASTM A501 and galvanized according to AASHTO M111. The locking wedge shall be contoured to fit between the steel pole and the 27-inch sleeve. A drawing detail as shown in the "CDOT Field Manual for Sign Installation" shall govern.

Sign Pole Base. The sign pole base furnished under this contract includes a carriage bolt, tamper-resistant nuts and anchor bolts with nuts. The finished casting shall be free from burrs, cracks, voids, or other defects.

Support Base. Twelve-inch diameter, aluminum-zinc alloy casting per ASTM A197. The casting shall have the words "City of Chicago" cast in relief as shown in the "CDOT Field Manual for Sign Installation".

Bolt Washers and Nut. Stainless steel as specified in Article 1006.31a of the SSRBC. Include a 1/2" x 4-1/2" carriage bolt with two 1" flat washers and a 1/2" x 13" full height hex nylon locknut.

Anchor Bolt. Galvanized steel expansion anchors conforming to Article 1006.09 of the SSRBC. Furnish three (3) per each sign base provided.

Finish. Powder coat to minimum 1 mil thickness with satin black polyester finish.

Submittals.

Shop Drawings. Fabrication shop drawings showing the full size layout, color, and proposed materials for poles, bases, and hardware shall be submitted for approval prior to start of fabrication.

Poles. Mill certification, samples of each size of finished pole and extension. Locking wedge and sleeve: Samples of each item.

Cast Aluminum Base. Mill Certifications.

Powder Coating. Test Data; Sample; Manufacturer's Certification that material complies with the required specifications.

Galvanizing. Requires Manufacturer's Certification for compliance with these specifications. Stainless Steel Bolts and Nuts, Anchor Bolts. Sample, product data sheet.

Construction Requirements. All installations shall be in accordance with Section 729 of the SSRBC and as per latest edition of the "CDOT Field Manual for Sign Installation".

Dig Method. To install a sign pole by dig method, the Contractor will first drive a base sleeve to a level with the top of the sleeve near flush to the ground. The sign pole will then be inserted into the sleeve and raised to a level with the bottom of the pole 10"-12" below the ground. The sign pole will then be locked in place by driving a locking wedge between the sign pole and the base sleeve.

Note: Pipe sleeve and wedge shall not be bolted together. The holes at the top of the sign pole will be properly aligned such that the sign to be installed will properly face the flow of traffic.

Drill Method. The base shall be secured to the concrete surface by steel expansion anchors and shall be leveled by using stainless steel washers as shims at the anchor bolt locations and under the base castings. The sign pole shall be installed into the cast iron base and locked in place with a carriage bolt with two flat washers and a nylon lock nut as shown in the "CDOT Field Manual for Sign Installation". The holes at the top of the sign pole shall be aligned such that the sign to be installed shall properly face the flow of traffic.

Sign poles shall be installed 18" from back of curb unless otherwise specified. Poles for transportation stops, e.g., bus, taxi, tour bus, or tour boat stops, shall be installed 24" from the back of the curb unless otherwise noted.

QC/QA Requirements. The contractor shall provide Manufacturer's certifications that the materials comply with these specifications.

Warranty. Manufacturer's warranty shall be five years from the date of installation and acceptance.

Method of Measurement. This work will be measured for payment per Section 729 of the SSRBC.

Basis of Payment. This work will be paid per Section 729 of the Standard Specifications as **SIGN SUPPORT (SPECIAL)** for all methods required, dig method or drill method and shall include furnishing all poles or extensions, sleeves, locking wedges, bases and all other hardware required to complete the installation as specified herein.

GRAFFITI REMOVAL

Description: This work shall consist of removing graffiti from the surfaces of the existing abutments or other locations as directed by the Engineer, by the methods described in this specification.

Materials: All materials and equipment shall be subject to the Engineer's approval before any work can begin.

Abrasive material for blast cleaning shall meet the requirements of IEPA.

Paint: All paint used shall meet the following requirements. The paint shall be a quality primer formulated specifically for the purpose of covering graffiti. It shall be compatible with the surface it is used on as per the manufacturer's data sheet and must adhere well to the substrate and resist fading and chalking. Compatibility shall be verified by the paint manufacturer's product data sheet or by written documentation from the paint manufacturer. Color of primer used to cover graffiti shall match existing paint color to the satisfaction of the Engineer.

Power Wash: Soluble, abrasive blast media shall be a large crystal sodium bicarbonate or a magnesium sulfate-based media. Solubility of the media in water shall meet the requirements of IEPA.

The equipment with the media shall be a soluble media injector type power washer. The Contractor shall submit catalog cuts or other documentation for all equipment proposed for use in this work. The Engineer may require demonstration of the equipment's capabilities. No work shall begin until the equipment have been demonstrated to and accepted by the Engineer.

Solvent Wash: The cleaning compound shall be a blend of an organic solvent of emulsifiers and surfactants. It shall be a bio-degradable water-based, mixture developed from non-toxic and noncorrosive substances. This may be a soybean solution or other, satisfactory to the Resident Engineer. Mineral spirits are also acceptable for this usage.

The cleaner shall lift graffiti from the substrate surface and emulsify and dissolve the paint constituents; pigments; oils; binders and fillers. Acceptance of the cleaning compound will be based on the manufacturer's certification that the material conforms to the requirements of this specification. No work shall begin until these materials have been delivered to and accepted by the Engineer.

Construction Details: All work must conform to the OSHA standards.

Unless otherwise directed by the Engineer, the following methods shall be used to remove graffiti from various surfaces. If one of these prescribed methods is used and the graffiti still remains visible, the Contractor shall use an alternate method approved by the Engineer. Painting over graffiti is the preferred option on previously painted surfaces, and where solvents were unsuccessful at removing graffiti.

Unless otherwise noted or directed by the Engineer, graffiti shall be removed within five working days of written notification. If a lift device will be necessary, the removal date will be extended to ten working days.

Graffiti Surface	Suggested Graffiti Removal Method
Steel (smooth, non-porous) Wood (painted or unpainted)	Solvent wash with Enviro-Solutions Paint Stripper & Graffiti Remover; SOY solv; Mineral Spirits or Painting Over Graffiti or Power Washing
Brick, Stone, Concrete, Paving. Solvent blocks (porous, unpainted)	Wash with Taginator, or Power Washing, or Painting Over Graffiti or Abrasive Blasting Painting Over Graffiti or Power Wash Solvent Washing with Enviro-Solutions Paint
Painted Masonry	
Sign Panel Faces & Aluminum (unpainted mill finish or anodized finish)	Stripper & Graffiti Remover; SOY Solv; EZ Solv or Mineral Spirits.

Painting Over Graffiti: The Contractor shall primer paint over all graffiti on the concrete surfaces within project limits and take appropriate precautions to prevent paint from falling onto traffic.

The substrate surfaces shall be thoroughly cleaned before painting. All dust, dirt, oil, grease, and other substances which might prevent the adhesion of the paint to the substrate shall be removed. No sandblasting will be allowed. Paint shall be applied as soon as practicable after cleaning is completed. If in the opinion of the Engineer, the substrate surface has become soiled, or otherwise contaminated, prior to the application of the paint, the surface shall be recleaned at no additional cost to the State. The paint shall be applied evenly in a neat and workmanlike manner by a roller or other suitable method, as approved by the Engineer. The rolling shall be done at such a pace that no spinning of the roller or throwing off paint occurs when the roller is lifted from the surface. The paint shall be feathered out by using light pressure at the end of the stroke to promote uniformity. The first time a surface is painted, it shall be painted from column to column, post to post, and from top to bottom for panels and from joint to joint or score mark to score mark for other concrete surfaces. After the first time, which includes previous painting for graffiti removal, the substrate surface shall be painted in small rectangular patterns to minimize the area painted and ensure that the graffiti will no longer be "readable" when the painting is complete. If the paint to be applied requires more stringent or additional surface preparation than stated in this specification, the Contractor shall prepare the surface in accordance with the paint manufacturer's recommendations.

The graffiti must be completely hidden before the painted area will be measured for payment.

The Contractor will be required to repaint areas if the graffiti remains visible after painting at no additional cost to the State. New graffiti at the same location will be measured for payment when the painting meets the requirements of this specification. The Engineer may require sand be added to the paint to provide a texture to the final surface.

Power Washing Graffiti Surfaces: All graffitied surfaces shall be cleaned with a soluble, abrasive blasting media applied with a soluble media injector or a compressed air delivery system, whichever is satisfactory to the Engineer. No particulate matter of any nature shall be permitted to remain on the cleaned surface. After cleaning, the surface shall be rinsed with tap water applied with a power washer. All visible media shall be removed from the surface.

After rinsing, the Contractor shall repeat the cleaning process in areas where graffiti or paint is still visible. If the second cleaning process fails to remove the graffiti or paint to the Engineer's satisfaction, the equipment and methods used by the Contractor will again be subject to review and approved by the Engineer. Cleaned surfaces shall bear no evidence of graffiti paint layers.

Solvent Washing Graffiti Surfaces:

Pre-Cleaning Materials: A wet, non-abrasive cleanser is recommended. This cleanser shall not contain strong solvents or alcohols.

Pre-Cleaning Procedure: Cleanse the surface of loose dirt particles with clean water. Use a soft sponge or brush to wash the graffitied surface with detergent and water. Avoid scrubbing the surface unnecessarily. After the cleaner has been utilized, apply a steady stream of water on the cleaned surface to wash the dirt particles away. Allow to dry.

Cleaning Procedure: The Contractor shall supply the instructions of the cleaning procedure, to the Engineer, at least two weeks prior to starting this work. Graffiti removal material shall be applied to surfaces as per the manufacturer's instructions. Graffiti removal material shall not be applied to silk screen processed areas.

After the solvent is applied, the surfaces shall then be wiped with a non-abrasive material. The wiped surfaces shall then be rinsed with a water wash. The cleanliness of the surfaces is subject to the approval by the Engineer.

After rinsing, the Contractor shall repeat the cleaning process in areas where graffiti is still visible. If the second cleaning process fails to remove the graffiti to the Engineer's satisfaction, the equipment and methods used by the Contractor will again be subject to review and approval by the Engineer.

Cleaned surfaces shall bear no evidence of graffiti. The cleaning of the graffiti image shall be feathered out by using light pressure at the end of the stroke to promote uniformity on the surrounding surface.

Abrasive Blasting off Graffiti: Due to the potential of abrasive blasting to damage the substrate, this method of graffiti removal may only be performed as a last resort, at the direction of the Engineer, after all other methods to remove graffiti have failed.

Graffiti should be removed using vacuum-shrouded blasting or power-tool equipment that has the appropriate attachments for the surface being cleaned to ensure that no dust or abrasive escapes during operation. This equipment should be capable of cleaning all the graffiti off the surface at a rate acceptable to the Engineer while producing no detectable dust. The equipment should operate in a manner such that all dust or abrasive/dust mix generated is simultaneously drawn away from the contact surface into attached vacuum hoses leading to a vacuum that utilizes HEPA filters. The vacuum and its hoses should be sufficiently rated for the volume of debris and/or abrasive/debris generated. The equipment, its method of use, and efficiency shall be demonstrated to the Engineer prior to the start of work. Power tool cleaning should remove the graffiti without causing undue damage to the surface being cleaned.

Graffiti Removal from Overhead Structures: If the use of a mechanical aerial lift is required to safely access the graffitied surface, the Contractor shall obtain the necessary equipment and use it in conjunction with the other graffiti removal items.

Method of Measurement: This work will be measured in square yards of surface area that graffiti is either removed from, or painted over, in accordance with this specification. There will be no payment for removing graffiti that is not done within the time limitations stated in this specification.

Basis of Payment: This work will be paid for at the contract unit price per SQUARE YARD for GRAFFITI REMOVAL.

ANTI-GRAFFITI COATING

Description. This work shall consist of the surface preparation and application of an anti-graffiti coating to the exposed surface of the proposed structure. The Contractor shall furnish all materials equipment, labor and other essentials necessary to accomplish this work and all other work described herein as directed by the Engineer.

General Requirements. The anti-graffiti paint system shall consist of a permanent, color stable, UV, stain, chemical and abrasion resistant coating. The removal of graffiti from the protected surfaces shall be accomplished by either water power-washing or applying a separate removal agent as recommended by the manufacturer of the permanent coating.

The removal agent shall have the capability of completely removing all types of paints and stains. After graffiti removal there shall be no damage to the anti-graffiti coating or the surface to which it is applied. Additionally there shall be no evidence of ghosting, shadowing or staining of the protected surface.

Materials. The Contractor shall utilize a single coat concrete waterproofing sealer and an additional anti-graffiti protective urethane clear coat to be placed over all exposed concrete surfaces, including stained concrete to limits as shown on the plans. Anti-graffiti protective coat shall be compatible with the concrete stain as utilized under the special provision "Staining Concrete Structures."

Submittals. The anti-graffiti protection system shall be a product that has been commercially available for a period of at least five years. The Contractor shall submit the following items to the Engineer:

- Written evidence that the installer for the work has completed at least 5 projects of similar complexity within the past five years.
- Product identification including brand name and product number
- Complete manufacturer's recommendation for usage
- Available test data and reports
- A one-liter representative sample

Approval of the coating shall be based upon the following:

- The sample exhibits no signs of graffiti or graffiti staining upon casual inspection
- The coating must be intact and exhibit no signs of streaking, cracking, pinholing, discoloring, or other coating degradation upon casual inspection.
- Color samples from the manufacturers color chart shall be submitted to the Engineer for approval by IDOT.

Surface Preparation and Application. All surfaces shall be thoroughly clean, dry and free of dust that might prevent penetration of the coatings. A technical representative of the manufacturer and the Engineer shall be present to approve surface preparation and application of the anti-graffiti coating.

Surface preparation for all concrete surfaces shall comply with the manufacturer's recommendations.

Application of the anti-graffiti coating to the concrete facing shall not be applied within 28-days of concrete placement and after the concrete stain has sufficiently dried according to the manufacturer's recommendation. After the manufacturer's recommended curing period for the anti-graffiti coating, the Engineer will apply various types of graffiti materials to the coating. After three days the removal agent shall be used to remove the graffiti. If after graffiti removal the anti-graffiti coating is clean and undamaged with no evidence of ghosting, shadowing or staining then the anti-graffiti coating shall be approved and accepted.

Weather Conditions. Coatings shall not be applied in the rain, snow, fog or mist nor shall they be applied if these conditions are expected within 12 hours of application. Coatings shall not be applied when surface or air temperature is less than 40 °F nor greater than 100 °F or is expected to exceed these temperatures within 12 hours of application or as recommended by the manufacturer.

Cleaning Agent. The Contractor shall supply the Engineer with an initial quantity of the removal agent and written instructions for its use, as recommended by the manufacturer for graffiti removal. The amount shall be furnished at the rate of 1 quart per 200 square feet of treated surface area.

Method of Measurement. This work will be measured in place per square foot of exposed surface area upon which the anti-graffiti coating has been applied and accepted by the Engineer after graffiti testing has been conducted.

Basis of Payment. This work will be paid for at the contract unit price per SQUARE FEET for ANTI- GRAFFITI COATING, which shall include surface preparation, application of the anti-graffiti coating, supplying the manufacturer's technical representative, supplying the initial quantity of cleaning agent, labor, tools, equipment, testing and incidentals described herein and as necessary to complete the work as specified.

DEBRIS REMOVAL

Description. This work shall consist of the removal and disposal of accumulated debris located under the bridge carrying Loomis Street over the CTA and I-290 as well as in the vicinity of the project limits on the side slopes adjacent to the north and south abutments that interfere with construction operations, in accordance with this special provision, Article 202.03 of the Standard Specifications, as shown on the plans or directed by the Engineer. This debris consists of but is not limited to biohazard debris, drug paraphernalia, broken concrete pieces, rocks, garbage, and refuse, along with accumulated dirt on the bridge seats.

Construction Requirements. The Contractor shall remove debris from the bridge seat areas and slope walls at both abutment from the ground within 5 feet around the base of piers. All biohazard debris and drug paraphernalia shall be removed and disposed of offsite.

Basis of Payment. This work will be paid for at the contract unit price per LUMP SUM for DEBRIS REMOVAL which price shall include all labor, equipment and materials required to remove and satisfactorily dispose the debris as specified herein.

FILLING EXISTING RUMBLE STRIP

Description. This work shall consist of the scarification of existing shoulder rumble strips constructed in HMA shoulders, and the furnishing and placement of HMA in the scarified area, prior to placing traffic onto the shoulder in a construction stage. This work shall take place per the limits shown on the plans and/or directed by the Engineer.

General Requirements. The nominal depth of scarification of the HMA shoulders shall be 2 inches. Unless otherwise shown in the plans, the width of the scarification shall be 4 feet, measured from the mainline pavement longitudinal joint between the mainline pavement and adjoining shoulder.

After removing all millings from the scarified limits, the surface shall be tacked in accordance with Article 406.05(c) of the Standard Specifications.

The scarified area shall then be filled with hot-mix asphalt surface course and compacted flush with the adjoining pavement and shoulder surfaces. The mix to be used for this item shall be Hot-Mix Asphalt Surface Course, IL9.5, Mix D, N70 in accordance with Section 406 of the Standard Specifications.

Method of Measurement. Filling existing rumble strip will be measured for payment in feet. Any portion of this work constructed outside the dimensions shown on the plans or as directed by the Engineer will not be measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for FILLING EXISTING RUMBLE STRIP, which payment shall constitute full compensation for scarifying the designated portion of HMA shoulder; cleaning the scarified area and removing all debris; applying tack; furnishing, placing, and compacting HMA surface mix; and for all labor, equipment, tools, and incidentals necessary to complete the work as specified.

Traffic control required for this item will not be paid for separately but will be included in the cost for Traffic Control And Protection (Expressways).

HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE

Description: This work shall consist of the construction of cast-in-place high performance concrete (HPC) structures, according to the applicable portions of Section 503 of the Standard Specifications. The structural members requiring the use of HPC shall be as shown on the plans and shall have a minimum 28-day compressive strength of 6,000 psi with tendon stressing commencing when concrete has been cured to a minimum compressive strength of 4,000 psi and minimum age of 3 days.

Equipment: The Contractor shall have the option of using a vibrating screed in lieu of a finishing machine for the placement of the high-performance concrete superstructure as specified per Article 503.03.

Mix Design: The mix design criteria for the high-performance concrete structure shall meet the requirements of Article 1020.04 for BS concrete. However, the high-performance concrete structure mix design shall be selected from the following table.

Article 1020.05(b) shall apply, except that no reduction in cement content will be allowed.

Mix Design	1*	2*	3*	4*	5*	6*
Cement	264 (445)	264 (445)	264 (445)	264 (445)	323 (545)	323 (545)
Class C Fly Ash	53 (90)	53 (90)				
GGBF Slag***			53 (90)	53 (90)		
Microsilica Solids	15(25)		15(25)		15(25)	
HRM**		16 (27)		16 (27)		16 (27)
Mortar	0.83- 0.86	0.83- 0.86	0.83- 0.86	0.83- 0.86	0.83- 0.86	0.83- 0.86
W/C Ratio	0.38- 0.44	0.38- 0.44	0.38- 0.44	0.38- 0.44	0.38- 0.44	0.38- 0.44

*All weights in kg/m³

**HRM — High Reactivity Metakaolin

***GGBF Slag — Ground Granulated Blast-Furnace Slag

The mix design shall be submitted to the Engineer for approval. Trial batches may be required for mix design verification. After a mix design has been approved, changes shall not be allowed without prior approval by the Engineer.

Mixture approval shall in no manner be construed as acceptance of any mixture produced. Tests at jobsite will determine if a mix design can meet specifications.

Mixing: The mixing requirements shall be according to Article 1020.11(d) and material mixing sequence shall be determined by trial mixtures. The Engineer may require trial batches for changes to the mixing sequence.

Method of Measurement: This work will be measured according to Article 503.21.

Basis of Payment: High performance concrete for cast-in-place structures will be paid for at the contract unit price per CUBIC YARD for HIGH PERFORMANCE CONCRETE SUPERSTRUCTURE.

REMOVAL OF ASBESTOS CEMENT CONDUIT

Description: This work consists of the removal and disposal of friable asbestos cement electrical conduits owned by the City of Chicago. The conduits shall be demolished including conduit supports and hangers. All work shall be done in accordance with the requirements of the U.S. Environmental Protection Agency (USEPA), the Illinois Environmental Protection Agency (IEPA), the Occupational Safety and Health Administration (OSHA), and as outlined herein.

Under the Loomis Street Bridge structure, the City of Chicago has an existing duct package for CDOT Department of Electrical Operations and CTA use across I-290.

Prior to any removal of any conduit material, the existing conduits must be tested for the presence of asbestos content by qualified personnel and/or qualified testing firm. Tests should be comprehensive, and include detailed visual inspection, sampling as determined by qualified testing firm or personnel and laboratory testing of samples to determine if conduits include asbestos cement. Each of the existing conduits should be independently reviewed due to unknown installation or maintenance improvement records. No separate payment for testing of the existing conduits will be made. The testing of existing conduits shall be included as part of Removal Of Existing Structures. All testing records and results shall be provided to the Engineer prior to any removal of existing City of Chicago conduits.

If testing identifies that asbestos cement is not present in the existing conduits, the conduits shall be demolished as part of Removal Of Existing Structures. If testing identifies that asbestos cement is present in the existing conduits, the removal of the conduits shall follow the procedures identified within this specification.

The work involved in the removal and disposal of friable or non-friable asbestos done prior to demolition of the Loomis Street Bridge structure shall be performed by a qualified Contractor or Sub-Contractor.

The Contractor shall coordinate with the City of Chicago and the CTA for the replacement of their ducts under this contract.

The Contractor shall provide a shipping manifest to the Engineer for the disposal of all asbestos containing material wastes.

Permits: The Contractor shall apply for permit(s) in compliance with applicable regulations of the Illinois Environmental Protection Agency. Any and all other permits required by other federal, state, or local agencies for carrying on the work will be the responsibility of the Contractor. Copies of these permits must be sent to the district office and the Engineer.

Notifications: The "Demolition/Renovation Notice" form, which can be obtained from the IEPA office, shall be completed and submitted to the agencies listed below at least 10 days prior to commencement of any asbestos removal or demolition activity.

Asbestos Demolition/Renovation Coordinator
Illinois Environmental Protection Agency Division of Air Pollution Control
P. O. Box 19276
Springfield, Illinois 62794-9276
(217)785-1743

Environmental Protection Agency Air Compliance Branch
77 W. Jackson Blvd
Chicago, Illinois 60604
Attention: Asbestos Coordinator

Notices must be updated if there is a change in the starting date or the amount of asbestos changes by more than 20%.

Submittals:

- All submittals and notices shall be made to the Engineer except where otherwise specified herein.
- Submittals that shall be made prior to start of work:
 - Submittals required under Asbestos Abatement Experience.
 - Submit documentation indicating that all employees have had medical examinations and instruction on the hazards of asbestos exposure, on use and fitting of respirators, on protective dress, on use of showers, on entry and exit from work areas, and on all aspects of work procedures and protective measures.
 - Submit manufacturer's certification stating that vacuums, ventilation equipment, and other equipment required to contain airborne fibers conform to ANSI 29.2.
 - Submit to the Engineer the brand name, manufacturer, and specification of all sealants or surfactants to be used. Testing under existing conditions will be required at the direction of the Engineer.

- Submit proof that all required permits, site locations, and arrangements for transport and disposal of asbestos-containing or asbestos- contaminated materials, supplies, and the like have been obtained (i.e., a letter of authorization to utilize designated landfill).
- Information about vehicles and equipment utilized for transport of material designated for disposal shall be submitted. This should include methods for restricting loose fibers from being released during travel.
- Submit a list of penalties, including liquidated damages, incurred through non-compliance with asbestos abatement project specifications.
- Submit a project specific Health and Safety plan for the removal operations. The Health and Safety Plan must be approved and signed by sub-contractor and Contractor personnel, and shall be provided to the Engineer prior to commencing site work activities. The Contractor shall be and remain liable for compliance by its employees, agents and subcontractors with the Contractor's Health and Safety Plan and procedures for the site and shall hold Engineer and Department harmless from all claims, damages, suits, losses and expenses in any way arising from non-compliance with the Health and Safety Plan.
 - In particular, the Health and Safety Plan shall address personal protection from asbestos fiber releases during asbestos abatement.
- Submit a detailed plan of the procedures proposed for use in complying with the requirements of this specification. Include in the plan the location and layout of decontamination units, the sequencing of work, the respiratory protection plan to be used during this work, a site safety plan, a disposal plan including the location of an approved disposal site, and a detailed description of the methods to be used to control pollution. The plan must be submitted to the Engineer prior to the start of work.
- Submit proof of written notification and compliance with Notifications.
- Submittals that shall be made upon completion of abatement work:
 - Submit copies of all waste chain-of-custodies, trip tickets, and disposal receipts for all asbestos waste materials removed from the work area.
 - Submit daily copies of work site entry logbooks with information on worker and visitor access.
 - Submit logs documenting filter changes on respirators. HEPA vacuums, negative pressure ventilation units, and other engineering controls.
 - Submit results of any bulk material analysis and air sampling data collected during the course of the abatement including results of any on- site testing by any federal, state, or local agency.

Certificate of Insurance: The Contractor shall document general liability insurance for personal injury, occupational disease and sickness or death, and property damage.

The Contractor shall document current Workmen's Compensation Insurance coverage. The Contractor shall supply insurance certificates as specified by the Department.

Asbestos Abatement Experience:

- Company Experience:
 - Prior to start of work, the Contractor shall supply:
 - Evidence that he/she has been qualified with the State of Illinois and he/she has been included on the Illinois Department of Public Health's list of approved Contractors.
- Personnel Experience:
 - For Superintendent, the Contractor shall supply:
 - Evidence of knowledge of applicable regulations in safety and environmental protection is required as well as training in asbestos abatement as evidenced by the successful completion of a training course in supervision of asbestos abatement as specified in 40 CFR 763, Subpart E, Appendix C, EPA Model Contractor Accreditation Plan. A copy of the certificate of successful completion must be provided to the Engineer prior to the start of work.
 - Documentation of experience with abatement work in a supervisory position as evidenced through supervising at least two asbestos abatement projects; provide names, contact, phone number, and locations of two projects in which the individual(s) has worked in a supervisory capacity.
 - The superintendent shall be thoroughly familiar with and experienced at asbestos abatement, characterization, bulking, transportation, and disposal activities and other related work, and shall be familiar with and shall enforce the use of all applicable safety procedures and equipment.
 - The Supervisor shall be knowledgeable of, and enforce, all applicable, USEPA, IEPA, and OSHA requirements and guidelines.
 - For Workers involved in the Removal of Friable and Nonfriable Asbestos the Contractor shall provide:
 - Training as evidenced by the participation and successful completion of an accredited training course for asbestos abatement workers as specified in 40 CFR 763, Subpart E, Appendix C, EPA Model Contractor Accreditation Plan. A copy of the certificate of successful completion must be provided to all employees who will be working on this project.
 - Workers shall be familiar with and experienced at asbestos abatement, characterization, bulking, transportation, and disposal activities and other related work; and Asbestos Workers shall be familiar with the use of applicable safety procedures and equipment.

Abatement Air Monitoring: The Contractor shall comply with the following:

- Personal Monitoring:
 - All personal monitoring shall be conducted per specifications listed in OSHA regulation, Title 29, Code of Federal Regulation 1926.58. All area sampling shall be conducted in accordance with 40 CFR Part 763.90. All air monitoring equipment shall be calibrated and maintained in proper operating condition. Excursion limits will be monitored daily. Personal monitoring is the responsibility of the Contractor. Additional personal samples may be required by the Engineer at any time during the project.
- Contained Work Areas for Removal of Friable Asbestos
 - Area samples shall be collected for the department within the work area daily. A minimum of one sample shall be taken outside of the abatement area removal operations. The Engineer will also have the option to require additional personal samples and/or clearance samples during this type of work.
- Air Monitoring Professional
 - All air sampling will be conducted by a qualified Air Sampling Professional supplied by the Contractor. The Air Sampling Professional must submit documentation of successful completion of the National Institute for Occupational Safety and Health (NIOSH) course #582 – “Sampling and Evaluating Airborne Asbestos Dust”.
 - Air Sampling will be conducted in accordance with NIOSH Method 7400. The results of these tests will be provided to the Engineer within 24 hours of the collection of air samples.

Basis of Payment: This work will be measured for payment per foot for REMOVAL OF ASBESTOS CEMENT CONDUIT, as shown for each individual conduit, which price shall include furnishing all labor, materials, equipment and services required to remove and dispose of the friable asbestos cement conduits, hangers, and conduit supports. No separate payment will be made for any testing of existing conduits for the presence of asbestos cement prior to the removal of any conduit material.

PEDESTAL WITH BASE: ALUMINUM, FOR TRAFFIC SIGNALS

Subject The specification states the requirements of an aluminum pedestal and base with handhole and door for supporting a traffic signal.

General

Specifications. The pedestal base shall conform to the requirements herein stated, to the specifications and methods of test of the American Society for Testing and Materials (ASTM), to the requirements of the Society of Protective Coatings (SSPC), and to the requirements of the American Welding Society (AWS), of which the most recently published revisions will govern.

Acceptance. Pedestal bases not conforming to this specification will not be accepted.

Drawing. The drawing mentioned herein is a drawing of the Department of Transportation. It is an integral part of this specification cooperating to state the necessary requirements.

Workmanship. All pedestal bases must be free of casting flaws and must have neat, smooth exterior surfaces. All holes must be accurately located and drilled. The bottom surface of the base must be ground smooth.

Sample. One complete pedestal of the manufacture intended to be furnished must be submitted within fifteen business days upon receipt of a request from the Chief Procurement Officer.

Warranty. The manufacturer shall warrant the performance and construction of the traffic pedestal to meet the requirements of this specification and shall warrant all parts, components, and appurtenances against defects due to design, workmanship, or material developing within a period of five years after the traffic pedestals have been delivered. This will be interpreted particularly to mean structural or mechanical failure of any element or weld, or failure of any portion of the painting system. The warranty must be furnished in writing guaranteeing material replacement including shipment, free of charge to the City. The Commissioner will be the sole judge in determining which replacements are to be made and the Commissioner's decision will be final.

Detail Requirements

Design. The pedestal base must conform to the design shown on Drawing Number 526. All bases must be of the same dimensions, and all doors must be interchangeable.

Base. The base must be cast of aluminum alloy 319 meeting the requirements of ASTM B26 with a minimum wall thickness of 9/32". The handhole opening must have a recessed lip along the entire length of both sides and the bottom such that with the door in place the exterior surface of the door is flush with the exterior surface of the base. The door must have the same curvature as the base. The door must be locked in place by means of two fingers located on its top edge which bear against the inside surface of the base, and a stainless-steel Allen head locking screw which fastens to the base. The locking screw must be protected by a C- shaped drip edge protruding approximately 5/8" and concentrically encircling the screw head. The clearance between the inner surface of the drip edge and the outer surface of the screw head must be no greater than 1/8". The drip edge must encircle the screw head by a minimum of 300° with the opening in the drip edge centered at the bottom of the screw head. A continuous pipe stop must be integrally cast along the inside of the base 2.5" below the top edge.

Pedestal. The pedestal must be aluminum-alloy extruded round tube conforming to the requirements of ASTM B221, alloy 6063-T6. Its outside diameter must be 5.563"; its wall thickness must be not less than 0.187", and its length must be as required to furnish the overall height specified in the order. The round tube must be inserted not less than 2.5 inches into the base and welded with four butt welds each not less than 1 inch long on the inside and a continuous seam weld around the outside. Aluminum alloy pipe in lieu of aluminum alloy tube is acceptable.

The pedestal cap must be of the same cast aluminum as the base. The pedestal cap shall be essentially conical with a globe-shaped upper-end and having a minimum wall thickness throughout of not less than 1/4 inch. The cone portion must meet the skirted portion of the top in a smooth filet. The skirt must enclose the top 7/8" inches of the pedestal. Three stainless steel, or other similar approved material, set screws not less than 3/4 inches long must be equally spaced in tapped holes around the skirt and must hold the cap securely in place atop the pedestal. The set screw size must be 5/16 – 18 hex head.

Welding. The welds shall be made by the inert gas metal welding process. Filler wire shall conform to chemical composition requirements of AWS Alloy Number A5.10-69.

Painting

Oil and Grease Removal. All metal surfaces shall be washed with an alkaline detergent to remove any oils or grease.

Chemical Pretreatment. The cleaned metal surfaces must then be treated with a hot, pressurized phosphate wash and must be dried by convection heat.

Coat. A thermosetting, weathering, polyester powder coat shall be applied electrostatically to all cleaned and treated exterior surfaces to a uniform four mil (4) thickness in a one coat application. This powder coat must be cured in a convection oven at a minimum temperature of 400° Fahrenheit to form a high molecular weight fusion bonded finish.

Alternate Methods. Alternate powder coat methods may be reviewed and tested on a case-by-case basis. However, no coating method will be accepted unless the Commissioner judges such alternate to be equal to the coating herein specified.

Durability. The coating shall be capable of passing 1,000 hours of salt spray exposure as per ASTM B117 in a 5% NaCl (by weight) solution at 95° Fahrenheit and 95% relative humidity without blistering. Before testing, the test panel must be scribed with an "X" down to bare metal.

Coating Measurement. Measurement of coating thickness shall be done in accordance with SSPC-PA 2-73T, "Measurement of Dry Paint Thickness with Magnetic Gauges", except that the lowest single spot measurement in an area of 2 square inches must not be less than 3 mils.

Color. Color shall be gloss black unless identified otherwise in the order. A color sample must be submitted for approval prior to fabrication. This color sample must include the manufacturer's name and the manufacturer's color name.

Packing. Each pedestal shall be individually wrapped to prevent damage to the surface. Each pedestal shall be suitably packed or blocked to prevent damage during shipment and handling.

POLE MOUNTED CAST ALUMINUM JUNCTION BOX FOR TRAFFIC SIGNALS

Scope. This specification states the requirements for pole mounted, cast aluminum junction boxes, with terminal strips, to be used for traffic signal multiple cable terminations.

General

Specifications. The junction boxes shall conform in detail to the requirements herein stated, and to the specifications and methods of test of the American Society for Testing and Materials cited by ASTM Designation Number, of which the most recently published revisions will govern. The terminal strip shall meet the applicable sections of NEMA ICS 4-2005, as well as the requirements herein stated.

Drawing. The drawing mentioned herein is a drawing of the Department of Transportation and will be interpreted as part of these specifications.

Acceptance. Junction boxes not conforming to this specification will not be accepted.

Sample. One complete junction box with terminal strip of the manufacture intended to be furnished shall be submitted within 15 business days after receipt of a request from the Chief Procurement Officer. The box must be delivered to the Division of Electrical Operations at 2451 South Ashland.

Workmanship. All junction boxes shall be free of casting flaws and must have neat, smooth exterior surfaces. All holes must be accurately located and drilled to ensure interchangeability of all components.

Design

(Drawing. The junction box must conform in detail to the dimensions and requirements shown on Drawing Number 954.

Material. The body door and plate must be castings of non-heat treated aluminum silicon alloy conforming to ANSI alloy 443.0 of ASTM B26.

Detail Requirements

Assembly. Each junction box shall consist of the body, door with its gasket, two cast elbows with gaskets at either end of the box, terminal block mounting bracket, and terminal strip on channel mounted to bracket. All must be completely assembled, painted and ready for installation. A flat plate with gasket shall also be provided so that the City can use the junction box with only one elbow if desired.

Body. The body shall be cast as shown in Drawing Number 954. The top and bottom sides of the box where flat plates, or other fittings, will be attached, must be identically cast, machined flat, and drilled and tapped in accordance with dimensions shown. All fittings which fit on the top side must fit on the bottom side.

Door. The door shall be cast as shown in Drawing Number 954. The door must be hinged at the left with stainless steel hinge pins and must open not less than 180° to permit complete access to the interior of the junction box. Two stainless steel Allen head machine screws, undercut and held captive, shall hold the door closed and maintain positive pressure against a sponge neoprene gasket cemented in place completely around the door jamb. The door shall be finished and painted prior to cementing the gasket into its groove in the door.

Elbow sweep. Two elbows must be provided for cable entry and exit into the box. The elbows shall be cast of the same alloy as the box. The dimensions will be as indicated on Standard Drawing 954.

End Plate. A flat end plate shall be furnished with each body casting. The plate must be drilled to align with tapped holes in the body casting and have a flush match with the periphery of the top and bottom body casting pads. The plate must have a properly fitted gasket.

Gaskets. The gasketing between the body and the door shall be of sponge neoprene and must be cemented in place after painting of the door. A cork gasket, 1/8 inch thick, shall be used between the elbow or end plate and the body of the junction box on the top end and bottom end and held in place by four stainless steel screws.

Mounting Bracket. A terminal block mounting bracket, as shown on Drawing Number 954, shall be furnished and installed in each junction box. The bracket must be cast from ANSI alloy 443.0 per ASTM B26.

Terminal Strip. The terminal strip will consist of modular blocks. Each block will consist of two terminals to handle one circuit. The strip will consist of twenty blocks to handle twenty circuits. The terminal strip will be mounted to an aluminum channel. The channel will have pre-punched holes for mounting to the junction box. The channel will be mounted to the box with two #10 screws.

Each block housing shall be constructed of nylon, polypropylene, or another approved material of equal properties. The bottom of the block housing will be dovetailed to fit into the aluminum channel. Overall dimensions of each block will be approximately 1.2 inches wide by 1.5 inches high. Center-to-center spacing between contacts (blocks) must be at least .375 inches.

The terminals shall accommodate AWG wire sizes 8 to 22. The contact type will be tubular clamp, with electroplated tubular copper contact. The screw type will be a steel electroplated number 10-32, slotted pan head. The terminals will be rated at 30 amps and 600 volts.

Maximum service temperature for the terminal strip will be 150° Celsius. The flammability rating must meet UL 94V-0.

Hardware. The hinge pins and all screws required for assembly of this junction box must be of stainless steel.

Painting. The exterior surfaces of the junction box shall be properly cleaned and given one coat of zinc chromate primer containing 10% iron oxide and one coat of enamel. The color of the enamel must be gloss black or as ordered. A color sample must be submitted and approved before manufacturing commences. The primer and enamel shall be of an approved grade and quality.

Packing. After the paint is completely dry, and the junction boxes have been assembled, they shall be suitably packed to prevent damage to painted surfaces during shipping and handling. All shipments must be fastened to, and shipped on, 48" x 48" hardwood, 4 way, non-returnable pallets. Total height must not exceed 64" and total weight must not exceed 2,000 pounds.

POLE: ANCHOR BASE, 3 AND 7 GAUGE, TAPERED TUBULAR STEEL, WITH HANDHOLE ENTRY

Subject. This specification states the requirements for tapered, tubular, 3 gauge and 7 gauge steel anchor base poles with mast arm supports. They will support street light luminaires and/or traffic signal mast arms and will be served by underground cables.

General

Specifications. The poles shall conform in detail to the requirements herein stated, and to the requirements of the following organizations cited herein, of which the most recent revisions shall govern:

- American Association of State Highway and Transportation Officials (AASHTO)
- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- American Welding Society (AWS)
- Society for Protective Coatings (SSPC)

Acceptance. Poles not conforming to this specification will not be accepted.

Bidders Drawings. Bidders shall submit with their bids detailed scale drawings of the mast showing actual dimensions, details, and welds. Shop drawings must be original engineering drawings created by the manufacturer. The drawings must show every dimension necessary to show how all parts will fit each other and be properly held in assembly. These drawings must also be submitted in electronic format, preferably MicroStation, if requested by the City.

Drawings. The drawings mentioned herein are drawings of the Department of Transportation being an integral part of this specification cooperating to state necessary requirements.

Sample. If requested by the Chief Procurement Officer, one completely assembled anchor-base pole of the manufacture intended to be furnished, must be submitted for review within 15 business days of receiving the request.

Warranty. The manufacturer shall warrant the performance and construction of the light poles to meet the requirements of this Specification and must warrant all parts, components, and appurtenances against defects due to design, workmanship, or material developing within a period of five years after the light poles have been delivered. This will be interpreted particularly to mean structural or mechanical failure of any element or weld, or failure of any portion of the painting system. The warranty must be furnished in writing guaranteeing material replacement including shipment, free of charge to the City. The Commissioner will be the sole judge in determining which replacements are to be made and the Commissioner's decision will be final.

Standards

Assembly. Each anchor base pole shall consist of a steel mast with handhole entry, entry door with machine screws, grounding nut, mast base plate, top cap for mast, two mast arm supports, bolt covers, and all necessary hardware required for complete assembly of these parts, ready for assembly, without special tools.

Interchangeability. Members of each pole type shall be mutually interchangeable for assembly, so that no reworking will be required to make any member fit properly in the place of any other similar member of any other similar pole.

Design. Each pole type shall conform in design and dimensions to the pertinent drawing(s) listed in Table "A".

Masts

Mast Size. The outside diameters of the mast of each pole type shall be as listed in Table A. The mast must be tapered at 0.14 inches per foot.

Material. The mast must be fabricated from one length of No. 3, No. 7, or No. 11 Standard gauge steel meeting the material requirements of ASTM A606 for low alloy high strength coil steel, which, after fabrication, must possess an ultimate tensile strength of not less than 70,000 psi and a yield strength of not less than 60,000 psi, in accordance with ASTM A595, Grade C. Chemistry of the steel must be such as to insure resistance to atmospheric corrosion superior to that of ordinary copper bearing steel. Material certification is required. Manufacturer's steel meeting the specified physical and chemical requirements, and approved by the Commissioner, will be accepted.

Fabrication. The mast must be fabricated with not more than one longitudinal weld. The weld shall be ground smooth so that it is virtually invisible. There shall be no lateral welds in the masts other than where the masts are welded to the steel bases. Each mast must be straight and centered on its longitudinal axis. Each mast must be formed on a mandrel and worked to form a round cross-section. The completed, unpainted masts shall have smooth external surfaces free from protuberances, dents, cracks or other imperfections marring their appearance.

Base. The mast base shall be a steel plate, of low alloy, high strength steel as noted in Par. 4 (b).

Plate Base. The base plate for each pole type shall be as listed in Table "A". It must be fabricated from the same ASTM A606 low alloy, high strength steel as is used for the mast. After fabrication the steel must meet the requirements of ASTM A588. The mast must be inserted into the base to a maximum depth which will still allow for an adequate weld to be made between the bottom of the mast and the plate. A circumferential weld must be made between the mast and the base at both the top and underside of the plate. Non-metallic removable bolt covers which completely cover the anchor bolts and nuts shall be provided. The covers must be attached with stainless steel screws coated with a non-seizing compound, or another type of non-seizing fastener, as approved by the Commissioner. The covers shall enclose the anchor bolts and be secured in an approved manner. The base shall be attached to the mast so that the bearing surface of the base is at right angles to the longitudinal axis of the mast. The vertical center line of the seam must be positioned so that no welds for the simplex attachments or the handhole opening will go through the seam.

Anchor Rod Openings. All anchor rod openings for each pole type shall have a width as listed in Table "A". Each opening must be sized to have a circumferential slot length equal to 15° of the circumference.

Mast Arm Support Plates. The mast arm support plates will be made of cast steel conforming to the requirements for Grade 65-35 cast steel of ASTM A27, or equivalent, subject to approval. They shall neatly fit the external surface of the mast. The upper mast arm support plate must have a hollow protuberance, the hole of which must be approximately equivalent to 2 inches in diameter, extending into the interior of the pole providing a smooth surface for the lamp cables to rest upon. The mast arm support plates shall be designed so that they will carry the mast arm and hold it in the proper position for fastening the mast arm to the mast. The design of the mast arm support plates must be a two bolt type as shown on Drawing No. 659.

Provision for Ground. A 1/2-13 UNC (unified thread – course ANSI B1.1) square nut must be welded to the inside of the mast on the handhole entry frame for a ground connection.

Entry. A vertical doorframe carrying a removable door providing access to the interior of the mast must be welded into a close fitting opening centered approximately 15 inches above the bottom of the base. The doorframe must be formed and welded of steel with a cross section of 2-1/4 inches wide by 1/4 inch thick to adequately reinforce the opening of the mast. The internal horizontal clearance of the doorframe must be 4-3/4 inches; its internal vertical clearance must be 7 inches. Its upper and lower ends must be semi-circular meeting its straight sides tangentially. The radius of this opening must be 2-3/8 inches. The vertical center line of the entry must be at a right angle clockwise from the vertical center line of the mast arm supports. The frame must have two welded tabs; one at the top and one at the bottom of the door frame. These tabs must be drilled and tapped to accept a 1/4-20 UNC screw. The top hole must be located 13/16 of an inch from the top of the opening. The bottom hole must be located 13/16 of an inch from the bottom of the opening. The 1/4-20 UNC machine screws must be stainless steel with hex heads, meeting the requirements of ASTM A193. The screws shall be treated with a compound to prevent seizing. Other non-seizing types of screws and fasteners may be considered. An alternate method of attachment consisting of a removable hinge on the bottom with a screw connection at the top may be considered. (The above requirements apply to all pole masts except those with a 10 inch bolt circle. Poles with 10 inch bolt circles must have handhole openings of 3" by 5". All other requirements apply.)

Door. The removable door must be formed of sheet steel approximately 1/8 inch thick. It shall be flat or dished depending upon the pole type and fit the doorframe closely so that it will stay in proper position even if its locking screws are slightly loosened. The door must be drilled top and bottom to accept the 1/4-20 UNC hex head machine screws which will fasten the door to the doorframe. A half-circle piece of steel must be welded by the screw opening, to allow only a socket wrench to be used. All doors shall be interchangeable. An alternate method of attachment using an internal hinge at the bottom of the door with a screw at the top of the door will be considered. Any alternate method will be subject to approval by the Commissioner or his duly authorized representative.

Locking Device. Any other door locking device, other than the one outlined above must be approved by the Commissioner or his duly authorized representative.

Tag. To each pole must be attached immediately below the handhole, by mechanical means and not by adhesive, a stainless steel tag with a stamped or embossed legend which must include the pole outside diameter at the base, the overall length, and the gauge; i.e., 12.5" X 34'-6" X 3 gauge.

Structural Requirements. The mast shall be manufactured in accordance with AASTHO's 1994 version of the "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals". The shaft and base assembly must be designed to meet AASTHO's 1994 criteria for 80 MPH wind loading with a 30% gust factor. The poles shall be designed appropriately for Chicago applications for both street lighting and traffic signal applications, including signal mast arms.

Top

Design. The mast top shall be essentially conical with a globe-shaped upper-end and having a minimum wall thickness throughout of not less than 1/4 inch. The cone portion must meet the skirted portion of the top in a smooth fillet, the skirt must enclose the top 7/8" inches of the mast. Three stainless steel, or other similar approved material, set screws not less than 3/4 inches long must be equally spaced in tapped holes around the skirt and must hold the top securely in place atop the mast. The design of the top shall be similar to the one shown on Drawing #11420A.

Material. The top must be aluminum alloy 356-F per ASTM B108. It shall have smooth surfaces, neat edges and corners and be free from fins, holes or other casting flaws. Non-metallic tops may be substituted if approved by the Commissioner.

Finish. Tops shall be painted as herein specified.

Hardware. All the hardware necessary to complete the assembly of the pole shall be furnished. All hardware will be as specified elsewhere in these specifications. Hardware not specified elsewhere must be stainless steel meeting the requirements of ASTM A193, or equal corrosion-resistant non-seizing metal, or a non-metallic material subject to approval by the Commissioner.

Welding

General. Every welded joint shall be made in conformity with the proper interpretation of the standard welding symbols of the American Welding Society as indicated on the drawings; however, each bidder must submit with his proposal a drawing showing the sizes and types of welds, must state the type of electrode, and must describe the welding methods, he proposes to use in fabricating the pole.

Testing. Welds shall be inspected for penetration and soundness of the welds by the magnetic particle inspection method or by radiography. Acceptance or rejection will be governed by the same conditions as above. If the magnetic inspection process is to be used, the dry method with the direct current must be employed. All transverse welds must be magnetized by the "prod" (Circular magnetization) method. Longitudinal welds may be magnetized by either circular or longitudinal magnetization.

Painting

Oil and Grease Removal. All metal surfaces shall be washed with an alkaline detergent to remove any oils or grease.

Metal Cleaning. All exterior metal surfaces shall be cleaned by blasting with a combination of shot and grit to remove all dirt, mill scale, rust, corrosion, oxides and foreign matter and provide a "near white" surface in accordance with SSPC-SP10. Included in this process will be the interior base section of the mast to a minimum height of 12 inches.

Chemical Pretreatment. The cleaned metal surfaces shall then be treated with a hot, pressurized iron phosphate wash and shall be dried by convection heat.

Primer Coat. All exterior surfaces are to be coated with corrosion- inhibiting zinc-rich aromatic urethane conforming to SSPC Paint 20, Type II. Dry film thickness shall be a minimum of 2.5 mils. The aromatic urethane shall consist of a zinc dust content not less than 83% by weight in dried film. The coating shall be airless-spray applied and moisture cured.

Finish Coat. All exterior surfaces are to be subsequently coated with aliphatic acrylic polyurethane paint, conforming to SSPC-36, to a minimum dry film thickness of 3.0 mils. The coating shall be airless-spray applied and cured in a gas-fired convection oven by heating the steel substrate to between 150° Fahrenheit and 220° Fahrenheit.

Interior Coat. Interior surfaces are to be coated with red oxide rust inhibitive alkyd primer to a dry film thickness of 1.5 mils.

Durability. Both the exterior and interior coats must be capable of passing 1,000 hours of salt spray exposure as per ASTM B117 in a 5% NaCl (by weight) solution at 95°F and 95% relative humidity without blistering. Before testing, the panel must be scribed with an "X" down to bare metal.

Coating Measurement. Measurement of coating thickness must be done in accordance with SSPC-Pa 2-73T, "Measurement of Dry Paint Thickness with Magnetic Gauges," except that the lowest "single spot measurement" in an area of 2 square inches must be not less than 5.5 mils.

Color. Color must be gloss black unless otherwise noted in the order. A color sample must be submitted for approval prior to fabrication.

Alternate Methods. Alternate painting methods may be reviewed and tested on a case by case basis. However, no coating method will be accepted unless the Commissioner judges such alternate to be equal to the coating herein specified.

Mast Test

General. All completed masts shall be available for testing for maximum deflection and set. The masts shall meet the structural requirements of Section 4(k). Unless specifically authorized in writing, all tests shall be made at the works of the manufacturer. A record of every test must be made, and a certified copy of the test record must be submitted to the Commissioner before the masts are shipped.

Lot. Tests for welds, deflection and set of the mast and of the mast arm supports shall be made upon three masts of the first 50 in every order. An additional one mast shall be tested for each additional 50 masts in the order. The selection of masts for testing shall be random from the entire completed lot. If any of the masts in any lot fail to meet the test, an additional three masts of the same lot must be tested. If any of these masts fail to meet the test requirements, the entire lot will be subject to rejection, except that the manufacturer may subject each mast in the lot to the test, and those which fulfill the requirement will be accepted. After testing, each base weld must be inspected by the magnetic particle method to determine that the welds have not been affected.

Mast Requirements. With base rigidly anchored, a test load as indicated in Table A must be applied at a point approximately 2 feet from the free end. The load must be applied at right angles to the center line of the mast and in the same vertical plane. The deflection must not be greater than that indicated in Table A. Within one minute after the test load is released, measurement must be made of the set taken by the mast. This set must not be greater than that indicated in Table A. The deflection measurement device must be reset to zero and the test load must be reapplied. The deflection must not change from the deflection noted in the first test by more than $\pm 5\%$. No measurable set must be noted within one minute after test load is released.

Mast Arm Support (Simplex) Requirements. With an appropriate mast arm firmly attached to the mast, a test load of 300 pounds must be applied to the mast arm as a side pull at a point 7 feet from the mast. After the test, the mast arm support welds on the mast must be tested by the magnetic particle method to determine that they have not been affected.

Packaging

General. The poles must be shipped in 12 pole bundles. Each pole must be individually wrapped so that the pole can be bundled for shipping and unbundled for delivery to the City without damaging the pole or its finish.

Bundles. The bundles shall consist of 12 poles laid base to top to form an approximately rectangular cylinder. Materials such as lumber (2" x 4" min.), non-marring banding, and other appropriate bundling materials must be used to make a rigid, long lasting, bundle capable of being handled, shipped and stored without shifting of contents or breaking, subject to approval. Any bundles, in which either poles or packaging is received broken, damaged or with contents shifted, will not be accepted and it will be the responsibility of the supplier to return the bundle to its original destination at no cost to the City of Chicago. The bundles should be capable of being stacked two high without breaking or shifting of the contents. Each bundle must be capable of being lifted by a forklift truck or crane and the bundles must be shipped on a flat bed truck to facilitate unloading. Each pole wrapping must be clearly labeled indicating the pole size, i.e. 34'6", 7 GAUGE, STEEL POLE, 15" B.C.

Hardware. The bolt covers and their attachment devices must be shipped with each bundle and packaged in 12sets of four each. The package must be labeled and placed in a prominent position to facilitate accessibility, and must be attached to, or within, the bundle in such a manner as to assure safe delivery. Payment will be withheld for any bundle delivered without the accompanying hardware. Pole caps must be attached at the manufacturer's facilities or be packed separately in a manner similar to the bolt covers, and the same payment conditions will prevail. Cracked, broken or chipped parts will be considered as an incomplete delivery as regards payment.

TABLE A

POLE	GAUGE	BOLT CIRCLE	ANCHOR ROD	BASE PLATE	TEST LOAD	MAX. DEF.	MAX. SET	DRAWING
7.67"x12.5" x34'6"	3	16.5"	1.5"	1.75"	3200#	22"	2.5"	827
6.17"x11" x 34'6"	3	17.25"	1.25"	1.5"	2500#	26"	2.5"	824
5.17"x10.0" x34'6"	3	15.0"	1.25"	1.5"	2000#	30"	2.5"	808
5.17"x10.0" x34'6"	7	15.0"	1.25"	1.5"	1500#	30"	2.5"	808
3.95"x8.5" x 32'6"	3	11.5"	1.25"	1.5"	1500#	33"	2.5"	763
3.95"x8.5" x 32'6"	7	11.5"	1.0"	1.25"	1200#	33"	2.5"	762
3.87"x8.0" x 29'6"	3	10.0"	1.0"	1.5"	1500#	28"	1.0"	657
3.87"x8.0" x 29'6"	7	10.0"	1.0"	1.25"	1200#	28"	1.0"	656
4.15"x8.0" x 27'6"	3	10.0"	1.0"	1.5"	1500#	23"	1.0"	655
4.15"x8.0" x 27'6"	7	10.0"	1.0"	1.25	1200#	23"	1.0"	654
4.20"x7.0" x 20'0"	3	10.0"	1.0"	1.0"	1500#	13"	1.0"	653
3.70"x6.5" x 20'0"	11	10.0"	1.0"	1.0"	800#	14"	1.0"	652

MAST ARM: TRAFFIC SIGNAL MONO-TUBE

Subject. This specification states the requirements for a tapered, tubular, 7-gauge steel mono-tube arm with mounting brackets. The arm will support traffic signals and signs.

General

Specifications. The arms shall conform in detail to the requirements herein stated, and to the requirements of the following organizations cited herein:

- American Association of State Highway and Transportation Officials (AASHTO)
- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- American Welding Society (AWS)
- Association for Materials Protection and Performance American Society for Nondestructive Testing (ASNT)

Acceptance. Arms not conforming to this specification will not be accepted.

Bidders Drawings. Bidders must submit with their bids detailed scale drawings of the mast arm showing actual dimensions, details, and welds. Shop drawings must be original engineering drawings created by the manufacturer. The drawings must show every dimension necessary to show how all parts will fit each other and be properly held in assembly. These drawings shall also be submitted in electronic format, preferably MicroStation dgn format, if requested by the City.

Drawings. The drawings mentioned herein are drawings of the Department of Transportation being an integral part of this specification cooperating to state necessary requirements.

Sample. If requested by the Chief Procurement Officer, one complete mast arm of the manufacture intended to be furnished must be submitted for review by the Commissioner within 15 business days of receiving such request.

Warranty. The manufacturer shall warrant the performance and construction of the mast arms to meet the requirements of this specification and shall warrant all parts, components, and appurtenances against defects due to design, workmanship, or material developing within a period of five years after the mast arms have been delivered. This will be interpreted particularly to mean structural or mechanical failure of any element or weld, or failure of any portion of the painting system. The warranty must be furnished in writing guaranteeing material replacement including shipment, free of charge to the City. The Commissioner will be the sole judge in determining which replacements are to be made and the Commissioner's decision will be final.

Standards

Assembly. Each arm shall consist of a tubular tapered steel shaft, mounting brackets, an aluminum cap, and all mounting hardware.

Interchangeability. Members of each arm type must be mutually interchangeable for assembly, so that no reworking will be required to make any member fit properly in the place of any other similar member of any other similar arm.

Design. Each arm must meet the requirements as shown on Standard Drawing 870.

Arms

Arm Size. The outside diameters of the arm of each size shall be as listed in Standard Drawing 870.

Material. The arm must be fabricated from one length of No. 7 Standard gauge steel meeting the requirements of ASTM A606 for low alloy high strength coil steel, which, after fabrication, must possess an ultimate tensile strength of not less than 70,000 psi and a yield strength of not less than 60,000 psi, in accordance with ASTM A595, Grade C. Chemistry of the steel shall be such as to insure resistance to atmospheric corrosion superior to that of ordinary copper bearing steel. Material certification is required. Manufacturer's steel meeting the specified physical and chemical requirements, and approved by the Commissioner, will be accepted.

Fabrication. The mast must be fabricated with not more than one longitudinal weld. The weld shall be ground or conditioned in a manner as to provide a smooth appearance so that the weld seam is virtually invisible. There shall be no lateral welds in the masts other than where the masts are welded to the steel bases. Each mast must be straight and centered on its longitudinal axis. Each mast must be worked to form a round cross- section with a maximum out of roundness or ovality of 1/8" measured at the cross section. The maximum deflection, flatness or "waviness" of the seam area shall be 1/32". This shall be measured with a taper gauge and a straight edge, measured at the trough between the high peaks. The completed, unpainted masts shall have smooth external surfaces free from protuberances, dents, cracks, or other imperfections marring their appearance.

Clamp. The arm clamp must be of low alloy, high strength steel as noted herein. The clamp must be constructed as shown on Standard Drawing 870.

Structural Requirements. The mast or shaft and base assembly must be designed to AASHTO "LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 1st Edition with 2017, 2018, 2019, 2020, and 2022 Interim Revisions". Light poles shall be designed for a three-second gust wind speed of 115 mph. The poles shall be designed appropriately for Chicago applications for traffic signal applications, including signal mast arms.

Cap

Design. The arm cap shall be conical with a globe-shaped upper-end and having a minimum wall thickness throughout of not less than 5/32 inches. The cone portion must meet the skirted portion of the arm in a smooth filet, the skirt must enclose the top 7/8" inches of the arm. Three stainless steel, or other similar approved material, set screws not less than 3/4 inches long must be equally spaced in tapped holes around the skirt and must hold the cap securely in place on the arm.

Material. The cap must be of aluminum alloy 356-F per ASTM B108. It shall have smooth surfaces, neat edges and corners and be free from fins, holes, or other casting flaws.

Finish. Tops shall be painted as herein specified.

Hardware. All the hardware necessary to complete the assembly of the arm must be furnished. All hardware shall be stainless steel, or equal corrosion-resistant non-seizing metal, subject to approval.

Welding. Every welded joint shall be made in conformity with the proper interpretation of the standard welding symbols of the American Welding Society as indicated on the drawings; however, each bidder must submit with his proposal a drawing showing the sizes and types of welds, must state the type of electrode, and must describe the welding methods, he proposes to use in fabricating the arm.

Testing. All welds of the first three arms of the first 50 arms in every lot must be inspected for penetration and soundness of the welds by the magnetic particle inspection method or by radiography. Acceptance or rejection must be governed by the same conditions as herein. If the magnetic inspection process is used, the dry method with the direct current shall be employed. All transverse welds must be magnetized by the "prod" (circular magnetization) method. Longitudinal welds may be magnetized by either circular or longitudinal magnetization.

Painting

Oil and Grease Removal. All metal surfaces must be washed with an alkaline detergent to remove any oils or grease.

Metal Cleaning. All exterior metal surfaces must be cleaned by blasting with a combination of shot and grit to remove all dirt, mill scale, rust, corrosion, oxides, and foreign matter and provide a "near white" surface in accordance with SSPC-SP 10.

Chemical Pretreatment. The cleaned metal surfaces must then be treated with a hot, pressurized iron phosphate wash and must be dried by convection heat.

Primer Coat. All exterior surfaces are to be coated with corrosion-inhibiting zinc-rich aromatic urethane conforming to SSPC Paint 20, Type II. Dry film thickness shall be a minimum of 2.5 mils. The aromatic urethane shall consist of a zinc dust content not less than 83% by weight in dried film. The coating shall be airless-spray applied and moisture cured.

Finish Coat. All exterior surfaces are to be subsequently coated with aliphatic acrylic polyurethane paint, conforming to SSPC-36, to a minimum dry film thickness of 3.0 mils. The coating shall be airless-spray applied and cured in a gas-fired convection oven by heating the steel substrate to between 150° Fahrenheit and 220° Fahrenheit.

Interior Coat. Interior surfaces are to be coated with red oxide rust inhibitive alkyd primer to a dry film thickness of 1.5 mils.

Durability. Both the exterior and interior coats must be capable of passing 1,000 hours of salt spray exposure as per ASTM B117 in a 5% Na Cl (by weight) solution at 95 °F and 95% relative humidity without blistering. Before testing, the panel must be scribed with an "X" down to bare metal.

Coating Measurement. Measurement of coating thickness must be done in accordance with SSPC-Pa 2-73T, "Measurement of Dry Paint Thickness with Magnetic Gauges," except that the lowest "single spot measurement" in an area of two square inches must not be less than 5.5 mils.

Color. Color must be gloss black unless noted otherwise in the order. A paint chip must be submitted for approval prior to fabrication.

Alternate Methods. Alternate coating methods may be reviewed and tested on a case-by-case basis. However, no coating method will be accepted unless the Commissioner judges such alternate to be equal to the coating herein specified.

Arm Test. All completed arms shall be available for testing for maximum deflection and set. Unless specifically authorized in writing, all tests must be made at the works of the manufacturer. A record of every test must be made, and a certified copy of the test record must be submitted to the Engineer of Electricity before the arms are shipped.

Lot. Tests for deflection and set must be made upon the first three arms in the first 50 arms in the lot. An additional one arm must be tested for each additional 50 arms. If any of the arms in any lot fail to meet the test, an additional three arms of the same lot must be tested. If any of these arms fail to meet the test requirements, the entire lot will be subject to rejection, except that the manufacturer may subject each arm in the lot to the test, and those which fulfill the requirement will be accepted. After testing, each weld must be inspected by the magnetic particle method to determine that the welds have not been affected.

Requirements. With the arm rigidly anchored, a test load as indicated in the table in Standard Drawing 870 must be applied at a point approximately 2 feet from the free end. The load must be applied at right angles to the center line of the arm and in the same vertical plane. The deflection must not be greater than that indicated. Within one minute after the test load is released, measurement must be made of the set taken by the arm. The deflection measurement device must be reset to zero and the test load must be reapplied. The deflection must not change from the deflection noted in the first test by more than $\pm 5\%$. No measurable set must be noted within one minute after test load is released.

Packaging. The arms shall be shipped in 12 arm bundles. Each arm must be individually wrapped so that the arm can be bundled for shipping and unbundled for delivery to the job site without damaging the arm or its finish.

Bundles. The bundles shall consist of 12 arms laid base to top to form an rectangular cylinder. Materials such as lumber (2" x 4" min.), non-marring banding, and other appropriate bundling materials must be used to make a rigid, long lasting, bundle capable of being handled, shipped, and stored without shifting of contents or breaking, subject to approval. Any bundles, in which either arms or packaging is received broken, damaged or with contents shifted, will not be accepted and it will be the responsibility of the supplier to return the bundle to its original destination at no cost to the City of Chicago. The bundles should be capable of being stacked two high without breaking or shifting of the contents. Each bundle must be capable of being lifted by a forklift truck or crane and the bundles must be shipped on a flatbed truck to facilitate unloading. Each arm wrapping must be clearly labeled indicating the mast size, i.e., "30' SIGNAL MAST ARM".

Hardware. The hardware must be shipped with each bundle and packaged in 12 sets of four each. The package shall be placed in a prominent position to facilitate accessibility, and must be attached to, or within, the bundle in such a manner as to assure safe delivery. Payment will be withheld for any bundle delivered without the accompanying hardware. Arm caps must be attached at the manufacturer's facilities or be packed separately in a manner similar to the other hardware, and the same payment conditions will prevail. Cracked, broken or chipped parts will be considered as an incomplete delivery as regards payment.

ELECTRICAL MANHOLE FRAMES AND COVERS 24 INCH AND 30 INCH DIAMETER

Scope. This specification describes the requirements for both 24 inch and 30 inch round frames and covers. These frames and covers will be used for electrical manholes and handholes and will provide access to the interior of the manholes and handholes. The 24 inch frames and covers will be used in parkway and sidewalk areas. The 30 inch frames and covers will be used in streets and in driveways and will provide sufficient strength to withstand normal traffic conditions.

General Requirements

Conformance. The manhole frames and covers shall conform with every detail of the requirements herein stated and to the specifications and methods of test of the American Society for Testing and Materials cited by ASTM Designation Number in which the most recently published revision will govern.

Acceptance. Frames and covers not conforming to this specification will not be accepted. The Commissioner of Transportation will have the final say as to whether or not the frames and covers meet specifications.

Drawings. The drawings mentioned herein are drawings of the Department of Transportation, Division of Engineering, and must be interpreted as part of these specifications.

Sample. Upon request, one complete manhole frame and cover of the manufacture intended to be furnished must be submitted within 15 business days after receipt of such a request from the Chief Procurement Officer. The samples must be delivered to the Division of Electrical Operations, 2451 South Ashland Avenue, Chicago, Illinois.

Warranty. The manufacturer shall warrant that the frames and covers meet the specifications and warrant the frames and covers for a period of one year from the date of delivery against defects which may occur during that period from normal and customary use. Any frame or cover which fails during this period must be replaced by the manufacturer at no cost to the City.

Design. The frames and covers shall each conform in detail to the designs shown on Drawings 872, 874 and 10927. Each frame and cover shall weigh approximately as shown on the drawings.

Machining. The bearing surfaces of both the cover and the frame shall be machine finished as indicated on the drawings.

Workmanship. The frames and covers must be mutually interchangeable size for size, so that each lid will fit every frame neatly without jamming and with only such clearance as the drawings indicate. In addition, 24" & 30" covers must fit existing 24" & 30" frames, as shown on drawings 872, 874 and 10927. The castings shall be neat, true to pattern and free from cracks and casting flaws. No welding of defective castings will be permitted nor must the castings be painted

Material. The frames and covers must be made of Class 30 Cast Iron described in the specifications for Gray Iron Castings of ASTM A48. No plugging of defective castings will be permitted.

Tests. Test bars of the metal used for the castings shall be made and tested for tensile and transverse strength in accordance with ASTM A48. The metal must be tested at the works of the manufacturer. The manufacturer must furnish a certified copy of all test data sheets to the City prior to delivery of the castings. Frames and covers shall each be considered a separate casting for determining the requirement of testing.

RIGID STEEL CONDUIT (HOT DIPPED GALVANIZED)

Scope. This specification describes rigid steel conduit, zinc coated. This specification also describes rigid steel conduit that is both zinc and PVC coated. The conduit will be used underground or on structure as a raceway for electrical cables.

General Requirements. Rigid steel conduit must be zinc coated by the hot-dip process. Conduit must be furnished in 10 foot lengths, threaded on each end and with one coupling attached to one end and a protective cap at the other end.

The conduit shall be manufactured according to Underwriters Laboratories Standard U.L. - 6 and must meet ANSI Standard C 80.1 and the requirements of NEC Article 344. In addition, conduit must be recognized as an equipment grounding conductor as per NEC Article 250. There will be no exceptions to meeting these standards.

Acceptance. Conduit not conforming to this specification will be rejected. The Commissioner will be the final judge in determining if the conduit meets the specification.

Sample. If requested by the Chief Procurement Officer, a sample of conduit must be submitted to the Engineer of Electricity within 15 business days of receipt of such a request.

Warranty. The manufacturer shall warrant the construction and performance of the conduit to meet the requirements of this specification and shall warrant all parts and components against defects due to design, workmanship, or material developing within a period of one year after the conduit has been delivered.

Steel. Conduit shall be formed from steel suitable for use as an electrical raceway. It shall be structurally sound so that it will hang straight and true when supported by hangers in accordance with Chicago electrical code requirements and shall be capable of being field bent without deformation of the walls.

Conduit shall have a circular cross section sufficiently accurate to permit the cutting of threads in accordance with Table 2 and shall provide a uniform wall thickness throughout. All surfaces shall be smooth and free of injurious defects. The dimensions and weights of rigid steel conduit must be in accordance with Table 1.

Threading And Chamfering. Each length of conduit, and each nipple, elbow and bend must be threaded on both ends, and each end must be chamfered to remove burrs and sharp edges.

The number of threads per inch, and the length of the threaded portion at each end of each length of conduit, nipple and elbow must be as indicated in Table 2. The perfect thread must be tapered for its entire length, and the taper must be 3/4 inch per foot.

Zinc Coating. After all cutting, threading, and chamfering all conduit surfaces shall be thoroughly cleaned before application of zinc. The cleaning process shall leave the interior and exterior surfaces of the conduit in such a condition that the zinc will be firmly adherent and smooth.

The conduit must be hot dipped galvanized both inside and out to provide approximately 2 ounces of zinc per square foot. This is equivalent to 3.4 mils of zinc coating. An additional interior coating to aid in the installation of wires is required.

Couplings. The outside surface of couplings shall be protected by means of a zinc coating. The zinc content of the coating on the outside surface must be equivalent to a minimum thickness of 3.4 mils.

Couplings shall be so made that all threads will be covered when the coupling is pulled tight on standard conduit threads.

Both ends of the coupling must be chamfered to prevent damage to the starting threads.

The outside diameter, length and weight of coupling must be as indicated in Table 3.

Couplings must be straight tapped, except that the 2 1/2 inch and larger sizes may be taper-tapped.

PVC Coated (When Specified). Only hot dipped galvanized conduit, couplings, and fittings may be PVC coated.

All conduit, couplings, and fittings must be cleaned before being coated. All conduit, couplings, and fittings must have a PVC coating applied to the exterior by dipping in liquid plastisol. The coating thickness must be a nominal 40 mils. All coated conduit, couplings, and fittings must conform to the requirements of NEMA Standard RN1- Section 3, "External Coatings". The latest revision will apply.

Packing And Identification. The pipe shall be delivered in bundles. Each length of conduit must be marked with the manufacturer's name or trademark. Securely attached to each bundle at two locations on the bundle must be a weather resistant tag containing the following information:

- conduit size
- footage of bundle
- gross weight of bundle
- manufacturer's name

Precaution will be taken by the Contractor in handling during shipment or delivery of conduit, and any conduit found to be damaged will not be accepted.

Test And Inspection. Galvanized rigid conduit must be capable of being bent cold into a quarter of a circle around a mandrel, the radius of which is four times the nominal size of the conduit, without developing cracks at any portion and without opening the weld.

The protective coatings used on the outside and inside surfaces of rigid steel conduit must be sufficiently elastic to prevent their cracking or flaking off when a finished sample of 2 inch conduit is tested within one year after the time of manufacture, by bending it into a half of a circle around a mandrel, the radius of which is 3 1/2 inches.

Tests on sizes other than 1/2 inch may be conducted within one year after the time of manufacture. If such tests are conducted, the conduit must be bent into a quarter of a circle around a mandrel, the radius of which is six times the nominal size of the conduit.

One of the following three test methods shall be employed for measuring the thickness or extent of the external zinc coating on conduit:

- Magnetic test.
- Dropping test.
- Preece test (Material which will withstand four 1-minute immersions will be considered as meeting requirements as follows; the zinc content of the coating on the outside surface must be equivalent to a minimum thickness of 3.4 mils).

All tests and inspections must be made at the place of manufacture prior to shipment unless otherwise specified and shall be so conducted as not to interfere with normal manufacturing processes.

Each length of conduit shall be examined visually both on the outside and inside to determine if the product is free from slivers, burrs, scale or other similar injurious defects (or a combination thereof), and if coverage of the coating is complete.

If any samples of rigid steel conduit tested as prescribed in this specification should fail, two additional samples must be tested, both of which must comply with the requirements of the specification.

All pipe which may develop any defect under tests, or which may before testing or on delivery be found defective, or not in accordance with these specifications, must be removed by the Contractor at his own expense; and such pipe so removed by the Contractor must be replaced by him or her within ten days of such rejection with other pipe which will conform to these specifications.

TABLE 1: Design Dimension and Weights of Rigid Steel Conduit

Nominal or Trade Size of Conduit (Inches)	Inside Diameter (Inches) (Pounds)	Outside Diameter (Inches)	Wall Thickness (Inches)	Length Without Coupling (Feet/Inches)	Minimum Weight of Ten Unit Length w/couplings
1/2	0.622	0.840	0.109	9-11 1/4	79.00
3/4	0.824	1.050	0.113	9-11 1/4	105.0
1	1.049	1.315	0.133	9-11	153.0
1 1/4	1.380	1.660	0.140	9-11	201.0
1 1/2	1.610	1.900	0.145	9-11	249.0
2	2.067	2.375	0.154	9-11	334.0
2 1/2	2.469	2.875	0.203	9-10 1/2	527.0
3	3.068	3.500	0.216	9-10 1/2	690.0
3 1/2	3.548	4.000	0.226	9-10 1/4	831.0
4	4.026	4.500	0.237	9-10 1/4	982.0

NOTE: The applicable tolerances are:

Length: + 1/4 inch (without coupling)

Outside diameter: + 1/64 inch or -1/32 inch for the 1 1/2 inch and smaller sizes,
 ± 1 % for the 2 inch and larger sizes.

Wall thickness: - 12 1/2 %

TABLE 2: Dimensions of Threads

Nominal or Trade Size of Conduit (Inches)	Threads per Inch	Pitch Length of Thread (Inches) Diameter at end of Thread (Inches) Effective Overall		
		Tapered 3/4 Inch per foot	L2	L4
1/2	14	0.7584	0.53	0.78
3/4	14	0.9677	0.55	0.79
1	11 1/2	1.2136	0.68	0.98
1 1/4	11 1/2	1.5571	0.71	1.01
1 1/2	11 1/2	1.7961	0.72	1.03
2	11 1/2	2.2690	0.76	1.06
2 1/2	8	2.7195	1.14	1.57
3	8	3.3406	1.20	1.63
3 1/2	8	3.8375	1.25	1.68
4	8	4.3344	1.30	1.73

NOTE: The applicable tolerances are:
 Threaded Length (L4 Col 5): Plus or minus one thread
 Pitch Diameter (Col 3): Plus or minus one turn is the maximum variation permitted from the gaging face of the working thread gages. This is equivalent to plus or minus one and one half turns from basic dimensions, since a variation of plus or minus one half turn from basic dimensions is permitted in working gages

TABLE 3: Designed Dimensions and Weights of Couplings

Nominal or Trade Size of Conduit	Outside Diameter	Minimum Length	Minimum Weight
<u>(INCHES)</u>	<u>(INCHES)</u>	<u>(INCHES)</u>	<u>(POUNDS)</u>
1/2	1.010	1-9/16	0.115
3/4	1.250	1-5/8	0.170
1	1.525	2	0.300
1 1/4	1.869	2-1/16	0.370
1 1/2	2.155	2-1/16	0.515
2	2.650	2 1/8	0.671
2 1/2	3.250	3-1/8	1.675
3	3.870	3-1/4	2.085
3 1/2	4.500	3-3/8	2.400
4	4.875	3-1/2	2.839

TRAFFIC SIGNAL MOUNTING BRACKETS FOR MONOTUBE ARMS

Subject. This specification states the requirements for mounting brackets which will be used to secure traffic signals and illuminated signs to steel monotube mast arms.

General

Specifications. The mounting brackets shall conform in detail to the requirements herein stated and to the specifications and methods of test of the American Society for Testing and Materials cited by ASTM Designation number of which the most recently published revision will govern.

Acceptance. Mounting brackets not conforming to these specifications will not be accepted.

Sample. If requested by the Chief Procurement Officer, one complete mounting bracket must be submitted within 15 business days upon receipt of such a request. It must be delivered to the Division of Electrical Operations, 2451 South Ashland Avenue, Chicago, Illinois 60608.

Warranty. Bracket must have a minimum 3 year warranty. The warranty must cover the material and workmanship. Any structural flaws or inability to maintain alignment will be deemed a failure and result in the warranty being invoked. The manufacturer will supply a new bracket for each failed bracket, at no cost to the City. The warranty will start from the date of delivery [date of acceptance for contract construction].

Design. The mounting bracket shall be designed such that no portion of the bracket is put into tension when it is attached to the mast arm with banding. The signal support tube will be attached to the bracket using compression type attachments. All materials must be corrosion resistant and designed to be structurally sound. The signal support tube will be a slotted aluminum pipe of sufficient length to hold either 3, 4, or 5 section signal heads, or an illuminated sign. The slot must have a neoprene gasket to protect the cable. There must also be top and bottom brackets that hold the signal head assembly at each end to the tube. The bottom bracket will also be used as a cable runway.

Hardware. All components of the mounting brackets must be held firmly in place with stainless steel hardware.

Adjustments. Bracket shall allow for mounting and adjustment of signal faces in any direction desired on a fixed mast arm. Adjustments shall be made using standard hand tools. Neither mounting nor adjusting the bracket should require the use of a torque wrench.

Signal Mounting. Mounting hardware shall be available for use with standard 2, 3, and 5 signal head configurations; for use with optically programmed signal heads; and for use with illuminated signs.

Wiring. Bracket design shall allow for ease of installation of components and wiring. All wiring troughs and nipples must provide smooth, burr-free surfaces and adequate space for facile movement of nominal .5 inch diameter cable between the mast arm and the signal face.

Banding. Where banding is used to attach the mounting bracket to the mast arm, the banding must be .75 inch wide stainless steel.

Castings. Where castings are used for the brackets, they shall be smooth and free of defects.

Testing. At least 1% of the traffic signal mounting brackets in each order or contract shall be tested for rigidity and structural integrity.

Re-testing. If any mounting bracket fails any portion of the test, an additional 3% of the brackets must be tested. If an additional bracket fails, the entire lot will be rejected.

Tests.

1. With five 12" signal head sections attached to the bracket, the assembly shall be mounted to a suitable and proper supporting structure.
2. Using a calibrated dynamometer, a 100 pound force must be applied for 60 seconds at the center of the bracket in the horizontal plane. At the completion of the test, there must be no movement of the assembly or deterioration of the bracket or appurtenant hardware.
3. Using a calibrated dynamometer, a 100 pound force must be applied to the top signal head section for 60 seconds in a direction which will pull the head away from the mounting post in the mounting post plane. During this time period, the mounting bracket castings must be struck 10 times with an 8 ounce flat head hammer at the point(s) which appear to be most vulnerable to stress. At the completion of the test, no movement of the assembly must have been observed and there must be no cracking of the castings or deterioration of the appurtenant hardware.
4. The above test must be repeated except that the force must be applied in a plane which is perpendicular to the mounting post plane.

Packaging

Packing. Each bracket shall be packed in a suitable carton so secured that the bracket and parts will not be damaged during shipment, handling or storage.

Marking. Each carton containing the bracket and parts shall be clearly marked on the outside in letters not less than 3/8 inches tall with the legend: "TRAFFIC SIGNAL MONOTUBE BRACKET", the name of the manufacturer, the date of manufacture, the contract number, and the City commodity code.

GROUND RODS

Subject. This specification states requirements for ground rods and clamps to be used for ground electrodes in street lighting, traffic signal, and miscellaneous electrical circuits.

General. Ground rods must be copper clad, steel rods suitable for driving into the ground without deformation of the rod or scoring, separation or other deterioration of the copper cladding.

Sample. If requested by the Chief Procurement Officer, the Contractor must furnish one sample of the ground rod proposed to be furnished within 15 business days from receipt of such request. The sample ground rod must be delivered to the Division of Electrical Operations, 2451 S. Ashland Avenue, Chicago, Illinois 60608.

Warranty. The manufacturer shall warrant every ground rod against defects due to design, workmanship, or material developing within a period of one year after the ground rod has been accepted. Any ground rod which fails during this period must be replaced by the Contractor without expense to the City. The Commissioner of Transportation or their duly authorized representative will be the sole judge in determining which replacements are to be made.

The Commissioner will be the sole judge in determining whether the submitted ground rods meet the requirements of this specification. Ground rods not accepted must be removed at the sole expense of the Contractor.

Design. The ground rods and couplings must meet the latest requirements of NEMA Standard GR-1, for copper bonded ground rod electrodes and couplings. The ground rods must also meet the requirements of UL 467.

Ground rods shall be made of steel core suitable for driving into the earth without deformation.

A uniform covering of electrolytic copper, 10 mils in thickness, shall be metallically bonded to the steel core to provide a corrosion resistant, inseparable bond between the steel core and the copper overlay.

The finished rod must be of uniform cross-section; straight, and free of nicks, cuts or protuberances.

The rod must be pointed at one end and chamfered at the other.

All ground rods must be 3/4 inches in diameter. The length shall be as specified in the order or in the plans. The length and diameter of the rod and the manufacturer must be clearly and permanently marked near the top of the rod (chamfered end).

All ground rods must have a ground clamp capable of accommodating a No. 6 AWG copper wire.

Packing. Ground rods must be packed in bundles with reinforced tape or plastic banding that will not damage the rods. Small bundles may then be bound in larger bundles held together with steel banding.

Ground clamps must be packed in a suitable carton. The carton must be labeled to indicate the contents.

ROD: ANCHOR, STEEL, WITH HARDWARE

Subject. This specification states the requirements for steel anchor rods with hardware for street light pole foundations.

General

Specifications. The anchor rods shall conform in detail to the requirements herein stated, and to the specifications of the American Society for Testing and Materials cited by ASTM Designation Number, of which the most recently published revision will govern.

Drawing. The drawings mentioned herein are issued by the Department of Transportation, Division of Engineering, and are an integral part of this specification.

Anchor Rod

Fabrication. Each anchor rod must be fabricated in conformity with City of Chicago drawings numbered 806, 811, 830 and 844.

Material. The rods must be fabricated from cold rolled carbon steel bar meeting the requirements of ASTM Specification A-36, except that the Specification must be modified to provide a minimum yield point of 55,000 psi.

Thread. The straight end of each rod must be threaded as shown on City of Chicago drawing for that size rod, and must be American Standard, National Coarse.

Hardware. Hardware furnished with the anchor rod shall be as shown on the applicable drawing. It must include two hexagonal nuts, American Standard Regular, two flat washers, type B, series W, and one lock washer, steel, helical spring. The nuts must have a Class 2 or 3 fit.

Finish

Galvanizing. The threaded end of each rod must be hot dipped galvanized for the distance shown on the applicable drawing. The thickness of the galvanized coating must not be less than 0.0021 inches. Each hexagonal nut and washer must be galvanized to the minimum thickness required by ASTM A-153, Class C, or ASTM B-454, Class 50. After galvanization, each anchor rod and nut must have a mating fit equivalent to the American Standard Class 2 or 3 fit for nuts and bolts.

Tests. At the discretion of the Commissioner, anchor rods and hardware furnished under this specification will be subject to testing to determine compliance with the materials physical requirements.

Inspection. Final inspection must be made at point of delivery. Any anchor rods and hardware rejected must be removed by the Contractor at his sole expense.

CORD: TRAFFIC SIGNAL, NO. 16 AWG

Subject. This specification states the requirements for a four or an eight conductor number 16 AWG, electrical cable, to be installed in poles and conduit and used to electrically energize traffic signals at street intersections. The cable shall be connected from the traffic signal to the junction box on the same pole.

General

Specifications. The cable shall conform in detail to the requirements herein stated, and to the specifications and methods of test of the following organizations, of which the most recently published revision will govern:

- ASTM - American Society for Testing and Materials
- ICEA - Insulated Cable Engineers Association
- IMSA - International Municipal Signal Association
- UL - Underwriters Laboratories

Acceptance. Cable not conforming to this specification will not be accepted.

Warranty. The Contractor will be responsible for any cable failing during normal use within one year after the date of acceptance by the City. The Contractor shall provide material replacement of any failed cable. There shall be no cost to the City. All replacements must be made free of charge, F.O.B. delivery point of original contract.

Sample. If requested by the Chief Procurement Officer, a 3 foot sample of the cable intended to be provided under this specification shall be submitted to the attention of the Engineer of Electricity within 15 business days after receipt of such request.

TRAFFIC SIGNAL: VEHICULAR, 12-INCH SINGLE FACE, SINGLE OR MULTIPLE-SECTION, POLYCARBONATE, LED

General Requirements. This specification states the requirements for 12-inch, single face, single and multiple-section, traffic signals with polycarbonate housings, using a LED light source, for use in the traffic control system of the City of Chicago. Units include red ball, yellow ball, green ball, red arrow, yellow arrow, green arrow, red bicycle, yellow bicycle, green bicycle, white vertical bar, and white horizontal bar.

Sample and Certified Test Reports. One complete signal, fully assembled and wired, of the manufacture proposed to be furnished, must be submitted along with the required certified test reports, within 15 business days upon request of the Chief Procurement Officer. The sample must be delivered to the Division of Electrical Operations, 2451 South Ashland Avenue, Chicago, Illinois 60608.

Standards. Equipment furnished under this specification shall meet the appropriate requirements of the following standards, as required within the body of this specification:

- American Association of State Highway and Transportation Officials (AASHTO)
- American Iron and Steel Institute (AISI)
- American Society for Testing and Materials (ASTM)
- Institute of Transportation Engineers (ITE)
- National Electrical Manufacturers Association (NEMA)
- Underwriters Laboratories (UL)

Approval. Approval will mean approval in writing by the Commissioner or his duly authorized representative.

Warranty. The manufacturer shall warrant the signals to meet the requirements of this specification, and shall warrant all equipment, components, parts and appurtenances against defective design, material and workmanship for a period of 3 years from date of delivery [date of acceptance for contract construction]. In addition, LED optical modules must carry a 7-year warranty against failure or loss of color (chromaticity) and signal brightness (luminance) below minimum acceptable ITE standard levels from date of delivery [date of acceptance for contract construction]. In the event defects or failures occur in the units during the warranty period, the manufacturer must replace all defective units, at no expense to the City. This warranty shall be evidenced by a letter or certificate of warranty submitted to the City at the time delivery is made. The warranty must cover all units delivered in an order or installed by contract and must include unit serial numbers.

The warranty must be signed and dated by an official of the manufacturer who is empowered by the manufacturer to enter into such a warranty.

Materials And Equipment Requirements. The traffic signal heads shall conform to ITE Standard "Vehicle Traffic Control Signal Heads" (VTCSH), in which the most recently published revision will govern.

Housing. The housing of each section must be one-piece, ultraviolet stabilized polycarbonate resin of the specified color, injection molded complete with integral top, bottom, and sides, having a minimum thickness of 0.1 inch.

The polycarbonate shall meet or exceed the following tests:

TEST	REQUIRED	METHOD
Specific gravity	1.17 minimum	ASTM D 792
Vicat Softening temp	310-320° F	ASTM D 1525
Brittleness temp.	-200° F	ASTM D 746
Flammability	Self-extinguishing	ASTM D 635
Tensile strength, yield	8,500 PSI	ASTM D 638
Elongation at yield	5.5-8.5%	ASTM D 638
Shear strength, yield	5,500 PSI min.	ASTM D 732
Izod impact strength (notched, .125" thick)	12-16 ft-lbs/in.	ASTM D 256
Fatigue strength (at 2.5 mm cycles)	950 PSI min.	ASTM D 671

Assembly. A traffic signal section shall be comprised of, but not limited to, the housing, hinged door, visor, optical unit and all necessary gaskets and hardware. The multi-section, single face, traffic signal shall be comprised of single face single sections assembled together, containing an internally mounted terminal block. Arrow indications must be shipped as single sections. The traffic signals shall be designed and constructed to permit sections to be assembled together, one above the other, forming a weatherproof and dust-tight unit.

Individual sections shall be fastened together with a coupling washer assembly composed of 2 washers, 3 zinc plated bolts, nuts, and lock washers which lock the individual sections together. As an alternative, individual sections may be fastened together with 4 cadmium plated bolts, lock washers, and nuts.

Height. The overall height of an assembled traffic signal must be 14 inches $\pm$ 1 inch for a single-section signal, 42 inches $\pm$ 3 inches for a three-section signal, and 70 inches $\pm$ 5 inches for a five-section signal.

Mounting. The traffic signal shall be designed for mounting with standard traffic signal brackets using 1.5-inch pipe size fittings.

Positioning Device. The top and bottom opening of each housing must have integral serrated bosses that will provide positive positioning of the signal head in 5° increments. A total of 72 teeth must be provided in the serrated bosses to allow the signal face to be rotated 360° about its axis. The teeth shall be clean and well defined to provide positive positioning.

Hinges. The signal housing shall be sectional; one section for each optical unit. Each housing must have 4 integral hinge lugs, with stainless steel hinge pins (AISI 304 or equivalent), located on the left side for mounting the door. The hinge pins shall be straight and not protrude past the outside of the housing lugs. The housing must have 2 integral latching bolt lugs on the right side each with a stainless-steel hinge pin to which a latching bolt (AISI 304 or equivalent), washer, and wing nut will be attached. The wing nuts must be captive. Each housing must be equipped with holes to be used for mounting backplates.

Door. The door shall be a one-piece ultraviolet stabilized polycarbonate resin of the specified color, injection molded complete with a minimum thickness of 0.1 inch. Two hinge lugs on the left side and 2 sets of latch screw jaws centered on the right side, as viewed from the front of the signal, must be integrally cast with the housing door. The door must be hinged to the housing with 2 stainless steel hinge pins, drive fitted. Two stainless steel latch screws and wing nut and washer assemblies on the latch side of the housing body shall provide for opening and closing the door without the use of tools. The door must have holes with threaded metal inserts for stainless steel machine screws to secure the visor and the lens. The inside of the door must be grooved to accommodate a one piece, air-cored ethylene propylene diene monomer (EPDM) gasket to provide a weatherproof and dust proof seal when the door is closed. The rim must have 4 equally spaced tabs around the circumference with threaded metal inserts for the visor.

Visor. Each traffic signal shall have a visor for each signal indication (section). The visor shall be the tunnel type, 9.25 inches long, fabricated of ultraviolet stabilized polycarbonate resin of the specified color, injection molded. The visor shall fit tightly against the door and not permit any light leakage between the door and visor. All hardware necessary for, but not limited to, attachment of the visor must be of stainless steel. The visor must have 4 mounting lugs for attaching the visor to the door. Screws must go through the visor lugs into the metal inserts in the door to secure the visor.

The traffic signal heads shall be provided with LED optical modules.

LED Optical Modules

LED optical modules shall consist of an integral unit containing the following components: power leads, housing, matrix of LED emitting monochromatic light of desired signal color, and electronic and electrical components necessary to permit operation at nominal 120-volt, 60 hertz power.

The LED module shall be of such dimensions as to permit mounting in any standard traffic signal housing, be interchangeable with incandescent optical units, and must include appropriate gasket for this purpose. Gasketing provided must provide a watertight seal meeting existing ITE standard for signal heads and exclude the infiltration of moisture into either the signal housing or into the LED optical unit case.

The LED module shall meet the applicable requirements of the ITE standards for Vehicle Traffic Control Signal Heads (VTCSH) Part 2: LED Vehicle Signal Modules, for color (chromaticity), signal brightness (luminance), and beam spread (luminance at various vertical and horizontal angles).

Minimum brightness of LED signal units shall be in accordance with the luminous requirements in a standard testing procedure as defined by Section 4 of the VTCSH Part 2: LED Vehicle Signal Modules. During the required operating life of LED signal units, the luminance output of the units must not be less than 60% of the values specified in the standard.

The module indicator surface shall be constructed of UV stabilized, impact resistant polycarbonate, acrylic, or other approved material. The surface must be anti-glare, smooth texture, and clear.

Modules shall consist of LEDs uniformly distributed to present a homogeneous appearance on the indicator face from a wide viewing angle.

LEDs shall be wired so that the loss of a single LED or a string of LEDs will not reduce the luminescence below the minimum requirement.

For purposes of this specification, failure of a single unit is defined as an occurrence where the luminescence of the signal measured in candela in standard test procedures is less than the required initial luminance or luminance at time points and conditions specified; or where minimum required brightness is achieved, but 2 or more series strings of LEDs or in excess of 20% of LEDs are not operable.

Module power supply shall be constant current regulated and filtered to provide instant on indications, and to prevent momentary signal outages or flicker. Units must be fully operable over a range of 90 volts to 130 volts at 60 hertz $\pm$ 3 hertz.

Surge protection: Each module must be provided with integral surge protection to withstand transient of 600-volt, 100 microsecond rise and 1 millisecond pulse width. The surge protector shall provide full electrical and physical protection to all unit components.

Maximum permissible power consumption at ambient conditions (nominal 120 volts, 60 hertz, 70°F.) must be 30 watts at a minimum 90% power factor. Power consumed must not vary by more than 10% from nominal power consumption over a voltage range of 105 volts to 125 volts, and over permissible environmental ranges.

Modules must be fully operable at temperature ranges of -40°F to +165°F at up to 100% relative humidity.

Modules shall be clearly marked on the back surface of the unit in a permanent manner showing information required for warranty and long term performance. Information to be shown must include manufacturer name, date of manufacture, electric power requirements, signal model type including color and indication type, and signal serial number.

The LED module shall be compatible with the traffic signal controller equipment currently in use by the City of Chicago, and meeting the City's latest specifications for traffic signal control equipment. In particular the LED unit shall be compatible with the NEMA TS-1 and later traffic signal load switches and conflict monitors.

Modules shall meet applicable sections of Title 47, Sub-Part B, Section 15 of the Federal Communications Commission (FCC) rules as applies to electronic noise limitation and electromagnetic interference.

Total harmonic distortion (THD) induced into the voltage and current AC power line sine waves must not exceed 20%.

LED modules must meet the requirements of VTCSH Part 2: LED Vehicle Signal Modules Section 6.3.1 for signal burn-in.

Wiring. Each module must be furnished with two leads color coded as follows:

• First Lead Wire:	White Common	Second Lead Wire:
• Red	Red Section	
• Yellow	Yellow Section	
• Green	Green Section	
• Green with Black Tracer	Green Arrow Section	
• Yellow with Black Tracer	Yellow Arrow Section	
• Red with Black Tracer	Red Arrow Section	
• Green with White Tracer	Green Bicycle Section	
• Yellow with White Tracer	Yellow Bicycle Section	
• Red with White Tracer	Red Bicycle Section	
• Any Other Colors	Bus Sections	

The leads must be No. 18 AWG stranded copper wire rated at 600-volt, 105° C., with thermo-plastic insulation. The leads must connect to the terminal strip without being spliced. The ends of the leads must be stripped of 0.5 inches of insulation and tinned.

Terminal Strip. A dual-point, barrier type terminal strip with a solid base and pressure plate type connectors shall be securely attached at both ends to the housing body inside the "Green" section of the signal head, or other approved section within a multiple section head.

Cable. One flexible electric cord, medium duty, type SO, 8-conductor No. 16 AWG stranded copper conductor, color coded, rubber insulated, neoprene jacketed, must be furnished with each signal head. Both ends of each cable length must be carefully stripped of 6 inches of jacket and 1 inch of insulation, and each conductor properly tinned.

Gaskets. Wherever necessary to make a completely dustproof, moisture proof, and weatherproof assembly of the housing and optical system, approved type gaskets of neoprene or silicone rubber shall be provided.

Testing And Documentation Requirements

Documentation. The Contractor shall provide certified manufacturing and testing documentation to demonstrate that the traffic signals being supplied meet or exceed the specification requirements. All LED modules shall be tested by a nationally recognized testing laboratory (NRTL), such as Intertek (ETL division), to demonstrate compliance with the latest ITE VTCSH specification. All LED units shall have the testing laboratory's label attached.

Inspection. The signals shall be subject to inspection at the request of the Commissioner. Final inspection shall be made at point of delivery. Any signal rejected shall be removed, disposed of, and replaced by the Contractor at their sole cost.

Packaging

Packing. Each traffic signal assembly shall be packed in a suitable carton so secured that the signal will not be damaged during shipment, handling or storage.

Marking. Each carton containing a traffic signal shall be clearly marked on the outside in letters not less than 3/8 inch tall with the legend: "TRAFFIC SIGNAL, 12 INCH, POLYCARBONATE, LED OPTICS" and the number of sections as required, the color and indication types, the name of the manufacturer, the date of manufacture, the pertinent contract number and the appropriate city commodity code number.

TRAFFIC SIGNAL MOUNTING BRACKET POLYCARBONATE, SIDE OF POLE

Scope. This specification states the requirements for polycarbonate brackets designed for mounting traffic and pedestrian signal heads from the side of poles.

General Requirements

Sample and Certified Test Reports. One complete signal bracket of the manufacture proposed to be furnished, must be submitted along with the required certified test reports, within 15 business days upon request of the Chief Procurement Officer. The sample must be delivered to the Division of Electrical Operations, 2451 South Ashland Avenue, Chicago, Illinois 60608.

Standards. Equipment furnished under this specification must meet the appropriate requirements of the following standards, as required within the body of this specification:

- American Association of State Highway and Transportation Officials (AASHTO)
- American Society for Testing and Materials (ASTM)
- Institute of Transportation Engineers (ITE)
- National Electrical Manufacturers Association (NEMA)

Approval. Approval will mean approval in writing by the Commissioner or his/her duly authorized representative.

Warranty. The manufacturer shall warrant the signal bracket to meet the requirements of this specification, and shall warrant all equipment, components, parts and appurtenances against defective design, material and workmanship for a period of 3 years from date of delivery [date of acceptance for contract construction]. In the event defects and failures become apparent during this period, the manufacturer must replace the defective brackets at no expense to the City. This warranty must be evidenced by a letter or certificate of warranty submitted to the City at the time final delivery is made.

Material. The bracket must be one piece, ultra violet stabilized polycarbonate resin of the specified color, injection molded complete with integral top, bottom, and sides.

The polycarbonate formulation used must provide these physical properties (Tests may be performed on separately molded specimens).

TEST	REQUIRED	METHOD
Specific gravity	1.17 minimum	ASTM D 792
Vicat Softening temp	310-320° F	ASTM D 1525
Brittleness temp.	-200° F	ASTM D 746
Flammability	Self-extinguishing	ASTM D 635
Tensile strength, yield	8,500 PSI	ASTM D 638
Elongation at yield	5.5-8.5%	ASTM D 638
Shear strength, yield	5,500 PSI min.	ASTM D 732
Izod impact strength (notched, 1/8" thick)	12-16 ft-lb/in.	ASTM D 256
Fatigue strength (at 2.5 mm cycles)	950 PSI min.	ASTM D 671

Glass. The polycarbonate may be glass impregnated to increase strength.

Positioning Device. The top and bottom opening of the bracket must have integral serrated bosses that will provide positive positioning of the signal head in 5° increments to eliminate undesirable rotation or misalignment of the signal head between sections. A total of 72 teeth must be provided in the serrated bosses to allow the signal head to be rotated 360° about its axis. The teeth must be clean and sharp to provide positive positioning with the grooves of the signal head.

Hardware. The mounting brackets must be provided complete with 1 polycarbonate shim(.25 inches thick), one 1.5 inch chase nipple with rubber gasket, and 1 pinnacle cap with rubber gasket.

Dimensions. The bracket must have nominal dimensions of 12 inches long, by 6 inches high, by 3 inches wide.

Wiring Space. The bracket must have an integral molded wireway with a minimum 1.5 inch diameter opening.

Design Strength. The bracket must be designed to support a 12 inch, single face, five-section, polycarbonate signal head.

Testing And Documentation Requirements

Documentation. The contractor must provide certified manufacturing and testing documentation to demonstrate that the brackets being supplied meet or exceed the specification requirements.

Inspection. The brackets will be subject to inspection at the request of the Commissioner. Final inspection must be made at point of delivery. Any bracket rejected must be removed, disposed of, and replaced by the Contractor at their sole cost.

Packaging. Each bracket must be packed in a suitable carton so secured that the bracket will not be damaged during shipment, handling, or storage.

Marking. Each carton containing brackets must be clearly marked on the outside in letters not less than 3/8 inch tall with the legend: "POLYCARBONATE SIGNAL BRACKET, SIDE OF POLE" the appropriate City Commodity Code Number, the name of the manufacturer, the date of manufacture, and the pertinent contract number.

PRECAST CONCRETE STRUCTURES

Subject. This specification covers the requirements for precast concrete structures to be used for City of Chicago electrical facilities. The structures will include manholes, handholes, and street light pole foundations.

General

Specifications. The precast structures must conform in detail to the requirements herein stated and to the specifications and methods of test of the American Society for Testing and Materials cited by ASTM Designation Number of which the most recently published revision will govern.

Acceptance. Precast structures not conforming to this specification will not be accepted. The Commissioner of Transportation or his representative will be the sole judge in determining if the precast structures meet this specification. The Commissioner's decision will be final.

Drawings. The drawings mentioned herein are drawings of the Department of Transportation. They are integral parts of this specification cooperating to state necessary requirements.

Bidders Drawings. The apparent low bidder must submit detailed scale drawings of the precast structures showing actual dimensions and details, if so requested. Shop drawings must be original engineering drawings created by the manufacturer. The drawings must give every dimension necessary and show how the structure is assembled.

Sample. One complete precast structure of each item must be submitted within 15 business days upon request of the Chief Procurement Officer.

Warranty. The manufacturer must warrant the performance and construction of the precast structures to meet the requirements of this specification and must warrant all parts, components, and appurtenances against defects due to design, workmanship, or material developing within a period of one year after the precast structures have been delivered. This will be interpreted particularly to mean structural failure of any element. The warranty must be furnished in writing guaranteeing material replacement including shipment, free of charge to the City. The Commissioner will be the sole judge in determining which replacements are to be made. The Commissioner's decision will be final.

Design

Material. Concrete must be PCC, Class SI, or PC, meeting current IDOT specifications. Pulling irons in manholes must meet or exceed the requirements of ASTM A36 steel. Pulling irons must be hot dipped galvanized. Steel reinforcing bars must meet or exceed the requirements of ASTM A615, Grade 60. Cable supports in manholes, including stanchions and racks, must be manufactured for that specific purpose. Stanchions must be non-metallic and must be capable of accommodating several different sizes of cable hooks at various elevations. A minimum of eight cable hooks, 4 inches in length, must be provided with each manhole, and should include any hardware necessary to affix the hooks to the racks. Cable hooks for handholes must be manufactured for that specific purpose. Cable hooks for handholes must be a minimum of 3 inches in length and 3 inches in depth. Anchor rods in foundations must meet the latest Electrical Material Specification 1467. Conduit elbows in foundations must meet the latest Electrical Material Specification 1462.

Foundations must include conduit elbows, anchor rods, washers, and nuts. The 7 foot foundation must include a 6 foot re-bar cage. Handholes must include cable hooks. Manholes must include cable racks, pulling irons, and cable hooks. Each manhole and each handhole must have lifting anchors cast in the concrete to facilitate shipment and installation. If the manhole or handhole is in more than one piece, instructions for assembly must be provided. Also, a sufficient amount of bonding agent must be provided. The bonding agent must be approved material. Frames and covers, sump grates, clay tile, and ground rods are not included under this specification.

Dimensions of Manholes and Handholes. Each manhole or handhole must be dimensioned as shown on the appropriate standard drawing. The 30 inch diameter handhole is Standard Drawing 867. The 36 inch diameter handhole for 24 inch frame and cover is Standard Drawing 866. The 36 inch diameter for 30 inch for frame and cover is Standard Drawing 871. The 3 foot by 4 foot by 4 foot manhole for a 24 inch diameter frame and cover is Standard Drawing 730. The 3 foot by 4 foot by 4 foot manhole for 30 inch frame and cover is Standard Drawing 729. The 4 foot by 6 foot by 6 foot manhole for 24 inch frame and cover is Standard Drawing 732. The four foot by 6 foot by 6 foot manhole for 30 inch frame and cover is Standard Drawing 733. The 5 foot 4 inch by 7 foot 4 inch manhole roof is Standard Drawing 733.

Dimensions of Grade Rings. Grade rings shall be in four different dimensions. The 39 inch outside diameter ring shall have a 24 inch diameter opening and shall come in both 2 inch and 4 inch thicknesses. The 45 inch outside diameter ring shall have a 30 inch diameter opening and shall also come in both 2 inch and 4 inch thicknesses.

Dimensions of foundations. The residential street light foundation shall be dimensioned as shown on standard drawing 565. The 7 foot arterial street light foundation shall be as shown on standard drawing 818.

Delivery. All manholes, handholes, and foundations will be delivered to the Division of Electrical Operations storage yard at 1539 South Ashland Avenue in Chicago, or to another location within the City as indicated on the order. Any manhole, handhole, or foundation deemed to be defective by the Commissioner or his representative must be removed and replaced at no cost to the City. The Commissioner's decision will be final.

NON-METALLIC CONDUIT

Scope. This specification states the requirements for both rigid and coilable non-metallic conduit. The conduit will be used for low voltage (600 volt rated cables) electrical street lighting and traffic control systems. It may also be used for fiber-optic communications cables. This conduit will be installed underground. Rigid non-metallic conduit may be installed on structure.

General

Standards. The following standards are referenced herein.

- ASTM – American Society for Testing and Materials
- NEC – National Electrical Code
- NEMA – National Electrical Manufacturer's Association
- UL – Underwriter's Laboratories

Warranty. The manufacturer must warrant the conduit against defective workmanship and material for a period of one year from date of installation or date of delivery. Any conduit that is found to be defective must be replaced without cost to the City.

Sample. If requested by the Chief Procurement Officer, a sample of the conduit intended to be furnished under this specification, must be submitted to the Engineer of Electricity within 15 business days upon receipt of such request.

Material. Rigid non-metallic conduit will be made of PVC. All conduit and fittings must comply with ASTM D 1784 and with the applicable sections of NEMA TC2, UL standard 651, and NEC Article 352. Fittings must meet the standards of NEMA TC3 and TC6, as well as UL 514.

Coilable non-metallic conduit will be made of HDPE. All conduit must comply with ASTM D3350 and NEMA TC7.

A tape must be installed in the HDPE conduit at the factory. The tape is for pulling cable through the conduit. The tape must be specifically manufactured for this purpose. The tape must have a tensile strength of at least 1000 pounds.

Sizes. PVC and HDPE will come in two wall thicknesses: schedule 40 and schedule 80. PVC will come in ten-foot sections. HDPE will come on reels.

Nominal inside diameters (in inches) for non-metallic conduits will include the following: $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4.

Packing. Rigid conduit must be shipped in bundles. Coilable conduit must come on wooden reels. Both bundles and reels must be tagged to indicate the size and diameter of the conduit, the quantity in feet, the weight, and the manufacturer's name. The conduit itself must be marked to indicate the type and size, as well as the manufacturer.

CABLE: SINGLE-CONDUCTOR, COPPER 600 VOLT

Subject. This specification states the requirements for single conductor cables intended to be used in 240 VAC street lighting circuits. The cable will also be used as service cable for both street light controllers and traffic signal controllers. The cables will be installed in underground conduit and rated as 600 volt.

General

Specifications. The cable shall conform in detail to the requirements herein stated, and to the applicable portions of the latest revisions of the specifications and methods of test of the following agencies:

- ASTM – American Society for Testing and Materials
- ICEA – Insulated Cable Engineers Association
- IEEE – Institute of Electrical and Electronics Engineers
- UL – Underwriters Laboratories

Acceptance. Cable not in accordance with this specification will not be accepted.

Sample. If requested by the Chief Procurement Officer, a 3 foot sample of the cable intended to be provided under this specification must be sent to the attention of the Engineer of Electricity within 15 days of receipt of such request.

Warranty. The Contractor will be responsible for any cable failing during normal use within one year after the date of acceptance by the City. The Contractor shall provide material replacement of any failed cable. There shall be no cost to the City. All replacements must be made free of charge, F.O.B. delivery point of the original contract.

Cables

Construction. The cable shall consist of a copper conductor with a tight- fitting thermoset, free stripping, concentric layer of insulation.

The outer diameter of the cable shall be as noted in Table A.

Cable shall be UL approved for sunlight resistance and for direct burial applications.

Cable must meet IEEE 383 and UL 1581 70,000 BTUs per hour flame test requirements.

Color Code

Triplexed cable shall consist of a black cable, a red cable, and a green ground cable. Triplexed cable will have a 16" to 18" lay.

Individual cables will be black, red, or white, depending upon the order.

Conductor

Material. The conductors shall be bare annealed copper. All strands shall be round.

Specifications. The conductor must meet the requirements of ASTM B3 and ASTM B8.

Sizes. The conductor sizes must be in accordance with all requirements in Table A of this specification.

Stranding. The number of strands must be as indicted in Table A. Stranding must meet the requirements of ASTM B8, Class B or Class C.

Insulation

Type. The insulation shall be either ethylene propylene rubber compound (EPR) or cross-linked polyethylene (XLP) meeting the requirements of ICEA S-95-658 and UL 44 for RHW-2 cable and UL 854 for USE-2 cable.

Thickness. The insulation shall be circular in cross-section, concentric to the conductor, and must have an average thickness not less than that set forth in Table A of this specification, and a spot thickness not less than 90% of the average thickness.

Cable Marking. The cable shall be identified by a permanently inscribed legend in white lettering as follows:

1/C No. (conductor size) AWG-600V-90°C-EPR or XLP-RHW-2

A similar marking may be acceptable. The legend must be repeated at approximately 18 inch intervals on the outside surface of the cable parallel to the longitudinal axis of the conductor. A sequential footage marking must be located on the opposite side from the legend.

Packaging

Reels. The completed cable must be delivered on sound substantial, non-returnable reels. Both ends of each length of cable must be properly sealed against the entrance of moisture and other foreign matter by the use of clamp-on cable caps. The ends must be securely fastened so as not to become loose in transit. Before shipment, complete 2 X 4 lagging must be applied to all reels.

Footage. Each reel must contain the length of cable as set forth in Table A of this specification. Alternate lengths may be considered.

Reel Marking. A metal tag must be securely attached to each reel indicating the reel number, contract number, date of shipment, gross and tare weights, the appropriate city commodity code if applicable, and a description of the cable. Also, each reel must have permanent marking on it indicating the total footage, and the beginning and ending sequential footage numbers.

Table A: Conductor Insulation A-C Test Reel Overall Thickness Length Diameter

<u>AWG</u>	<u>STRANDS</u>	<u>MILS</u>	<u>VOLTS</u>	<u>FEET</u>	<u>INCH</u>
14	7	45	5500	2000	.133
12	7	45	5500	2000	.152
10	7	45	5500	2000	.176
8	7	60	5500	2000	.236
6	7	60	5500	2000	.274
4	7	60	5500	2000	.322
2	7	60	5500	1000	.382
1/0	19	80	7000	1000	.470
2/0	19	80	7000	1000	.514
3/0	19	80	7000	1000	.564
4/0	19	80	7000	1000	.620
250 MCM	37	95	8000	1000	.705

CABLE: TRAFFIC SIGNAL, MULTIPLE CONDUCTOR, COPPER WIRE, 600 VOLT

Subject. This specification states the requirements for a multiple conductor cable to be installed in underground conduits and used to distribute electrical energy to operate automatic traffic control signals for both vehicular and pedestrian traffic at street intersections within the City of Chicago. The cable will be used between the traffic controller cabinet and the junction boxes on the traffic signal poles. The cable will be rated as 600 volts.

General

Specification. The cable must conform in detail to the requirements herein stated, and to the specifications and methods of test of the following:

- ASTM - American Society for Testing and Materials
- ICEA - Insulated Cable Engineers Association
- IEEE - Institute of Electrical and Electronic Engineers
- UL - Underwriters Laboratories

Acceptance. Cable not conforming to this specification will not be accepted.

Sample. If requested by the Chief Procurement Officer, a 3 foot sample of the cable intended to be furnished under this specification must be submitted to the attention of the Engineer of Electricity within 15 business days of receipt of such request.

Warranty. The manufacturer must warrant the cable to be first class material throughout. In lieu of other claims against them, if the cable is installed within 12 months of date of shipment, the manufacturer must replace any cable failing during normal and proper use within two years of date of installation. All replacements under this warranty must be made free of charge, F.O.B. delivery point of the original contract.

Cables

Construction. The cable must consist of coated conductors each concentrically encased with a free- stripping, thermoset cross-linked polyethylene insulation. Suitable fillers must be used to produce an essentially round cross-section. A Mylar tape must be wrapped over the conductor assembly, and a thermoset low smoke zero halogen polyolefin (LSZH) jacket applied overall.

Outer Diameter. The maximum allowable outer diameter for round cables must be as follows:

No. Of Conductors (inches)	Outer Diameter
Ten	0.69
Twenty-Two	1.08

Cable shall be UL approved for sunlight resistance and for direct burial applications.

Cable must meet UL 1277, IEEE 383 and UL 1581 and UL1202 70,000 BTUs per hour flame test requirements.

Color Code. Conductor identification must be provided by color synthetic-resin coverings, or an approved equal. Table A sets forth the color code for the various conductor arrangements.

Conductor

Material. Solid, soft, or annealed, tinned copper wire, meeting the requirements of ASTM B-33 and B-258.

Size. Cables must be made up of conductor sizes as set forth in this specification. The Number 14 AWG will be solid.

Insulation

Type. The insulation must be a thermoset cross-linked polyethylene compound meeting the requirements of ICEA S-73-532 and UL 44 for XHHW-2 cable.

Thickness. The insulation must be circular in cross-section and have the following minimum thicknesses.

	Conductor Size. AWG	stranding (No. Of Wires)	No. of Conductors	Insulation Thickness (mils)
	#14	1	10	30
	#14	1	22	30

Cable Tape. The assembled and cabled conductor core must be wrapped with a one mil thick Mylar tape allowing a minimum of 10% overlap.

Jacket

Material. The jacket must be a thermoset low smoke zero halogen (LSZH) polyolefin.

Workmanship. The jacket must have a smooth exterior surface free from holes, cracks, and splits, and must be tough, elastic, homogeneous in composition, and properly vulcanized.

Thickness. Thickness of the jacket must be 4/64 inches. Minimum thickness must be not less than 90% of the average thickness.

Cable Marking. Outer Jacket must be embossed or printed with the manufacturer's name, year of manufacture, insulation and jacket materials, conductor number, conductor size, at approximately 18" intervals. On the side opposite, the cable must be sequentially marked in 1 foot increments. The jacket must be black.

Testing

(a) Initial Physical Properties of Insulation.

- Tensile Strength, minimum 1200psi
- Elongation at Rupture, minimum 250%

Physical Properties of Insulation After Aging. After 168 hours in air oven at 121° C.

- Tensile Strength 75% of initial value
- Elongation 75% of initial value

Initial Physical Properties of Jacket.

- Tensile Strength, minimum 1800psi
- Elongation at Rupture, minimum 300%

Physical Properties of Jacket After Aging. After 168 hours in air oven at 121° C.

- Tensile Strength 75% of initial value
- Elongation 65% of initial value

Water Absorption. Tests must be made in accordance with ASTM D 470. After 168 hours in distilled water at 70° C., water absorption of the insulation material must not exceed 5 milligrams of water per square inch. For the jacket material the water absorption must not exceed 1 milligram per square inch under the same conditions.

Cold-Bend Test. The completed cable must pass cold bend test of ASTM D 470, except that the test temperature must be -25°C.

Electrical Requirements.

Voltage. The completed cable must meet an A.C. and D.C. voltage test in accordance with ASTM D 470 and D 2655.

Insulation Resistance. The completed cable must have an insulation resistance of not less than 20,000 ohms when tested in accordance with methods in ASTM D 470.

Flame Tests. Cable must pass a 70,000 BTU flame test in accordance with IEEE 383.

Tests. The above tests must be performed on the insulation, the jacket, and the completed cable as required above. Tests must be performed on samples taken every 25,000 feet or fraction thereof of each cable size.

Reports. No cable will be accepted until certified copies of the test reports have been reviewed and approved by the City. Cable that does not pass any of the above tests will be rejected.

Packaging

Reels. The completed cable must be delivered on sound substantial, non- returnable reels. Both ends of each length of cable must be properly sealed against the entrance of moisture and other foreign matter by the use of clamp-on cable caps. The ends must be securely fastened so as not to become loose in transit. Before shipment, complete 2 x 4 lagging must be applied to all reels.

Footage. Each reel must contain the length of cable as set forth below.

- Ten-Conductor 2000 feet
- Twenty two-Conductor 1000 feet

Marking. A metal tag must be securely attached to each reel indicating the reel number, contract number, date of shipment, gross and tare weights, the appropriate city commodity code number if applicable, and a description of the cable. Also, each reel must have permanent marking on it indicating directions for unrolling the cable and the footage of cable contained in the reel. Indelible ink or other such material susceptible to washing off or fading will not be permitted, and approved permanent marking material such as paint or a securely attached metal tag is required.

Table A Color Code Conductor Identification

Base Color	First Tracer	Second Tracer	10C	22C
White	Black	Red	--	14
White	Red	Green	--	14
Black	--	--	14	14
White	--	--	14	14
Red	--	--	14	14
Green	--	--	14	14
Orange	--	--	14	14
Blue	--	--	14	14
White	Black	--	--	--
Red	Black	--	14	14
Green	Black	--	14	14
Orange	Black	--	14	14
Blue	Black	--	14	--
Black	White	--	--	--
Red	White	--	--	14
Green	White	--	--	14
Blue	White	--	--	14
Orange	White	--	--	14
White	Red	--	--	--
Blue	Orange	--	--	14
Red	Blue	--	--	14
Green	Blue	--	--	14
Orange	Blue	--	--	14
Yellow	Black	--	--	14
Yellow	Blue	--	--	14
Yellow	Red	--	--	14

REINFORCING ROD FORMED STEEL CAGES

SUBJECT

1. This specification is for steel cages. The cages are to be used in street light pole foundations to provide the necessary strength to support street light poles.

DESCRIPTION

2.
 - (a) The steel must conform to the requirements of the American Society for Testing and Materials cited by ASTM designation number, of which the latest revision will govern.
 - (b) The steel cages must conform to all the requirements shown on Electrical Standard Drawing 793A.
 - (c) The steel cages must be constructed of number 3 and number 6 reinforcing bars, as shown on Electrical Standard Drawing 793A. Reinforcing steel must conform to ASTM A615, Grade 60, with a yield strength of 60,000 psi. All joints must be welded according to the latest recommendations of the American Welding Society's (AWS) Document 1.4.

ACCEPTANCE

3. If so requested, a sample cage must be delivered to the City within fifteen (15) business days of such request by the Chief Procurement Officer. The contractor must present certification that the steel used meets this specification. The City reserves the right to reject any cages which do not completely meet this specification.

DELIVERY

4. The Contractor must furnish and deliver the steel cages to the City of Chicago, Department of Transportation, Division of Electrical Operations, 4101 South Cicero Avenue, Chicago, Illinois 60650, or to a location as directed in the contract. Any cages that do not meet the specification or are delivered damaged will be rejected.

**PEDESTRIAN COUNTDOWN TRAFFIC SIGNAL LED, 16 INCH WITH SYMBOLIC
WALK/DON'T WALK, POLYCARBONATE HOUSING**

SUBJECT

1. This specification states the requirements for a single section pedestrian countdown signal with light emitting diode (LED) symbolic messages on a nominal sixteen inch by eighteen-inch message surface and enclosed in a polycarbonate housing.

GENERAL REQUIREMENTS

2. (a) Sample and Certified Test Reports. One complete pedestrian countdown signal, fully assembled and wired, of the manufacture proposed to be furnished, must be submitted along with the required certified test reports, within 15 business days upon request of the Chief Procurement Officer. The sample must be delivered to the Division of Electrical Operations, 2451 South Ashland Avenue, Chicago, Illinois 60608.

- (b) Standards. Equipment furnished under this specification shall meet the appropriate requirements of the following standards, as required within the body of this specification:

American Association of State Highway and Transportation Officials (AASHTO)
American Iron and Steel Institute (AISI)
American Society for Testing and Materials (ASTM)
Institute of Transportation Engineers (ITE)
National Electrical Manufacturers Association (NEMA)
Underwriters Laboratories (UL)

- (c) Approval. Approval will mean approval in writing by the Commissioner or his duly authorized representative.

MATERIAL AND EQUIPMENT REQUIREMENTS

3. (a) The pedestrian signal heads must conform to ITE Standard "Pedestrian Traffic Control Signal Indications" (PTCSI), in which the most recently published revision will govern.

- (b) **Housing Design.** The housing must be one piece, ultra violet stabilized polycarbonate resin of the specified color, injection molded complete with integral top, bottom, and sides, having a minimum thickness of 0.1 inches.

The polycarbonate formulation used must provide these physical properties in the housing (Tests may be performed on separately molded specimens).

<u>TEST</u>	<u>REQUIRED</u>	<u>METHOD</u>
Specific gravity	1.17 minimum	ASTM D 792
Vicat Softening temp	310-320° F	ASTM D 1525
Brittleness temp.	-200° F	ASTM D 746
Flammability Self-extinguishing		ASTM D 635
Tensile strength, yield	8,500 PSI	ASTM D 638
Elongation at yield	5.5-8.5%	ASTM D 638 Shear
strength, yield	5,500 PSI min.	ASTM
Izod impact strength .125" thick)	12-16 ft. lbs./in.	ASTM D 256 (notched,
Fatigue strength (at 2.5 mm cycles)	950 PSI min.	ASTM D 671

- (c) **Positioning Device.** The top and bottom opening of each housing must have integral serrated bosses that will provide positive positioning of the signal head in 5° increments to eliminate undesirable rotation or misalignment of the signal head between sections. A total of 72 teeth must be provided in the serrated bosses to allow the signal face to be rotated 360° about its axis. The teeth shall be clean and sharp to provide positive positioning with the grooves of the mating section or framework. Each opening must accommodate standard 1.5 inch pipe fittings and brackets.
- (d) **Hinges.** The housing must have 4 integral hinge lugs, with stainless steel hinge pins (AISI 304 or equivalent), located on the left side for mounting the door. The hinge pins must be straight and not protrude past the outside of the housing lugs. The housing must have 2 integral latching bolt lugs on the right side each with a stainless steel hinge pin to which a latching bolt (AISI 304 or equivalent), washer, and wing nut will be attached. The wing nuts must be captive.
- (e) **Door.** The door must be a one piece ultraviolet stabilized polycarbonate resin of the specified color, injection molded complete with a minimum thickness of 0.1 inch. Two hinge lugs on the left side and 2 sets of latch screw jaws centered on the right side, as viewed from the front of the signal, must be integrally cast with the housing door. The door must be hinged to the housing with 2 stainless steel hinge pins, drive fitted. Two stainless steel latch screws and wing nuts and washer assemblies on the latch side of the housing body must provide for opening and closing the door without the use of tools.

The inside of the door must be grooved to accommodate a one piece, air-cored ethylene propylene diene monomer (EPDM) gasket to provide a weatherproof and dust proof seal when the door is closed. The outside of the door must have an integral rim completely encircling the opening to prevent leakage between the door and the LED module. The rim must have equally spaced tabs around the circumference with threaded metal inserts for the visor attachment.

(f) Gaskets. Wherever necessary to make a completely dust-proof, moisture-proof and weatherproof assembly of the housing and optical system, approved type gaskets of neoprene or silicone rubber shall be provided.

LED OPTICAL MODULES

4. (a) Light emitting diode (LED) optical modules must consist of an integral unit containing the following components: power leads, housing, integral lens, matrix of light emitting diodes (LEDs) emitting monochromatic light of desired colors, and electronic and electrical components necessary to permit operation at nominal 120 volt, 60 hertz power. All units shall form a neat compact unit within the housing body with no light leakage between the door and the housing body.
- (b) The LED unit shall meet the applicable requirements of ITE's LED Pedestrian Traffic Control Modules. During the required operating life of LED signal units, the luminance output of the units must not be less than 60% of the values specified in the standard.
- (c) LED module power supply must be constant current regulated and filtered to provide instant on indications, and to prevent momentary signal outages or flicker.
- (d) Modules shall consist of LEDs uniformly distributed to present a homogeneous appearance on the face of the lens from a wide viewing angle.
- (e) LEDs shall be wired so that the loss of a single LED or a string of LEDs will not reduce the luminescence below the minimum requirement.
- (f) For purposes of this specification, failure of a single unit is defined as an occurrence where the luminescence of the signal measured in candela in standard test procedures is less than the required initial luminance or luminance at time points and conditions specified; or where minimum required brightness is achieved, but 2 or more series strings of LEDs or in excess of 20% of LEDs are not operable.
- (g) LED modules must be fully operable over a range of 90 volts to 130 volts at 60 hertz $\pm$ 3 hertz.

- (h) Surge protection. Each unit must be provided with integral surge protection to withstand a transient of 600 volt, 100 microsecond rise and 1 millisecond pulse width. The surge protector shall provide full electrical and physical protection to all unit components.
- (i) Maximum permissible power consumption at ambient conditions (nominal 120 volts, 60 hertz, 70°F.) must be 18 watts at a minimum 90% power factor. Power consumed must not vary by more than 10% from nominal power consumption over a voltage range of 105 volts to 125 volts, and over permissible environmental ranges.
- (j) Modules must be fully operable at temperature ranges of -40°F. (-40°C.) to +165°F. (+74°C.) at up to 100% relative humidity.
- (k) Modules shall be clearly marked on the back surface of the unit in a permanent manner showing information required for warranty and long term performance. Information to be shown must include manufacturer name, date of manufacture, electric power requirements, signal model type, and signal serial number.
- (l) The LED module shall be compatible with all traffic signal controller equipment currently in use by the City of Chicago, and meeting the City's latest specifications for traffic signal control equipment. In particular the LED unit shall be compatible with the NEMA TS-1 and later traffic signal load switches and conflict monitors.
- (m) Modules shall meet applicable sections of Title 47, Sub-Part B, Section 15 of the Federal Communications Commission (FCC) rules as applies to electronic noise limitation and electromagnetic interference.
- (n) Total harmonic distortion (THD) induced into the voltage and current AC power line sine waves must not exceed 20%.
- (o) Burn-in. LED Optical modules must be energized for a minimum 24 hour burn-in at 100% on-time duty cycle.

DISPLAY

- 5. (a) The message area shall be approximately 16 inches square and display the double overlay "Don't Walk" and "Walk" symbols immediately adjacent to the countdown digits. The symbols shall be applied in such a manner as to provide an opaque polycarbonate background and illuminated legends.

- (b) Symbolic Messages. Symbols for "Walk" (Man) and "Don't Walk" (Hand) must conform in style and color to those of ITE. The symbols must not be less than 9.5 inches high with proportional width. The "Don't Walk" symbol must be Portland orange, and the "Walk" symbol must be of lunar white, conforming to the specifications of the ITE/PTCSI.
- (c) Countdown Digits. Countdown digits must be Portland orange and not less than 9 inches high with proportional width and shall be compliant with latest ITE standards.
- (d) The module message surface shall be constructed of ultraviolet (UV) stabilized, impact resistant polycarbonate, acrylic or other approved material. The surface must be anti-glare, smooth texture, and clear.

WIRING

6. (a) Wire Leads. Each module connector must be furnished with 3 wire leads color coded as follows:

White	-	Common
Red	-	"Don't Walk" Indication
Green	-	"Walk" Indication

The leads must be No.18 AWG, stranded copper wire rated at 600 volt and 105°C., with thermoplastic insulation. The ends of the leads must be stripped of 0.5 inches of insulation and tinned. The leads must be splice-free and connected to one side of the terminal strip.

- (b) Terminal Strip. A four terminal, eight point, barrier type terminal strip with solid base and pressure plate type connectors must be securely attached at each end to the housing body inside the walk section.
- (c) Cable. One 11 foot length of flexible electric cord, medium duty, type SO, 3-conductor No. 16 AWG stranded copper, with color coded insulation, and an overall jacket, must be furnished with each pedestrian signal. Both ends of each cable length must be carefully stripped of 6 inches of jacket and 1 inch of insulation, and each conductor properly tinned.

COUNTDOWN FUNCTIONALITY

7. (a) The countdown unit shall be compatible with all traffic signal controller equipment currently in use by the City of Chicago, and meeting the City's latest specifications for traffic signal control equipment.
- (b) The countdown timer must have a micro-processor capable of recording its own time when connected to a traffic controller.

- (c) The countdown timer unit must continuously monitor the traffic controller for any changes to the pedestrian phase time and re-program itself automatically as needed.
- (d) The countdown unit must register the time for the walk and clearance intervals individually and must begin counting down at the beginning of the pedestrian change interval (flashing hand).
- (e) At the end of the pedestrian change interval, the unit must display A0" and the blank out. The display must remain dark until the beginning of the next countdown.
- (f) In the event of a preemption sequence, the countdown unit must skip the pre-empted clearance time and reach "0" at the end of the pedestrian change interval.
- (g) The countdown must remain synchronized with signal indications and always reach A0" at the end of the pedestrian change interval.
- (h) The countdown must not display an erroneous or conflicting time when subjected to defective load switches.

TESTING AND DOCUMENTATION REQUIREMENTS

- 8. (a) Documentation. The contractor shall provide certified manufacturing and testing documentation to demonstrate that the traffic signals being supplied meet or exceed the specification requirements. All LED Optical modules shall be tested by a nationally recognized testing laboratory (NRTL), such as Intertek (ETL division), to demonstrate compliance with the latest ITE VTCSH specification. All LED modules shall have the testing laboratory's label attached.
- (b) Inspection. The signals will be subject to inspection at the discretion of the Commissioner. Final inspection shall be made at point of delivery. Any signal rejected must be removed, disposed of, and replaced by the contractor at his sole cost.

(c) Warranty. The manufacturer shall warrant the signals to meet the requirements of this specification, and must warrant all equipment, components, parts and appurtenances against defective design, material and workmanship for a period of 3 years from date of delivery [date of acceptance for contract construction]. In addition, LED optical modules must carry a 7 year warranty against failure or loss of color (chromaticity) and signal brightness (luminance) below minimum acceptable PTCSI standard levels from date of delivery [date of acceptance for contract construction]. In the event defects and failures occur in the LED units during the warranty period, the manufacturer must replace such units at no expense to the City. This warranty shall be evidenced by a letter or certificate of warranty submitted to the City at the time delivery is made. The LED warranty must cover all units delivered in an order or installed by contract, and must include unit serial numbers. The warranty must be signed and dated by an official of the manufacturer who is empowered by the manufacturer to enter into such a warranty.

PACKAGING

9. (a) Packing. Each pedestrian signal assembly shall be packed in a suitable carton so secured that the signal will not be damaged during shipment, handling or storage.
- (b) Marking. Each carton containing a pedestrian signal shall be clearly marked on the outside in letters not less than 3/8 inch tall with the legend: "PEDESTRIAN SIGNAL, COUNTDOWN, SIXTEEN-INCH, SYMBOLIC LED WALK-DON'T WALK@, the name of the manufacturer, the date of manufacture, the pertinent Contract Number and the appropriate City Commodity Code Number.

NEMA TS2-2 SUPER P CABINET WITH ADVANCED TRANSPORTATION CONTROLLER AND UNINTERRUPTIBLE POWER SUPPLY

1. GENERAL REQUIREMENTS

1.1 This specification details the requirements for traffic signal control equipment for use in the City of Chicago. This equipment shall control traffic signal timing and sequencing at an intersection. The equipment shall include a battery back-up system which will maintain power to the signals during a power failure.

1.2 (For contract construction only) If requested by the City, the contractor shall provide a sample to the Division of Electrical Operations, 2451 South Ashland Avenue, Chicago, Illinois 60608. The sample shall consist of the controller, cabinet, load switches, conflict monitor and all appurtenant wiring and equipment completely assembled as a working unit. This sample will be regarded as a finished production sample and conformance or non-conformance to these specifications will be based on the sample submitted.

(For City commodity contract only) If requested by the Chief Procurement Officer, within thirty (30) days from the receipt of such request, the bidder shall provide a sample to the Division of Electrical Operations, 2451 South Ashland Avenue, Chicago, Illinois 60608. The sample shall consist of the controller, cabinet, load switches, conflict monitor and all appurtenant wiring and equipment completely assembled as a working unit. If the sample is acceptable and the bidder is awarded a contract, the sample will become the property of the City of Chicago with a suitable credit issued to the contract.

1.3 All tests as outlined herein shall be regarded as minimum requirements. The contractor shall submit his testing procedure for approval prior to performing any testing functions. Upon successful completion of all testing, certified test reports shall be submitted for each unit. Units not successfully passing these tests or lacking proper documentation will be rejected. The manufacturer, or manufacturer's representative, must be available for shop testing at the City's facilities.

1.4 Standards. Equipment furnished under this specification shall meet the appropriate requirements of the following standards, as required within the body of this specification:

American Association of State Highway and Transportation Officials (AASHTO)
American Society for Testing and Materials (ASTM)
Institute of Transportation Engineers (ITE)
Manual on Uniform Traffic Control Devices (MUTCD) National
Electrical Manufacturers Association (NEMA) Occupational
Safety and Health Administration (OSHA) Underwriters
Laboratories (UL)

1.5 Standard Drawings. The Electrical Standard Drawing 962 "Load Switch and Conflict Assignment", Electrical Standard Drawing 964 "Traffic Controller Cabinet Back Panel and Power Supply, 1 of 2", and Electrical Standard Drawing 965 "Traffic Controller Cabinet Back Panel and Power Supply, 2 of 2" are integral parts of this specification.

1.6 Warranty. The manufacturer(s) shall warranty the performance and construction of the traffic signal controller and other major components to meet the requirements of this specification, and must warranty all parts, components, and appurtenances against defects in design, material, and workmanship for a period of one (1) year after acceptance by the City. In the event of defects or failures during this period, the manufacturer(s) must repair and/or replace all defective or failed parts or appurtenances at no expense to the City.

1.7 Manufacturer. The manufacturer of the cabinet and controller and the manufacturer of the battery back-up system must demonstrate a knowledge of past production, or have been actively engaged in the sale and/or service of the equipment herein described, as demonstrated by a submitted list of comparable projects.

2. CONTROLLER REQUIREMENTS

2.1 ATC. The controller shall be an Advanced Transportation Controller (ATC) meeting the requirements of the specification "Advanced Transportation Controller (ATC) Standard Version 5.2b" dated June 26, 2006 and the requirements of NEMA TS2-2003. The referenced ATC specification is a joint effort of AASTHO, NEMA, and ITE. Since each user agency has different controller needs, for the City of Chicago, the controller shall meet the programming modifications and options listed in the ATC Matrix as indicated in Table A. All software necessary to make the controller operational shall be included.

2.2 Power. The controller shall operate on 120 volt, 60 cycle (± 3 Hertz), single phase, alternating current. The controller shall function in the range from 89 to 135 Volts a.c. The power consumed must be under 50VA.

2.3 Packing. (For City commodity contracts only) Each controller, with all its component parts, shall be suitably packed in a single container in such a manner as to prevent damage to the contents in shipment and handling.

2.4 Instructions. One (1) complete set of up to date instructions providing complete information on installation, adjustment, operation and maintenance, including both up to date "Logic Schematics" and "Electronic Circuit" diagrams, of these controllers, shall be furnished to the Division of Electrical Operations for approval prior to the first shipment of controllers. All information, including photos and schematics, shall reference to the controller being furnished on this contract and must be a high quality, completely legible reproduction. Upon approval, one complete set of data must be furnished with each controller.

2.5 Training. If requested, the contractor shall provide training at the City's facilities. The training must be on the actual equipment provided under the contract, and must include, but not be limited to, programming all features, connecting and wiring, and troubleshooting. Training manuals are required (training manuals should include the instructions in a teaching-type format). Training shall be structured for both field personnel and shop personnel. The manufacturer shall provide all material and equipment necessary for the training.

2.6 Chassis. The chassis shall be aluminum with a powder coat finish. No plastic chassis or composite chassis will be allowed. The controller must physically fit into existing 'M', 'P', and 'SUPER P' cabinets configured for City of Chicago applications, so that retrofitting will not be a problem. The controller must not exceed the following dimensions:
10.5 inches high, 10.5 inches deep, and 15 inches wide.

2.7 Processor / Memory. At a minimum, the processor will be:

Clock speed - 300MHz

Non-volatile Memory - 32MB Flash

DRAM - 64MB

SRAM - 1MB

(All memory and firmware must be stored in flash memory. No EPROMS will be allowed.)

2.8 Display. The display shall be a 16 x 40 backlit LCD using a 6 x 8 character font. Display and keypad must be permanently attached to chassis. Detachable keypads will not be allowed.

2.9 Environmental. The controller shall operate in the temperature range of -34° Celsius to +74° Celsius. The controller shall operate within the relative humidity of 5% to 95%.

2.10 All printed circuit boards shall be mounted vertically.

2.11 Encapsulation of 2 or more discrete components into circuit modules is prohibited except for transient suppression circuits, resistor networks, diode arrays, solid-state switches, optical isolators and transistor arrays. All encapsulated components must be second sourced and must be of such design, fabrication, nomenclature or other identification as to be purchased from a wholesale distributor or from the component's manufacturer as a standard product. Custom encapsulated components are not allowed.

2.12 Obsolete components, components no longer supported by the manufacturer, components not recommended for new designs, components which have been discontinued or which the contractor should have reasonably been expected to know were discontinued, or components which the vendor/manufacturer has announced plans to discontinue at the time of the bid/contract must not be used in the design of any subassemblies provided under this contract.

2.13 The controller shall meet the functional and environmental requirements of NEMA TS2 2003. The use of 2070s, 170s, BIUs, SIUs, or similar devices is not allowed.

2.14 As allowed by ATC v5.2b, Section 8.1.1, the controller will utilize NEMA 'A', 'B', and 'C' I/O connectors, except for the HMC-1000 and LMD40 I/O variants. Pin assignments for NEMA 'A', 'B', and 'C' connectors shall follow the NEMA TS2 2003 standards for I/O. Port 2 must be the ATC v5.2b pin-limited version of NEMA TS2 Port 2. Port 4 (C50S) must be a 9-pin connector with only limited signals being required.

Special function connector for the TS2-2 shall follow the CPC style “D” pin outs as follows:

CPC MSD Pin	Function
1	Flash
2	Offset 1
3	Interconnect Common
4	User defined input 6
5	Offset 2
6	Offset 3
7	Time Plan A
8	User defined input 7
9	User defined input 8
10	Call to Free
11	Call to week 10
12	Time Plan B
13	Time Plan C
14	Time Plan D
15	Alt Seq A
16	Alt Seq B
17	Alt Seq C
18	Dimming
19	Monitor status bit C
20	System Input
21	Alt Seq D
22	Monitor status bit A
23	Monitor status bit B
24	Veh Det 13
25	Veh Det 9
26	Veh Det 10
27	Veh Det 11
28	Polarizing Pin
29	Veh Det 12
30	Veh Det 14
31	Veh Det 15
32	Veh Det 16
33	SGO/Conditional Service
34	Preempt input 5
35	Preempt output 1
36	Preempt output 2
37	Interconnect inhibit
38	Time Clock sync
39	Sync inhibit
40	Preempt input 1
41	Preempt input 2
42	Preempt input 3
43	Preempt output 3
44	Polarizing Pin

45	Preempt output 4
46	Preempt output 5
47	System Out
48	Preempt output 6
49	Preempt input 4
50	Clock Ckt 9 (Aux 1)
51	Clock Ckt 10 (Aux 2)
52	Clock Ckt 11 (Aux 3)
53	Clock Ckt 12 (Aux 4)
54	Clock Ckt 13 (System)
55	Clock Ckt 8 (Flash)
56	Clock Ckt 3 (Offset 1)
57	Clock Ckt 4 (Offset 2)
58	Clock Ckt 5 (Offset 3)
59	Clock Ckt 1 (T/P A)
60	Clock Ckt 2 (T/P B)
61	Clock Ckt 6 (T/P C)
62	Clock Ckt 7 (T/P D)
63	Preempt input 6

2.15 Downward compatibility with existing City of Chicago cabinets.

- (1) The controller shall be of a modular design allowing for the ability to exchange I/O modules to allow for use in existing City of Chicago HMC- 1000, LMD40, and standard NEMA TS2-2 cabinets. This I/O module shall be “plug and play”. The controller’s firmware must detect the type of I/O installed (HMC-1000, LMD40 or NEMA TS2) and provide the proper user interface. Adapter harnesses for the HMC-1000, LMD40 and Setcon clock will not be allowed.
- (2) The HMC-1000 I/O module shall be pinned as follows:

63 Pin Connector	Function
1	Output 20
2	Output 11
3	Manual Advance
4	Stop Time
5	Output 24
6	Offset 1
7	Offset 3
8	Output 15
9	Preempt 2
10	Advance
11	Output 23
12	Restart

13	Output 32
14	Offset 2
15	Output 16
16	Preempt 1
17	Output 25
18	Output 28
19	Spare 1
20	Spare 2
21	Output 7
22	Output 18
23	Output 21
24	Output 22
25	Dial 3
26	Dial 2
27	Output 1
28	Output 14
29	Output 4
30	Output 29
31	Output 27
32	Output 17
33	Output 9
34	Output 19
35	Dial 4
36	On-Line
37	Flashing Bus
38	Manual
39	Output 30
40	Output 31
41	Output 12
42	Output 10
43	Output 2
44	Output 3
45	Output 13
46	Output 8
47	Output 26
48	Logic Ground
49	Not Used
50	Not Used
51	Output 5
52	Output 6
53	Logic Ground
54	Logic Ground
55	Not Used
56	Not Used
57	Not Used
58	Not Used
59	24 V.D.C
60	Not Used

61	115 Volts AC
62	AC Neutral
63	Chassis Ground

(3) The LMD40 I/O module contains 4 I/O connectors, MSA, MSB, MSD, and communications connectors which shall be pinned as follows:

LMD40 MSA	Pin	Voltage Level
Actuation 3	A	DC
24 V.D.C	B	DC
Voltage Monitor	C	DC
Actuation 1	D	DC
Actuation 2	E	DC
Preemption 2	F	DC
Preemption 1	G	DC
Interval Advance	H	DC
Stop Time	J	DC
MCE (Manual Control)	K	DC
External C/S/O	L	DC
Signal Plan 2	M	DC
Signal Plan 3	N	DC
System Cont/AZ Reset	P	DC
External Start	R	DC
Remote Flash (AC)	S	120 VAC
Interconnect Common	T	120 VAC
AC – (Common)	U	AC
Chassis Ground	V	Earth Ground
Logic Ground	W	DC Reference
Output 1	X	DC
Output 2	Y	DC
Output 3	Z	DC
Output 4	a	DC
Output 5	b	DC
Output 6	c	DC
Output 7	d	DC
Output 8	e	DC
Output 9	f	DC
Output 10	g	DC
Output 11	h	DC
Output 12	i	DC
Output 13	j	DC
Output 14	k	DC
Output 15	m	DC
Output 16	n	DC
AC+ input	p	120 VAC
Output 17	q	DC
Output 18	r	DC
Output 19	s	DC

Output 20	t	DC
Output 21	u	DC
Spare Output	v	DC
Spare Output	w	DC
Spare Output	x	DC
Cycle 2 (User Defined)	y	120 VAC
Cycle 3 (User Defined)	z	120 VAC
Split 2	AA	120 VAC
Split 3	BB	120 VAC
Output 22	CC	120 VAC
Output 23	DD	120 VAC
Offset 1	EE	120 VAC
Offset 2	FF	120 VAC
Offset 3 (user def 1)	GG	120 VAC
Output 24	HH	DC

LMD40 MSB	Pin	Voltage
Output 25	A	DC
Output 26	B	DC
Output 27	C	DC
Output 28	D	DC
Output 29	E	DC
Output 30	F	DC
Output 31	G	DC
Output 32	H	DC
Output 33	J	DC
Output 34	K	DC
Output 35	L	DC
Output 36	M	DC
Output 37	N	DC
Output 38	P	DC
Output 39	R	DC
Output 40	S	DC
Actuation 4	T	DC
Hold	U	DC
Force Off	V	DC

LMD40 MSD	Pin	Voltage
Flash Monitor 1	1	120 VAC
Cycle 5	2	120 VAC
PE Clear 1	3	DC
PE Clear 3	4	DC
Flash Monitor 2	5	120 VAC
Spare Input 4	6	120 VAC
System Input	7	120 VAC
AZ Reset (Absolute Zero)	8	DC

PE Clear 2	9	DC
UD 6 Input	10	DC
Call to week 10	11	DC
Signal Plan 6	12	DC
Signal Plan 7	13	DC
Signal Plan 8	14	DC
Actuation 5	15	DC
Actuation 6	16	DC
Actuation 7	17	DC
Spare input 1	18	DC
UD 7 Input	19	DC
Actuation 8	20	DC
Actuation 9	21	DC
Actuation 10	22	DC
Spare input 2	23	DC
UD 8 input	24	DC
Sys Command (Ckt 13)	25	DC
Flash Attained	26	DC
PE Active	27	DC
Polarization	28	DC
System Out	29	DC
Preempt input 3	30	DC
Preempt input 4	31	DC
Preempt input 5	32	DC
Signal Plan 5 in	33	DC
Call to FREE op	34	DC
Output 41	35	DC
Output 42	36	DC
Interconnect Inhibit	37	DC
Spare input 3	38	DC
Sync Inhibit	39	DC
Dimming	40	DC
Added Time inhibit	41	DC
Time Clock Sync	42	DC
Output 43	43	DC
Polarization	44	DC
Output 44	45	DC
Output 45	46	DC
Output 46	47	DC
Output 47	48	DC
Signal Plan 4	49	DC
Aux 1 (Ckt 9)	50	DC
Aux 2 (Ckt 10)	51	DC
Aux 3 (Ckt 11)	52	DC
Aux 4 (Ckt 12)	53	DC
Output 48 (FF Enable)	54	DC
Flash Out (Ckt 8)	55	DC
Offset 1 (Ckt 3)	56	DC

Offset 2 (Ckt 4)	57	DC
Offset 3 (Ckt 5)	58	DC
Cycle 2 (Ckt 1)	59	DC
Cycle 3 (Ckt 2)	60	DC
Split 2 (Ckt 6)	61	DC
Split 3 (Ckt 7)	62	DC
Fast Flash Image	63	DC

LMD40 Communication Connector (15 pin sub-D)	PIN	Voltage
System Detector 11	1	DC
System Detector 12	2	DC
System Detector 13	3	DC
System Detector 14	4	DC
System Detector 15	5	DC
System Detector 16	6	DC
System Detector 17	7	DC
System Detector 18	8	DC
Monitor Status bit B	9	DC
Monitor Status bit A	10	DC
Monitor Status bit C	11	DC
DC User Defined in #1	12	DC
Logic Ground	13	DC
DC User Defined in #2	14	DC
DC User Defined in #3	15	DC

- (4) The Setcon I/O connector will be resident on the HMC1000 version of the ASTC I/O.

Setcon Clock Connector	PIN	Voltage
Output 1	1	DC
Output 2 (Dial 2)	2	DC
Output 3 (Dial 3)	3	DC
Output 4 (Dial 4)	4	DC
Output 5 (Offset 1)	5	DC
Output 6 (Offset 2)	6	DC
Output 7 (Offset 3)	7	DC
Output 8 (Flash)	8	DC
Sync Output	9	DC
Sync Input	10	DC
Not used	11	N/A
Logic Ground	12	DC
Not Used	13	N/A
Not Used	14	N/A
Not Used	15	N/A
Not Used	16	N/A

2.16 Communication.

- (1) NTCIP (National Transportation Communications for ITS Protocol).
 - a. The controller shall be compliant with NTCIP Standards as outlined in NEMA TS2 – 2003 and must be tested and documented for compliance.
 - b. Global objects shall be compliant to NTCIP 1201 v2.26 or later.
 - c. Actuated Signal Controller objects shall be compliant to NTCIP 1202 v2.19f or later.
- (2) Serial ports, one of which must be set as either RS-232 or RS-485.
- (3) Ability to add an internal GPS module.
- (4) Ethernet. The controller must be equipped with a minimum of two front panel mounted 10/100Mb Ethernet ports.
- (5) A single port USB interface must be provided to facilitate database transfers, re-flashing of operation software and log transfer.
- (6) The unit must be fully compatible with, and fully functional within, the City's existing traffic signal management system. All available functions and capabilities that exist within existing controllers must be available within this unit, as well as compatible with the ATC LMD40 unit and the ATC NEMA unit. Any additional software or hardware necessary to fully integrate the controller into the City's traffic signal management system must be provided by the bidder/contractor and will be considered as part of the requirements of this specification.
- (7) Windows based laptop utility software must be provided for data transfers and monitoring of controller operation.
- (8) A fiber-optic modem shall be provided, if required. The modem must be compatible with existing City fiber interconnect systems. The modem may be internal or external to the controller.

2.17 Software operation.

- (1) The controller shall have the ability to re-synch a minimum of 8 cycle lengths to an "absolute zero" reference point. It must be possible to set absolute zero by either global command or individual cycle length.
- (2) In addition to hardwire input, it shall be possible to set Absolute Zero via keyboard command or fiber optic communication.

(3) The controller shall have the ability to operate in two modes of operation, selectable by time of day:

- a. Actuated control per NEMA TS2 – 2003.
- b. Pre-timed Interval based control per NEMA TS2 – 2003.

(4) The controller shall have the ability to transfer between actuated control and interval based control by time of day schedule.

(5) The controller will have 32 Pre-timed plans

- a. Each plan will allow for up to 32 timing intervals
- b. Each plan will allow for 64 circuit outputs. Each output must be individually programmable per interval.

(6) The controller shall have 100 coordination plans.

(7) The controller shall provide 6 preempts per NEMA TS2-2003.

(8) The controller shall offer security as follows:

- a. Two 4 digit security codes can be programmed (one for timing data, one for signal plan data), which when activated, allow data changes. These codes must automatically deactivate 10 minutes after the last user keystroke. It will be possible to re-program the security codes if the previous security code is known or has been defeated.
- b. It must not be possible to read the security code from the controller's display.
- c. It must be possible to access the controller in the case of a lost security code through a "back door" which is provided only by the controller manufacturer. This "back door" security code must change based upon the controller's internal calendar.

3. CONFLICT MONITOR

3.1 General. Each controller shall be furnished with a NEMA conflict monitor unit for checking for conflicts in the signal output circuits. The conflict monitor shall be capable of monitoring a minimum of twelve (12) distinct channels. It must be a self-contained unit with its own power supply and not be located within the timer housing.

3.2 Programming Board. A removable programming board shall be supplied with the monitor for programming signal compatibility. The circuits for programming must be composed of soldered jumper wires. Diode or dip switch type programming will not be acceptable. The programming board must contain no circuitry or components other than the wire jumpers and the wire jumper soldering devices.

3.3 Flashing Circuit Energizing. The conflict monitor shall be programmed to put the controller in a flashing sequence upon detection of a failure or conflicting signal display. The controller must also be programmed to energize the flash circuit if the conflict monitor is removed or loses its supply voltage. The conflict monitor must have a manual reset button to return the controller to normal operation after conflict circuit operation is no longer necessary.

3.4 Stop Time Circuit. A stop-time control circuit shall be supplied from the conflict monitor to force the timer unit to stop timing upon detection of a conflict.

3.5 Indicator. The front panel of the conflict monitor housing shall have an indicator which will be activated when a conflict or failure occurs as per Section 6 of NEMA Spec. TS1-1983.

3.6 Latch Circuit. The conflict monitor shall have a latch circuit, insuring that if a voltage monitor failure occurs, the intersection remains in conflict until reset.

3.7 Memory. The conflict monitor shall have the ability to store, in memory, a minimum of ninety-nine (99) conflict events, including date of conflict and channels conflicting.

3.8 Conflict Monitor Assignments

(1) Conflict monitor channels shall be assigned as follows:

Channel 1	Load Switch 1	Phase 1 Vehicle
Channel 2	Load Switch 2	Phase 2 Vehicle
Channel 3	Load Switch 3	Phase 3 Vehicle
Channel 4	Load Switch 4	Phase 4 Vehicle
Channel 5	Load Switch 5	Phase 5 Vehicle
Channel 6	Load Switch 6	Phase 6 Vehicle
Channel 7	Load Switch 7	Phase 7 Vehicle
Channel 8	Load Switch 8	Phase 8 Vehicle
Channel 2W	Load Switch 9	Phase 2 Ped
Channel 4W	Load Switch 10	Phase 4 Ped
Channel 6W	Load Switch 11	Phase 6 Ped
Channel 8W	Load Switch 12	Phase 8 Ped
Channel 9	Load Switch 13	Overlap A
Channel 10	Load Switch 14	Overlap B
Channel 11	Load Switch 15	Overlap C
Channel 12	Load Switch 16	Overlap D

(2) It shall be possible for the user to change conflict assignments without unsoldering any connections.

(3) All unused channels - vehicle or pedestrian - must be neatly tied or terminal mounted in such a manner that they are readily available in front of the panel. If tied, the harness wires must be labeled. If terminal mounted, the terminations must be labeled.

(4) A terminal shall be provided for the red enable feature.

(5) A terminal shall be provided for the hook up of any unused red channels to AC.

(6) Controller monitoring shall consist of; voltage monitor, 24VDC-I, 24VDC-II.

(7) The output relay shall operate a sixty (60) ampere, normally open, "A" type contactor without the use of an external or "cabinet interface" relay.

4. SUPER P CABINET

4.1 Housing. Each controller shall be furnished completely housed in a Type 5052- H32 aluminum housing of 0.125 inch thickness. The exterior dimensions of the cabinet shall be approximately 57 inches high, 58 inches wide, and 27 inches deep. The top of the cabinet shall be approximately 58 inches wide and 29 inches deep. The top of the cabinet must have a front to rear slope that will direct rain away from the front cabinet door. Door openings must be double-flanged. The interior of the cabinet will be divided into two compartments. The interior of the main cabinet shall be equipped with four (4) "C" mounting channels on both side walls and two (2) "C" mounting channels on the rear wall. The UPS portion of the cabinet shall be equipped with two (2) "C" mounting channels on each of the two side walls. All shelves, panels and individual equipment items must be mounted to these channels using 1.0" channel nuts with 1/4-20 bolts. All items mounted on panels must be securely fastened by bolting into drilled and tapped holes. No pop rivet or similar fastening methods will be accepted.

4.2 Doors. The cabinet shall have a main door hinged with one-quarter inch (1/4") minimum, continuous, removable stainless steel pins. The hinges themselves will be aluminum secured to the cabinet with stainless steel bolts. The battery compartment door on the side of the cabinet must be similarly hinged. The main cabinet door will be hinged on the right side. The battery compartment door will be hinged on the left side. The doors must be closely fitted to a neoprene gasket making the doors dust, water and weather resistant. The doors must be interchangeable with any other doors from any other controller.

Opening of the main door must provide complete access to the cabinet interior. The door shall be embossed, subject to approval, with the legend "CITY OF CHICAGO-TRAFFIC CONTROL" in letters at least one (1) inch high. The main door and the battery compartment door must have stops at 90, 150 and 180 degrees, from the closed position. The door latches must have three (3) point locking with rollers at the ends of the latch rods. The latch handle must be capable of being padlocked. The key lock for the latch mechanism must be a Corbin cylinder lock with keys to match existing City of Chicago controller cabinets. Two (2) keys must be furnished with each cabinet. Both the main door and the battery compartment door will have stainless steel handles with an 8" shank. The handles must be able to be padlocked. The padlocking arrangement must clear the lock and key.

Police Panel Door. The police panel door on the main door shall be furnished with a lock for a modified Chicago police key per sample to be furnished to the supplier. This key must have a shaft of at least one and three quarter inches (1-3/4") in length. Two keys must be furnished with each cabinet. The door will have a stainless steel piano hinge and be sealed with a neoprene gasket.

Generator Door. This door will be on the rear of the cabinet. This door will have a stainless steel piano hinge and be sealed with a neoprene gasket. Two keys will be furnished for this door.

4.3 Cabinet Ventilation. The main cabinet compartment shall be provided with a mounting assembly to hold the forced air fan system. A fan, having a minimum air movement capacity of 100 CFM, shall be mounted in the air baffle in the top of the cabinet with an air outlet built into the roof overhang. The main door must be louvered and equipped with a removable, standard, commercially available aluminum dust filter. The battery compartment shall have a similar fan system. The battery compartment door must also have a louvered section with a removable dust filter. The ventilation openings must be equipped with removable covers for summer operation. No external fan housings or air outlets will be allowed. Any other method must be approved.

4.4 Shelves. The cabinet shall contain a vertically adjustable shelf large enough to accept the solid state controller and all other shelf mounted devices. The battery compartment shall have a minimum of three shelves.

4.5 Bolt Pattern. The bolt pattern shall be a four (4) point rectangular pattern matching the corresponding foundation. The dimensions will be 40.75" center-to-center and 18.5" center-to-center.

4.6 Finish. The exterior surfaces of the cabinet must be smooth. All drilled, tapped, or punched holes on the outer surface must be filled with liquid metal and ground smooth, and slotted screw heads must be ground smooth flush with surface. Bolts extending through cabinet wall must be round head, carriage, square shoulder type and fastened on the inside of the cabinet with an Esna nut and necessary gaskets to insure the weatherproofing integrity of the cabinet. The finished cabinet must be thoroughly degreased in a wash process and dried in a heated chamber. A thermosetting, ultra violet resistant, polyester powder coat must be electrostatically applied to all cleaned and treated surfaces and cured to a hard, mar resistant finish in a heated chamber at a temperature recommended by the powder coat paint manufacturer. Exterior color must conform to Federal Standard 595 #17038 for gloss black. Cabinet interior must be glossy white and may be either baked enamel or thermosetting, polyester powder coat. For either process, the interior must be prepared as described above. If the baked enamel finish is used, it must be preceded by one (1) coat of primer.

5. POWER SUPPLY

5.1 A sixty (60) ampere main breaker shall be inserted in series with the line.

5.2 An un-fused terminal bus shall be provided for ground side of the power supply and signal conductor commons.

5.3 Individual circuit breakers shall be supplied for: (a) AC+ lights, 50 amperes; (b) AC+ control, 10 amperes; (c) duplex outlet supply, 15 amperes.

5.4 The incoming line shall contain lightning protection devices consisting of, but not limited to, a metal oxide varistor and gas type arrestor. The gas type arrestor must be on the line side of the radio interference filter.

5.5 Contactor. A sixty (60) ampere, normally open, "A" type contactor shall be supplied for opening and closing the AC supply to the signal bus. The contactor must be mounted in such a manner on the power supply panel that accidental contact does not produce a safety hazard.

5.6 R.I.S. Filter. A radio interference suppression filter rated at sixty (60) amperes minimum shall be installed in line with the main power supply, after the sixty (60) ampere circuit breaker.

5.7 Ground. The grounded side of the power supply must be continuous throughout the controller and must be grounded to the controller cabinet in an approved manner meeting OSHA requirements.

5.8 Polarity. The phase conductors of the signal circuits shall have the same polarity as the phase side of the power supply, and the common conductor(s) shall be of the same polarity as the grounded side of the power supply.

6. UNINTERRUPTIBLE POWER SUPPLY

6.1 General. The uninterruptible power supply (UPS) will consist of batteries which will recharge through the 120 volt electric service line. In the event of a power disruption, the unit will automatically activate. The transfer from utility power to battery power will not interfere with the normal operations of the traffic controller, conflict monitor, or any other part of the traffic system. A generator port will be provided to accept input from an external generator that can operate the traffic signals. The UPS must be the product of an established manufacturer, and suitable for the service required. The UPS must be manufactured by an established manufacturer who has been in the business for a minimum of five (5) years.

6.2 General Operation

(1) The line power provided by ComEd is nominally 120 volt, single phase, 60 Hertz. The UPS system must take the line power, regulate it, and provide continuous 120 volt, single phase, 60 hertz power to the traffic system. The UPS must regulate the input line voltage within the limits specified herein. The input line voltage must also be transformed and rectified to charge the batteries. Under battery operation, the output from the batteries will go through an inverter to provide the proper A.C. current to provide continuous 120 volt, single cycle, 60 Hertz power to the traffic system. In the event of a power loss, the system must automatically switch to battery operation, without adversely affecting the traffic system. When power is restored, the system must automatically switch back without adversely affecting the traffic system. In the event the UPS system fails, an automatic switch must bypass the UPS and connect unconditioned power from ComEd directly to the traffic system. A manual bypass switch shall also be provided. The system shall be capable of running off a generator. The UPS will allow the generator to be put in or out of the system without adversely affecting the traffic system.

(2) The system will be capable of providing power for normal full timing mode, flash mode, or a combination of both. The operation will be field programmable to activate at various times, to change operation due to changing battery capacities, and to track alarm conditions, using the touch pad or remotely using the RS-232 interface. Programmability shall be in ASCII formats and shall not require any external or proprietary software. The DB-9 connector for the RS-232 interface shall be located on the front panel of the UPS. The UPS must provide a minimum of 4 hours of full normal timing for a full LED controlled intersection.

(3) In the event ComEd line voltage falls outside the high and low limits (95VAC and 130VAC should be the default values) the UPS must transfer the load to battery power.

The high and low limits shall be programmable.

(4) The UPS must return to line mode when the ComEd power is restored within the proper limits for a specified period of time. The limits shall be programmable. The default values should be 105VAC and 125VAC. This time shall be programmable and should range from 3 to 30 seconds.

(5) The transfer time allowed, from disruption of normal utility line voltage to batteries or from batteries back to line voltage, must be such that the traffic signal system is not disrupted. The maximum transfer time allowed will be 60 milliseconds.

6.3 Specifications

- (1) The UPS capacity will be a minimum of 2000VoltAmps/ 1500 watts.
- (2) The inverter shall have a minimum efficiency of 80%.
- (3) The UPS will have an operating range of between -37°C. to +74°C.
- (4) The manual bypass switch shall be rated at 240 volts, 40 amps.
- (5) The UPS shall have a temperature compensated battery charging system. The charging system must compensate over a range of 2.5mV to 4 mV per degree centigrade per cell. Batteries must not be charged when temperatures exceed 50°C. The temperature sensor shall be located in the cabinet near the batteries.
- (6) The charger shall be rated at 10 amps at 48 VDC.
- (7) When under battery operation the UPS output voltage must be between 110 VAC and 125VAC, with a sine wave with THD less than 3% at 60 Hertz (± 3 Hz).
- (8) The UPS shall be equipped to prevent a malfunction feedback to the utility service or to the cabinet per UL 1778, Section 48 "Back-Feed Protection Test". The upstream back-feed voltage from the UPS must be less than 1 volt AC.
- (9) The UPS shall have a lightning surge protection in compliance with IEEE/ ANSI C.62.41 for 2000 volts AC.
- (10) The UPS shall not weigh more than 50 pounds.
- (11) The UPS shall have a minimum efficiency of 95%.
- (12) The generator bypass switch shall be supplied with a 30 amp, weather-proof locking receptacle and cover plate.

6.4 Computer Control and Display

- (1) The UPS shall include an LCD display with programmable keypad, a red LED and a green LED, and an RS-232 interface.
- (2) The UPS processor shall be capable of indicating, through the LCD display or the RS-232 interface, the current battery charge status, various input/output voltages, power output, battery temperature, date, time, settings of programmable relays, events, and various other functions.
- (3) The UPS shall provide a temperature control for the cabinet fan.
- (4) The UPS shall be provided with a resettable inverter event counter and a cumulative inverter timer.
- (5) The UPS shall be equipped with an event log for a minimum of 100 events. Each event must have a date and time.
- (6) The UPS shall be capable of performing a self-test.
- (7) Password protection shall be provided.
- (8) The following LED conditions shall be used to indicate current status: RED
FLASHING - Alarm
RED STEADY - Fault
GREEN FLASHING - Battery Mode
GREEN STEADY - Line Mode
- (9) The manual UPS bypass switch will allow the UPS to be maintained or replaced.

6.5 Battery System

- (1) Individual batteries shall be 12 volt, and must be commercially available and easily replaced.
- (2) Four 79ah batteries shall be supplied.
- (3) The batteries will be connected in series. The wiring harness must be color coded and have quick disconnects.
- (4) Batteries must be certified to operate over a temperature range of -25° C. to +74° C.

- (5) The batteries shall be extreme temperature, deep cycle, sealed prismatic lead-calcium based AGM/VRLA (absorbed glass mat/valve regulated lead acid) .
- (6) Maximum recharge time from protective low cut-off to 80% of full capacity must not exceed 20 hours.
- (7) Thermostat controlled heater strips or pads shall be supplied to keep battery operation efficient.

6.6 Relay Contacts

- (1) The UPS shall provide 6 sets of panel-mounted, potential free, fully programmable relay contacts rated at 1 amp, 120 volt. The relays shall be numbered from C1 to C6.
- (2) Each relay shall be programmable to activate under any number of the following conditions:
 - ON BATTERY, relay activates when UPS switches to battery power.
 - LOW BATTERY, relay activates when batteries have reached a certain level of remaining capacity. This is adjustable from 0 to 100%.
 - TIMER, relay activates after battery power is on for a certain amount of time. This is adjustable from 0 to 8 hours.
 - ALARM, relay activates after a specific alarm is detected. Alarm conditions include line frequency, low output voltage, no temperature reading, overload, batteries not connected, high temperature, and low temperature.
 - FAULT, relay activates after a specific fault is detected. Fault conditions include short circuitry, low battery voltage, high battery voltage, high internal temperature, and excessive overload.
 - OFF, relay is not active.

7. **LOAD SWITCH BAY**

7.1 General. A panel shall be provided for mounting the load switch jacks, flash transfer relay jacks, flasher jack, auxiliary relays, time clock jacks, switches, flash change combination terminals, and terminals for field signal connections under non-interconnected operation. See Electrical Standard Drawings 964 and 965.

7.2 Wiring. Panel wiring must be neatly laced and properly terminated individual conductors. They must be insulated and properly sized for their application.

7.3 Load Circuits. Each load circuit shall be capable of carrying fifteen (15) amperes continuously at a temperature of 165° F. (74° C.).

7.4 Bus Feeds. Bus feeds shall be capable of carrying fifty (50) amperes continuously at a temperature of 165° F. (74° C.).

7.5 Equipment. In addition to the items listed in 2(a), the wiring panel shall include, but not be limited to, the following:

(1) Ten (10) ampere fuses with barrier type fuse holders shall be installed between the load switch signal output circuits and field terminals for signal light conductors. Each terminal shall be the barrier type with sufficiently long screws to accept four (4) #12 AWG solid conductors. The terminals must be located at least two inches (2") above the bottom of the cabinet.

(2) Switching Device. The signal load switching device shall be a three (3) circuit, solid state, jack mounted load switch which meets the N.E.M.A. Publication TS-1, Part 5 requirements. Each load switch shall be rated for a minimum fifteen (15) ampere continuous resistive load and must mate with an S-2412-SB panel socket. A minimum of twelve (12) and a maximum of sixteen (16) load switches to be provided with each cabinet, as defined in the contract.

(3) User Programmable Interface. Two (2) sets of terminal blocks shall be provided between the machine logic output and the input side of the load switches. By terminating all machine logic output on one set of terminals and all load switch input to the other set, an interface is thus created by which the machine logic can be readily connected to any of the load switches by means of a jumper wire. The two (2) sets of terminal blocks must be conveniently located in close proximity to each other and must be arranged such that, initially, each function will be factory wired directly from one set of terminals to the other without the need to criss-cross wires between blocks.

(4) Number of Signal Circuits:

a. Sixteen (16) load bay panel. Each panel shall be equipped with sixteen (16) load switch jacks for a minimum of forty-eight (48) signal circuits.

b. All unused signal circuits must be neatly tied or terminated. If tied, the harness wire must be labeled. If terminated, each termination must be identified.

7.6 Identification. All field terminals must be suitably identified, subject to approval.

8. FLASHING FEATURE

8.1 General. The flasher must be a solid state device, with no contact points or moving parts, producing between 50 and 60 flashes per minute with a 40 to 50 percent duty cycle. The flasher mechanism shall be mounted on a type P-406-SB plug which will mate with an S-406-SB socket on the controller panel. The flasher must utilize zero-point switching, with turn-on at the zero voltage point (± 5 degrees) of the power line sinusoid.

8.2 Flasher Panel. A panel must be provided with one (1) terminal wired to the flasher and marked "FL". The panel must be equipped with terminals to provide or omit flashing of all red and yellow outputs.

8.3 Flasher Circuits. Flashers shall provide two (2) output circuits to permit alternate flashing of signal phases and must be capable of carrying a minimum of twenty (20) amperes per circuit at 120 volts. The flasher must operate continuously so that flashing power will be available at the field terminal marked "FL". The flasher wiring must divide the loads imposed on the two (2) circuit flasher alternately on each phase.

8.4 Manual Flash. A manual flash switch shall provide flashing indication for all circuits. The flash change combination terminals must allow the selection of flashing either yellow or red on the main and/or cross streets, or complete omission of the flashing feature if required.

9. POLICE PANEL

9.1 Auto-Off Flash Switch. Each controller must be provided with an auto-off-flash switch. In the "AUTO" position the signals will be on and the controller timing unit will run normally. In the "OFF" position the signals will be OFF and the controller timing unit will continue to run. In the "FLASH" position the signals will flash and the controller timing unit will continue to run. The auto-off flash switch must be located on the side of the police switch panel that faces outward when the police door is open.

9.2 Auto-Hand Switch. Each controller will have an auto-hand switch on the back side of the police switch panel. This switch must be so arranged that the switch can be physically rotated 180 degrees to provide usage after opening the police panel door. It must be so mounted that the act of rotation does not affect the police switch panel. Switch terminals must not be exposed on either position. The auto-hand switch must provide a means of manually timing the signals by use of a separate, momentary contact, hand switch. Operation of the timer by manual control must provide the same color sequence as an automatic operation with no momentary undesirable indications appearing. Manual control must be possible with the door of the cabinet closed. The hand switch required for manual control must only be supplied when specified in the contract. It must be of an approved weatherproof construction with a six (6) foot, retractable, flexible, extension cord to allow connection to the appropriate terminals on the panel of the controller. It must be possible to manually step through a vehicle clearance interval.

9.3 Terminal Block. A two point terminal block must be mounted on the back side of the police switch panel and the hand control circuit terminated on this block. This will be for installation of a hand control cord by others, as required.

9.4 Space Requirement. Adequate room must be provided in the police panel section to store the manual switch and retractable cord.

10. RELAYS

10.1 Transfer Relays. Eight (8) double pole, double throw, flash transfer relays shall be furnished with each controller. These relays must be jack mounted into an S-408-SB, or equivalent, socket mounted on the controller panel.

10.2 Contact Arm. Each contact arm must have over travel on the front and back contacts and be independent of any other contact arms. No adjustment of contact pressure or wipe must be necessary. Load capability must be a minimum of fifteen (15) amperes per contact continuously and thirty (30) amperes for one (1) minute. Contacts must be of coin or fine silver or an approved alternate.

10.3 Dust Cover. A suitable dust cover must be furnished for each relay.

10.4 Relay Mounting and Endurance. All relays supplied must meet their approved specified requirements and must have contacts which cannot be opened by unusual vibrations, shock, or momentary voltage excursions of up to 30%. All relays other than the flash and bus relay must be mounted on a molded base with eleven (11) or eight (8) pins for jack mounting to their respective panel or sub-base, and must be electrically interchangeable with those presently used by the City of Chicago.

11. COMMUNICATIONS INTERFACE PANEL

11.1 Where a communications interface has been specified to allow a controller to function as a Master or Secondary controller, then one of the specified options must be provided:

(1) Fiber Optic Communications Interfaces must meet the following requirements:

a. General. The fiber optic communications components must consist of, but not be limited to, an internal fiber optic modem within the controller or an external fiber optic modem, a fiber optic patch panel to interface the modem to field fiber optic cables, and fiber optic jumpers between the modem and patch panel.

b. The modem must either be a multi-directional "star" type or a bi-directional type, as specified in the contract. All modems must be Electronic Industries Association (EIA) compatible for RS-232 data communications via fiber optic link. Modems must be multi-mode, operate at 850nm wavelength, and provide full-duplex, frequency modulated, asynchronous transmission at data rates of up to 38.4 kbps.

c. The fiber optic patch panel must consist of a 14" long by 5-3/4" wide by 3-1/4" high rack constructed in accordance with City of Chicago Electrical Standard Drawing #909. The rack must be designed to mount on the controller cabinet rails. "ST" type terminals, suitably labeled, must be provided for the connection of field fibers and Modem.

d. The fiber optic jumpers (i.e., optical patch cords) must consist of a single multi-mode fiber in 900 micron orange jacket, with "ST" type connectors factory installed on each end. The jumpers must be 3' long in Secondary (i.e., local) controller cabinets and 6' long in Master controller cabinets. The jumpers must be connected to the patch panel and supported in such a manner that the minimum bending radius is ten (10) times the diameter of the cable, and the cables exert no strain on the connectors. Each jumper must have a minimum tensile strength of 50 lbs.

(2) Copper Wire Interconnect Panels (Seven Wire, VAC) must meet the following requirements:

a. General. The interconnect panel must serve to isolate interconnect VAC from the controller. The panel must consist of, but not be limited to, seven (7) relays. Each relay interconnect circuit must include an M.O.V. properly rated for protection against lightning and switching surges injurious to the controller and a barrier type 3AG fuse receptacle and fuse not to exceed five (5) amperes. Each panel must provide a seven (7) wire interface with the T.B.C. functions described below and must provide barrier type terminals suitably labeled for these functions.

b. The secondary interconnect panel must be wired in such a manner that a VAC input activates a relay sending an input from that relay to the controller. It must have a minimum of seven (7) relays for the following functions; Dial 2, Dial 3, Dial 4, Offset 1, Offset 2, Offset 3, M.U.T.C.D. flash.

c. The master interconnect panel must provide a means to establish outgoing VAC for a seven (7) wire interconnect system using eight (8) relays. The relays must have 24 VDC coils and be designated as, Dial 2, Dial 3, Dial 4, Sync, Offset 1, Offset 2, Offset 3, M.U.T.C.D. flash. The sync relay must be wired in such a manner that it provides the offset pulse to the contacts of the three (3) Offset relays.

d. Each relay must be a double pole type, with one pole designated as field interconnect output, and the other designated as controller input. Relay coils must be rated for continuous duty. Relay contacts must be rated for a continuous fifteen (15) AMP resistive load.

e. A terminal strip must be mounted on the top of the master interconnect panel for controller interface.

f. The master panel must interface with the T.B.C. terminals as described above.

g. Each output must be fused as outlined above.

12. RAILROAD INTERCONNECT REQUIREMENTS

12.1 General. The railroad preemption will meet the requirements of the ICC (Illinois Commerce Commission) and the requirements of IDOT (Illinois Department of Transportation).

12.2 IDOT. The railroad preemption will meet all the requirements of the Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction, adopted January 1, 2012. It must meet all the requirements of Article 1073.01 (c) (2) and Article 1074.03 (a) (5) e.

12.3 ICC. The railroad preemption will meet all the requirements of the Illinois Commerce Commission, as stated herein.

(1) The railroad preempt relays and the City traffic cabinet in general must be able to be wired as indicated in IDOT's Standard 857006-01 "SUPERVISED RAILROAD INTERCONNECT CIRCUIT". A failure in the interconnection circuit will result in activation of a supervisory failure alarm.

(2) Remote Flash. The Remote Flash input to the controller must be inverted from normal NEMA logic. Instead of grounding the input to Logic Ground (0 volts DC) to activate, the Remote Flash will be normally grounded and will be activated when the input is in the Logic 1 (+24 volts DC) state. This will preclude the installation of a controller without the proper railroad software and a normal controller with standard (non- railroad) software will not be able to run the traffic signals.

(3) Critical Components Series Loop. All critical components to railroad preemption such as relays and harnesses must utilize the 24 VOLT DC monitor voltage to form a series loop. Removal of any component will result in the traffic signals entering a flashing red condition. The 24 VOLT latch in the Management Malfunction Unit will be programmed, requiring manual reset if a failure in the series loop occurs.

(4) Controller Preempt Input Verification. Like the supervisory interconnection circuit monitors the integrity of the interconnect cable, this feature monitors the integrity of the controller railroad preemption input and associated wiring within the traffic controller cabinet. This will utilize a secondary railroad preemption input that is normally active (on) when no demand for railroad preemption is present. When a demand for railroad preemption is received, the normal railroad preemptor input is applied and the secondary input is dropped. If both inputs are either simultaneously on or simultaneously off for a time period of more than one (1) second, the controller will recognize this as an input failure. When a failure occurs, the traffic controller will be configured to provide a track clearance interval followed by a flashing red condition. This occurrence will set a preempt input alarm and also will require a manual reset of the controller.

(5) Track Clearance Green Re-service. Any demand for railroad preemption received at any point in the normal sequence, the emergency vehicle preemption sequence, a bus preemption sequence, or any other form of low priority preemption, or a previously called for railroad preemption sequence will result in the traffic controller providing a track clearance green indication within a “maximum time to track clearance green “ (usually 8 seconds depending upon site specific criteria) and will provide a full track clearance green time interval after the preemption demand was received. The controller software must have the capability to restart the railroad preemption sequence providing a full track clearance green interval from any point within the railroad preemption sequence from the start of track clear green through the entire dwell/hold interval(s) including any exit yellow and red clearance intervals, if the demand for preemption drops and is reapplied. The number of times the controller is able to react to successive demands for railroad preemption must not be limited. This will be a software based routine that does not require any user programming and must be designed into the software.

(6) Preemption Priority. Preemptor number 1 is typically assigned to a supervisory failure in the interconnection circuit and preemptor 2 is typically assigned to a normal railroad preemption demand. Preemptor 1 must have priority over preemptor 2. Preemptor 2 must have priority over all other forms of preemption.

(7) Delay Time. In order to compensate for noisy or intermittent calls, the controller must have a programmable delay timing parameter for railroad preemptors, programmed at 1 second. Any demands for railroad preemption lasting less than this time will be ignored. This will apply to any subsequent demands for railroad preemption that may occur while the controller is still within the railroad preemption sequence from a prior demand.

(8) Non-Locking Preemption. The controller must have the capability to configure the railroad preemptors as non-locking calls. If a demand for preemption is placed for a duration of less than 1second (as programmed in the delay timer), the call will not lock and the controller will not initiate the preemption sequence. Furthermore, if an initial demand for preemption is dropped prematurely while the preemption sequence is still timing, the non-locking feature will allow the controller to re-service another demand for preemption.

(9) Minimum Green before Preemption. The controller must have a separate minimum green timing parameter, programmed at 1 second, that replaces normal controller phase minimum green times when entering railroad preemption. When a demand for preemption is applied, any active phase(s) must terminate immediately or after they have been active for 1 second if the demand occurs at the start of the phase(s). If any indications that are part of the track clearance green are active when the demand for railroad preemption is placed, those indications will not terminate until after the track clearance green interval is completed.

(10) Railroad Hold/Dwell Interval. The controller must have the capability to display a programmable phase(s) and rest in that phase(s) until the demand for railroad preemption is released. The controller must also have the option to cycle between a set of programmable phases that don't conflict with the railroad crossing, or rest in an all-red steady state until the demand is released. The necessity for cycling during the hold interval or the use of an all-red steady state is determined by an assessment of the specific site. The controller must have a timing parameter that will provide a minimum hold/dwell time, even if the demand for preemption is dropped prematurely. The controller must be able to re-service any subsequent demands for preemption during this minimum hold/dwell time.

(11) Railroad Hold/Dwell Extension. The controller must have a timing parameter that will extend the hold/dwell interval for a programmed time after the demand for railroad preemption has been released. The controller must be able to re-service any subsequent demands for preemption during this extension time.

(12) Pre-signal Timing. When pre-signals are present in advance of a railroad crossing, during normal operation the pre-signal green indications terminate a programmable time (timed overlap) prior to the indications at the intersection. The duration of the timed overlap should not be reduced when leaving normal operation to service other forms of preemption, such as emergency vehicle or bus preemption. If a demand for railroad preemption occurs during the timed overlap portion of the normal sequence, the overlap timer must terminate and the track clear green interval must begin immediately, after the pre-signal yellow and red vehicle clearance intervals are completed.

(13) Remote Monitoring and Alarms. Capabilities to remotely monitor the traffic controller must be provided, including the capability to monitor the operation of the controller, upload logs/events, and to verify the integrity of the database. In addition, the controller must have the ability to automatically report alarms, such as preempt 1 activation, preemptor input failure, automatic flash, CRC failure, 24 volt failure, and other defined alarms. The controller must have the ability to prevent the remote download of changes to the critical data protected by the railroad preemption security feature.

(14) Blank-out Signs. If these signs are used for railroad preemption, they should activate immediately with the activation of the railroad interconnect circuit. They should deactivate immediately with the deactivation of the interconnect circuit, not after the controller exits the railroad preemption sequence. Whenever the traffic signals are in flashing red operation, cabinet circuitry must be such that the signs will remain operational if the interconnect circuit activates due to railroad warning device activation.

12.4 CRC. A CRC module with all connections, a USB memory device, software, and any other firmware necessary to make the CRC fully functional will be provided if so designated.

(1) Hardware. A 16 bit CRC (cyclical redundancy check) module must be provided. The module will connect to the ATC controller using unused I/O pins. Reassignment of unused inputs on the NEMA 'A', 'B', and 'C' connector I/O pins or connection to a proprietary 'D' module's input pins will be acceptable. The final CRC value for the specific intersection requirements will be set on the module for that intersection. Removing the CRC module during normal operation of the intersection, or mismatching the values in the database and the CRC, will result in a fault condition and put the intersection in flash mode.

(2) Software. The controller software/firmware will provide the logic and control facilities to fully implement CRC error detection. All the data elements (objects) required for the implementation will be contained in a proprietary data block. The software will provide a mechanism to "display" the final CRC value to be set on the CRC module.

A USB memory device will be utilized to 'lock' or 'unlock' the database. When the USB device is inserted into the controller, the controller will display a menu that will include a utility to 'unlock' the database. The USB device will contain a file structure that will allow access to the protected areas of the database. Once 'unlocked', the database can be edited through normal user interfaces. While the database is 'unlocked', the controller will drop the voltage/fault monitor signal to the conflict monitor to keep the intersection in flash. The CRC comparison check will be disabled during this period.

After all the changes to the database are completed, the user will use a utility on the USB to 'lock' the database. After the database is 'locked', another utility will allow the calculated CRC to be displayed. This can be used to configure the CRC module. After the CRC is connected and the USB is removed from the controller, the voltage/fault monitor signal to the conflict monitor will be enabled. A restart will be required to restart the controller.

Once the CRC module has been set (programmed), and the database has been locked, the controller can resume normal operation. The controller firmware will validate the stored CRC against the CRC module's value at least once per second.

13. WIRING

13.1 General. All electrical conductors must be stranded copper, with a minimum of nineteen (19) strands per conductor, and a concentrically applied 90° C. insulation with a 600 VAC rating. Wiring from the fuse block to the first distribution point, and to the controller bus, must be No. 10 AWG. Signal circuit wire must be No. 14 AWG. The wires must be provided with lugs or other approved terminal fittings for attachment to binding posts. All wiring between various parts of the controller must be neatly cabled. All wiring and terminal blocks must be tested for possible short circuits and resistance to ground by a high voltage dielectric test at 1,200 VAC. A wiring harness of adequate length must be provided to the timing device to allow the timer to be placed on top of the cabinet when required.

13.2 All VAC connections to load switches, flasher, and flash transfer relays must be soldered. All VAC connections on back of terminals must be soldered.

13.3 All VDC connections on back of terminals, and load switches must be soldered or connected with pre-approved terminations. All VDC connections to load switches are to be soldered or connected in a manner pre-approved by the City of Chicago's Division of Electrical Operations.

14. TESTING REQUIREMENTS

14.1 General. The testing on the controllers must be done as described herein. Environmental testing must be done at the manufacturer's facilities or at an independent laboratory, and must be certified by the manufacturer or the independent laboratory. Functional testing will be done at the City's facilities. All controllers provided under the contract must be tested as stipulated under "Functional Burn-In Testing" and "Physical Inspection" at the manufacturer's facilities. If a controller is ordered for a specific location, the manufacturer shall program and test the controller at the factory and certify the test results.

14.2 N.E.M.A. Environmental Test. One controller, unless approved previously, must be tested, at the manufacturer's expense, in accordance with Part 2 of NEMA Standards Publication TS1-1983. All of the tests listed must be performed with all data properly recorded and certified. If the manufacturer changes the design, fabrication or components of a previously tested and approved controller, then a sample of the controller containing the new design, fabrication or components must be retested at the manufacturer's expense. Any N.E.M.A. environmental test references to minimum recall must include but not be limited to: All sixty-four (64) output circuits must be programmed in a sequence to simulate the normal functioning of the entire controller cabinet assembly; the conflict monitor must have a test board with the allowable channel jumpers installed to simulate normal operation; All thirty-two (32) intervals must be programmed with a minimum of two (2) seconds per interval.

14.3 Functional "Burn In" Testing. The manufacturer of the controller must perform, at his manufacturing facilities, a one hundred (100) hour burn-in test on every controller, conflict monitor, and appurtenant devices. This test period must be certified by the manufacturer with supportive documentation and must include the device serial number, dates and times of test periods, and results. Any failed, or nonconforming components, must be replaced at this time. After each of the components has passed the burn-in test, they may be used in the assembly of the complete controller unit. Each completed unit must be subjected to the seventy-two (72) hour function test as described in this specification. The "burn in" requirement must include a test that uses all sixty-four (64) output circuits in "solid" burn as well as 1 pps and 5 pps for each circuit. All thirty-two (32) intervals must be programmed with a minimum of two (2) seconds per interval. The documentation for a test program to simulate the normal functioning of the controller phasing must be supplied. A copy of the test program must be approved by the City of Chicago, Division of Electrical Operations prior to testing. Certification of these tests must be attached to the outside of the shipping container. This certification is in addition to any other documentation and/or testing required by these specifications.

14.4 Testing Requirements. In addition to the NEMA environmental test and the "burn-in" requirements stated above, satisfactory performance of the traffic signal cabinet and its equipment must be demonstrated. The manufacturer must submit five (5) copies of his proposed "Test Procedure Document" for approval with the sample requested above. The test procedure must consist of two (2) sections; physical inspection and functional testing. If the test procedure is judged by the Commissioner or his duly authorized representative to be incomplete, inadequate or otherwise deficient, the contractor must revise and resubmit his "test procedure document" until it is approved. No controller will be accepted until the "test procedure document" has been approved. Functional testing must include, but not be limited to, phasing for multiple legged intersections, bridge and railroad pre-empt, flash operation, actuation, and any combinations of these features. Controllers designed to function without railroad pre-empt must be shown to function without the presence of a railroad interconnect. Options for downward compatibility when replacing 339 either HMC1000 controllers or LMD40 controllers must also be demonstrated. In addition, it should be demonstrated that the controller functions within the MIST system. Any failure must be addressed by the manufacturer within the time frame allotted.

14.5 UPS. Testing of the equipment must verify that the operation meets the requirements of this specification. All equipment must be shown to operate correctly, including the rectifier, charger, inverter, batteries, and control unit. The UPS must be connected to a dummy load at the factory and tested for performance under various conditions of line voltage and frequency, varying loads, temperature range, and humidity range. The automatic switching must be successfully demonstrated; losing line power and restoration of line power must not adversely affect the operation of the traffic signals. Use of the manual bypass switch must be successfully demonstrated. A generator must be connected to the unit and successfully operate the system without interruption. The batteries must be shown to be able to operate the traffic signals for the specified time. The batteries must be shown to be able to be recharged in the specified time between failures. The control unit, including the LCD display and the RS-232 interface, must be shown to function according to this specification. All reports and event monitoring must be successfully demonstrated. Programming functions must also be shown to work properly.

14.6 Physical Inspection. The "physical inspection" portion of the test procedure document must require the manufacturer to perform a physical inspection of workmanship and specification compliance for each traffic signal controller assembly. The inspection must be done using a detailed check list defining items to be inspected and criteria for acceptance. The inspection must include, but not be limited to, the following items:

- (1) Hardware installation.
- (2) Assembly mounting.
- (3) Dimensions.
- (4) Presence of specified devices and materials.
- (5) Presence of required documents.
- (6) Labeling and required serial numbers.
- (7) Wiring including routing, covering, gauge, length, and soldering of terminations.
- (8) Arrangement of equipment for safety and ease of calibration reprogramming troubleshooting and maintenance.
- (9) Condition of cabinet body and finish.
- (10) Condition and installation of doors, panels, gaskets and ventilation.
- (11) High voltage test of insulation resistance to ground, with wires installed in cabinet and equipment disconnected.

14.7 Functional Testing. The "functional testing" portion of the Test Procedure must require the manufacturer to perform a complete room-temperature functional test of each complete traffic signal controller assembly for a minimum of seventy-two (72) hours. This test must be designed to concurrently check integrated hardware systems e.g., from simulated input to load switch output including conflict monitor and time base coordinator. All interface/controller interconnections must be tested. All load switch and interconnect relay positions must be tested, regardless of the number of load switches and interconnect relays being purchased. The functions tested must include, but not be limited to, the following:

- (1) Flash logic and operation (color, phases).
- (2) Conflict monitor logic and operation.
- (3) Police panel switch operation.
- (4) Auxiliary panel switches (including fans).
- (5) Interface panel.
- (6) Time switch operation.
- (7) Load switches (with a continuous ten (10) ampere load on each signal circuit).
- (8) Outputs.
- (9) Power interruptions of less than 500 ms.
- (10) Power interruptions of more than 1.0 sec.
- (11) Generator Hook-up.

15. SHIPMENT AND DELIVERY (Only applies to City commodity contracts)

15.1 Packaging. The cabinets must be shipped on individual pallets. Each cabinet must be individually wrapped and protected so that it can be handled without damage to the cabinet or its finish. The UPS and cabinet must be wrapped to give protection from the elements, as well as from shipping. If subassemblies or parts are ordered they must be suitably packaged to prevent damage during shipping and handling. All packages should be clearly labeled indicating the contents.

15.2 Delivery. The assembled cabinets, or subassemblies and parts, must be delivered to the Division of Electrical Operations at 2451 S. Ashland Avenue, unless otherwise directed. Assembled cabinets, or subassemblies and parts, must be available for testing and shipping within six weeks of the placement of an order.

CHICAGO ATC MATRIX - TABLE A

(ATC Standard Version 5-2b June 26, 2000)

Since the ATC standard specifies a “family” of controllers, the following options have been selected from the ATC standard to meet the City’s needs.

Functional Requirement	ATC Clause #	Status	Details
Shelf Mounted	2.2.1 4.3.2.1	Required	(Shelf mount only)
Use of ATC Engine Board	2.2.2 4.3.2.2 5.1.1 5.1.2 5.3.2 5.3.4 5.3.5 5.3.5.1 5.4.2 5.4.3 5.4.4 5.4.5	Required	
Use of ATC Engine Board	5.2.1	Required	Allowed component height below Engine Board PCB provided that the overall envelope remains unchanged, the clearance between the Host Board and Engine Board remains as specified, and the Engine Board still fits into a compliant Host Board
Use of ATC Engine Board	5.2.2 5.4.5	Required	In order to show the Ethernet communications to the Engine Board, the following “Reserved” pins can assume the following legacy functions: - P1-34: ENET2 Speed - P1-35: ENET2 Link/Activity - P1-36: ENET1 Speed - P1-37: ENET1 Link/Activity
Use of ATC Engine Board	5.3.1	Required	Minimum CPU capability of 500 MIPS

Use of ATC Engine Board	5.3.3	Required	Additionally, must provide a minimum of 16 MB of Flash total to accommodate future applications.
Use of ATC Engine Board	5.4.1	Required	Engine Board shall not draw more than 4W of power from VPRIMARY (due to battery backup in Chicago)
			Engine may supplement VSTANDBY_5 with on-board storage for its standby power.
Use of ATC Engine Board	5.4.3	Required	All optional baud rates shall be supported
Parallel I/O	2.2.4	Required	- No support required for TS2 Type 1 or ITS cabinets - Must provide parallel I/O for TS2 Type 2 cabinets and legacy parallel I/O interfaces via interchangeable modules
Linux O/S and ATC BSP	2.2.5 4.3.1 4.3.3	Required	
Linux O/S and ATC BSP	2.2.5 4.3.1 4.3.3	Required	
Linux Kernel	Annex A	Required	
Parallel I/O	3.4	Required	Not required to support ITS Cabinet standard (NEMA cabinets are used)
Manage Clock/Calendar functions and synchronize with external source	3.5.1.3	Required	Must also support synchronization with absolute zero.
Manage Clock / Calendar functions and synchronize with External Source	4.1.3	Required	- BSP RTC driver shall automatically update the RTC with the OST time once per second with an accuracy of 0.1 seconds - Successive interruptions (e.g. on for 5 minutes, off for 3 minutes over a period of 8 hours) shall not introduce cumulative error
Configure and Verify Parameters	3.5.1.4 4.1.4	Required	

Upload/Download blocks of data	3.5.1.5 4.1.5	Required	
Monitor & Verify Application Status	3.5.1.6 4.1.6	Required	
Operator Control of Application Execution	3.5.1.7	Required	<u>Only</u> a local operator is allowed to manage the starting, stopping and scheduling of one or more applications on the ATC.
Operator Control of Application Execution	4.1.7	Required	
Long Term Storage of Log Data, etc	3.5.1.8 4.1.8	Required	
Support Diagnostics	3.5.3.3 4.3.4	Required	
Modes of Operation	3.7	Required	(Must support Standalone, Direct, and Distributed modes of operation)
Manage/Control a Variety of External Devices	4.2.1	Required	- Fixed Ports on the front panel shall be specified by the City - Only SP1 and SP2 are required to be supported on the modem slot - The dedicated synchronous serial port (SP5) is to be used exclusively for supporting a parallel I/O module (NEMA TS2 or legacy interface)
Monitor the Status of External Devices	4.2.2	Required	- Fixed Ports on the front panel shall be specified by the City - Only SP1 and SP2 and required to be supported on the modem slot - The dedicated synchronous serial port (SP5) is to be used exclusively for supporting a parallel I/O module (NEMA TS2 or legacy interface)
Support future Hardware Upgrades	4.3.2	Required	
Environmental Requirements	5.2.3	Required	
Front Panel Serial Ports	6.2.3.1 6.1.3 6.3.2.1	Required	One serial port on the front panel shall satisfy this section as an EIA-574 (25-pin) and be labeled "Port 2".

Front Panel Serial Ports	6.2.3.1 6.3.2.1	Required	One serial port shall satisfy this section as an EIA-574 (9-pin) with a reduced pin-out (TXD, RXD, and DC Reference at a minimum) and be labeled "Port 4". C50_ENABLE shall not be supported. A second serial port shall fully satisfy this section as an EIA-574 (25-pin) and be labeled "Port 5."
Front Panel Serial Ports	6.2.3.2 6.1.3 6.3.2.2	Required	One serial port shall satisfy this section as an EIA-485 (15-pin) with the TS2 Type 1 Port 1 pin-out and be labeled "Port 1".
Front Panel Ethernet Ports	6.2.3.9 6.3.2.9 7.1.4.4	Required	There shall be a minimum of two Ethernet ports on the Front Panel (one for ENET1, one for ENET2)
User Interface	7.1 7.1.1.2 7.1.4.4 7.1.4.5 7.1.4.7	Required	
User Interface	7.1.1	Required	Must meet City's Minimum requirements
User Interface	7.1.1.1 7.1.2.1 7.1.3 7.1.4.1	Required	• Data key is not required • Front Panel Interface is to be integral to the controller (i.e. not

	7.1.5		removable, no SP6 connector) • “Option 1” to be selected but AUX switch is optional • Keypad shall have a minimum of 24 keys • LCD Display shall be graphical with a minimum resolution of 128 rows x 240 columns (up to 16 lines x 40 characters). • LCD pixel size shall be a minimum of 0.32mm x 0.32mm with a minimum pitch of 0.325mm with character size defined as 6 pixels wide x 8 pixels high • Refresh rate is a minimum of 10 times per second (due to larger display requirements) • LCD heater is mandatory to ensure sub-second LCD display response over full temperature range. Heater shall only be active when needed and User is interacting with the controller locally (due to battery backup requirements). • Heater Power shall be up to 15V
Power Supply	7.2 7.2.2 7.2.3 7.2.4 7.2.5 7.2.5.1 7.2.5.2 7.2.6.1 7.2.6.2	Required	12 V not required As applicable for NEMA cabinets only
	7.2.6.3 7.2.6.4 7.2.6.6		
Mechanical/Chassis	7.3.1.3 7.3.1.4	Required	• Only Shelf mounted units are acceptable • Only components / connectors specified by the City shall be located on either the Front or Rear panels. No C1 Type Connectors allowed.

I/O Interfaces	8.1.1 8.2.2 8.2.2.1 8.2.2.2 8.2.2.3	Required	Support for TS2 Type 2 and TS1 Interfaces
I/O Interfaces	8.1.2 8.2.2.5	Required	- Support is only required for NEMA TS2 Type 2, TS1, and other similar legacy interfaces - NEMA TS2 Port 1 shall also be provided (for detectors only)
I/O Interfaces	8.2.3	Required	Port 1 Connector shall be provided as specified within this section (only used for detectors)
I/O Interfaces	8.2.1.13	Required	Legacy I/O interfaces shall respond as required.
I/O Interfaces not required	8.2.1	Required	No support for Model 332 Cabinets or ITS Cabinets & devices is to be provided
Environmental & Test Procedures	9	Required	All subsections are required
Performance & Material Requirements	10	Required	All subsections are required
Performance & Material Requirements	10.1.15	Required	All PCBs and similar construction mechanisms shall be mounted vertically (i.e. no horizontal PCBs are allowed).
Quality Control	11	Required	All subsections are required

ACCESSIBLE PEDESTRIAN SIGNAL

SUBJECT

1. This specification states the requirements for an integrated accessible pedestrian signal assembly which will include a vibrotactile push-button with arrow, a speaker, a sign, and housing. This assembly will provide non-visual walk information for persons without sight or with low vision. The walk indications shall be both audible and vibrotactile. This assembly can be used for either actuated pedestrian signal crossings or for non-actuated pedestrian signal crossings.

GENERAL

2.
 - (a) Specifications. The accessible pedestrian signal (APS) assembly must conform in detail to the requirements herein stated, and to the latest requirements of the Manual on Uniform Traffic Control Devices (MUTCD). The APS must also meet the most recent requirements of the Americans with Disabilities Act (ADA).
 - (b) Acceptance. APS assemblies not conforming to this specification will not be accepted.
 - (c) Bidders Submittal. Bidders must submit with their bids detailed specifications and any shop drawings that describe the physical appearance and the functionality of the APS.
 - (d) Sample. One complete APS assembly of the manufacture intended to be furnished must be submitted within fifteen (15) business days upon request of the Chief Procurement Officer.
 - (e) Warranty. The contractor shall warrant the APS against defects due to design, workmanship, and material, for a period of five years from the date of acceptance by the City. If any assembly fails to properly function within this period, the contractor shall replace the assembly, free of charge to the city, including shipping.

HOUSING

3.
 - (a) The housing shall be cast aluminum. It shall be vandal resistant. The housing shall contain a speaker, a push-button, and be able to accommodate a 9 inch by 12 inch sign. The housing shall have a hole in the back to accommodate cable. The housing shall be mounted to a bracket with stainless steel screws.

- (b) A cast aluminum mounting bracket shall be supplied. The mounting bracket will be manufactured to be mounted onto a tubular shaped pole or post using two 3/4 inch steel bands (0.03 inches thick) or two stainless steel screws. The mounting bracket shall accept the APS housing.
- (c) The housing and bracket shall be powder coated Gloss Black with an enamel.

EXTENSION BRACKET

- 4.
 - (a) Extension brackets shall be available that allow for extensions of 4, 6, or 12 inches. The bracket components shall be aluminum alloy (6061 tempered to T6, or equivalent).
 - (b) The extension shall consist of a pole bracket that allows for banding to a pole or post, a tube of the proper length to support the APS and to serve as a wire-way, and a bracket for mounting the APS. These parts shall be welded together and shall provide a secure and structurally sound support. The assembly shall be powder coated to match the APS.
 - (c) The extension bracket may consist of one or two tubes. The tubes may be of fixed lengths or be telescoping.

ELECTRICAL

- 5.
 - (a) The APS shall operate on 12 volt DC.
 - (b) A separate power supply shall be provided. The power supply will have its own housing and be able to be mounted in the WALK/DONT WALK signal compartment.
 - (c) The power supply shall accept 120 volt ac input. There will be two inputs (WALK, DONT WALK) that will accept 89VAC to 250VAC at 120 VAC nominal, 27 watt maximum per input. Output shall be a maximum of 16VDC and 1.6 amps.
 - (d) An MOV rated at 5 joules shall provide electrical protection. Each input shall be fused at 1.5 amps.
 - (e) There shall be four input wires and four output wires. These wires shall be identified on the power supply: WALK, DONT WALK, NEUTRAL, and GROUND. The input wires shall be long enough to be terminated in the signal compartment. The output wires on the power supply shall have a single quick disconnect plug.

- (f) The push-button switch contacts must be normally open and must be closed when the push-button is pressed, restoring immediately to a normal open position when released. The switch must be electrically insulated from the housing. The push- button output rating shall be 36VAC/DC, 100mA.
- (g) For push-button actuation, the APS shall require 2 wires to connect the APS to the controller cabinet. An AC low voltage isolation package shall be provided in the cabinet. Isolation shall be provided by optical means.
- (h) The wires for connection to the WALK signal and any wiring for connection to the cabinet are not part of this specification.

PUSH-BUTTON

- 6.
 - (a) The push-button must meet ADA requirements and the requirements of the MUTCD (Chapter 4E.11-4E.12).
 - (b) The push-button must have a raised tactile arrow on its surface. The arrow must be adjustable, so that it can face in the direction of the associated crosswalk. The arrow will vibrate during the associated WALK interval.
 - (c) If there is an actuated walk, pushing the button will send a request to the controller.

SOUND

- 7.
 - (a) All sounds generated by the APS must meet the requirements of the MUTCD (Chapter 4E.11-4E.12).
 - (b) Sound levels must be manually adjustable. Sound levels must be in the 30dB to 90dB range.
 - (c) The APS must include an option for automatic sound adjustment due to ambient sound levels.
 - (d) The APS shall have a push-button locator "click" tone during DONT WALK and flashing DONT WALK intervals.
 - (e) The APS shall have two options for the WALK interval. The APS shall generate a rapid "click" tone during the WALK interval or shall have a programmable voice message during the WALK interval.
- (f) When the push-button is pushed during the DONT WALK or flashing DONT WALK, the APS will respond with a voice message, either "wait" or another programmed voice message.

SIGN

8. (a) A 9" by 12" reflective sign that can be mounted to the housing back-plate shall be supplied.
- (b) The sign shall be an R10-2, "CROSS ONLY ON WALK (symbol) SIGNAL", an R10-3, "PUSH BUTTON FOR WALK (symbol)", or another sign as specified in the order or contract. Each sign shall contain a message in Braille meeting the requirements of the ADA (Americans with Disabilities Act).

ENVIRONMENT

9. (a) The APS shall function correctly within the temperature range of -34°C and +74°C.
- (b) The APS shall function correctly up to 100% non-condensing humidity.
- (c) The APS shall function correctly under the power conditions from Commonwealth Edison.

PACKAGING

10. (a) General. The APS must be shipped fully assembled and ready for installation. Each assembly must be individually wrapped and boxed so that the assembly is not damaged in shipment. Extension brackets shall be boxed and shipped separately.
- (b) Labeling. Each box must be labeled in 3/8 inch high letters " ACCESSIBLE PEDESTRIAN SIGNAL" or "APS EXTENSION BRACKET SIZE X". The City Commodity Code, contract number, manufacturer, and date of manufacture must be clearly labeled on the box.

CABLE: FLEXIBLE CORD FOR ACCESSIBLE PEDESTRIAN SIGNAL

SUBJECT

1. This specification states the requirements for an electrical cable to be used to connect a power supply located in the compartment of a WALK signal to an accessible pedestrian signal located either on the same pole or to another pole nearby.

GENERAL

2. (a) Specifications. The cable must conform in detail to the requirements herein stated, and to the applicable portions of the latest revisions of the specifications and methods of test of the following agencies:
 - (1) ASTM – American Society for Testing and Materials
 - (2) ICEA – Insulated Cable Engineers Association
 - (3) IEEE – Institute of Electrical and Electronics Engineers
 - (4) UL – Underwriters
- (b) Acceptance. Cable not conforming to this specification will not be accepted.
- (c) Bidder Submittal. Bidders must submit with their bids detailed specifications.
- (d) Sample. If requested by the Chief Procurement Officer, a three (3) foot sample of the cable intended to be provided under this specification must be sent to the attention of the Division of Electrical Operations within fifteen (15) days of receipt of such request.
- (e) Warranty. If the cables are installed within twelve (12) months of date of shipment, the manufacturer must replace any cable failing during normal and proper use within one year of the date of installation. All replacements under this warranty must be made free of charge F.O.B. delivery point of the original contract.

CABLE

3. (a) The cable shall be rated at 600 Volts.
- (b) The cable shall be classified as SOOW cord.
- (c) The conductors shall consist of uncoated annealed multiple strand copper meeting the requirements of ASTM B-174. The size of each conductor shall be No. 18AWG.

- (d) The cable shall contain six (6) insulated conductors within a single jacket. The insulation for each conductor shall be ethylene propylene rubber (EPR), 30mils thick. The jacket shall be chlorinated polyethylene (CPE), 60 mils thick. Insulation and jacket shall be thermoset.
- (e) The insulation for the individual conductors shall be colored as follows: red, black, white, green, orange, blue. The jacket shall be black.
- (f) The cable shall meet the requirements of UL 62 for flexible cord.
- (g) The cable shall be UL listed for outdoor use and for water resistance. It shall be rated to operate in temperatures from -40°C to +90°C.

PACKAGING

- 4. (a) General. The cable must be delivered on sound substantial, non-returnable reels. Each reel must be marked with the manufacturer's name, footage, and any other pertinent information.

FIELD CABINET INTEGRATION EQUIPMENT AND DETECTION PROCESSOR WITH VIDEO CAMERA

1. SUBJECT

This specification states the requirements for video camera and integration equipment to enhance the technological functions at a signalized intersection that does not have a City fiber network connection. The set of equipment shall include a hemispherical video detection camera and integration device for video detection processing, video streaming, Ethernet networking, and cellular communications. The technology enhancement equipment shall collectively interface with the existing or proposed traffic signal controllers and cabinets, enable remote monitoring and control of the signal operations, support continuous data collection and signal performance monitoring, provide vehicle actuation, enable Web-based real-time and recorded video from the intersection, provide local area network connectivity for equipment in the cabinet, interface with the City's central signal system, and provide forward compatibility with future systems. The integration device and video detection processor shall be physically located in a traffic signal control cabinet. The camera shall be mounted to a City pole or extension arm with a mounting bracket specifically manufactured for that purpose.

2. GENERAL

- 2.1 Specifications. The intersection technology equipment shall conform in detail to the requirements herein stated and to the latest referenced specifications of the following:

Electronic Industries Alliance (EIA)
Federal Communications Commission (FCC)
National Electrical Manufacturers Association (NEMA)
National Transportation Communications for ITS Protocol
(NTCIP) Restriction of Hazardous Substances (RoHS)
Telecommunications Industry Association (TIA)
Underwriters Laboratories (UL)

- 2.2 Acceptance. Intersection enhancement equipment not conforming to this specification will not be accepted. The equipment shall be approved by the selected wireless carrier for use on their network.

- 2.3 Sample. If requested by the Chief Procurement Officer, a sample of the technology enhancement equipment intended to be provided under this specification, shall be submitted to the Division of Electrical Operations within fifteen (15) business days after receipt of the request. The samples shall be delivered to the Division of Electrical Operations, 2451 South Ashland Avenue, Chicago, Illinois 60608.

- 2.4 Compatibility

1. Traffic signal controller. The technology enhancement equipment must be compatible with the City's traffic control equipment and the City's communications equipment.
2. Future technology. The technology enhancement equipment shall be forward compatible to support technologies through the integrated standard Layer 2 network interface including adaptive traffic signal controls.

- 2.5 Documentation. All equipment shall include the manufacturer's installation and operations manuals in hardcopy and electronic PDF formats. Contractor shall provide documentation of exact equipment model and serial numbers in hardcopy and electronic PDF formats.

- 2.6 Warranty. The contractor shall warrant the technology enhancement equipment against defects in material and workmanship for a period of three (3) years from the date of the City's acceptance. The contractor shall provide a replacement of any failed technology enhancement equipment at no cost to the City.

2.7 Support

1. Support shall include software updates and phone support, Monday through Friday, 7:00 AM to 7:00 PM, for the duration of the warranty period.
2. Equipment shall have ability to receive Over-The-Air (OTA) upgrades for enhancements to capabilities and security.

2.8 License

1. The technology enhancement equipment shall include licensed software use and full maintenance and support services for the software for a minimum period of 10 years from the date of the City's acceptance of the equipment. The maintenance and support services must include:
 - a. API and web portal access to historical and live data
 - b. Phone and email access to a customer service person
 - c. Troubleshooting of connectivity issues
 - d. Remote configuration help
 - e. Troubleshoot traffic count and detection issues.
 - f. Assistance to traffic controller connectivity
 - g. Access to live signal telemetry
2. Any software licenses required to be entered into by City or on City's behalf shall conform to the requirements or restrictions listed below. Any terms to the contrary within any software license shall be deemed to be void and of no effect as to the City, and the software license agreement shall be deemed to be modified to incorporate the terms required below that are not contained with the license agreement.
 - a. Early Termination. The City may terminate the software license, at any time by a notice in writing from the City to the Licensor.
 - b. Ownership of License. The software license shall be fully transferable to the City, and shall be transferred to the City prior to the Substantial Completion of the Project.
 - c. Term of License. The City shall be granted a fully-paid, non-exclusive, non-transferable license to access and enable use of all software, web portal, and cloud-based components described in this specification for a minimum term of 10 years.
 - d. Support and Maintenance. Full maintenance and support services shall be included for the software for the duration of the term of the license.
 - e. Data Protection Requirements. The licensor shall be subject to the City of Chicago Data Protection Requirements for Contractors, Vendors and Third Parties. A copy of this document is included as Exhibit 1.

- f. Indemnification. Any provision in any software license agreement that obligates the City to indemnify the licensor, or any of its employees, agents, subcontractors, or affiliates, shall be deemed to be void and of no effect as applied to the City.
 - g. Governing Law. This License shall be construed in accordance with the laws of the State of Illinois. Any claim, action or lawsuit regarding this License or for breach thereof shall have jurisdiction and venue in a state or federal court of competent jurisdiction in the County of Cook, State of Illinois, and each party hereby submits to the personal jurisdiction thereof. Each party waives any objection to the exercise of such jurisdiction.
- 3. Software license shall allow a minimum of 100 concurrent users for any client based or cloud services.
 - 4. Written evidence of the transfer shall be provided to the City prior to Substantial Completion.
 - 5. The software license shall grant the City full use of the Web-based software including access to the data collected by the technology enhancement equipment and all data analytic tools of the Web portal software. All data collected by the technology enhancement equipment shall be owned by the City. The capabilities of the software may be enhanced but shall not be reduced.
 - 6. Regardless of the full license and maintenance support period, City will have perpetual access to the following features directly from the device:
 - a. Presence and Pulse Detection
 - b. Remote detection configuration via the cloud platform
 - c. Roadside /local Configuration
 - d. Real-time device (detector events) via API on the cloud platform
 - e. Real Time Streaming Protocol (RTSP) Video API on device accessed via agency network or added LTE comms
 - f. Over-the-Air (OTA) Updates automatically deployed to all devices for security and algorithm performance improvements
 - g. Rolling 365-Day Count Data (vehicle, bicycle, pedestrian) available via the API on the cloud platform.
 - h. Detection Metrics
 - i. Occupancy ratio
 - ii. Arrival on Red
 - iii. Arrival on Green
 - iv. Phase Interval

2.9 Cellular Service

If so mentioned in the line item, cellular service shall be provided for a period of three years, starting at the installation date of the cellular modem. Service shall be provided from the City's cellular provider at the time.

3. ENVIRONMENTAL

- 3.1 All technology enhancement equipment inside the traffic signal cabinet, including the SIM card, shall be manufacturer-hardened to withstand the elements and fully operate in the field without a dependency on external environmental conditioning equipment.
- 3.2 The technology enhancement equipment shall meet the environmental and operating requirements of the NEMA TS2 standard for controller units, including temperature, humidity, shock, vibration, and voltage. Testing shall comply with NEMA TS2 2.2.7 through 2.2.11.
1. Operating temperature: -30° F to 165° F.
 2. Storage temperature: -50° F to 185° F.
 3. Operating relative humidity: 5% to 95% non-condensing.

4. INTEGRATION DEVICE

- 4.1 General.
1. Provide multiple backhaul communications options including hardwired Ethernet and cellular communications backhaul.
 2. Provide local network Ethernet, serial, or I/O connectivity for field devices at the signalized intersection.
 3. Provide an “always-on” connection, without dialing.
 4. Support local and remote management access
 5. Support Virtual Private Network (VPN) connections
 6. Communicate with an NTCIP compliant controller over Ethernet providing auto-negotiation to 10/100 Mbps, half or full duplex.
 7. SIM card shall have a static IP address assigned by City, and shall be provisioned on the City’s cellular provider’s (currently Verizon) private network for City of Chicago.
 8. Support direct communication between City systems and the devices connected to the integration device (and through an interface hardware adapter for legacy controllers) for remote monitoring and control.
 9. Provide all required components, including power supply, cables, mounting hardware, and all accessories required to make the system fully operational in accordance with these specifications.
 10. Provide data buffering of all telemetry and alert data for at least 12 minutes of communications loss at least 5 seconds of power loss.
 11. Support vertical and horizontal installation.
 12. Shall support the collection and transmission of telemetry data, video data, alert data, and vehicle identification data to the server via the communications network.
 13. Include light-emitting diode (LED) indicators for health heartbeat, network connectivity, and device status.

4.2 Integrated Layer 2 Ethernet switch.

1. Minimum six Gigabit Ethernet ports (RJ-45) including one WAN port and minimum three PoE+ ports (802.3af and 802.3at compliant).
2. Support Transmission Control Protocol (TCP)/IP and User Datagram Protocol (UDP).
3. For each RJ-45 port, include a 6-foot Category 6 network cable that is Electronic Industries Alliance (EIA) / Telecommunications Industry Association (TIA)-568-A compliant.
4. One non-PoE+ port shall be used for the traffic signal controller, one PoE+ port shall be used for the video camera, and the remaining ports shall remain unused and reserved for the City's approved other uses.
5. Each port shall have auto-resetting in-line surge protection, compliant with IEC 61000-4-5 Class 4.

4.3 Connection ports

1. Minimum two serial ports (EIA RS-232).
2. Minimum one Universal Serial Bus (USB-A) port (USB 2.0 or higher).
3. Minimum one general purpose input/output (I/O) port with four signal pins, 0~30V, 200 mA, sinking, digital input.
4. Minimum one NEMA-rated I/O port for detector actuation (24)
5. Minimum one NEMA-rated I/O port for signal priority control (8)
6. Minimum one SDLC port

4.4 Data storage

1. Solid State Drive (SSD)
2. Minimum 240 GB
3. SATA III compliant
4. Support Self-Monitoring, Analysis, and Reporting Technology (SMART) command feature set
5. Rugged. 1500 G/0.5ms shock-resistance, 5~800 Hz at 5G peak vibration- resistance

4.5 Wireless communications

1. Frequency band and cellular network interface shall be fully compatible with the City's cellular data service provider.
2. Shall support 5G or 4G LTE cellular connectivity with MiMo and diversity (Bands 2, 4, 5, 12, 13, 14, 66, 71), UMTS/HSPA+ and GSM/GPRS/EDGE with peak downlink of 150 Mbps and peak uplink of 50Mbps.
3. Shall support 802.11 a/b/g/n with MiMo and Diversity antennas with security of at least 64/128 bits WEP, WPA, WPA2.
4. Shall support GPS for location service.

4.6 NTCIP controller interface

1. Communicate with an NTCIP compliant controller over Ethernet providing auto-negotiation to 10/100 Mbps, half or full duplex
2. Provide an ethernet cable for interfacing with NEMA TS2 type A1N, A2N, P1N, or P2N controllers.
3. Ethernet cable shall be Category 6 and shall meet NEMA operating temperature specification -30 °F to 165 °F and be shielded with a UL-certified jacket.
4. Communicate to the controller over TCP/IP
5. Communicate over SNMP v1, v2c, and v3 protocols
6. Communicate over STMP NTCIP protocols reading all objects defined in NTCIP 1201 and 1202 supported by the controller
7. Acquire and record phase, channel, detector, pedestrian detector, pre-emption, alarm and overlap statuses at a frequency of no less than 10 times per second including whether a phase is next or has a call for service on it
8. Read and distinguish information from all detector, pedestrian detection and pre-emption devices wired into the cabinet
9. Detect failure of a detector, pedestrian detector or pre-emption device in either always high or always low mode based on user configuration.
10. Detect all controller-defined failures of a detector defined in NTCIP-1202::ASC.vehicleDetectorAlarms
11. Detect all detector-defined failures of a detector defined in NTCIP-1202::ASC.vehicleDetectorReportedAlarms
12. Detect the free mode status of the controller
13. Read coordination information including cycle and sync status and current and future coordination plan parameters when provided by controller
14. Distinguish between minimum green, extension, maximum, green rest, yellow change, red clearance and red rest intervals of a phase.
15. Identify flash status, stop time, external start, power restart, low battery, a serviceable call exists and has not been serviced for two cycles, or SDLC response fault.
16. Measure the existing sequence selected
17. Read the phase table, sequence table, channel table, and overlap table
18. Re-synch controller clock
19. Place a call on a phase if a detector is in fault
20. Run the traffic controller in free mode through force, hold, and omit directions
21. Set the current timing plan dial, split, or offset
22. Set coordination plan parameters including splits, offsets, and cycle length
23. Set phase table parameters.
24. Capture and report controller faults based on controller reported flash status reasons of 'other', 'automatic', 'localManual', 'faultMonitor', 'mmu', 'startup', and 'preempt'

4.7 SDLC controller interface

- a) Provide all necessary cabling to connect to a cabinet's existing Port 1/SDLC bus
- b) Read terminal and facility input & outputs at a frequency of at least 10 times per second
- c) Read channel state at a frequency of at least 10 times per second
- d) Acquire MMU fault status including conflict, red failure and clearance failure
- e) Read information from all detectors wired into the cabinet supporting up to 100 millisecond resolution between detection events
- f) Detect detector failure in either always high or always low mode
- g) Support capturing and reporting controller faults based on MMU status bits of 'in conflict', 'red failure', 'diagnostic failure', 'in failure state', and 'local flash'
- h) Function as multiple SDLC detector racks for actuation

4.8 Video processor

- 1. The integration device shall include real-time multimodal (vehicle, cyclist, pedestrian) video detection.
- 2. Support Real Time Streaming Protocol (RTSP).
- 3. Support live video streaming through remote network access. The live video shall be accessible from a browser and/or through third-party software used by the operating agency.
- 4. The cameras system at each intersection shall locally record camera video streams continuously at the intersection and store recordings for at least 14 days.
- 5. Shall allow the locally stored video recordings at the intersection to be recalled, downloaded, and viewed remotely for up to 14 days.
- 6. Detection accuracy shall be 90% for each lane at the intersection in clear weather conditions for any 1-hour period and 95% for any 24-hour period of real-time video processing.
- 7. Shall include a display showing status information of signal phases, detection channels, cameras, SDLC bus, and operational state.
- 8. Shall support multimodal detection and counting
 - a. Process simultaneous feeds from multiple intersection video cameras
 - b. Process at least 150 detection zones at intersection
 - c. Allow irregular polygon shaped zones
 - d. Support conditional detection based on directional movement of object
 - e. Differentiate between vehicle and cyclist at stop bar detection
 - f. Support conditional stop bar detection based on object type
 - g. Auto adjust settings in response to viewing conditions for improved detection accuracy
 - h. Support approach and departure detection zones
 - i. Support automated OTA software updates

- j. Process turning movement count data for all visible movements at the intersection at all times
 - k. Classify in real-time all detected objects passing through an intersection including bicycles, light vehicles, single-unit trucks, articulated trucks, and buses
 - l. Process crosswalk movement count data for pedestrians
 - m. Track objects for video analytics applications
 - n. Auto-validate detection accuracy for each configured presence zone in the intersection
 - o. Distinguish between lanes for all vehicle movements
 - p. Count large groups of pedestrians
 - q. Adjustable enhanced detection sensitivity per detection zone
9. Actuation.
- a. Support the option of actuation via SDLC or direct wiring into traffic cabinet
 - b. Support 64 actuation outputs over SDLC
 - c. Support 16 actuation outputs over general purpose I/O direct wiring with constant-call fail active capability
 - d. Support 8 actuation outputs over general purpose I/O without constant-call fail active capability
 - e. Support multiple detection zones per lane in any combination of pulse or presence configuration
 - f. Support constant detection channel call output when no video signal detected (1 second response time).
 - g. Support automatically switching individual detection zones into alternate detection mode when poor visibility is detected
 - h. Support delay and extend functionality per detection zone
 - i. Support local and remote manual override of detection to force actuated channels into constant call
 - j. Support virtual actuation channels for signal performance measures without actuating controller channels

4.9

Device data access

- 1. Support data access by third-party devices via TCP/IP
- 2. Provide local live data access via an open standard interface for third-party device integration
 - a. Signal indication status change on each channel
 - b. Detector status change on each channel
 - c. Preemption status change on each channel
 - d. Active timing plan change for NTCIP controllers
 - e. Video detection object presence
 - f. Movement data for detected objects
- 3. Provide updated status with 100 millisecond resolution.

5. VIDEO CAMERA

- 5.1 Hemispherical (fisheye) lens shall provide an ultra-wide, 360-degree, fixed field of view of all approaches of a signalized intersection at a maximum of 125 feet from the farthest stop bar. Additional cameras shall be provided at no additional cost to the City if the maximum distance is exceeded.
 - 1. 180-degrees horizontal
 - 2. 180-degrees vertical
- 5.2 4K video resolution.
- 5.3 Shall support at least 9 megapixel (MP) capture
- 5.4 Shall support configuration in both spherical “fisheye” configuration, and rectangular “quad view”
- 5.5 Support a minimum of 10 concurrent video streams
- 5.6 Shall support pan, tilt, and zoom of the video feed by users
- 5.7 Camera shall be powered over Ethernet cable (PoE) in compliance with IEEE 802.3af
- 5.8 Shall provide H.264 and MJPEG image compression
- 5.9 Shall support RTSP streaming and H.265 compression
- 5.10 Shall support integration of RTSP video streams into third-party video management systems
- 5.11 Shall be rated to IP66 (NEMA 4X compliant)
- 5.12 Shall include an electronic de-humidification device for use in various weather conditions
- 5.13 Shall include a lens defrost function
- 5.14 The camera shall be fully compatible with the video processor and be provided by the same manufacturer. The camera quality and performance shall support the detection requirements of the video processor.
- 5.15 The camera shall provide full visibility of the intersection as required to achieve the performance requirements of this special provision.

- 5.16 Shall include Cat-6 surge protection capable of being mounted to the sidewall mounting channel of the traffic signal controller cabinet for protection of the camera and video processor. The surge must not interfere or degrade the quality of the video signals on the line.
- 5.17 Shall include a compatible in-line Ethernet repeater or other solution recommended by the manufacturer for cable runs exceeding standard Ethernet distance at no additional cost to the City.
- 5.18 Mounting hardware.
1. Support vertical and horizontal mounting
 2. Constructed of aluminum or stainless steel
 3. Compatible for securing a minimum 6-foot extension mast, 1.5-inch diameter
 4. Shall be shipped fully assembled within secured package and ready to attach to pole or extension arm
 5. A hole for cable of a minimum of 1" shall be located where the bracket shall be attached to City infrastructure. Bracket shall allow for banding to City mast arm.
 6. Shall meet the structural requirements of ASSTHO's Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, First Edition. The entire assembly shall be able to withstand wind gusts up to 150 MPH.
- 5.19 Camera cable.
1. Shall be Category 6 network cable that is EIA/TIA-568-A complaint
 2. Shall meet NEMA TS2 operating temperature requirements and have a UL- certified jacket
 3. Shall include innerduct within raceways between the traffic signal controller cabinet and the camera to protect the cable at no additional cost to the City. Innerduct shall meet Section 1088.01(c) of IDOT's Standard Specifications for Road and Bridge Construction (Standard Specifications).

6. ANTENNA

- 6.1 The low-profile, omnidirectional external antenna rated for outdoor use shall be fully compatible with the integration device and shall provide optimal signal reception at each site as recommended by the equipment manufacturer.

- 6.2 Antenna shall be able to be easily mounted to cabinet. Antenna housing shall require only one penetration in the mounting surface to route all internal antenna cabling. The antenna shall be an environmentally hardened, vandal-resistant antenna that protrudes no more than 1-1/2 inch from the cabinet. A watertight sealing bushing shall be included to prevent cable fraying and the ingress of water into the cabinet. All mounting hardware shall be included.
- 6.3 For the cellular modem integrated in the integration device, the antenna housing shall have multiple antennas inside with one threaded opening for all cabling and shall support:
1. Global Positioning System (GPS) (qty: 1)
 2. 4G/LTE MIMO (qty: 2)
 3. 2.4GHz/5GHz WiFi MIMO (qty: 2)
- 6.4 Shall include antenna cables with required manufacturer-terminated connectors for full compatibility with corresponding ports on the integration device.
- 6.5 Shall have labeled antenna terminations for easy installation.
- 6.6 Shall not exceed 1-1/2 inch in height.
- 6.7 Shall be IP67 rated and include a water-tight seal made of a closed cell rubber type foam and medium-firm acrylic adhesive with bonding features including a high initial adhesion and excellent high/low temperature holding power with excellent peel strength.

7. POWER

Technology enhancement equipment inside the traffic signal controller cabinet shall meet the following power requirements.

- 7.1 Include compatible UL-certified power supply and connections as recommended by the technology enhancement equipment manufacturer.
- 7.2 Provide galvanic isolation between earth ground and logical ground.
- 7.3 Shall support power source via NEMA 5-15R or direct-wire terminal block.
- 7.4 Shall include power backup to maintain device operation for at least 5 seconds of brownout. System shall shutdown safely with power loss.
- 7.5 Shall include a separate circuit breaker of sufficient amperage rating (minimum 10 amperes) for powering the technology enhancement equipment inside the cabinet. Breaker shall be at a minimum, a thermal magnetic type, UL listed with a minimum of 10,000 amp interrupting capacity.

8. SOFTWARE

- 8.1 Web-based management client software shall be included by the equipment manufacturer with Graphical User Interface (GUI) and secured through Secure Sockets Layer (SSL) encryption.
- 8.2 Shall provide access to field data from the integration device and provide all functions from a single software platform with a single sign-on.
- 8.3 Shall support an unlimited number of concurrent logins by authenticated users.
- 8.4 Shall be fully accessible via desktop, tablet, and mobile products on Chrome, Edge and Safari.
- 8.5 Shall support the full set of software features without interfering with the traffic signal controller to communicate with third-party software used by the operating agency.
- 8.6 System server
1. Professional cloud server hosting facility with fault-tolerant redundancy, automated load-balancing, and scalability to meet the service levels specified herein.
 2. Storage of all telemetry, alert, and vehicle data with no age limit.
 3. Polling, storage, and support for at least 3,000 signal controllers
 4. Performance of at least 95% uptime
- 8.7 Security features
1. User login through credentials and OAuth protocol
 2. Authentication and encryption with public key infrastructure (PKI) and Datagram/Transport Layer Security (DTLS/TLS1.0+) protocol
 3. Account verification through email
 4. Secure password reset
 5. Administrative management of user profiles and customizable privileges for users internal and external to operating agency
 6. Secure Virtual Private Network (VPN) connection
 7. HTTPS/SSL communication to the server from the public Internet
- 8.8 Signal equipment monitoring
1. Shall support live display of all telemetry data with latency not to exceed 1 second with at least LTE connectivity.
 2. Shall support historical display for at least 3 months of all telemetry data on- demand with load latency not to exceed 1 second.

3. Shall support a viewing mode in which all telemetry data is displayed overlaid onto a diagram of the intersection.
4. Shall support a viewing mode in which all telemetry data is displayed in a timing diagram format in which interval length is displayed in seconds for each signal phase.
5. Shall support display of environmental weather conditions, including precipitation and temperature, as part of live and historical viewing of telemetry data.
6. Shall provide networking support for secure monitoring by operating agency's third-party software of equipment connected via serial communications
7. Shall provide reporting on signal telemetry, detector, and alert data.

8.9 Data reports and Automated Traffic Signal Performance Measures (ATSPM) on metrics enabled by monitored detection implemented at intersection

1. Secure remote access to dashboard for traffic count data
2. Available data in at least 15-minute intervals
3. Summary charts and trend reporting with user-selectable parameters
 - a. Turning movement counts
 - b. Vehicle type
 - c. Percentiles
 - d. Historical date range selection
 - e. Delay per vehicle and per approach
 - f. Approach volume and speed
 - g. Red light runners
 - h. Arrivals on green
 - i. Arrivals on red
 - j. Split failures
 - k. Platoon ratios
 - l. Pedestrian actuations
 - m. Pedestrian delay
 - n. Detector count and duration
 - o. Queue length
 - p. Queue spillback
 - q. Intersection level of service
 - r. Total cost
 - s. CO₂ emissions
 - t. Travel time
 - u. Purdue phase termination, split failures, adjustment optimization, and predicted coordination diagrams
4. Exportable data summary formats, including Portable Document Format (pdf), MS Excel (xlsx), and Comma-Separated Values (csv)

8.10 Video viewing

1. Access from Web browsers to live video streams without third-party plugins and additional software installation
2. Access from tablet Web browsers with HTTP Live Streaming (HLS)
3. Support a minimum of 300 total simultaneous video streams among all cameras
4. Allows users to virtually pan, tilt, and zoom the video feed
5. Support live video streaming of any third-party camera connected over Ethernet to the integration device that supports non-proprietary codecs and RTSP streaming
6. Support live video streaming with an initial load time of no more than 10 seconds
7. Support live video streaming with a latency of no more than 10 seconds at a frame rate of at least 15 fps
8. Support at least 10 concurrent video streams from a single camera to be viewed in multiple browsers
9. Allow users to recall, download, and view intersection video recorded and stored at the intersection for up to 14 days

8.11 Video detection configuration

1. Web-based user interface for configuration of detection zones
2. Configuration of rectangular and irregular polygon shaped zones and pulse or presence detection zones
3. Secure remote configuration of system without additional connectivity costs
4. Full configuration history for remote changes
5. Local roadside configuration of all detection zones

8.12 External data interface

1. Support external data access by shared open protocol or documented network-based Application Programming Interface (API)
 - a. Turning movement count data in minimum 15-minute intervals
 - b. Crosswalk bi-directional pedestrian counts in minimum 15-minute intervals
 - c. Intersection information including geographic coordinates
 - d. Active alert data
2. Open data interface format including JSON and XML
3. Support administrative management and security of data interface
4. Provide API documentation and testing support
5. Secure access to all stored multimodal count data

8.13 Management functions

1. Signal assessment information on signal operations and maintenance, signal configuration, signal performance, input data quality, and alert volume
2. Condition detection and alerting
 - a. Power outage
 - b. Signal flash operation
 - c. Digital I/O signals
 - d. Detector failure
 - e. Preemption failure
 - f. Controller failure
 - g. Support
3. Issue reporting with prioritization, acknowledgement, comment, assignment, resolution, recipients, and user-customizable SMS text and email alerting functions
4. Viewing of information in tabular and geographic format with user-selectable filtering
5. Data query by date and time
6. Record retention for at least 10 years
7. Exportable data formats, including MS Excel (xlsx) and Comma-Separated Values (csv)
8. Asset management features
 - a. Create geographical placeholders for intersections without a device installed
 - b. Record cabinet equipment inventory information for each intersection
 - c. Upload and store reference files (up to 1 GB) with each node in the network
 - d. View all asset information and uploaded reference files

8.14.1 Cellular communications

- a) Fully communicate with the integration device over 4G LTE cellular data service and local network of the operating agency.
- b) Provide cellular signal strength readings with field unit to support integration device deployment CDMA/UTMS/, and RSRP for Reference Signal Received Power for 4G LTE)
- c) Provide cellular signal quality readings with field unit to support integration device deployment CDMA/UMTS/, RSRQ or Reference Signal Received Quality for 4G LTE, and SINR or Signal to Interference- plus-Noise-Ratio for 4G LTE)

9. SHIPPING

All technology enhancement equipment and hardware shall be packed to provide protection during shipping. Instructions must be included in each package. Packages shall be labeled indicating contents and shall include the manufacturer and model numbers.

EXHIBIT 1

Data Protection Requirements for Contractors, Vendors and Third-Parties

"Breach" means the acquisition, access, use, or disclosure of Protected Information that compromises the security or privacy of the Protected Information.

"Contractor" means an entity that receives or encounters Protected Information. Contractor includes, without limitation, entities that store Protected Information, or host applications that process Protected Information. The provisions of this Data Policy includes not only the entity that is a signatory to this Policy but all subcontractors, of whatever tier, of that entity; the signatory must inform and obtain the agreement of such subcontractors to the terms of this Data Policy.

"Protected Information" means all data provided by City to Contractor or encountered by Contractor in the performance of the services to the City, including, without limitation, all data sent to Contractor by City and/or stored by Contractor on its servers. Protected Information includes, but is not limited to, employment records, medical and health records, personal financial records (or other personally identifiable information), research data, and classified government information. To the extent there is any uncertainty as to whether any data constitutes Protected Information, the data in question shall be treated as Protected Information.

1. Information Security. Contractor agrees to the following:

1.1. General. Notwithstanding any other obligation of Contractor under this policy, Contractor agrees that it will not lose, alter, or delete, either intentionally or unintentionally, any Protected Information, and that it is responsible for the safe-keeping of all such information, except to the extent that the City directs the Contractor in writing to do so.

1.2. Access to Data. In addition to the records to be stored / maintained by Contractor, all records that are possessed by Contractor in its service to the City of Chicago to perform a governmental function are public records of the City of Chicago pursuant to the Illinois Freedom of Information Act (FOIA), unless the records are exempt under the Act. FOIA requires that the City produce records in a very short period of time. If the Contractor receives a request from the City to produce records, the Contractor shall do so within 72 hours of the notice.

- 1.3. Minimum Standard for Data at Rest and Data in Motion. Contractor must, at a minimum, comply, in its treatment of Protected Information, with National Institute of Standards and Technology (NIST) Special Publication 800-53 Moderate Level Control. Notwithstanding this requirement, Contractor acknowledges that it must fully comply with each additional obligation contained in this policy. If data is protected health information or electronic protected health information, as defined in the Health Insurance Portability and Accountability Act and Health Information Technology for Economic and Clinical Health Act (HIPAA/HITECH) and regulations implementing these Acts (see 45 CFR Parts 160 and 164), it must be secured in accordance with "Guidance Specifying the Technologies and Methodologies that Render Protected Health Information Unusable, Unreadable, or

Indecipherable to Unauthorized Individuals," available on the United States Department of Health and Human Services (HHS) website <https://www.hhs.gov/hipaa/for-professionals/breach-notification/guidance/index.html>, or at Volume 74 of the Federal Register, beginning at page 42741. That guidance from the HHS states that valid encryption processes for protected health information data at rest (e.g., protected health information resting on a server), must be consistent with the NIST Special Publication 800-111, Guide for Storage Encryption Technologies for End User Devices. Valid encryption processes for protected health information data in motion (e.g., transmitted through a network) are those which comply with NIST Special Publications 800-52, Guidelines for the Selection and Use of Transport Layer Security Implementation; 800-77, Guide to IPsec VPNs; or 800-113, Guide to SSL VPNs, or others which are Federal Information Processing Standards (FIPS) 140-2 validated.

- 1.4. Where Data is to be Stored. All data must be stored only on computer systems located in the continental United States.
- 1.5. Requirement to Maintain Security Program. Contractor acknowledges that the City has implemented an information security program to protect the City's information assets, which Program is available on the City website at <https://www.chicago.gov/content/dam/city/depts/dti/pdfs/ISTP.pdf> ("City Program"). Contractor shall be responsible for establishing and maintaining an information security program that is designed to: (i) ensure the security and confidentiality of Protected Information; (ii) protect against any anticipated threats or hazards to the security or integrity of Protected Information; (iii) protect against unauthorized access to or use of Protected Information; (iv) ensure the proper disposal of Protected Information; and, (v) ensure that all subcontractors of Contractor, if any, comply with all of the foregoing.
- 1.6. Undertaking by Contractor. Without limiting Contractor's obligation of confidentiality as further described herein, in no case shall the safeguards of Contractor's information security program be less stringent than the information security safeguards used by the City Program.

- 1.7. Right of Audit by the City of Chicago. The City of Chicago shall have the right to review Contractor's information security program prior to the commencement of Services and from time to time during the term of this Agreement. During the performance of the Services, from time to time and without notice, the City of Chicago, at its own expense, shall be entitled to perform, or to have performed, an on-site audit of Contractor's information security program. In lieu of an on-site audit, upon request by the City of Chicago, Contractor agrees to complete, within forty-five (45 days) of receipt, an audit questionnaire provided by the City of Chicago or the City of Chicago's designee regarding Contractor's information security program.
- 1.8. Audit by Contractor. No less than annually, Contractor shall conduct an independent third- party audit of its information security program and provide such audit findings to the City of Chicago, all at the Contractor's sole expense.
- 1.9. Audit Findings. Contractor shall implement at its sole expense any remedial actions as identified by the City as a result of the audit.
- 1.10. Demonstrate Compliance - PCI. No less than annually, as defined by the City of Chicago and where applicable, the Contractor agrees to demonstrate compliance with PCI DSS (Payment Card Industry Data Security Standard). Upon City's request, Contractor must be prepared to demonstrate compliance of any system or component used to process, store, or transmit cardholder data that is operated by the Contractor as part of its service. Similarly, upon City's request, Contractor must demonstrate the compliance of any third party it has sub-contracted as part of the service offering. As evidence of compliance, the Contractor shall provide upon request a current attestation of compliance signed by a PCI QSA (Qualified Security Assessor).
- 1.11. Demonstrate Compliance – HIPAA / HITECH. If the Protected Information includes protected health information or electronic protected health information covered under HIPAA/HITECH, Contractor must execute, and be governed by, the provisions in its contract with the City regarding HIPAA/HITECH, the regulations implementing those Acts, and the Business Associate Agreement in its contract with the City. As specified in 1.3, protected health information must be secured in accordance with the "Guidance Specifying the Technologies and Methodologies that Render Protected Health Information Unusable, Unreadable, or Indecipherable to Unauthorized Individuals."
- 1.12. Data Confidentiality. Contractor shall implement appropriate measures designed to ensure the confidentiality and security of Protected Information, protect against any anticipated hazards or threats to the integrity or security of such information, protect against unauthorized access or disclosure of information, and prevent any other action that could result in substantial harm to the City of Chicago or an individual identified with the data or information in Contractor's custody.
- 1.13. Compliance with All Laws and Regulations. Contractor agrees that it will comply with all laws and regulations.

- 1.14. Limitation of Access. Contractor will not knowingly permit any Contractor personnel to have access to any City of Chicago facility or any records or data of the City of Chicago if the person has been convicted of a crime in connection with (i) a dishonest act, breach of trust, or money laundering, or (ii) a felony. Contractor must, to the extent permitted by law, conduct a check of public records in all of the employee's states of residence and employment for at least the last five years in order to verify the above. Contractor shall assure that all contracts with subcontractors impose these obligations on the subcontractors and shall monitor the subcontractors' compliance with such obligations.
- 1.15. Data Re-Use. Contractor agrees that any and all data exchanged shall be used expressly and solely for the purposes enumerated in the Agreement. Data shall not be distributed, repurposed or shared across other applications, environments, or business units of Contractor. As required by Federal law, Contractor further agrees that no City of Chicago data of any kind shall be revealed, transmitted, exchanged or otherwise passed to other Contractors or interested parties except on a case-by-case basis as specifically agreed to in writing by an officer of the City of Chicago with designated data, security, or signature authority.
- 1.16. Safekeeping and Security. Contractor will be responsible for safekeeping all keys, access codes, passwords, combinations, access cards, personal identification numbers and similar security codes and identifiers issued to Contractor's employees, agents or subcontractors. Contractor agrees to require its employees to promptly report a lost or stolen access device or information to their primary business contact and to the City of Chicago Information Security Office.
- 1.17. Mandatory Disclosure of Protected Information. If Contractor is compelled by law or regulation to disclose any Protected Information, the Contractor will provide to the City of Chicago with prompt written notice so that the City of Chicago may seek an appropriate protective order or other remedy. If a remedy acceptable to the City of Chicago is not obtained by the date that the Contractor must comply with the request, the Contractor will furnish only that portion of the Protected Information that it is legally required to furnish, and the Contractor shall require any recipient of the Protected Information to exercise commercially reasonable efforts to keep the Protected Information confidential.
- 1.18. Data Breach. Contractor agrees to comply with all laws and regulations relating to data breach, including without limitation, the Illinois Personal Information Protection Act and other applicable breach disclosure laws and regulations. Data breaches of protected health information and electronic protected health information shall be governed by the provisions regarding HIPAA/HITECH, and the regulations implementing those Acts, in the Contractor's contract with the City, specifically the Business Associate Agreement in such contract. Contractor will immediately notify the City if security of any Protected Information has been breached, and will provide information as to that breach in such detail as requested by the City. Contractor will, if requested by the City, notify any affected individuals of such breach at the sole cost of the Contractor.

- 1.19. Data Sanitization and Safe Disposal. All physical and electronic records must be retained per federal, state and local laws and regulations, including the Local Records Act. Where disposal is approved, the Contractor agrees that prior to disposal or reuse of all magnetic media (e.g. hard disk, floppy disk, removable media, etc.) which may have contained City of Chicago data shall be submitted to a data sanitization process which meets or exceeds DoD 5220.28-M 3-pass specifications. Certification of the completion of data sanitization shall be provided to the City of Chicago within 10 days of completion. Acceptance of Certification of Data Sanitization by the Information Security Office of the City of Chicago is required prior to media reuse or disposal. All other materials which contain City of Chicago data shall be physically destroyed and shredded in accordance to NIST Special Publication 800-88, Guidelines for Media Sanitization, specifications.
- 1.20. End of Agreement Data Handling. The Contractor agrees that upon termination of this Agreement it shall return all data to the City of Chicago in a useable electronic form, and erase, destroy, and render unreadable all data in its entirety in accordance to the prior stated Data Sanitization and Safe Disposal provisions. Data must be rendered in a manner that prevents its physical reconstruction through the use of commonly available file restoration utilities. Certification in writing that these actions have been completed must be provided within 30 days of the termination of this Agreement or within 7 days of a request of an agent of the City of Chicago, whichever shall come first.

BRIDGE DEMOLITION DEBRIS (BDE)

Effective: July 1, 2009

The debris from removing structure number 016-2114 shall be delivered to (agency name), located at (address), (agency contact person and phone number) miles from the jobsite. For description of debris to be salvaged, the Contractor shall contact (agency contact person and phone number). The Contractor shall coordinate delivery of the debris to the designated location, at no additional cost to the Department. Upon receipt of the debris, the receiving agency shall be responsible for additional costs of processing, delivery placement and use of the material and shall assume legal and permitting responsibility for the placement of the debris. Payment for delivery of the debris to the designated location shall be included in the cost for removal of existing structures.

RAILROAD PROTECTIVE LIABILITY INSURANCE (BDE)

Effective: December 1, 1986

Revised: January 1, 2022

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.

OF NAMED INSURED & ADDRESS	NUMBER & SPEED OF PASSENGER TRAINS	NUMBER & SPEED FREIGHT TRAINS
Chicago Transit Authority (CTA) Chicago IL 60661-1465	Blue Line	-0- 567 West Lake Street
Class 1 RR (Y or N): N DOT/AAR No.: NA RR Division: CTA	NA RR Sub-Division: Blue Line	
For Freight/Passenger Information Contact: Abdin Carrillo For Insurance Information Contact: Tamika Press		Phone: 312/681-3913 Phone: 312/681-2901

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.

CTA FLAGGING AND COORDINATION

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

1.1 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). The Contractor shall also be responsible for compliance with the CTA *Adjacent Construction Manual* (in effect at such time) – this manual may be found at <https://www.transitchicago.com/nearbyconstruction/>. NOTE: In case of conflict between the manual and this CTA FLAGGING AND COORDINATION Specification, the most stringent shall apply.
- 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.)" - this document may be found herein and at <https://www.transitchicago.com/nearbyconstruction/>.
- 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. When the scope of work under this contract includes construction activities adjacent to and above CTA tunnels, then work activities shall protect the existing CTA infrastructure

and allow unimpeded service to CTA customers unless specifically allowed by CTA as identified herein.

1.2 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

1.3 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. If there are maximum amounts of flagger shifts identified within this specification and 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.

1.4 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.

1.5 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.
 6. All employees shall wear an undamaged hard hat with current rail safety sticker affixed, CTA standard safety vest, eye protection and face-mask / face-covering performing work 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.
 7. Contractor and Subcontractor employees assigned to work adjacent to or above the CTA right-of-way shall wear a face-mask / face-covering while performing work on CTA property
- 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.

1.6 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.

1.7 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.

1.8 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 from 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 six (6) 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 zero (0) 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. St. Patrick's Day Parade
 2. Easter Sunday
 3. Chicago Cubs Home Games
 4. Memorial Day Weekend
 5. Chicago Blues Festival
 6. Pride Parade
 7. Independence Day
 8. Taste of Chicago
 9. Pitchfork Music Festival
 10. Lollapalooza
 11. Chicago Air and Water Show
 12. Labor Day Weekend
 13. Chicago Marathon
 14. Mag Mile Lights Parade
 15. The Saturday before Thanksgiving Day through the Monday following Thanksgiving
 16. Christmas Eve and Christmas Day
 17. New Year's Eve and New Year's Day

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.

1.9 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 (SEE CTA STANDARD SPECIFICATIONS, SECTION 03 30 00, CAST-IN-PLACE CONCRETE, PARAGRAPH 1.05 SUBMITALS, SUBPARAGRAPH C FOR FORMWORK SHOP DRAWING REQUIREMENTS- INCLUDED AS EXHIBIT "A"), 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, if required by the CTA. Contractor to refer to the requirements as identified under the *CTA Adjacent Construction Manual (see 1.01.A)*.
- 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 (Contractor may purchase signage from CTA if Contractor does not have) 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 Contractor 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 (N/A) flagger shifts will be reimbursed as part of the Contract (N/A- All Flagger shifts will be reimbursed by IDOT, unless noted otherwise). 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.

EXHIBIT "A"

CTA STANDARD SPECIFICATIONS, SECTION 03 30 00, CAST-IN-PLACE CONCRETE, PARAGRAPH 1.05 SUBMITALS, SUBPARAGRAPH C (FORMWORK SHOP DRAWING REQUIREMENTS):

The Contractor shall submit formwork shop drawings and calculations for all structural concrete to the Authority for review with the exception of footings, piers, pier caps, walls, etc. that are less than six (6) feet tall and not directly adjacent to the tracks. The shop drawings

shall indicate the fabrication, erection and support procedures for the formwork. The formwork shop drawings and structural calculations for the design of the formwork and formwork support shall be signed and sealed by an Illinois licensed structural engineer. Show form construction including jointing, special form joints, location and pattern of form tie placement and other items that affect exposed concrete visually. The Contractor shall make modifications to the procedure if required, to obtain results that are satisfactory to the Authority, only after receiving approval in writing from the Authority. .

1. Formwork design calculations are to have the following minimum requirements.
 - a. All loads applied on the formwork must be identified and must have a load path thru the structure to a suitable foundation. All elements in the load path must be designed and detailed.
 - b. Formwork to be designed per ACI 347-Guide to Formwork for Concrete.
 - c. Tie splices are to have equal or greater capacity than the tie rods, i.e. coil ties splices are not to be used.
 - d. Actual mix design needs to be used to calculate pressure on formwork.
 - e. Actual concrete temperature (or colder temperature to be conservative) needs to be used to calculate pressure on formwork.
 - f. Actual pour rate (or faster pour rate to be conservative) needs to be used to calculate pressure on formwork.
 - g. In such case that the formwork is a prefabricated unit that has limits to the pressures it can support, the SE should provide the contractor with a maximum pour rate (or lower pour rate if dictated by the contractor) based on conservatively assumed temperature and mix design. Formwork system then to be designed based on a pour rate agreed to between the IL SE and the contractor.
 - h. In such cases where formwork or accessories are proprietary, the design SE (or the independent SE as part of the independent review in part 4), as part of the calculation package shall provide documentation explaining that they have reviewed the analysis and/or testing verification done by the manufacturer and understand that they, by signing and sealing the calculation package with the proprietary products, are liable for any failures.
2. Formwork shop drawings are to have the following minimum requirements.
 - a. They are to match the formwork calculations.
 - b. Accessories not supplied by the formwork supplier and expected to be supplied by the Contractor need to be identified as such and called out with a product manufacturer, name and part number, or other such material specifications, to ensure the contractor purchases the same product that was designed by the formwork design Structural Engineer.
 - c. Overlay rebar shop drawing information and other adjacent construction information at locations of potential conflict and coordinate a solution.
 - d. If directly adjacent to tracks or road, show section to verify clearance with trains and/or vehicle traffic.

3. The Contractor shall submit product data sheets, material certifications, etc. for accessories noted on the formwork shop drawings as not being supplied by the formwork supplier.
4. Formwork design calculations, shop drawings and product data submittals to be reviewed by an Independent Structural Engineer, hired by the Contractor, and the review process is to have the following minimum requirements.
 - a. The Independent Structural Engineer reviewer, as a minimum, is to review the formwork calculations and shop drawings to ensure the formwork design Structural Engineer has addressed the minimum requirements for shop drawings and calculations as noted herein.
 - b. Formwork design Structural Engineer and Independent Structural Engineer to coordinate and come to a resolution on disagreements.
 - c. Once formwork design Structural Engineer and Independent Structural Engineer come to resolution on all disagreements, a final set of formwork shop drawings and calculations signed and sealed by the formwork design Structural Engineer are to be issued for construction to the Authority along with a signed and sealed letter from the Independent Structural Engineer noting that all of their concerns have been addressed with an attachment of itemized comments and resolution actions.



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: 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 _____ Specification #: _____
 Insured: _____ RFP#: _____
 Address: _____ Project #: _____
 _____ Contract #: _____
 _____ (NUMBER & STREET)
 _____ (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 ☐ Occurrence ☐ Claims made ☐ Premise-Operations ☐ Explosion/Collapse Underground ☐ Products/Completed Operations ☐ Blanket Contractual ☐ Broad Form Property Damage ☐ Independent Contractors ☐ Personal Injury ☐ Pollution Commercial General Liability Form #: CG 00 01 _____				Each Occurrence \$ _____ General Aggregate \$ _____ Products/Completed Operations Aggregate \$ _____
Automobile Liability (Any Auto)				Each Occurrence \$ _____
Excess Liability ☐ 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.

CTA RISK MANAGEMENT 12/05

Name and Address of Certificate Holder and Receipt of Notice	Signature of Authorized Representative
Certificate Holder/Additional Insured Chicago Transit Authority Risk Management Dept. 567 W. Lake St, 6th Floor Chicago, IL 60661	_____ Agent/Company Address _____ Telephone _____



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
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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

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.

CONTAINMENT AND DISPOSAL OF LEAD PAINT CLEANING RESIDUES

Effective: October 2, 2001

Revised: April 22, 2016

Description. This work shall consist of the containment, collection, temporary storage, transportation and disposal of waste from lead paint removal projects. Waste requiring containment and control includes, but is not limited to, old paint, spent abrasives, corrosion products, mill scale, dirt, dust, grease, oil, salts, and water used for cleaning the surface of existing lead coatings prior to overcoating.

General. The existing coatings contain lead and may also contain other toxic metals. This specification provides the requirements for containment and for the protection of the public, and the environment from exposure to harmful levels of toxic metals that may be present in the paint being removed or repaired. The Contractor shall take reasonable and appropriate precautions to protect the public from the inhalation or ingestion of dust or debris from the operations, and is responsible for the clean-up of all spills of waste at no additional cost to the Department.

The Contractor shall comply with the requirements of this Specification and all applicable Federal, State, and Local laws, codes, and regulations, including, but not limited to the regulations of the United States Environmental Protection Agency (USEPA), Occupational Safety and Health Administration (OSHA), and Illinois Environmental Protection Agency (IEPA). The Contractor shall comply with all applicable regulations even if the regulation is not specifically referenced herein. If a Federal, State, or Local regulation is more restrictive than the requirements of this Specification, the more restrictive requirements shall prevail.

Submittals. The Contractor shall submit for Engineer review and acceptance, the following drawings and plans for accomplishing the work. The submittals shall be provided within 30 days of execution of the contract unless given written permission by the Engineer to submit them at a later date. Work cannot proceed until the submittals are accepted by the Engineer. Details for each of the plans are presented within the body of this specification. The Contractor shall also maintain on site, copies of the standards and regulations referenced herein (list provided in appendix 1).

Containment Plans. The containment plans shall include drawings, equipment specifications, and calculations (wind load, air flow and ventilation when negative pressure is specified). The plans shall include copies of the manufacturer's specifications for the containment materials and equipment that will be used to accomplish containment and ventilation.

When required by the contract plans, the submittal shall provide calculations that assure the structural integrity of the bridge when it supports the containment and the calculations and drawings shall be signed and sealed by a Structural Engineer licensed in the state of Illinois.

When working over the railroad or navigable waterways, the Department will notify the respective agencies that work is being planned. Unless otherwise noted in the plans, the Contractor is responsible for follow up contact with the agencies, and shall provide evidence that the railroad, Coast Guard, Corps of Engineers, and other applicable agencies are satisfied with the clearance provided and other safety measures that are proposed.

Environmental Monitoring Plan. The Environmental Monitoring Plan shall address the visual inspections and clean up of the soil and water that the Contractor will perform, including final project inspection and cleanup. The plan shall address the daily visible emissions observations that will be performed and the corrective action that will be implemented in the event emissions or releases occur. When high volume ambient air monitoring is required, an Ambient Air Monitoring Plan shall be developed. The plan shall include:

- Proposed monitor locations and power sources in writing. A site sketch shall be included, indicating sensitive receptors, monitor locations, and distances and directions from work area.
- Equipment specification sheet for monitors to be used, and a written commitment to calibrate and maintain the monitors.
- Include a procedure for operation of monitors per 40 CFR 50, Appendix B, including use of field data chain-of-custody form. Include a sample chain of custody form.
- Describe qualifications/training of monitor operator.
- The name, contact information (person's name and number), and certification of the laboratory performing the filter analysis. Laboratory shall be accredited by one of the following: 1) the American Industrial Hygiene Association (AIHA) for lead (metals) analysis, 2) Environmental Lead Laboratory Accreditation Program (ELLAP) for metals analysis, 3) State or federal accreditation program for ambient air analysis or, 4) the EPA National Lead Laboratory Accreditation Program (NLLAP) for lead analysis. The laboratory shall provide evidence of certification, a sample laboratory chain-of-custody form, and sample laboratory report that provides the information required by this specification. The laboratory shall also provide a letter committing to do the analysis per 40 CFR 50, Appendix G. If the analysis will not be performed per 40 CFR Appendix G, a proposed alternate method shall be described, together with the rationale for using it. The alternate method can not be used unless specifically accepted by the Engineer in writing.

Waste Management Plan. The Waste Management Plan shall address all aspects of handling, storage, testing, hauling and disposal of all project waste, including waste water. Include the names, addresses, and a contact person for the proposed licensed waste haulers and disposal facilities. Submit the name and qualifications of the laboratory proposed for Toxicity Characteristic Leaching Procedure (TCLP) analysis. If the use of abrasive additives is proposed, provide the name of the additive, the premixed ratio of additive to abrasive being provided by the supplier, and a letter from the supplier of the additive indicating IEPA acceptance of the material. Note that the use of any steel or iron based material, such as but not limited to grit, shot, fines, or filings as an abrasive additive is prohibited. The plan shall address weekly inspections of waste storage, maintaining an inspection log, and preparing a monthly waste accumulation inventory table.

Contingency Plan. The Contractor shall prepare a contingency plan for emergencies including fire, accident, failure of power, failure of dust collection system, failure of supplied air system or any other event that may require modification of standard operating procedures during lead removal. The plan shall include specific procedures to ensure safe egress and proper medical attention in the event of an emergency.

When the Engineer accepts the submittals, the Contractor will receive written notification. The Contractor shall not begin any work until the Engineer has accepted the submittals. The Contractor shall not construe Engineer acceptance of the submittals to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Acceptance of the plans does not relieve the Contractor from the responsibility to conduct the work according to the requirements of Federal, State, or Local regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

Quality Control (QC) Inspections. The Contractor shall perform first line, in process QC inspections of all environmental control and waste handling aspects of the project to verify compliance with these specification requirements and the accepted drawings and plans. The Contractor shall use the IDOT Environmental Daily Report form to record the results of the inspections. Alternative forms (paper or electronic) will be allowed provided they furnish equivalent documentation as the IDOT form, and they are accepted as part of the QC Program submittal. The completed reports shall be turned into the Engineer before work resumes the following day. Contractor QC inspections shall include, but not be limited to the following:

- Proper installation and continued performance of the containment system(s) in accordance with the approved drawings.
- Visual inspections of emissions into the air and verification that the cause(s) for any unacceptable emissions is corrected.
- Set up, calibration, operation, and maintenance of the regulated area and high volume ambient air monitoring equipment, including proper shipment of cassettes/filters to the laboratory for analysis. Included is verification that the Engineer receives the results within the time frames specified and that appropriate steps are taken to correct work practices or containment in the event of unacceptable results.
- Visual inspections of spills or deposits of contaminated materials into the water or onto the ground, pavement, soil, or slope protection. Included is verification that proper cleanup is undertaken and that the cause(s) of unacceptable releases is corrected.
- Proper implementation of the waste management plan including laboratory analysis and providing the results to the Engineer within the time frames specified herein.
- Proper implementation of the contingency plans for emergencies.

The personnel providing the QC inspections shall poses current SSPC-C3 certification or equal, including the annual training necessary to maintain that certification (SSPC-C5 or equal), and shall provide evidence of successful completion of 2 bridge lead paint removal projects of similar or greater complexity and scope that have been completed in the last 2 years. References shall include the name, address, and telephone number of a contact person employed by the bridge owner. Proof of initial certification and the current annual training shall also be provided.

Quality Assurance (QA) Observations. The Engineer will conduct QA observations of any or all of the QC monitoring inspections that are undertaken. The presence or activity of Engineer observations in no way relieves the Contractor of the responsibility to provide all necessary daily QC inspections of its own and to comply with all requirements of this Specification.

Containment Requirements. The Contractor shall install and maintain containment systems surrounding the work for the purpose of controlling emissions of dust and debris according to the requirements of this specification. Working platforms and containment materials that are used shall be firm and stable and platforms shall be designed to support the workers, inspectors, spent surface preparation media (e.g., abrasives), and equipment during all phases of surface preparation and painting. Platforms, cables, and other supporting structures shall be designed according to OSHA regulations. If the containment needs to be attached to the structure, the containment shall be attached by bolting, clamping, or similar means. Welding or drilling into the structure is prohibited unless approved by the Engineer in writing.

The containment shall be dropped in the event of sustained winds of 40 mph (64 kph) or greater and all materials and equipment secured.

The Contractor shall provide drawings showing the containment system and indicating the method(s) of supporting the working platforms and containment materials to each other and to the bridge. When the use of negative pressure and airflow inside containment is specified, the Contractor shall provide all ventilation calculations and details on the equipment that will be used for achieving the specified airflow and dust collection.

When directed in the contract plans, the Contractor shall submit calculations and drawings, signed and sealed by a Structural Engineer licensed in the state of Illinois, that assure the structural integrity of the bridge under the live and dead loads imposed, including the design wind loading.

When working over railroads, the Contractor shall provide evidence that the proposed clearance and the safety provisions that will be in place (e.g., flagman) are acceptable to the railroad. In the case of work over navigable waters, the Contractor shall provide evidence that the proposed clearance and provisions for installing or moving the containment out of navigation lanes is acceptable to authorities such as the Coast Guard and Army Corps of Engineers. The Contractor shall include plans for assuring that navigation lighting is not obscured, or if it is obscured, that temporary lighting is acceptable to the appropriate authorities (e.g., Coast Guard) and will be utilized.

Engineer review and acceptance of the drawings and calculations shall not relieve the Contractor from the responsibility for the safety of the working platforms and containment, and for providing ample ventilation to control worker and environmental exposures. After the work platforms and containment materials are erected additional measures may be needed to ensure worker safety according to OSHA regulations. The Contractor shall institute such measures at no additional cost to the Department.

Containment for the cleaning operation of this contract is defined as follows:

- The containment system shall maintain the work area free of visible emissions of dust and debris according to all provisions of this Specification, with no debris permitted outside of the regulated area at any time. All debris within the regulated area and within the containment shall be collected at the end of the last shift each day, and properly stored in sealed containers. Cleaning shall be accomplished by HEPA vacuuming unless it is conducted within a containment that is designed with a ventilation system capable of collecting the airborne dust and debris created by sweeping and blowing with compressed air. The ventilation system shall be in operation during the cleaning.
- The containment systems shall comply with the specified SSPC Guide 6 classifications as presented in Table 1 for the method of paint removal utilized.
- TSP-lead in the air at monitoring locations selected by the Contractor shall comply with the requirements specified herein.

The Contractor shall take appropriate action to avoid personnel injury or damage to the structure from the installation and use of the containment system. If the Engineer determines that there is the potential for structural damage caused by the installed containment system, the Contractor shall take appropriate action to correct the situation.

In addition to complying with the specific containment requirements in Table 1 for each method of removal, the Contractor shall provide and maintain coverage over the ground in the areas to be cleaned. This coverage shall be capable of catching and containing surface preparation media, paint chips, and paint dust in the event of an accidental escape from the primary containment. The containment materials shall be cleaned of loose material prior to relocation or dismantling. Acceptable methods of cleaning include blowing down the surfaces with compressed air while the ventilation system is in operation, HEPA vacuuming, and/or wet wiping. If paint chips or dust is observed escaping from the containment materials during moving, all associated operations shall be halted and the materials and components recleaned.

The containment systems shall also meet the following requirements:

a) Dry Abrasive Blast Cleaning - Full Containment with Negative Pressure (SSPC Class 1A)

The enclosure shall be designed, installed, and maintained to sustain maximum anticipated wind forces, including negative pressure. Flapping edges of containment materials are prohibited and the integrity of all containment materials, seams, and seals shall be maintained for the duration of the project. Airflow inside containment shall be designed to provide visibility and reduce worker exposures to toxic metals according to OSHA regulations and as specified in Table 1 and its accompanying text. When the location of the work on the bridge, or over lane closures permit, the blast enclosure shall extend a minimum of 3 ft. (1 m) beyond the limits of surface preparation to allow the workers to blast away from, rather than into the seam between the containment and the structure. The blast enclosure shall have an airlock or resealable door entryway to allow entrance and exit from the enclosure without allowing the escape of blasting residue.

If recyclable metallic abrasives are used, the Contractor shall operate the equipment in a manner that minimizes waste generation. Steps shall also be taken to minimize dust generation during the transfer of all abrasive/paint debris (expendable or recyclable abrasives) for recycling or disposal. Acceptable methods include, but are not limited to vacuuming, screw or belt conveyance systems, or manual conveyance. However manual conveyance is only permitted if the work is performed inside a containment that is equipped with an operating ventilation system capable of controlling the dust that is generated.

Appropriate filtration shall be used on the exhaust air of dust collection and abrasive recycling equipment as required to comply with IEPA regulations. The equipment shall be cleaned/maintained, enclosed, or replaced if visible dust and debris are being emitted and/or the regulated area or high volume monitor lead levels are not in compliance.

Areas beneath containment connection points that were shielded from abrasive blast cleaning shall be prepared by vacuum blast cleaning or vacuum-shrouded power tool cleaning after the containment is removed.

b) Vacuum Blast Cleaning within Containment (SSPC-Class 4A)

Vacuum blasting equipment shall be fully automatic and capable of cleaning and recycling the abrasive. The system shall be designed to deliver cleaned, recycled blasting abrasives and provide a closed system containment during blasting. The removed coating, mill scale, and corrosion shall be separated from the abrasive, and stored for disposal.

The Contractor shall attach containment materials around and under the work area to catch and contain abrasive and waste materials in the event of an accidental escape from the vacuum shroud. This containment is in addition to the ground covers specified earlier.

It is possible that the close proximity of some structural steel members, such as the end diaphragms or end cross-frames underneath transverse deck expansion joints, preclude the use of the vacuum blasting equipment for the removal of the old paint. For surfaces that are inaccessible for the nozzles of the vacuum blasting equipment, the Contractor shall remove the paint by means of full containment inside a complete enclosure as directed by the Engineer.

c) Vacuum-Shrouded Power Tool Cleaning within Containment (SSPC-Class 3P)

The Contractor shall utilize power tools equipped with vacuums and High Efficiency Particulate Air (HEPA) filters. The Contractor shall attach containment walls around the work area, and install containment materials beneath the work area to catch and contain waste materials in the event of an accidental escape from the vacuum shroud. This containment is in addition to the ground covers specified earlier and shall be installed within 10 ft. (3m) of the areas being cleaned.

d) Power Tool Cleaning without Vacuum, within Containment (SSPC-Class 2P)

When the use of power tools without vacuum attachments is authorized by the Engineer, the Contractor shall securely install containment walls and flooring around the work area to capture and collect all debris that is generated. The containment material requirements for this Class 2P are similar to Class 3P used for vacuum-shrouded tools, but the supporting structure will be more substantial in Class 2P to better secure the containment materials from excessive movement that could lead to the loss of waste paint chips and debris. Containment beneath the work shall be within 10 ft. (3m) of the areas being cleaned, and is in addition to the ground covers specified earlier.

Water Washing, Water Jetting or Wet Abrasive Blast Cleaning within Containment
(SSPC Class 2W-3W)

Water washing of the bridge for the purpose of removing chalk, dirt, grease, oil, bird nests, and other surface debris, and water jetting or wet abrasive blast cleaning for the purpose of removing paint and surface debris shall be conducted within a containment designed, installed, and maintained in order to capture and contain all water and waste materials. The containment shall consist of impermeable floors and lower walls to prevent the water and debris from escaping. Permeable upper walls and ceilings are acceptable provided the paint chips, debris, and water, other than mists, are collected. A fine mist passing through the permeable upper walls is acceptable, provided the environmental controls specified below are met. If paint chips, debris, or water, other than mists, escape the containment system, impermeable walls and ceilings shall be installed.

When water is used for surface cleaning, the collected water shall be filtered to separate the particulate from the water. Recycling of the water is preferred in order to reduce the volume of waste that is generated. The water after filtration shall be collected and disposed of according to the waste handling portions of this specification.

When a slurry is created by injecting water into the abrasive blast stream, the slurry need not be filtered to separate water from the particulate.

Environmental Controls and Monitoring. The Contractor shall prepare and submit to the Engineer for review and acceptance, an Environmental Monitoring Plan. The purpose of the plan is to address the observations and equipment monitoring undertaken by the Contractor to confirm that project dust and debris are not escaping the containment into the surrounding air, soil, and water.

- a) Soil and Water. Containment systems shall be maintained to prevent the escape of paint chips, abrasives, and other debris into the water, and onto the ground, soil, slope protection, and pavements. Releases or spills of, paint chips, abrasives, dust and debris that have become deposited on surrounding property, structures, equipment or vehicles, and bodies of water are unacceptable. If there are inadvertent spills or releases, the Contractor shall immediately shut down the emissions-producing operations, clean up the debris, and change work practices, modify the containment, or take other appropriate corrective action as needed to prevent similar releases from occurring in the future.

Water booms, boats with skimmers, or other means as necessary shall be used to capture and remove paint chips or project debris that falls or escapes into the water.

At the end of each workday at a minimum, the work area inside and outside of containment, including ground tarpaulins, shall be inspected to verify that paint debris is not present. If debris is observed, it shall be removed by hand and HEPA-vacuuming. If wet methods of preparation are used, the damp debris can remain overnight provided it is protected from accidental release by securely covering the waste, folding the waste into the ground tarps, or by other acceptable methods. Prior to commencing work the next day, the debris from the folded ground tarps shall be removed.

Upon project completion, the ground and water in and around the project site are considered to have been properly cleaned if paint chips, paint removal media (e.g., spent abrasives), fuel, materials of construction, litter, or other project debris have been removed.

NOTE: All project debris must be removed even if the debris (e.g., spent abrasive and paint chips) was a pre-existing condition.

- b) Visible Emissions. The Contractor shall conduct observations of visible emissions and releases on an ongoing daily basis when dust-producing activities are underway, such as paint removal, clean up, waste handling, and containment dismantling or relocation. Note that visible emissions observations do not apply to the fine mist that may escape through permeable containment materials when wet methods of preparation are used.

Visible emissions in excess of SSPC-TU7, Method A (Timing Method), Level 1 (1% of the workday) are unacceptable. In an 8-hour workday, this equates to emissions of a cumulative duration no greater than 5 minutes.. This criterion applies to scattered, random emissions of short duration. Sustained emissions from a given location (e.g., 1 minute or longer), regardless of the total length of emissions for the workday, are unacceptable and action shall be initiated to halt the emission.

If unacceptable visible emissions or releases are observed, the Contractor shall immediately shut down the emission-producing operations, clean up the debris, and change work practices, modify the containment, or take other appropriate corrective action as needed to prevent similar releases from occurring in the future.

- c) Ambient Air Monitoring. The Contractor shall perform ambient air monitoring according to the following:
- Monitor Siting. The Contractor shall collect and analyze air samples to evaluate levels of TSP-lead if there are sensitive receptors within 5 times the height of the structure or within 1000 ft. (305 m) of the structure, whichever is greater. If sensitive receptors are not located within these limits, monitoring is not required. Sensitive receptors are areas of public presence or access including, but not limited to, homes, schools, parks, playgrounds, shopping areas, livestock areas, and businesses. The motoring public is not considered to be a sensitive receptor for the purpose of ambient air monitoring.

The Contractor shall locate the monitors according to Section 7.3 of SSPC-TU-7, in areas of public exposure and in areas that will capture the maximum pollutant emissions resulting from the work. The Contractor shall identify the recommended monitoring sites in the Ambient Air Monitoring Plan, including a sketch identifying the above. The monitors shall not be sited until the Engineer accepts the proposed locations. When possible, monitors shall be placed at least 30 feet (9 m) away from highway traffic.

- **Equipment Provided by Contractor.** The Contractor shall provide up to 4 monitors per work site and all necessary calibration and support equipment, power to operate them, security (or arrangements to remove and replace the monitors daily), filters, flow chart recorders and overnight envelopes for shipping the filters to the laboratory. The number of monitors required will be indicated in the Plan Notes. Each monitor shall be tagged with the calibration date.
- **Duration of Monitoring.** Monitoring shall be performed for the duration of dust-producing operations (e.g., paint removal, waste handling, containment clean-up and movement, etc.) or a minimum of 8 hours each day (when work is performed).

The monitoring schedule shall be as follows:

1. For dry abrasive blast cleaning monitoring shall be conducted full time during all days of dust-producing operations (e.g., paint removal, waste handling, containment movement, etc.).
2. For wet abrasive blast cleaning, water jetting, or power tool cleaning, monitoring shall be conducted for the first 5 days of dust producing operations. If the results after 5 days are acceptable, monitoring may be discontinued. If the results are unacceptable, corrective action shall be initiated to correct the cause of the emissions, and monitoring shall continue for an additional 5 days. If the results are still unacceptable, the Engineer may direct that the monitoring continue full time.

When monitoring is discontinued, if visible emissions are observed and/or the Contractor's containment system changes during the course of the project, then air monitoring will again be required for a minimum of two consecutive days until compliance is shown.

- **Background Monitoring.** Background samples shall be collected for two days prior to the start of work while no dust producing operations are underway to provide a baseline. The background monitoring shall include one weekday and one weekend day. The background monitoring shall coincide with the anticipated working hours for the paint removal operations, but shall last for a minimum of 8 hours each day.

- Ambient Air Monitoring Results. The laboratory shall provide the report directly to the Engineer with a copy to the contractor. The report shall include:
 1. Monitor identification and location
 2. Work location and activities performed during monitoring period
 3. Monitor flow rate, duration, and volume of air sampled
 4. Laboratory methods used for filter digestion / analysis
 5. Sample results for the actual duration of monitoring
 6. Sample results expressed in terms of a 24 hour time weighted average. Assume zero for period not monitored.
 7. Comparison of the results with the acceptance criteria indicating whether the emissions are compliant.
 8. Field data and chain-of-custody records used to derive results.

Should revised reports or any information regarding the analysis be issued by the laboratory directly to the Contractor at any time, the contractor shall immediately provide a copy to the Engineer and advise the laboratory that the Engineer is to receive all information directly from the laboratory.

- Acceptance Criteria. TSP-lead results at each monitor location shall be less than 1.5 $\mu\text{g}/\text{cu m}$ per calendar quarter converted to a daily allowance using the formulas from SSPC- TU7 as follows, except that the maximum 24-hour daily allowance shall be no greater than 6 $\mu\text{g}/\text{cu m}$.

The formula for determining a 24-hour daily value based on the actual number of paint disturbance days expected to occur during the 90-day quarter is:

$$\text{DA} = (90 \div \text{PD}) \times 1.5 \mu\text{g}/\text{cu m}, \text{ where}$$

DA is the daily allowance, and

PD is the number of preparation days anticipated in the 90-day period

If the DA calculation is $> 6.0 \mu\text{g}/\text{cu m}$, use $6.0 \mu\text{g}/\text{cu m}$.

Regulated Areas. Physically demarcated regulated area(s) shall be established around exposure producing operations at the OSHA Action Level for the toxic metal(s) present in the coating. The Contractor shall provide all required protective clothing and personal protective equipment for personnel entering into a regulated area. Unprotected street clothing is not permitted within the regulated areas.

Hygiene Facilities/Protective Clothing/Blood Tests. The Contractor shall provide clean lavatory and hand washing facilities according to OSHA regulations and confirm that employees wash hands, forearms, and face before breaks. The facilities shall be located at the perimeter of the regulated area in close proximity to the paint removal operation. Shower facilities shall be provided when workers' exposures exceed the Permissible Exposure Limit. Showers shall be located at each bridge site, or if allowed by OSHA regulations, at a central location to service multiple bridges. The shower and wash facilities shall be cleaned at least daily during use.

All wash and shower water shall be filtered and containerized. The Contractor is responsible for filtration, testing, and disposal of the water.

The Contractor shall make available to all IDOT project personnel a base line and post project blood level screening for lead and zinc protoporphyrin (ZPP) (or the most current OSHA requirement) levels as determined by the whole blood lead method, utilizing the Vena-Puncture technique. This screening shall be made available every 2 months for the first 6 months, and every 6 months thereafter.

The Contractor shall provide IDOT project personnel with all required protective clothing and equipment, including disposal or cleaning. Clothing and equipment includes but is not limited to disposable coveralls with hood, booties, disposable surgical gloves, hearing protection, and safety glasses. The protective clothing and equipment shall be provided and maintained on the job site for the exclusive, continuous and simultaneous use by the IDOT personnel. This equipment shall be suitable to allow inspection access to any area in which work is being performed.

All handwash and shower facilities shall be fully available for use by IDOT project personnel.

Site Emergencies.

a) Stop Work. The Contractor shall stop work at any time the conditions are not within specifications and take the appropriate corrective action. The stoppage will continue until conditions have been corrected. Standby time and cost required for corrective action is at the Contractor's expense. The occurrence of the following events shall be reported in writing to IDOT and shall require the Contractor to automatically stop lead paint removal and initiate clean up activities.

- Airborne lead levels at any of the high volume ambient air monitoring locations that exceed the limits in this specification, or airborne lead in excess of the OSHA Action Level at the boundary of the regulated area.
- Break in containment barriers.
- Visible emissions in excess of the specification tolerances.
- Loss of negative air pressure when negative air pressure is specified (e.g., for dry abrasive blast cleaning).
- Serious injury within the containment area.
- Fire or safety emergency
- Respiratory system failure
- Power failure

- b) Contingency Plans and Arrangements. The Engineer will refer to the contingency plan for site specific instructions in the case of emergencies.

The Contractor shall prepare a contingency plan for emergencies including fire, accident, failure of power, failure of dust collection system, failure of supplied air system or any other event that may require modification of standard operating procedures during lead removal. The plan shall include specific procedures to ensure safe egress and proper medical attention in the event of an emergency. The Contractor shall post the telephone numbers and locations of emergency services including fire, ambulance, doctor, hospital, police, power company and telephone company on clean side of personnel decontamination area.

A two-way radio, or equal, as approved by the Engineer, capable of summoning emergency assistance shall be available at each bridge during the time the Contractor's personnel are at the bridge site under this contract. The following emergency response equipment described in the contingency plan (generic form attached) shall be available during this time as well: an appropriate portable fire extinguisher, a 55 gal (208 L) drum, a 5 gal (19 L) pail, a long handled shovel, absorbent material (one bag).

A copy of the contingency plan shall be maintained at each bridge during cleaning operations and during the time the Contractor's personnel are at the bridge site under this contract. The Contractor shall designate the emergency coordinator(s) required who shall be responsible for the activities described.

An example of a contingency plan is included at the end of this Special Provision.

Collection, Temporary Storage, Transportation and Disposal of Waste. The Contractor and the Department are considered to be co-generators of the waste.

The Contractor is responsible for all aspects of waste collection, testing and identification, handling, storage, transportation, and disposal according to these specifications and all applicable Federal, State, and Local regulations. The Contractor shall provide for Engineer review and acceptance a Waste Management Plan that addresses all aspects of waste handling, storage, and testing, and provides the names, addresses, and a contact person for the proposed licensed waste haulers and disposal facilities. The Department will not perform any functions relating to the waste other than provide EPA identification numbers, provide the Contractor with the emergency response information, the emergency response telephone number required to be provided on the manifest, and to sign the waste manifest. The Engineer will obtain the identification numbers from the state and federal environmental protection agencies for the bridge(s) to be painted and furnish those to the Contractor.

All surface preparation/paint residues shall be collected daily and deposited in all-weather containers supplied by the Contractor as temporary storage. The storage area shall be secure to prevent unauthorized entry or tampering with the containers. Acceptable measures include storage within a fully enclosed (e.g., fenced in) and locked area, within a temporary building, or implementing other reasonable means to reduce the possibility of vandalism or exposure of the waste to the public or the environment (e.g., securing the lids or covers of waste containers and roll-off boxes). Waste shall not be stored outside of the containers. Waste shall be collected and transferred to bulk containers taking extra precautions as necessary to prevent the suspension of residues in air or contamination of surrounding surfaces. Precautions may include the transfer of the material within a tarpaulin enclosure. Transfer into roll-off boxes shall be planned to minimize the need for workers to enter the roll-off box.

No residues shall remain on surfaces overnight, either inside or outside of containment. Waste materials shall not be removed through floor drains or by throwing them over the side of the bridge. Flammable materials shall not be stored around or under any bridge structures.

The all-weather containers shall meet the requirements for the transportation of hazardous materials and as approved by the Department. Acceptable containers include covered roll-off boxes and 55-gallon drums (17H). The Contractor shall insure that no breaks and no deterioration of these containers occurs and shall maintain a written log of weekly inspections of the condition of the containers. A copy of the log shall be furnished to the Engineer upon request. The containers shall be kept closed and sealed from moisture except during the addition of waste. Each container shall be permanently identified with the date that waste was placed into the container, contract number, hazardous waste name and ID number, and other information required by the IEPA.

The Contractor shall have each waste stream sampled for each project and tested by TCLP and according to EPA and disposal company requirements. The Engineer shall be notified in advance when the samples will be collected. The samples shall be collected and shipped for testing within the first week of the project, with the results due back to the Engineer within 10 days. Testing shall be considered included in the pay item for "Containment and Disposal of Lead Paint Cleaning Residues." Copies of the test results shall be provided to the Engineer prior to shipping the waste.

Waste water generated from bridge washing, hygiene purposes, and cleaning of equipment shall be filtered on site to remove particulate and disposed of at a Publicly Owned Treatment Works (POTW) according to State regulations. The Contractor shall provide the Engineer with a letter from the POTW indicating that they will accept the waste water. If the POTW allows the filtered water to be placed into the sanitary sewer system, the Contractor shall provide a letter from the POTW indicating that based on the test results of the water, disposal in the sanitary sewer is acceptable to them. Water shall not be disposed of until the above letter(s) are provided to, and accepted by, the Engineer.

If approved abrasive additives are used that render the waste non-hazardous as determined by TCLP testing, the waste shall be classified as a non-hazardous special waste, transported by a licensed waste transporter, and disposed of at an IEPA permitted disposal facility in Illinois.

When paint is removed from the bridge without the use of abrasive additives, the paint, together with the surface preparation media (e.g. abrasive) shall be handled as a hazardous waste, regardless of the TCLP results. The waste shall be transported by a licensed hazardous waste transporter, treated by an IEPA permitted treatment facility to a non-hazardous special waste and disposed of at an IEPA permitted disposal facility in Illinois.

The treatment/disposal facilities shall be approved by the Engineer, and shall hold an IEPA permit for waste disposal and waste stream authorization for this cleaning residue. The IEPA permit and waste stream authorization must be obtained prior to beginning cleaning, except that if necessary, limited paint removal will be permitted in order to obtain samples of the waste for the disposal facilities. The waste shall be shipped to the facility within 90 days of the first accumulation of the waste in the containers. When permitted by the Engineer, waste from multiple bridges in the same contract may be transported by the Contractor to a central waste storage location(s) approved by the Engineer in order to consolidate the material for pick up, and to minimize the storage of waste containers at multiple remote sites after demobilization. Arrangements for the final waste pickup shall be made with the waste hauler by the time blast cleaning operations are completed or as required to meet the 90 day limit stated above.

The Contractor shall submit a waste accumulation inventory table to the Engineer no later than the 5th day of the month. The table shall show the number and size of waste containers filled each day in the preceding month and the amount of waste shipped that month, including the dates of shipments.

The Contractor shall prepare a manifest supplied by the IEPA for off-site treatment and disposal before transporting the hazardous waste off-site. The Contractor shall prepare a land ban notification for the waste to be furnished to the disposal facility. The Contractor shall obtain the handwritten signature of the initial transporter and date of the acceptance of the manifest. The Contractor shall send one copy of the manifest to the IEPA within two working days of transporting the waste off-site. The Contractor shall furnish the generator copy of the manifest and a copy of the land ban notification to the Engineer. The Contractor shall give the transporter the remaining copies of the manifest.

All other project waste shall be removed from the site according to Federal, State and Local regulations, with all waste removed from the site prior to final Contractor demobilization.

The Contractor shall make arrangements to have other hazardous waste, which he/she generates, such as used paint solvent, transported to the Contractor's facility at the end of each day that this waste is generated. These hazardous wastes shall be manifested using the Contractor's own generator number to a treatment or disposal facility from the Contractor's facility. The Contractor shall not combine solvents or other wastes with cleaning residue wastes. All waste streams shall be stored in separate containers.

The Contractor is responsible for the payment of any fines and undertaking any clean up activities mandated by State or federal environmental agencies for improper waste handling, storage, transportation, or disposal.

Contractor personnel shall be trained in the proper handling of hazardous waste, and the necessary notification and clean up requirements in the event of a spill. The Contractor shall maintain a copy of the personnel training records at each bridge site.

Basis of Payment. The soil, water, and air monitoring, containment, collection, temporary storage, transportation, testing and disposal of all project waste, and all other work described herein will be paid for at the contract lump sum price for CONTAINMENT AND DISPOSAL OF LEAD PAINT CLEANING RESIDUES at the designated location. Payment will not be authorized until all requirements have been fulfilled as described in this specification, including the preparation and submittal of all QC documentation, submittal of environmental monitoring and waste test results, and disposal of all waste.

Appendix 1 – Reference List

The Contractor shall maintain the following reference standards and regulations on site for the duration of the project:

- Illinois Environmental Protection Agency – Information Statement on the Removal of Lead-Based Paint from Exterior Surfaces, latest revision
- Illinois Environmental Protection Act
- SSPC Guide 6, Guide for Containing Debris Generated During Paint Removal Operations
- 29 CFR 1926.62, Lead in Construction
- 40 CFR Part 50, Appendix B, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method)
- 40 CFR Part 50, Appendix G, Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air
- SSPC Guide 16, Guide to Specifying and Selecting Dust Collectors
- SSPC TU-7, Conducting Ambient Air, Soil, and Water Sampling Activities During Surface Preparation and Paint Disturbance Activities.

Table 1								
Containment Criteria for Removal of Paint Containing Lead and Other Toxic Metals ¹								
Removal Method		SSPC Class ²	Containment Material Flexibility		Containment Material Permeability ³	Containment Support Structure	Containment Material Joints ⁴	
Hand Cleaning	Tool	3P ⁶	Rigid	or Flexible	Permeable	or Impermeable	Minimal	Partially Sealed
Power Cleaning Vacuum	Tool w/ Vacuum	3P ⁶	Rigid	or Flexible	Permeable	or Impermeable	Minimal	Partially Sealed
Power Cleaning Vacuum	Tool w/o	2P	Rigid	or Flexible	Permeable	or Impermeable	Rigid Flexible	or Fully Partially Sealed
Water Jetting Wet Abrasive Water Cleaning ⁷		2W-3W	Rigid	or Flexible	Permeable and Impermeable ⁷		Rigid, Flexible, or Minimal	Fully and Partially Sealed
Abrasive Blast Cleaning		1A	Rigid	or Flexible	Impermeable		Rigid or Flexible	Fully Sealed
Vacuum Blast Cleaning		4A ⁶	Rigid	or Flexible	Permeable		Minimal	Partially Sealed

Table 1 (Continued) Containment Criteria for Removal of Paint Containing Lead and Other Toxic Metals¹						
Removal Method		SSPC Class²	Containment Entryway	Ventilation System Required⁵	Negative Pressure Required	Exhaust Filtration Required
Hand Cleaning	Tool	3P ⁶	Overlapping or Open Seam	Natural	No	No
Power Cleaning Vacuum	Tool w/	3P ⁶	Overlapping or Open Seam	Natural	No	No
Power Cleaning Vacuum	Tool w/o	2P	Overlapping or Open Seam	Natural	No	No
Water Jetting Wet Abrasive Water Cleaning ⁷		2W-3W	Overlapping or Open Seam	Natural	No	No
Abrasive Blast Cleaning		1A	Airlock or Resealable	Mechanical	Yes	Yes
Vacuum Blast Cleaning		4A ⁶	Open Seam	Natural	No	No

Notes:

¹This table provides general design criteria only. It does not guarantee that specific controls over emissions will occur because unique site conditions must be considered in the design. Other combinations of materials may provide controls over emissions equivalent to or greater than those combinations shown above.

²The SSPC Classification is based on SSPC Guide 6. Note that for work over water, water booms or boats with skimmers must be employed, where feasible, to contain spills or releases. Debris must be removed daily at a minimum.

³Permeability addresses both air and water as appropriate. In the case of water removal methods, the containment materials must be resistant to water. Ground covers should always be impermeable, and of sufficient strength to withstand the impact and weight of the debris and the equipment used for collection and clean-up. Ground covers must also extend beyond the containment boundary to capture escaping debris.

⁴ If debris escapes through the seams, then additional sealing of the seams and joints is required.

⁵When "Natural" is listed, ventilation is not required provided the emissions are controlled as specified in this Special Provision, and provided worker exposures are properly controlled. If unacceptable emissions or worker exposures to lead or other toxic metals occur, incorporate a ventilation system into the containment.

⁶Ground covers and wall tarpaulins may provide suitable controls over emissions without the need to completely enclose the work area.

⁷This method applies to water cleaning to remove surface contaminants, and water jetting (with and without abrasive) and wet abrasive blast cleaning where the goal is to remove paint. Although both permeable and impermeable containment materials are included, ground covers and the lower portions of the containment must be water impermeable with fully sealed joints, and of sufficient strength and integrity to facilitate the collection and holding of the water and debris for proper disposal. If water or debris, other than mist, escape through upper sidewalls or ceiling areas constructed of permeable materials, they shall be replaced with impermeable materials. Permeable materials for the purpose of this specification are defined as materials with openings measuring 25 mils (1 micron) or less in greatest dimension.

- A. Containment Components - The basic components that make up containment systems are defined below. The components are combined in Table 1 to establish the minimum containment system requirements for the method(s) of paint removal specified for the Contract.
1. Rigidity of Containment Materials - Rigid containment materials consist of solid panels of plywood, aluminum, rigid metal, plastic, fiberglass, composites, or similar materials. Flexible materials consist of screens, tarps, drapes, plastic sheeting, or similar materials. When directed by the Engineer, do not use flexible materials for horizontal surfaces directly over traffic lanes or vertical surfaces in close proximity to traffic lanes. If the Engineer allows the use of flexible materials, The Contractor shall take special precautions to completely secure the materials to prevent any interference with traffic.
 2. Permeability of Containment Materials - The containment materials are identified as air impenetrable if they are impervious to dust or wind such as provided by rigid panels, coated solid tarps, or plastic sheeting. Air penetrable materials are those that are formed or woven to allow air flow. Water impermeable materials are those that are capable of containing and controlling water when wet methods of preparation are used. Water permeable materials allow the water to pass through. Chemical resistant materials are those resistant to chemical and solvent stripping solutions. Use fire retardant materials in all cases.
 3. Support Structure - Rigid support structures consist of scaffolding and framing to which the containment materials are affixed to minimize movement of the containment cocoon. Flexible support structures are comprised of cables, chains, or similar systems to which the containment materials are affixed. Use fire retardant materials in all cases.
 4. Containment Joints - Fully sealed joints require that mating surfaces between the containment materials and to the structure being prepared are completely sealed. Sealing measures include tape, caulk, Velcro, clamps, or other similar material capable of forming a continuous, impenetrable or impermeable seal. When materials are overlapped, a minimum overlap of 8 in. (200 mm) is required.
 5. Entryway - An airlock entryway involves a minimum of one stage that is fully sealed to the containment and which is maintained under negative pressure using the ventilation system of the containment. Resealable door entryways involve the use of flexible or rigid doors capable of being repeatedly opened and resealed. Sealing methods include the use of zippers, Velcro, clamps, or similar fasteners. Overlapping door tarpaulin entryways consist of two or three overlapping door tarpaulins.

6. Mechanical Ventilation - The requirement for mechanical ventilation is to ensure that adequate air movement is achieved to reduce worker exposure to toxic metals to as low as feasible according to OSHA regulations (e.g., 29 CFR 1926.62), and to enhance visibility. Design the system with proper exhaust ports or plenums, adequately sized ductwork, adequately sized discharge fans and air cleaning devices (dust collectors) and properly sized and distributed make-up air points to achieve a uniform air flow inside containment for visibility. The design target for airflow shall be a minimum of 100 ft. (30.5m) per minute cross-draft or 60 ft. (18.3 m) per minute downdraft. Increase these minimum airflow requirements if necessary to address worker lead exposures. Natural ventilation does not require the use of mechanical equipment for moving dust and debris through the work area.
7. Negative Pressure - When specified, achieve a minimum of 0.03 in. (7.5 mm) water column (W.C.) relative to ambient conditions, or confirm through visual assessments for the concave appearance of the containment enclosure.
8. Exhaust Ventilation - When mechanical ventilation systems are used, provide filtration of the exhaust air, to achieve a filtration efficiency of 99.9 percent at 0.02 mils (0.5 microns).

HAZARDOUS WASTE
CONTINGENCY PLAN
FOR
LEAD BASED PAINT REMOVAL PROJECTS

Bridge No.: _____
Location: _____
USEPA Generator No.: _____
IEPA Generator No.: _____

Note:

1. A copy of this plan must be kept at the bridge while the Contractor's employees are at the site.
2. A copy of the plan must be mailed to the police and fire departments and hospital identified herein.

Primary Emergency Coordinator

Name: _____
Address: _____
City: _____
Phone: (Work) _____
(Home) _____

Alternate Emergency Coordinator

Name: _____
Address: _____
City: _____
Phone: (Work) _____
(Home) _____

Emergency Response Agencies

POLICE:

1. State Police (if bridge not in city) Phone: _____
District No. _____
Address: _____
2. County Sheriff _____ Phone: _____
County: _____
Address: _____
3. City Police _____ Phone: _____
District No. _____
Address: _____

Arrangements made with police: (Describe arrangements or refusal by police to make arrangements):

FIRE:

1. City _____ Phone: _____
Name: _____
Address: _____
2. Fire District _____ Phone: _____
Name: _____
Address: _____
3. Other _____ Phone: _____
Name: _____
Address: _____

Arrangements made with fire departments: (Describe arrangements or refusal by fire departments to make arrangements):

HOSPITAL:

Name: _____ Phone: _____

Address: _____

Arrangements made with hospital: (Describe arrangements or refusal by hospital to make arrangements):

Properties of waste and hazard to health:

Places where employees working:

Location of Bridge:

Types of injuries or illness which could result:

Appropriate response to release of waste to the soil:

Appropriate response to release of waste to surface water:

Emergency Equipment at Bridge

Emergency Equipment List	Location of Equipment	Description of Equipment	Capability of Equipment
1. Two-way radio	Truck		Communication
2. Portable Fire Extinguisher	Truck		Extinguishes Fire
3. Absorbent Material	Truck		Absorbs Paint or Solvent Spills
4. Hand Shovel	Truck		Scooping Material
5. 55 Gallon (208 L) Drum	Truck		Storing Spilled Material
6. 5 Gallon (19 L) Pail	Truck		Storing Spilled Material

Emergency Procedure

1. Notify personnel at the bridge of the emergency and implement emergency procedure.
2. Identify the character, source, amount and extent of released materials.
3. Assess possible hazards to health or environment.
4. Contain the released waste or extinguish fire. Contact the fire department if appropriate.
5. If human health or the environment is threatened, contact appropriate police and fire department. In addition, the Emergency Services and Disaster Agency needs to be called using their 24-hour toll free number (800-782-7860) and the National Response Center using their 24-hour toll free number (800-824-8802).
6. Notify the Engineer that an emergency has occurred.
7. Store spilled material and soil contaminated by spill, if any, in a drum or pail. Mark and label the drum or pail for disposal.
8. Write a full account of the spill or fire incident including date, time, volume, material, and response taken.
9. Replenish stock of absorbent material or other equipment used in response.

CONCRETE WEARING SURFACE

Effective: June 23, 1994

Revised: October 17, 2025

Description. This work consists of placing a concrete wearing surface, to the specified thickness, on precast concrete members such as deck beams and deck panels. Included in this work is cleaning and preparing the precast concrete surface prior to placement of the concrete wearing surface. This work shall be according to the applicable articles of Section 503 and the following.

Materials. The concrete wearing surface shall be class BS concrete.

Equipment: The equipment used shall be subject to the approval of the Engineer and shall meet the following requirements:

(a) Surface Preparation Equipment. Surface preparation equipment shall be according to the applicable portions of Section 1100 and the following:

(1) Hand-Held Blast Cleaning Equipment. Blast cleaning using hand-held equipment may be performed by high-pressure waterblasting or abrasive blasting. Hand-held blast cleaning equipment shall have oil traps.

Hand-held high-pressure waterblasting equipment shall have a minimum water pressure of 7000 psi (48 MPa).

(2) Vacuum Cleanup Equipment. The equipment shall be equipped with fugitive dust control devices capable of removing wet debris and water all in the same pass. Vacuum equipment shall also be capable of washing the deck with pressurized water prior to the vacuum operation to dislodge all debris and slurry from the deck surface.

(b) Concrete Equipment: Equipment for proportioning and mixing the concrete shall be according to Article 1020.03.

(c) Finishing Equipment. Finishing equipment shall be according to Article 503.03.

(d) Mechanical Fogging Equipment. Mechanical fogging equipment shall be according to 503.03.

Construction Requirements

Surface Preparation. Prior to placement of the concrete wearing surface, the top surface of the precast concrete members shall be clean and free of all foreign material.

All debris of every type, including dirty water, resulting from the cleaning operation shall be reasonably confined during the performance of the cleaning work and shall be immediately and thoroughly removed from the cleaned surfaces and all other areas where debris may have accumulated.

Prior to placement of the concrete wearing surface, the Engineer will inspect the cleaned surface, all areas still contaminated shall be cleaned again at the Contractor's expense.

Wearing Surface Placement. The concrete wearing surface placement shall be according to Article 503.16 of the Standard Specifications. Areas to receive the overlay shall be either thoroughly or continuously wetted with water at least one hour before placement of the concrete wearing surface is started. When the surface is pre-wetted any accumulations of water shall be dispersed or removed prior to placement of the concrete wearing surface.

Plans for anchoring support rails and the mixture-placing procedure shall be submitted to the Engineer for approval.

Curing and Protection. The concrete shall be continuously wet cured for at least 14 days according to Article 1020.13(a)(5). However, if the minimum specified compressive strength or flexural strength is obtained prior to 14 days, the cure time may be reduced, but at no time shall the wet cure be less than 7 days. The concrete shall be protected from low air temperatures according to Article 1020.13(d)(1) or (2), except the protection method shall remain in place for the entire curing period.

Opening to Traffic. The concrete wearing surface may be opened to traffic when test specimens have obtained a minimum compressive strength of 4000 psi (27,500 kPa) or a minimum flexural strength of 675 psi (4650 kPa), but not prior to the completion of the wet cure.

Method of Measurement. Concrete wearing surface will be measured for payment in place and the area computed in square yards (square meters).

Basis of Payment. This work including cleaning and surface preparation will be paid for at the contract unit price per square yard (square meter) for CONCRETE WEARING SURFACE, of the thickness specified.

BRIDGE DECK CONSTRUCTION

Effective: October 22, 2013

Revised: December 21, 2016

When Diamond Grinding of Bridge Sections is specified, hand finishing of the deck surface shall be limited to areas not finished by the finishing machine and to address surface corrections according to Article 503.16(a)(2). Hand finishing shall be limited as previously stated solely for the purpose of facilitating a more timely application of the curing protection. In addition the requirements of 503.16(a)(3)a. and 503.16(a)(4) will be waived.

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).

BRIDGE DECK GROOVING (LONGITUDINAL)

Effective: December 29, 2014

Revised: March 29, 2017

Revise Article 503.16(a)(3)b. to read as follows.

b. Saw Cut Grooving. The grooving operation shall not be started until after the expiration of the required curing or protection period and after correcting excessive variations by grinding or cutting has been completed.

The grooves shall be cut into the hardened concrete, parallel to the centerline of the roadway, using a mechanical saw device equipped with diamond blades that will leave grooves 1/8 in. wide and 3/16 in. $\pm$ 1/16 in. deep (3 mm wide and 5 mm $\pm$ 1.5 mm deep), with a uniform spacing of 3/4 in. $\pm$ 1/16 in. (20 mm $\pm$ 1.5 mm) centers. The grooving shall typically extend the full width of the traffic lanes and terminate at the edge of the traffic lane or shoulder. If the bridge has a variable width traffic lane, the grooving shall remain parallel to the centerline of the main roadway. Any staggering of the groove terminations to accommodate the variable width shall be within the shoulders. Grooves shall not be cut closer than 3 inches (75 mm) nor further than 6 inches (150 mm) from any construction joint running parallel to the grooving. In addition, grooves shall not be cut within 6 in. $\pm$ 1 in. (150 mm $\pm$ 25 mm) from deck drains and expansion joints.

The grooving machine shall contain diamond blades mounted on a multi-blade arbor on a self-propelled machine built for grooving hardened concrete surfaces. The grooving machine shall have a depth control device that detects variations in the deck surface and adjusts the cutting head height to maintain a specified depth of groove. The grooving machine shall have a guide device to control multi-pass alignment.

The removal of slurry shall be continuous throughout the grooving operations. The grooving equipment shall be equipped with vacuum slurry pickup equipment which shall continuously pick up water and sawing dust, and pump the slurry to a collection tank. The slurry shall be disposed of offsite according to Article 202.03.

Cleanup shall be continuous throughout the grooving operation. All grooved areas of the deck shall be flushed with water as soon as possible to remove any slurry material not collected by the vacuum pickup. Flushing shall be continued until all surfaces are clean.

Method of Measurement. This work shall be measured for payment according to Article 503.21(b) except no measurement will be made for any grooving of the shoulders to accommodate a variable width traffic lane.

Basis of Payment. This work will be paid for at the contract unit price per square yard (square meter) for BRIDGE DECK GROOVING (LONGITUDINAL).

METALLIZING OF STRUCTURAL STEEL

Effective: October 4, 2016

Revised: October 20, 2017

Description: This work consists of furnishing all materials, equipment, labor, and other essentials necessary to accomplish the surface preparation and application of thermal spray metallizing to all new structural steel, or portions thereof as detailed in the plans, in the shop. Also included in this work, when specified on the Contract plans, is the application of a paint system over the metallizing in the shop and/or in the field.

Materials: Materials shall be according to the following.

Metallizing Wire: All thermal spray feedstock (metallizing wire) shall be the products of a single manufacturer, meet the requirements below, and meet the thermal spray equipment manufacturer's specifications.

- a. The metallizing wire shall consist of 99.9% zinc or 85/15 zinc/aluminum complying with ASTM B-833 and ANSI/AWS C2.25/C2.25M
- b. The Contractor shall provide a certificate of chemical composition of the proposed metallizing wire from the metallizing wire manufacturer.

Paint: All materials to be used on an individual structure shall be produced by the same manufacturer.

The Bureau of Materials and Physical Research has established a list of all paint products that have met preliminary requirements. Each batch of material, except for the clear aliphatic urethane and the penetrating sealer shall be tested and approved for use. The specified colors shall be produced in the coating manufacturer's facility. Tinting of coating after it leaves the manufacturing facility is not allowed.

The paint materials shall meet the following requirements of the Standard Specification and as noted below:

<u>Item</u>	<u>Article</u>
(a) Waterborne Acrylic	1008.04
(b) Aluminum Epoxy Mastic (Note 1)	1008.03
(c) Epoxy/ Aliphatic Urethane (Note 1)	1008.05
(d) Penetrating Sealer (Note 2)	
(e) Clear Aliphatic Urethane (Note 3)	

Note 1: If the finish coats are being applied in the field over a shop applied epoxy, select an epoxy intermediate for shop application with a recoat window that is long enough to support the construction schedule.

Note 2: The Epoxy Penetrating Sealer shall be a cross-linked multi component sealer. The sealer shall have the following properties:

- (a) The volume solids shall be 98 percent (plus or minus 2 percent).
- (b) Shall be clear or slightly tinted color.

Note 3: The Clear Aliphatic Urethane material shall be one of the following products:

- (a) Carbothane Clear Coat by Carboline Company
- (b) Pitthane Ultra Clear 95-8000 by Pittsburgh Paints (PPG)
- (c) ArmorSeal Rexthane I MCU by Sherwin-Williams

Shop Prequalification: The Contractor performing the shop work shall have either an SSPC-QP 3 Certification or an AISC Sophisticated Paint Endorsement certification. The certification(s) shall remain current throughout the duration of the contract.

The Contractor performing the shop work shall have satisfactorily performed a minimum of three (3) previous projects involving abrasive blast cleaning, metallizing, and paint application. At least one project within the past two (2) years shall have involved a bridge or similar industrial type application. The suitability of the Contractor's qualifications and prior experience will be considered by the Department before granting approval to proceed.

Submittals: The Contractor performing the shop work shall submit the following plans and information for Engineer review and acceptance within 30 days of contract execution (unless written permission from the Engineer states otherwise). When full coats are being applied in the field, the field painting contractor shall comply with the submittal requirements of Article 506.03. Work in the shop or field shall not proceed until submittals are accepted by the Engineer.

- (a) **Contractor Personnel Qualifications:** Evidence of experience and the names and qualifications/experience/training of the personnel managing and implementing the Quality Control program, and for those performing the quality control tests. QC personnel qualification requirements are found under "Quality Control (QC) Inspection."

All metallizing applicators shall be qualified in accordance with AWS C2.16/C2.16M.

- (b) **Quality Control (QC) Plan:** A Quality Control Plan that identifies: test instruments to be used, a schedule of required measurements and observations, procedures for correcting unacceptable work, and procedures for improving surface preparation and metallizing/painting quality as a result of quality control findings. The program shall incorporate the IDOT Quality Control Daily Report Forms as supplied by the Engineer, or equivalent information on Engineer-approved Shop Contractor-designed forms.
- (c) **Surface Preparation Plan:** The surface preparation plan shall include the methods of surface preparation and types of equipment that will be used to prepare the surfaces as specified herein. Also any solvents proposed for solvent cleaning shall be identified and MSDS provided.

- (d) Abrasives: Identify the type and brand name of the abrasive proposed for use, provide MSDS and manufacturer's data indicating that the abrasive meets requirements of the SSPC-AB 1 or AB 3 standards as specified herein.
- (e) Metallizing Plan: Written procedures for the shop application of metallizing, including the brand name and type of metallizing wire and application equipment to be used. Proof that the metallizing wire complies with ASTM B-833 and ANSI/AWS C2.25/C2.25M shall also be provided. Provide written documentation verifying that all metallizing applicators are qualified in accordance with ANSI/AWS C2.16/C2.16M.
- (f) Painting Plan: If shop painting is specified to be applied over the metallizing or if galvanizing is used in lieu of metallizing on minor bridge members, procedures for the application of the coating system shall be provided along with MSDS and product data sheets. A description of the application equipment to be used shall be included. The plan shall include the requirements to be followed by the field contractor for field touch up.
- (g) Shipping and Handling Plan: A written plan outlining the precautions that shall be taken for the protection of the finished surface during shipping and handling. The plan shall address the steps to be taken, such as insulating padding, wood dunnage, load securing strapping, binding apparatus, etc.
- (h) Galvanizing Option: At the Contractor's option, hot dip galvanizing may be proposed as a substitute for shop metallizing of bearings, typical cross frames, or diaphragms on non-curved structures; expansion joint assemblies; and other elements not carrying calculated stress. Submittal requirements are found under "Hot Dip Galvanizing Option." Include the proposed cleaning and painting plan.

The Engineer will provide written notification to the Contractor when submittals are complete and acceptable. No surface preparation work shall begin until that notification is received. This acceptance shall not be construed to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Acceptance does not relieve the Contractor from the responsibility to conduct the work according to the requirements of Federal, State, or Local regulations and this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

Quality Control (QC) Inspections: The Contractor performing the shop work shall perform first line, in process QC inspections. The Contractor shall implement the accepted QC Program to insure that the work complies with these specifications. The designated Quality Control inspector shall be onsite full time during any operations that affect the quality of the system (e.g., surface preparation, metallizing application, paint application, and final inspection at project completion). The Contractor shall use the IDOT Contractor Daily (QC) Metallizing & Painting Report form (supplied by the Engineer, or Engineer-approved Contractor-designed forms that contain the same information, to record the results of quality control tests and inspections. The completed reports shall be given to the Engineer before work resumes the following day.

QC inspections shall include, but are not limited to the following:

- Ambient conditions.
- Surface preparation (solvent cleaning, abrasive blast cleanliness, surface profile depth, etc.).
- Metallizing application (specified materials used, bend test, continuity and coverage, adhesion, dry film thickness).
- Verification that the MISTIC test ID number for the paint system has been issued when painting is specified.
- Paint Application (when specified)(specified materials used, continuity and coverage, dry film thickness, freedom from overspray, dry spray, pinholes, skips, misses, etc.).

The personnel managing the QC Program shall possess a minimum classification as a NACE CIP Level 2, or shall provide evidence of successful inspection of three projects of similar or greater complexity and scope completed in the last two years. References shall include the name, address, and telephone number of a contact person employed by the facility owner.

The personnel performing the QC tests shall be trained in all tests, inspections, and instrument use required for the inspection of surface preparation, metallizing and paint application. Documentation of training shall be provided. The QC personnel shall be solely dedicated to quality control activities and shall not perform any production work. QC personnel shall take the lead in all inspections, but applicators shall perform wet film thickness measurements during application of the coatings, with QC personnel conducting random spot checks. The Contractor shall not replace the QC personnel assigned to the project without advance notice to the Engineer, and acceptance of the replacement(s), by the Engineer.

The Contractor performing the shop work shall supply all necessary equipment to perform the QC tests and inspections as specified. Equipment shall include the following at a minimum:

- Psychrometer or comparable equipment for measurement of dew point and relative humidity, including weather bureau tables or psychrometric charts
- Surface temperature thermometer
- SSPC Visual Standard VIS 1
- Surface profile replica tape and spring micrometer or electronic micrometer designed for use with replica tape; or electronic profilometer designed for measuring blast profile.

- Blotter paper for compressed air cleanliness checks
- Type 2 Electronic Dry Film Thickness Gage
- Calibration standards for dry film thickness gage
- Bend test coupons and bend test mandrel
- Adhesion testing instrument
- Companion panels for adhesion testing (if that option is selected)
- All applicable ASTM, ANSI, AWS, and SSPC Standards used for the work (reference list attached)

The instruments shall be verified for accuracy and adjusted by the Contractor's personnel in accordance with the equipment manufacturer's recommendations and the Contractor's QC Program. All inspection equipment shall be made available to the Engineer for QA observations as needed.

Hold Point Notification: Specific inspection and testing requirements within this specification are designated as Hold Points. Unless other arrangements are made, the Contractor shall provide the Engineer with a minimum four-hour notification in advance of the Hold Point. If four-hour notification is provided and the work is ready for inspection at that time, the Engineer will conduct the necessary observations. If the work is not ready at the appointed time, unless other arrangements are made, an additional four-hour notification is required. Permission to proceed beyond a Hold Point without a QA inspection will be at the sole discretion of the Engineer and will only be granted on a case-by-case basis.

Quality Assurance (QA) Observations: The Engineer will conduct QA observations of any or all phases of the work. The presence or activity of Engineer observations in no way relieves the Contractor of the responsibility to perform all necessary daily QC inspections of their own and to comply with all requirements of this Specification.

The Engineer has the right to reject any work that was performed without adequate provision for QA observations.

CONSTRUCTION REQUIREMENTS

The surface preparation and metallizing shall be according to the SSPC Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc and their Alloys and Composites for the Corrosion Protection of Steel, SSPC-CS 23.00/AWS C2.23M/NACE No. 12 except as modified herein. In the event of a conflict, the requirements of this specification shall prevail.

Hot Dip Galvanizing Option: At the Contractor's option, hot dip galvanizing may be substituted for shop metallizing of bearings, typical cross frames, or diaphragms on non-curved structures; expansion joint assemblies; and other elements not carrying calculated stress. Galvanized surfaces which shall have concrete poured against them shall be chemically passivated or otherwise protected by a method approved by the Engineer. Galvanized bearings for exterior members and elements readily visible after erection shall be prepared for field painting, but galvanized items obscured from public view will not require field painting. The Contractor shall submit a proposal for substituting galvanizing to the Engineer, showing items to be field painted, applicable provisions of AASHTO M 111 (ASTM A 123), drain/vent holes and any other necessary modifications.

Notification: The Contractor shall notify the Engineer 24-hours in advance of beginning surface preparation operations.

Surface Preparation, Metallizing and Painting Equipment: The Contractor shall provide surface preparation, metallizing, and painting equipment as needed to perform the work as specified herein.

Metallizing application equipment shall be portable electric arc thermal spray units that are set-up, adjusted and operated in accordance with the manufacturer's written instructions.

All cleaning and painting equipment shall include gages capable of accurately measuring fluid and air pressures and shall have valves capable of regulating the flow of air, water or paint as recommended by the equipment manufacturer. The equipment shall be maintained in proper working order.

Diesel or gasoline powered equipment shall be positioned or vented in a manner to prevent deposition of combustion contaminants on any part of the structure.

Hand tools, power tools, pressure washing, water jetting, abrasive blast cleaning equipment, brushes, rollers, and spray equipment shall be of suitable size and capacity to perform the work required by this specification. Appropriate filters, traps and dryers shall be provided for the compressed air used for abrasive blast cleaning and conventional spray application. Paint pots shall be equipped with air operated continuous mixing devices unless prohibited by the coating manufacturer.

Test Areas (Sections): Prior to proceeding with production work on the project, the Contractor shall prepare test sections of at least 10 square feet (0.93 sq. m). More than one test section may be needed to represent the various design configurations of the structure. The test section(s) shall be blast cleaned, metallized and painted (if specified) in accordance with the requirements specified herein using the same equipment, materials and procedures that will be used for the production.

During the blast cleaning, metallizing, and painting of the test section(s), in the presence of the Engineer, the Contractor shall perform all quality control tests and inspections required by this specification including complete documentation. In addition, the Contractor shall allow sufficient time for the Engineer to perform any or all quality assurance tests and inspections desired.

Production work shall not proceed until the Engineer agrees that the blast cleaning, metallizing, and painting work, along with the quality control testing, inspection, and documentation are acceptable.

No additional compensation will be paid for the preparation of the test section(s).

Protective Coverings and Damage: The Contractor shall apply protective coverings to all surfaces of the structural steel that are not scheduled for surface preparation, metallizing, and painting. The coverings shall be maintained and remain in place until the work is completed and then shall be removed prior to shipping.

Metallized or painted surfaces damaged by any Contractor's operation shall be repaired, and re-metallized and/or re-painted, as directed by the Engineer, at no additional cost to the Department.

Ambient Conditions: Surfaces prepared for metallizing or painting shall be free of moisture and other contaminants. The Contractor shall control operations to insure that dust, dirt, or moisture do not come in contact with surfaces on which work will take place. The surface temperature shall be at least 5°F (3°C) above the dew point during final surface preparation operations, and the application of metallizing. Metallizing shall only be applied when the surface and air temperatures are above 32°F (0°C). The manufacturers' published literature shall be followed for specific temperature, dew point, and humidity restrictions during the application of each paint coat. Metallizing or paint shall not be applied in rain, wind, snow, fog or mist. Ambient conditions shall be maintained during the drying period specified by the manufacturer.

Compressed Air Cleanliness: Prior to using compressed air for abrasive blast cleaning, blowing down surfaces, and metallizing or painting application, the Contractor shall verify that the compressed air is free of moisture and oil contamination according to the requirements of ASTM D 4285. The tests shall be conducted at least one time per shift for each compressor system in operation. If air contamination is evident, the Contractor shall change filters, clean traps, add moisture separators or filters, or make other adjustments as necessary to achieve clean, dry air. The Contractor shall also examine the work performed since the last acceptable test for evidence of defects or contamination caused by the contaminated compressed air. Contaminated work shall be repaired at no additional cost to the Department.

Solvent Cleaning (HOLD POINT): All traces of oil, grease, and other detrimental contaminants on the steel surfaces to be metallized shall be removed by solvent cleaning in accordance with SSPC-SP 1. The brand name of proposed cleaning solvent(s) and/or proprietary chemical cleaners including manufacturers' product data sheet and MSDS shall be submitted for Engineer acceptance prior to use.

Under no circumstances shall blast cleaning be performed in areas containing surface contaminants or in areas where the Engineer has not accepted the solvent cleaning. Rejected surfaces shall be re-cleaned to the specified requirements at no additional cost to the Department.

Abrasives: Abrasive blast cleaning shall be performed using either expendable abrasives or recyclable steel grit abrasives. Expendable abrasives shall be used one time and discarded. The abrasive shall be angular in shape. Acceptable angular shaped abrasives include, but are not limited to, aluminum oxide, steel grit, and crushed slag. Silica sand shall not be used. Steel shot and other abrasives producing a rounded surface profile are not acceptable, even if mixed with angular grit abrasives.

Abrasive suppliers shall provide written certification that expendable abrasives and recyclable steel grit abrasives meet the requirements of SSPC-AB 1 and AB 3, respectively. Abrasive suppliers shall certify that abrasives are not oil contaminated and shall have a water extract pH value within the range of 6 to 8. On a daily basis, the Contractor shall verify that recycled abrasives are free of oil and contamination by performing a vial test in accordance with SSPC-AB 2.

All surfaces that are found to have been prepared using abrasives not meeting the SSPC-AB 1, AB 2, or AB 3 requirements, as applicable, are oil contaminated, or have a pH outside the specified range, shall be solvent cleaned or low pressure water cleaned, and re-blast cleaned at no cost to the Department.

Surface Preparation (HOLD POINT): The following method of surface preparation shall be used:

- (a) **Flame Cut Steel:** Prior to blast cleaning, all flame cut edges shall be ground to remove hardened steel and any sharp or irregular shapes.
- (b) **Near-White Metal Blast Cleaning:** All steel surfaces to be metallized shall be near white metal blast cleaned in accordance with SSPC-SP 10 using dry abrasive blast cleaning methods.
- (c) **Galvanized Minor Bridge Members:** If galvanizing of minor bridge members is selected in lieu of metallizing, prepare all galvanized surfaces for painting by brush-off blast cleaning in accordance with SSPC-SP 16 or by using proprietary solutions that are specifically designed to clean and etch (superficially roughed) galvanized steel for painting. If cleaning and etching solutions are selected, submit manufacturer's technical product literature and MSDS for Engineer's review and written acceptance prior to use.
- (d) **Base Metal Irregularities:** If hackles, burrs, or slivers in the base metal are visible on the steel surface after cleaning, the Contractor shall remove them by grinding followed by re-blast cleaning.

Surface Profile (HOLD POINT): Blast cleaning abrasives shall be of the size and grade that will produce a uniform angular surface profile depth of 3.5 to 4.5 mils (89 to 114 microns). If the metallizing wire manufacturer's profile requirements are more restrictive, the Contractor shall advise the Engineer and comply with those requirements. For recycled abrasives, an appropriate operating mix shall be maintained in order to control the profile within these limits.

The average surface profile shall be determined each work day with a minimum frequency of one location per every 200 sq ft (18.6 sq m) per piece of equipment. All surfaces, including flame cut edges, shall be tested in accordance with SSPC-PA 17. Surface profile replica tape or electronic profilometer shall be used. The tape shall be retained and included with the daily QC report. Single measurements less than 3.5 mils (89 microns) are unacceptable. In that event, additional testing shall be done to determine the limits of the deficient area and, if it is not isolated, work will be suspended. The Contractor shall submit a plan for making the necessary adjustments to insure that the specified surface profile is achieved on all surfaces. Work shall not resume until the Engineer provides written acceptance.

Surface Condition Prior to Metallizing (HOLD POINT): Prepared surfaces shall meet the requirements of SSPC-SP 10 immediately prior to metallizing, and shall be metallized within six hours of blast cleaning. If rust appears or bare steel has been exposed for more than six hours, the affected area shall be re-blasted at no additional cost to the Department.

All dust and surface preparation residue on steel surfaces shall be removed prior to metallizing.

The quality of surface preparation and cleaning of surface dust and debris shall be accepted by the Engineer prior to metallizing.

The Engineer has the right to reject any work that was performed without adequate provision for QA observations to accept the degree of cleaning. Rejected metallizing work shall be removed and replaced at no additional cost to the Department.

Daily Metallizing Operator-Equipment Qualification – Bend Tests: Unless directed otherwise by the Engineer, each day that metallizing will be applied, the Contractor shall perform bend testing prior to beginning production work. For each metallizing applicator, five carbon steel coupons measuring 2 inch wide x 8 inch long x 0.05 inch (50mm x400 mm x 1.3 mm) thick shall be blast cleaned using the same equipment and abrasive used for the production work. Each applicator shall apply the metallizing to five coupons in accordance with the requirements of this Specification to a dry film thickness of 8.0 to 12.0 mils (200 to 300µm). 180 degree bend testing shall be performed on all five coupons using a 13mm (1/2") mandrel in accordance with the requirements and acceptance criteria of SSPC-CS 23/AWS C2.23M/NACE 12. Minor cracks that cannot be lifted from the substrate with knife blade are acceptable. If lifting occurs on any coupon, the surface preparation and/or metallizing process shall be modified until acceptable results are achieved before proceeding with production work.

Application of Metallizing: Application shall be done in overlapping passes in a cross-hatch pattern (i.e., a second set of overlapping passes shall be applied at right angles to the first set of overlapping passes) to ensure uniform coverage. The gun shall be held at such a distance from the work surfaces that the metal is still molten on impact. The metallizing shall be applied as a continuous film of uniform thickness, firmly adherent, and free from thin spots, misses, lumps or blisters, and have a fine sprayed texture. Thin spots and misses shall be re-metallized. If touch up metallizing or the application of additional metallizing to previously applied metallizing does not occur within 24 hours, the surface of the metallizing shall be brush off blast cleaned according to SSPC-SP7 to remove oxidation and surface contaminants prior to the application of additional metallizing. The final appearance of the metallizing when left un-top coated or top coated with System 1 shall be uniform without excessive blotchiness or contrast in color. If the surface does not have a uniform appearance, remove and replace the metallizing at no cost to the Department. If the configuration of the surface being metallized does not allow for a proper gun-to-work piece standoff distance, the Contractor shall notify the Engineer.

Unless required by the contract plans, the top of the top flanges shall not be metallized or painted. If the contract plans indicate that the top flange is to be metallized, only the first coat of the paint system shall be applied to the top flange.

Metallizing Thickness: The thickness of the metallizing shall be 8.0 to 12.0 mils (200-300 microns). Thickness shall be measured as specified by SSPC-PA 2 (use a Type 2 Electronic Gauge only).

Metallizing Adhesion: Adhesion testing of metallizing applied each day shall be determined with a self-adjusting adhesion tester in accordance with ASTM D 4541. Unless otherwise directed by the Engineer, a minimum of one test shall be conducted for every 500 sq ft (46sq m) of metallized surface. The tests shall be conducted prior to application of any coating. If any of the tests exhibit less than 700 psi (4.83 MPa) for 85/15 or less than 500 psi (3.45 MPa) for zinc, additional tests shall be conducted to determine the extent of the deficient material. All deficient metallizing shall be removed by blast cleaning and re-applied at no additional cost to the Department.

At the discretion of the Engineer, a representative blast cleaned test panel (or steel companion panel approximately 12 inch x 12 inch x ¼ inch thick) can be metallized at the same time each 500 sq ft (46sq m) of surface area, or portion thereof, is metallized. Adhesion testing can be performed on the companion panel rather than on the structure. If the adhesion tests on the panels are acceptable, the metallizing on the structure is considered acceptable and testing on the structure is not required. If adhesion testing of the panels fails, testing shall be conducted on the structure. If adhesion testing on the structure is acceptable, the metallizing on the structure is considered to be acceptable. If tests on the structure are unacceptable, complete removal of the failing metallizing and re-metallizing in accordance with this Specification shall be performed at no additional cost to the Department.

Application of Paint Systems Over Metallizing:

When painting over the metallizing is specified, three painting system options exist for application over the metallizing as shown below. Systems, or components of systems, specified to be shop applied shall not be applied to the faying surfaces of bolted connections. The system to be applied shall be as designated on the plans.

- (a) **System 1** is a single coat system consisting of a full clear aliphatic urethane coat shop applied to all metallized surfaces except as noted above.

The thickness of the clear coat to be applied is dependent on the product selected and shall be as follows:

TABLE 1

CLEAR URETHANE COAT (SINGLE COAT SYSTEM)

MANUFACTURER	SEALER COAT ONLY (DFT)
Carboline Company	Carbothane Clear Coat (3.0 to 5.0 mils) (75 to 125 microns)
Pittsburgh Paints (PPG)	Pitthane Ultra Clear 95-8000 (2.0 to 3.0 mils) (50 to 75 microns)
Sherwin-Williams	AarmorSeal Rexthane I MCU (3.0 to 5.0 mils) (75 to 125 microns)

The clear urethane shall be applied in a 2 step process. The first step shall be to apply a “mist coat” that is thinned at the maximum allowable thinning rate as listed on the manufacturer’s product data sheet that is compliant with VOC regulations. The intent of the mist coat is to saturate the porous metallizing surface and displace entrapped air within the porosity of the metallizing. After allowing the mist coat to flash off for 20 minutes, the full coat of clear urethane shall be applied to achieve the manufacturer’s recommended dry film thickness.

- (b) **System 2** is a four coat system consisting of a full shop coat of epoxy penetrating sealer coat, a full shop coat of an extended recoat epoxy and two full field applied coats of waterborne acrylic.

The epoxy penetrating sealer shall be applied in accordance with the coating manufacturer's instructions at a coverage rate designed to achieve a theoretical dry film thickness of 1.5 mils (38 microns). The intent of the epoxy penetrating sealer coat is to saturate the metallizing and cover the surface rather than to build a film thickness; therefore, dry film thickness measurement of the epoxy penetrating sealer coat is not required. The top of top flanges that are specified to be metallized and embedded in concrete shall receive the epoxy penetrating sealer only.

The thicknesses of the epoxy and waterborne acrylic coats shall be according to Article 506.09(f)(1).

- (c) **System 3** is a three coat system consisting of a full epoxy penetrating sealer coat, a full epoxy intermediate coat, and a full urethane finish coat. All coats shall be shop-applied unless specified otherwise. If the urethane is field-applied, an extended recoat epoxy shall be applied in the shop.

The epoxy penetrating sealer shall be applied in accordance with the coating manufacturer's instructions at a coverage rate designed to achieve a theoretical dry film thickness of 1.5 mils (38 microns). The intent of the epoxy penetrating sealer coat is to saturate the metallizing and cover the surface rather than to build a film thickness; therefore, dry film thickness measurement of the epoxy penetrating sealer coat is not required. The top of top flanges that are specified to be metallized and embedded in concrete shall receive the epoxy penetrating sealer only.

The thicknesses of the epoxy and urethane coats shall be according to Article 506.09(f)(2).

The single clear urethane coat or the epoxy penetrating sealer coat shall be applied within 24 hours of metallizing providing that the immediate work environment is controlled. If temperature and humidity cannot be controlled, that time frame shall be reduced to within 8 hours. The metallizing shall be dry and free of any visible debris or oxidation (zinc oxide) at the time of application. Visible oxidation shall be removed by mechanical methods such as stiff bristle or wire brushing. Contact surfaces for bolted connections shall consist of bare, uncoated metallizing only and shall be masked off prior to the application of any shop applied coatings.

The clear urethane coat or the epoxy penetrating sealer shall be applied in accordance with the manufacturer's instructions and in such a manner to assure thorough wetting and sealing of the metallizing.

For systems 2 and 3, prior to application of any subsequent coat, the surface of the previous coat shall be dry in accordance with the manufacturer's instructions and free of any visible contamination. If the manufacturer's specified recoat times are exceeded, the effected coat(s) shall be completely roughened or removed and replaced, according to the manufacturer's instructions, at no cost to the Department. The same restrictions regarding film appearance and continuity for the seal coat apply to the intermediate coat and topcoat.

All coats shall be applied to achieve a smooth, uniform appearance that is free of dryspray, overspray, and orange peel. Shadow-through, pinholes, bubbles, skips, misses, lap marks between applications, runs, sags, or other visible discontinuities are unacceptable.

Masked off areas around field connections shall be coated in the field after the steel is fully erected according to the touch-up procedure for the completed system.

When the application of field coat(s) is required, the existing shop applied coats shall be prepared and field painting performed according to the applicable provisions of Article 506.10. If any coat has exceeded its recoat time, the surface shall be completely roughened or removed and replaced according to the manufacturer's instructions, prior to the application of the topcoat.

All coatings shall be applied by spray, supplemented with brushing or rolling, if needed. Special attention shall be given to obtaining complete coverage and proper coating thickness in crevices, on welds and edges, and in hard to reach areas.

Application of Paint System over Galvanizing: If galvanizing is used in lieu of metallizing and Paint System 1, no further painting is required. If galvanizing is used in lieu of metallizing and Paint System 2, apply a two-coat system consisting of a full waterborne acrylic intermediate coat and a full waterborne acrylic finish coat from System 2. If galvanizing is used in lieu of metallizing and Paint System 3, apply a full epoxy intermediate coat and a full urethane coat from System 3. To minimize handling and erection damage the acrylic coats of System 2 shall be applied in the field. Except as noted on the plans, the epoxy and urethane coats of System 3 can be applied in the shop or field.

Touch-Up of Completed Coating System: The Contractor shall repair all damaged and/or unacceptable areas of the completed coating system (all metallizing, galvanizing, and paint layers) prior to shipment as defined below. The same process shall be followed for the repair of shipping, handling, and erection damage.

Damage to the metallizing, galvanizing, and/or paint that does not expose the substrate shall be prepared by solvent cleaning in accordance with SSPC-SP 1 followed by power tool cleaning in accordance with SSPC-SP 3 to remove loose material. For the repair of damaged metallizing or galvanizing that exposes the substrate, the surface shall be spot blast cleaned in accordance with SSPC-SP 10. If blast cleaning cannot be performed, as authorized by the Engineer, the damage shall be spot power tool cleaned to SSPC-SP11.

The metallizing, galvanizing and/or paint surrounding each repair area shall be feathered for a distance of 1 to 2 inches (25 to 50 mm) to provide a smooth, tapered transition into the existing intact material. The surrounding intact paint shall be roughened to promote adhesion of the repair coats.

Damage to metallizing or galvanizing extends to the substrate shall be repaired. For metallizing it is critical that all remnants of sealer or paint have been removed from the porosity of the metallizing before applying new metallizing or an adhesion failure can occur. If it is no longer feasible to apply metallizing, spot-apply an organic zinc primer meeting the requirements of Section 1008. For galvanizing, spot apply organic zinc. After priming, for both the metallizing and galvanizing, apply the same intermediate and finish coats used on the surrounding steel. If the damage does not expose the substrate, only the effected paint coat(s) shall be applied.

Surface Preparation and Painting of Galvanized Fasteners: All ASTM A 325 or ASTM F 3125 high strength steel bolts, nuts and washers shall be hot dip galvanized according to AASHTO M232, except in areas where the metallized surfaces are to be top coated, in which case they shall be mechanically galvanized according to Article 1006.08(a) of the Standard Specifications.

The Contractor shall prepare all fasteners (i.e., galvanized nuts, bolts, etc.) by power tool cleaning in accordance with SSPC-SP 3. Following power tool cleaning and prior to painting, the surfaces shall be solvent cleaned according to SSPC-SP 1. Slight stains of torquing compound dye may remain after cleaning provided the dye is not transferred to a cloth after vigorous rubbing. If any dye is transferred to a cloth after vigorous rubbing, additional cleaning is required.

Spot paint the fasteners with one coat of an aluminum epoxy mastic coating meeting the requirements of Article 1008.03 of the Standard Specifications.

Shipping and Handling: The Contractor shall take special care in handling the steel in the shop and when loading for shipment. Painted, metallized, or galvanized steel shall not be moved or handled until sufficient cure time has elapsed to prevent handling damage. During shipping, the steel shall be insulated from the moving apparatus (i.e., chains, cables, hooks, clamps, etc.) by softeners approved by the Engineer. Apparatus used to hoist the steel shall be padded. Steel shall be placed on wood dunnage and spaced in such a manner that no rubbing will occur during shipment that could damage the paint, metallizing or galvanizing.

Special Instructions: At the completion of the work, the Contractor shall stencil on the bridge, using a contrasting colored paint, the date of metallizing and painting. The letters shall be capitals, not less than 2 inches (50 mm) and not more than 3 inches (75 mm) in height. The information defined below shall be stenciled on the exterior face of the first girders at the bridge abutments (approximately 1 or 2 feet outward from the abutment end of the girders). The Engineer will identify the bridge member(s) to be stenciled.

When all coats are applied in the shop with the exception of touch-up, the shop Contractor shall do the stenciling. The stencil shall contain the following words on four lines: "METALLIZED BY" on the first line; name of the Contractor on the second line; and the month and year in which the coating was completed on the third line; and the applicable system Code on the fourth line.

When the finish coat is applied in the field, the Contractor shall do the stenciling as described above, but insert "PAINTED BY" and the Contractor's name after the fourth line.

Basis of Payment: This work shall not be paid for separately but shall be included in the unit price bid for furnishing and/or erecting structural steel according to Article 505.13.

Appendix 1 – Reference List

The Shop and Field Contractor(s) shall maintain the following regulations and references on site for the duration of the project:

Illinois Environmental Protection Act

American Society of Testing Material

- ASTM D 4285, Standard Test Method for Indicating Oil or Water in Compressed Air
- ASTM B833, Standard Specifications for Zinc Wire for Thermal Spraying (Metallizing)
- ASTM D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

Society of Protective Coatings

- SSPC-AB 1, Mineral and Slag Abrasives
- SSPC-AB 2, Specification for Cleanliness of Recycled Ferrous Metallic Abrasives
- SSPC-AB 3, Newly Manufactured or Re-Manufactured Steel Abrasives
- SSPC-PA 2, Measurement of Dry Coating Thickness with Magnetic Gages
- SSPC-QP 1, Standard Procedure for Evaluating Painting Shop Contractors (Field Application to Complex Structures)
- SSPC-QP 2, Standard Procedure for Evaluating the Qualifications of Painting Shop Contractors to Remove Hazardous Paint
- SSPC-SP 1, Solvent Cleaning
- SSPC-SP 5/NACE No. 1, White Metal Blast Cleaning
- SSPC-SP 11, Power Tool Cleaning to Bare Metal
- SSPC-SP 12/NACE No. 5, Surface Preparation and Cleaning of Metals by Water Jetting Prior to Recoating
- SSPC-SP 16, Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals

- SSPC-PA 17, Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements.
- SSPC-VIS 1, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning
- SSPC-VIS 5, Guide and Reference Photographs for Steel Prepared by Wet Abrasive Blast Cleaning
- SSPC-Guide 15, Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Surfaces
- SSPC-CS 23.00/AWS C2.23M/NACE No. 12, Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel

American National Standards Institute/American Welding Society

- ANSI/AWS C2.25/C2.25M, Specification for Solid and Composite Wires, and Ceramic Rods for Thermal Spraying
- AWS C2.6/C2.6M, Guide for Thermal-Spray Operator Qualification

Metallizing wire and coating manufacturer's application instructions, MSDS and product data sheets

HOT DIP GALVANIZING FOR STRUCTURAL STEEL

Effective: June 22, 1999

Revised: June 28, 2024

Description. This work shall consist of surface preparation and hot dip galvanizing all structural steel specified on the plans and painting of galvanized structural steel when specified on the plans.

Materials. Fasteners shall be ASTM F 3125, Grade 325, Type 1, High Strength bolts with matching nuts and washers.

Fabrication Requirements. Hot-dip galvanizing shall be indicated on the shop drawings. The fabricator shall coordinate with the galvanizer to incorporate additional steel details required to facilitate galvanizing of the steel. These additional details shall be indicated on the shop drawings.

Additional temporary stiffeners may be added at the contractor's expense as necessary to prevent distortion of the girders during galvanizing. The contractor shall coordinate with the fabricator and the galvanizer to determine if additional stiffeners are necessary, and where these shall be placed. Any proposed changes shall be submitted to the Engineer for approval prior to making any changes and documented on the shop drawings.

Temporary stiffener angles shall be bolted to each side of the splice ends of each girder segment to prevent distortion during galvanizing. Temporary stiffener angles shall bolt or fit tight against top and bottom flanges and include spacer tubes to minimize damage to galvanizing during removal.

To ensure identification after galvanizing, piece marks shall be supplemented with metal tags for all items where fit-up requires matching specific pieces.

After fabrication (cutting, welding, drilling, etc.) is complete, all holes shall be deburred and all fins, scabs or other surface/edge anomalies shall be ground or repaired per ASTM A6. The items shall then be cleaned per Steel Structures Painting Council's Surface Preparation Specification SSPC-SP1 (Solvent Cleaning) and SSPC-SP6 (Commercial Blast Cleaning). All surfaces shall be inspected to verify no fins, scabs or other similar defects are present.

The Contractor shall consult with the galvanizer to ensure proper removal of grease, paint and other deleterious materials prior to galvanizing.

Surface Preparation and Hot Dip Galvanizing

General. Surfaces of the structural steel specified on the plans shall be prepared and hot dip galvanized as described herein.

Cleaning Structural Steel. If rust, mill scale, dirt, oil, grease or other foreign substances have accumulated prior to galvanizing, steel surfaces shall be cleaned by a combination of caustic cleaning and cleaning according to SSPC-SP8 (Pickling).

Special attention shall be given to the cleaning of corners and reentrant angles.

Surface Preparation. A flux shall be applied to all steel surfaces to be galvanized. Any surfaces which will receive field-installed stud shear connectors shall not be galvanized within 2 in. (50 mm) of the stud location. Either the entire area receiving studs or just individual stud locations may be left ungalvanized. The following steel surfaces of bearings shall not be galvanized: stainless steel surfaces, surfaces which will be machined (except for fixed bearing sole plates), and surfaces which will have TFE, elastomer, or stainless steel parts bonded to them.

The cleaned surfaces shall be galvanized within 24 hours after cleaning, unless otherwise authorized by the Engineer.

Application of Hot Dip Galvanized Coating. Steel members, fabrications and assemblies shall be galvanized by the hot dip process in the shop according to AASHTO M 111.

Bolts, nuts, and washers shall be galvanized according to ASTM F 2329.

All steel shall be safeguarded against embrittlement according to ASTM A 143. Water quenching or chromate conversion coating shall not be used on any steel work that is to be painted. All galvanized steel work shall be handled in such a manner as to avoid any mechanical damage and to minimize distortion.

Beams and girders shall be handled, stored and transported with their webs vertical and with proper cushioning to prevent damage to the member and coating. Members shall be supported and externally stiffened during galvanizing to prevent permanent distortion.

Hot Dip Galvanized Coating Requirements. Coating weight, surface finish, appearance and adhesion shall conform to requirements of ASTM A 385, ASTM F2329, AASHTO M 111 or AASHTO M 232, as appropriate.

Any high spots of zinc coating, such as metal drip lines and rough edges, left by the galvanizing operation in areas that are to be field connected or in areas that are to be painted shall be removed by cleaning per SSPC-SP2 (Hand Tool Cleaning) or SSPC-SP3 (Power Tool Cleaning). The zinc shall be removed until it is level with the surrounding area, leaving at least the minimum required zinc thickness.

Shop assemblies producing field splices shall provide 1/8 in. (3 mm) minimum gaps between ends of members to be galvanized. At field splices of beams or girders, galvanizing exceeding 0.08 in. (2 mm) on the cross-sectional (end) face shall be partially removed until it is 0.04 in. to 0.08 in. (1 to 2 mm) thick.

Testing of Hot Dip Galvanized Coating. Inspection and testing of hot dip galvanized coatings shall follow the guidelines provided in the American Galvanizers Association publication "*Inspection of Products Hot Dip Galvanized After Fabrication*". Sampling, inspection, rejection and retesting for conformance with requirements shall be according to AASHTO M 111 or AASHTO M 232, as applicable. Coating thickness shall be measured according to AASHTO M 111, for magnetic thickness gage measurement or AASHTO M 232, as applicable.

All steel shall be visually inspected for finish and appearance.

Bolts, nuts, washers, and steel components shall be packaged according to ASTM F 2329. Identity of bolts, nuts and washers shall be maintained for lot-testing after galvanizing according to Article 505.04(f)(2) for high strength steel bolts.

A notarized certificate of compliance with the requirements listed herein shall be furnished. The certificate shall include a detailed description of the material processed and a statement that the processes used met or exceeded the requirements for successful galvanizing of the surface, where applicable. The certificate shall be signed by the galvanizer.

Repair of Hot Dip Galvanized Coating. Surfaces with inadequate zinc thickness shall be repaired in the shop according to ASTM A 780 and AASHTO M 111.

Surfaces of galvanized steel that are damaged after the galvanizing operation shall be repaired according to ASTM A 780 whenever damage exceeds 3/16 in. (5 mm) in width and/or 4 in. (100 mm) in length. Damage that occurs in the shop shall be repaired in the shop. Damage that occurs during transport or in the field shall be repaired in the field.

Connection Treatment. All bolt holes shall be reamed or drilled to their specified diameters after galvanizing. All bolts shall be installed after galvanizing.

Surface Preparation and Painting

Surface Preparation. When galvanized steel surfaces are specified to be painted they shall be clean and free of oil, grease, and other foreign substances. Surface preparation necessary to provide adequate adhesion of the coating shall be performed according to ASTM D6386. Surface preparation shall include, but not be limited to the following:

- All galvanized steel surfaces that are to be painted shall be cleaned according to SSPC-SP1 (Solvent Cleaning). After cleaning, all chemicals shall be thoroughly rinsed from the surface with a suitable solvent. The steel shall be allowed to completely dry prior to coating application.
- All galvanized steel surfaces that are to be painted shall be checked for the presence of chromate conversion coating according to ASTM D 6386 Appendix X1. Surfaces where chromate conversion coating is found shall be cleaned according to the same appendix and blown down with clean, compressed air according to ASTM D 6386 Section 6.1.
- All galvanized steel surfaces that are to be painted shall be checked for the presence of wet storage stain. Surfaces where wet storage stain is found shall be cleaned, rinsed and completely dried according to ASTM D 6386 Section 6.2.
- Following galvanizing, thickness readings shall verify the acceptable thickness of the galvanizing according to AASHTO M111/ASTM A123.

Paint Requirements. The paint materials (epoxy intermediate coat and aliphatic urethane finish coat) shall meet the requirements of the Articles 1008.05(d) and (e) of the Standard Specification.

All paint materials for the shop and field shall be supplied by the same manufacturer, and samples of components submitted for approval by the Department, before use.

Paint storage, mixing, and application shall be according to Section 506 of the Standard Specifications and the paint manufacturer's written instructions and product data sheets. In the event of a conflict the Contractor shall advise the Engineer and comply with the Engineer's written resolution. Until a resolution is provided, the most restrictive conditions shall apply.

Shop Application of the Paint System. The areas to be painted shall receive one full coat of an epoxy intermediate coat and one full coat of an aliphatic urethane finish coat. The film thickness of each coat shall be according to Article 506.09(f)(2).

Construction Requirements. The contact surfaces of splice flange connections (mating flange faces and areas under splice bolt heads and nuts) shall be free of paint prior to assembly. If white rust is visible on the mating flange surfaces, the steel shall be prepared by hand wire brushing or brush-off blasting according to SSPC-SP7. Power wire brushing is not allowed.

After field erection, the following areas shall be prepared by cleaning according to SSPC-SP1 (Solvent Cleaning), tie- or wash-coated if applicable, and then painted or touched up with the paint specified for shop application (the intermediate coat and/or the finish coat):

- exposed unpainted areas at bolted connections
- areas where the shop paint has been damaged
- any other unpainted, exposed areas as directed by the Engineer.

Special Instructions. Painting Date/System Code. At the completion of the work, the Contractor shall stencil in contrasting color paint the date of painting the bridge and the paint type code from the Structure Information and Procedure Manual for the system used according to Article 506.10(i). The code designation for galvanizing is "V". If painting of the structural steel is not specified then the word "PAINTED" may be omitted, the month and year shall then correspond to the date the stencil is applied.

Basis of Payment. The cost of all surface preparation, galvanizing, painting and all other work described herein shall be considered as included in the unit price bid for the applicable pay items to be galvanized and painted, according to the Standard Specifications.

DRILLED SHAFTS

Effective: October 5, 2015

Revised: October 27, 2023

Revise Section 516 of the Standard Specifications to read:

"SECTION 516. DRILLED SHAFTS

516.01 Description. This work shall consist of constructing drilled shaft foundations.

516.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Portland Cement Concrete (Note 1)	1020
(b) Reinforcement Bars.....	1006.10
(c) Grout (Note 2).....	1024.01
(d) Permanent Steel Casing.....	1006.05(d)
(e) Slurry (Note 3)	

Note 1. When the soil contains sulfate contaminates, ASTM C 1580 testing will be performed to assess the severity of sulfate exposure to the concrete. If the sulfate contaminate is >0.10 to < 0.20 percent by mass, a Type II (MH) cement shall be used. If the sulfate contaminate is >0.20 to < 2.0 percent by mass, a Type V cement shall be used. If the sulfate contaminate is ≥ 2.0 percent by mass, refer to ACI 201.2R for guidance.

Note 2. The sand-cement grout mix shall be according to Section 1020 and shall be two to five parts sand and one part Type I or II cement. The maximum water cement ratio shall be sufficient to provide a flowable mixture with a typical slump of 10 in. (250 mm).

Note 3. Slurry shall be bentonite, emulsified polymer, or dry polymer, and shall be approved by the Engineer.

516.03 Equipment. Equipment shall be according to the following.

Item	Article/Section
(a) Concrete Equipment	1020.03
(b) Drilling Equipment (Note 1)	
(c) Hand Vibrator	1103.17(a)
(d) Underwater Concrete Placement Equipment	1103.18

Note 1. The drilling equipment shall have adequate capacity, including power, torque and down thrust, to create a shaft excavation of the maximum diameter specified to a depth of 20 percent beyond the depths shown on the plans.

516.04 Submittals. The following information shall be submitted on form BBS 133.

(a) Qualifications. At the time of the preconstruction conference, the Contractor shall provide the following documentation.

(1) References. A list containing at least three projects completed within the three years prior to this project's bid date which the Contractor performing this work has installed drilled shafts of similar diameter, length, and site conditions to those shown in the plans. The list of projects shall contain names and phone numbers of owner's representatives who can verify the Contractor's participation on those projects.

(2) Experience. Name and experience record of the drilled shaft supervisor, responsible for all facets of the shaft installation, and the drill operator(s) who will be assigned to this project. The supervisor and operator(s) shall each have a minimum of three years experience in the construction of drilled shafts.

- (b) Installation Procedure. A detailed installation procedure shall be submitted to the Engineer for acceptance at least 28 days prior to drilled shaft construction and shall address each of the following items unless otherwise directed by the Engineer in writing.
- (1) Equipment List. List of proposed equipment to be used including cranes, drill rigs, augers, belling tools, casing, vibratory hammers, core barrels, bailing buckets, final cleaning equipment, slurry equipment, tremies, or concrete pumps, etc.
 - (2) General Sequence. Details of the overall construction operation sequence, equipment access, and the sequence of individual shaft construction within each substructure bent or footing group. The submittal shall address the Contractor's proposed time delay and/or the minimum concrete strength necessary before initiating a shaft excavation adjacent to a recently installed drilled shaft.
 - (3) Shaft Excavation. A site specific step by step description of how the Contractor anticipates the shaft excavation to be advanced based on their evaluation of the subsurface data and conditions expected to be encountered. This sequence shall note the method of casing advancement, anticipated casing lengths, tip elevations and diameters, the excavation tools used and drilled diameters created. The Contractor shall indicate whether wet or dry drilling conditions are expected and if groundwater will be sealed from the excavation.
 - (4) Slurry. When the use of slurry is proposed, details on the types of additives to be used and their manufacturers shall be provided. In addition, details covering the measurement and control of the hardness of the mixing water, agitation, circulation, de-sanding, sampling, testing, and chemical properties of the slurry shall be submitted.
 - (5) Shaft Cleaning. Method(s) and sequence proposed for the shaft cleaning operation.
 - (6) Reinforcement Cage and Permanent Casing. Details of reinforcement placement including rolling spacers to be used and method to maintain proper elevation and location of the reinforcement cage within the shaft excavation during concrete placement. The method(s) of adjusting the reinforcement cage length and permanent casing if rock is encountered at an elevation other than as shown on the plans. As an option, the Contractor may perform soil borings and rock cores at the drilled shaft locations to determine the required reinforcement cage and permanent casing lengths.
 - (7) Concrete Placement. Details of concrete placement including proposed operational procedures for free fall, tremie or pumping methods. The sequence and method of casing removal shall also be stated along with the top of pour elevation, and method of forming through water above streambed.

- (8) Mix Design. The proposed concrete mix design(s).
- (9) Disposal Plan. Containment and disposal plan for slurry and displaced water. Containment and disposal plan for contaminated concrete pushed out of the top of the shaft by uncontaminated concrete during concrete placement.
- (10) Access and Site Protection Plan. Details of access to the drilled shafts and safety measures proposed. This shall include a list of casing, scaffolding, work platforms, temporary walkways, railings, and other items needed to provide safe access to the drilled shafts. Provisions to protect open excavations during non-working hours shall be included.

The Engineer will evaluate the drilled shaft installation procedure and notify the Contractor of acceptance, need for additional information, or concerns with the installation's effect on the existing or proposed structure(s).

CONSTRUCTION REQUIREMENTS

516.05 General. Excavation for drilled shaft(s) shall not proceed until written authorization is received from the Engineer. The Contractor shall be responsible for verification of the dimensions and alignment of each shaft excavation as directed by the Engineer.

Unless otherwise approved in the Contractor's installation procedure, no shaft excavation, casing installation, or casing removal with a vibratory hammer shall be made within four shaft diameters center to center of a shaft with concrete that has a compressive strength less than 1500 psi (10,300 kPa). The site-specific soil strengths and installation methods selected will determine the actual required minimum spacing, if any, to address vibration and blow out concerns.

Lost tools shall not remain in the shaft excavation without the approval of the Engineer. Blasting shall not be used as a method of shaft excavation.

516.06 Shaft Excavation Protection Methods. The construction of drilled shafts may involve the use of one or more of the following methods to support the excavation during the various phases of shaft excavation, cleaning, and concrete placement dependent on the site conditions encountered. Surface water shall not flow uncontrolled into the shaft excavation, however water may be placed into the shaft excavation in order to meet head pressure requirements according to Articles 516.06(c) and 516.13.

The following are general descriptions indicating the conditions when these methods may be used.

- (a) Dry Method. The dry construction method shall only be used at sites where the groundwater and soil conditions are suitable to permit the drilling and dewatering of the excavation without causing subsidence of adjacent ground, boiling of the base soils, squeezing, or caving of the shaft side walls. The dry method shall consist of drilling the shaft excavation, removing accumulated water, cleaning the shaft base, and placing the reinforcement cage and concrete in a predominately dry excavation.

Slurry Method. The slurry construction method may be used at sites where dewatering the excavation would cause collapse of the shaft sidewalls or when the volume and head of water flowing into the shaft is likely to contaminate the concrete during placement resulting in a shaft defect. This method uses slurry, or in rare cases water, to maintain stability of the shaft sidewall while advancing the shaft excavation. After the shaft excavation is completed, the slurry level in the shaft shall be kept at an elevation to maintain stability of the shaft sidewall, maintain stability of the shaft base, and prevent additional groundwater from entering the shaft. The shaft base shall be cleaned, the reinforcement cage shall be set, and the concrete shall be discharged at the bottom of the shaft excavation, displacing the slurry upwards.

- (b) Temporary Casing Method. Temporary casing shall be used when either the dry or slurry methods provide inadequate support to prevent sidewall caving or excessive deformation of the shaft excavation. Temporary casing may be used with slurry or be used to reduce the flow of water into the excavation to allow dewatering and concrete placement in a dry shaft excavation. Temporary casing shall not be allowed to remain permanently without the approval of the Engineer.

During removal of the temporary casing, the level of concrete in the casing shall be maintained at a level such that the head pressure inside the casing is a minimum of 1.25 times the head pressure outside the casing, but in no case is less than 5 ft (1.5 m) above the bottom of the casing. Casing removal shall be at a slow, uniform rate with the pull in line with the shaft axis. Excessive rotation of the casing shall be avoided to limit deformation of the reinforcement cage. In addition, the slump requirements during casing removal shall be according to Article 516.12.

When called for on the plans, the Contractor shall install a permanent casing as specified. Permanent casing may be used as a shaft excavation support method or may be installed after shaft excavation is completed using one of the above methods. After construction, if voids are present between the permanent casing and the drilled excavation, the voids shall be filled with grout by means of tremie(s) or concrete pump which shall be lowered to the bottom of the excavation. The contractor's means and methods for grout placement shall fill the annular void(s) between the permanent casing and the surrounding earth material to restore and provide lateral earth resistance to the shaft. Grout yield checks shall be performed by the contractor for submittal to the Engineer. Permanent casing shall not remain in place beyond the limits shown on the plans without the specific approval of the Engineer.

When the shaft extends above the streambed through a body of water and permanent casing is not shown, the portion above the streambed shall be formed with removable casings, column forms, or other forming systems as approved by the Engineer. The forming system shall not scar or spall the finished concrete or leave in place any forms or casing within the removable form limits as shown on the plans unless approved as part of the installation procedure. The forming system shall not be removed until the concrete has attained a minimum compressive strength of 2500 psi (17,200 kPa) and cured for a minimum of 72 hours. For shafts extending through water, the concrete shall be protected from water action after placement for a minimum of seven days.

516.07 Slurry. When slurry is used, the Contractor shall provide a technical representative of the slurry additive manufacturer at the site prior to introduction of the slurry into the first shaft where slurry will be used, and during drilling and completion of a minimum of one shaft to adjust the slurry mix to the specific site conditions. During construction, the level of the slurry shall be maintained a minimum of 5 feet (1.5 m) above the height required to prevent caving of the shaft excavation. In the event of a sudden or significant loss of slurry in the shaft excavation, the construction of that foundation shall be stopped and the shaft excavation backfilled or supported by temporary casing, until a method to stop slurry loss, or an alternate construction procedure, has been approved by the Engineer.

- (a) General Properties. The material used to make the slurry shall not be detrimental to the concrete or surrounding ground. Mineral slurries shall have both a mineral grain size that remains in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. Polymer slurries shall have sufficient viscosity and gel characteristics to transport excavated material to suitable screening systems or settling tanks. The percentage and specific gravity of the material used to make the slurry shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement.

If approved by the Engineer, the Contractor may use water and excavated soils as drilling slurry. In this case, the range of acceptable values for density, viscosity and pH, as shown in the following table for bentonite slurry shall be met.

When water is used as the slurry to construct rock sockets in limestone, dolomite, sandstone or other formations that are not erodible, the requirements for slurry testing shall not apply if the entire fluid column is replaced with fresh water after drilling. To do so, fresh water shall be introduced at the top of the shaft excavation and existing water used during drilling shall be pumped out of the shaft excavation from the bottom of the shaft excavation until the entire volume of fluid has been replaced.

- (b) Preparation. Prior to introduction into the shaft excavation, the manufactured slurry admixture shall be pre-mixed thoroughly with clean, fresh water and for adequate time in accordance with the slurry admixture manufacturer's recommendations. Slurry tanks of adequate capacity shall be used for slurry mixing, circulation, storage and treatment. No excavated slurry pits will be allowed in lieu of slurry tanks without approval from the Engineer. Adequate desanding equipment shall be provided to control slurry properties during the drilled shaft excavation in accordance with the values provided in Table 1.

- (c) Quality Control. Quality control tests shall be performed on the slurry to determine density, viscosity, sand content and pH of freshly mixed slurry, recycled slurry and slurry in the shaft excavation. Tests of slurry samples from within two feet of the bottom and at mid-height of the shaft excavation shall be conducted in each shaft excavation during the excavation process to measure the consistency of the slurry. A minimum of four sets of tests shall be conducted during the first eight hours of slurry use on the project. When a series of four test results do not change more than 1% from the initial test, the testing frequency may be decreased to one set every four hours of slurry use. Reports of all tests, signed by an authorized representative of the Contractor, shall be furnished to the Engineer upon completion of each drilled shaft. The physical properties of the slurry shall be as shown in Table 1.

The slurry shall be sampled and tested less than 1 hour before concrete placement. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be removed. The contractor shall perform final shaft bottom cleaning after suspended solids have settled from the slurry. Concrete shall not be placed if the slurry does not have the required physical properties.

Table 1 – SLURRY PROPERTIES				
	Bentonite	Emulsified Polymer	Dry Polymer	Test Method
Density, lb/cu ft (kg/cu m) (at introduction)	65.2 ± 1.6 ¹ (1043.5 ± 25.6)	63 (1009.0) max.	63 (1009.0) max.	ASTM D 4380
Density, lb/cu ft (kg/cu m) (prior to concrete placement)	67.0 ± 3.5 ¹ (1073.0 ± 56.0)	63 (1009.0) max.	63 (1009.0) max.	ASTM D 4380
Viscosity ² , sec/qt (sec/L)	46 ± 14 (48 ± 14)	38 ± 5 (40 ± 5)	65 ± 15 (69 ± 16)	ASTM D 6910
pH	9.0 ± 1.0	9.5 ± 1.5	9.0 ± 2.0	ASTM D 4972
Sand Content, percent by volume (at introduction)	4 max.	1 max.	1 max.	ASTM D 4381
Sand Content, percent by volume (prior to concrete placement)	10 max.	1 max.	1 max.	ASTM D 4381
Contact Time ³ , hours	4 max.	72 max.	72 max	

Note 1. When the slurry consists of only water and excavated soils, the density shall not exceed 70 lb/cu ft (1121 kg/cu m).

Note 2. Higher viscosities may be required in loose or gravelly sand deposits.

Note 3. Contact time is the time without agitation and sidewall cleaning.

516.08 Obstructions. An obstruction is an unknown isolated object that causes the shaft excavation method to experience a significant decrease in the actual production rate and requires the Contractor to core, break up, push aside, or use other means to mitigate the obstruction. Subsurface conditions such as boulders, cobbles, or logs and buried infrastructure such as footings, piling, or abandoned utilities, when shown on the plans, shall not constitute an obstruction. When an obstruction is encountered, the Contractor shall notify the Engineer immediately and upon concurrence of the Engineer, the Contractor shall mitigate the obstruction with an approved method.

516.09 Top of Rock. The top of rock will be considered as the point where rock, defined as bedded deposits and conglomerate deposits exhibiting the physical characteristics and difficulty of rock removal as determined by the Engineer, is encountered which cannot be drilled with augers and/or underreaming tools configured to be effective in the soils indicated in the contract documents.

516.10 Design Modifications. If the top of rock elevation differs from that shown on the plans by more than 10 percent of the length of the drilled shaft above the rock, the Engineer shall be contacted to determine if any drilled shaft design changes may be required. In addition, if the type of soil or rock encountered is not similar to that shown in the subsurface exploration data, the Contractor may be required to extend the drilled shaft length(s) beyond those specified in the plans. In either case, the Engineer will determine if revisions are necessary and the extent of the modifications required.

516.11 Excavation Cleaning and Inspection. Materials removed or generated from the shaft excavations shall be disposed of according to Article 202.03.

After excavation, each shaft shall be cleaned. For a drilled shaft terminating in soil, the depth of sediment or debris shall be a maximum of 1 1/2 in. (38 mm). For a drilled shaft terminating in rock, the depth of sediment or debris shall be a maximum of 1/2 in. (13 mm).

A shaft excavation shall be overreamed when, in the opinion of the Engineer, the sidewall has softened, swelled, or has a buildup of slurry cake. Overreaming may also be required to correct a shaft excavation which has been drilled out of tolerance. Overreaming may be accomplished with a grooving tool, overreaming bucket, or other approved equipment. Overreaming thickness shall be a minimum of 1/2 in. (13 mm) and a maximum of 3 in. (75 mm).

516.12 Reinforcement. This work shall be according to Section 508 and the following.

The shaft excavation shall be cleaned and inspected prior to placing the reinforcement cage. The reinforcement cage shall be completely assembled prior to drilling and be ready for adjustment in length as required by the conditions encountered. The reinforcement cage shall be lifted using multiple point sling straps or other approved methods to avoid reinforcement cage distortion or stress. Cross frame stiffeners may be required for lifting or to keep the reinforcement cage in proper position during lifting and concrete placement.

The Contractor shall attach rolling spacers to keep the reinforcement cage centered within the shaft excavation during concrete placement and to ensure that at no point will the finished shaft have less than the minimum concrete cover(s) shown on the plans. The rolling spacers or other approved non-corrosive spacing devices shall be installed within 2 ft (0.6 m) of both the top and bottom of the drilled shaft and at intervals not exceeding 10 ft (3 m) throughout the length of the shaft to ensure proper reinforcement cage alignment and clearance for the entire shaft. The number of rolling spacers at each level shall be one for each 1.0 ft (300 mm) of shaft diameter, with a minimum of four rolling spacers at each level. For shafts with different shaft diameters throughout the length of the excavation, different sized rolling spacers shall be provided to ensure the reinforcement cage is properly positioned throughout the entire length of the shaft.

When a specific concrete cover between the base of the drilled shaft and the reinforcement cage is shown on the plans, the bottom of the reinforcement cage shall be supported so that the proper concrete cover is maintained.

If the conditions differ such that the length of the shaft is increased, additional longitudinal bars shall be either mechanically spliced or lap spliced to the lower end of the reinforcement cage and confined with either hoop ties or spirals. The Contractor shall have additional reinforcement available or fabricate the reinforcement cages with additional length as necessary to make the required adjustments in a timely manner as dictated by the encountered conditions. The additional reinforcement may be non-epoxy coated.

516.13 Concrete Placement. Concrete work shall be performed according to the following.

Throughout concrete placement the head pressure inside the drilled shaft shall be at least
1.1 times the head pressure outside the drilled shaft.

Concrete placement shall begin within 1 hour of shaft cleaning and inspection. The pour shall be made in a continuous manner from the bottom to the top elevation of the shaft as shown on the contract plan or as approved in the Contractor's installation procedure. Concrete placement shall continue after the shaft excavation is full and until 18 in. (450 mm) of good quality, uncontaminated concrete is expelled at the top of shaft. Vibration of the concrete will not be allowed when the concrete is displacing slurry or water. In dry excavations, the concrete in the top 10 ft (3 m) of the shaft shall be vibrated.

When using temporary casing or placing concrete under water or slurry, a minimum of seven days prior to concrete placement, a 4 cu yd (3 cu m) trial batch of the concrete mixture shall be performed to evaluate slump retention. Temporary casing shall be withdrawn before the slump of the concrete drops below 6 in. (150 mm). For concrete placed using the slurry method of construction, the slump of all concrete placed shall be a minimum of 6 in. (150 mm) at the end of concrete placement.

Devices used to place concrete shall have no aluminum parts in contact with concrete.

When the top of the shaft is at the finished elevation and no further concrete placement above the finished elevation is specified, the top of the shaft shall be level and finished according to Article 503.15(a).

Concrete shall be placed by free fall, tremie, or concrete pump subject to the following conditions.

- (a) Free Fall Placement. Concrete shall only be placed by free fall when the rate of water infiltration into the shaft excavation is less than 12 in. (300 mm) per hour and the depth of water in the shaft excavation is less than 3 in. (75 mm) at the time of concrete placement.

Concrete placed by free fall shall fall directly to the base without contacting the reinforcement cage, cross frame stiffeners, or shaft sidewall. Drop chutes may be used to direct concrete to the base during free fall placement.

Drop chutes used to direct placement of free fall concrete shall consist of a smooth tube. Concrete may be placed through either a hopper at the top of the tube or side openings as the drop chute is retrieved during concrete placement. The drop chute shall be supported so that free fall does not exceed 60 ft (18.3 m) for conventional concrete or 30 ft (9.1 m) for self-consolidating concrete. If placement cannot be satisfactorily accomplished by free fall in the opinion of the Engineer, either a tremie or pump shall be used to accomplish the pour.

- (b) Tremie and Concrete Pump Placement. Concrete placement shall be according to Article 503.08, except the discharge end of the steel pipe shall remain embedded in the concrete a minimum of 10 ft (3.0 m) throughout concrete placement when displacing slurry or water.

516.14 Construction Tolerances. The following construction tolerances shall apply to all drilled shafts.

- (a) Center of Shaft. The center of the drilled shaft shall be within 3 in. (75 mm) of the plan station and offset at the top of the shaft.
- (b) Center of Reinforcement Cage. The center of the reinforcement cage shall be within 1 1/2 in. (40 mm) of plan station and offset at the top of the shaft.

- (c) Vertical Plumbness of Shaft. The out of vertical plumbness of the shaft shall not exceed 1.5 percent.
- (d) Vertical Plumbness of Reinforcement Cage. The out of vertical plumbness of the shaft reinforcement cage shall not exceed 0.83 percent.
- (e) Top of Shaft. The top of the shaft shall be no more than 1 in. (25 mm) above and no more than 3 in. (75 mm) below the plan elevation.
- (f) Top of Reinforcement Cage. The top of the reinforcement cage shall be no more than 1 in. (25 mm) above and no more than 3 in. (75 mm) below the plan elevation.
- (g) Bottom of shaft. Excavation equipment and methods used to complete the shaft excavation shall have a nearly planar bottom. The cutting edges of excavation equipment used to create the bottom of shafts in rock shall be normal to the vertical axis of the shaft within a tolerance of 6.25 percent.

516.15 Method of Measurement. This work will be measured for payment in place and the volume computed in cubic yards (cubic meters). The volume will be computed using the plan diameter of the shaft multiplied by the measured length of the shaft. The length of shaft in soil will be computed as the difference in elevation between the top of the drilled shaft shown on the plans, or as installed as part of the Contractor's installation procedure, and the bottom of the shaft or the top of rock (when present) whichever is higher. The length of shaft in rock will be computed as the difference in elevation between the measured top of rock and the bottom of the shaft.

When permanent casing is specified, it will be measured for payment in place, in feet (meters). Permanent casing installed at the Contractor's option will not be measured for payment.

Reinforcement furnished and installed will be measured for payment according to Article 508.07.

516.16 Basis of Payment. This work will be paid for at the contract unit price per cubic yard (cubic meter) for DRILLED SHAFT IN SOIL, and/or DRILLED SHAFT IN ROCK.

Permanent casing will be paid for at the contract unit price per foot (meter) for PERMANENT CASING.

Reinforcement furnished and installed will be paid for according to Article 508.08.

Obstruction mitigation will be paid for according to Article 109.04."

PREFORMED PAVEMENT JOINT SEAL

Effective: October 4, 2016

Revised: March 24, 2023

Description. This work shall consist of furnishing all labor, equipment and materials necessary to prepare the joint opening and install pavement joint seal(s) at the locations specified. Unless otherwise detailed on the plans, the joint shall be sized for a rated movement of 2 inches (50 mm).

Materials: Unless otherwise specified, one of the following prefabricated joint seals will be permitted.

- (a) Preformed Elastomeric Joint Seal. This material shall be according to Section 1053.01.
- (b) Preformed Pre-compressed, Silicone Coated, Self-Expanding Sealant System. This Sealant system shall be comprised of three components: 1) cellular polyurethane foam impregnated with hydrophobic 100% acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone; 2) field-applied epoxy adhesive primer, 3) field-injected silicone sealant bands.

The preformed, pre-compressed silicone joint seal shall, as a minimum, be according to the following:

- The joint seal shall be held in place by a non-sag, high modulus silicone adhesive.
- The joint seal shall be compatible with the epoxy and header material.
- The joint seal shall withstand the effects of vertical and lateral movements, skew movements and rotational movement without adhesive or cohesive failure.
- The joint seal shall be designed so that, the material is capable of movement of +50%, -50% (100% total) of nominal material size.
- The gland shall not contain any open, unsealed joints along its length in its final condition.
- Changes in plane and direction shall be executed using factory fabricated 90 degree transition assemblies. The transitions shall be watertight at the inside and outside corners through the full movement of the product.
- The depth of the joint shall be recessed 3/4 in. (19 mm) below the riding surface throughout the normal limits of joint movement.
- The joint seal shall be resistant to ultraviolet rays.
- The joint seal shall be resistant to abrasion, oxidation, oils, gasoline, salt, and other materials that may be spilled on or applied to the surface.
- The manufacturer shall certify that the joint composition shall be free of any waxes or wax compounds; asphalts or asphalt compounds.

The joint material shall meet the following physical properties:

Property	Requirement	Test Method
Tensile Strength of Silicone Coating (min)	140 psi	ASTM D 412
UV Resistance of Joint System	No Changes--2000 Hours	ASTM C793
Density of Cellular Polyurethane Foam	4.0 lb/ cu ft (200kg/cu m)	ASTM D545
Heat Aging Effects (Silicone Coating)	No cracking, chalking	ASTM C 792
Joint System Operating temp range (min)	-40° F to 185° F	ASTM C 711

The adhesive shall be a two-component, 100% solid, modified epoxy meeting the requirements of ASTM C881, Type I, Grade 3, Class B & C. The adhesive shall also have the following properties:

Property	Requirement	Test method
Tensile Strength	2,500 psi (24 MPa) min.	ASTM D638
Compressive Strength	7000 psi (48 MPa) min.	ASTM D695
Bond Strength (Dry Cure)	2000 psi (28MPa) min	ASTM C882
Water Absorption	0.1% by weight	ASTM D570

The silicone band adhesive shall have the following properties:

Property	Requirement	Test Method
Movement Capability	+50/-50%	ASTM C 719
Elongation at Break	>600%	ASTM D 5893
Slump	≤0.3"	ASTM D 2202
Hardness (Shore A) max.	20	ASTM C 661
Tack free time (max)	60 minutes	ASTM C 679
Heat Aging Effects	No cracking, chalking	ASTM C 792
Resilience	≥ 75%	ASTM D5329
Bond	0% Adhesive or Cohesive Failure after 5 cycles @100%extension	ASTM D 5329

- (c) Performed Silicone Joint Seal. The preformed silicone joint seal used for this item shall conform to the following specifications:

Table 1
Physical Properties of Preformed Silicone Gland

Property	Requirement	Test Method
Rated Movement Capability	+2 ¼ inch total	N/A
Tensile Strength, psi.	1000 min	ASTM D 412
Elongation	400% min	ASTM D 412
Tear (die B)	100 ppi. min	ASTM D 624
Hardness Durometer (Shore A).	55 +/- 5 max	ASTM D 2240
Compression set at 212°F, 70 hrs	30% max	ASTM D 395
Heat Aged Properties	5pt max loss on Durometer	ASTM D 573
Tensile and Elongation % Loss	10 % max	

The color of the preformed silicone seal shall be black, made by the addition of Carbon Black fillers which increases UV resistance, tensile strength, and abrasion wear properties.

The locking adhesive shall be non-sag, high modulus silicone adhesive conforming to the following specifications:

Table 2
Physical Properties of the Silicone Locking Adhesive

Property	Requirement	Test Method
Tensile Strength, psi.	200 min	ASTM D 412
Elongation, %	450 min	ASTM D 412
Tack Free Time, minutes.	20 max.	ASTM C 679
Cure Time ¼" bead, hrs	24 max	ASTM C 679
Resistance to U.V.	No cracking, chalking, or degradation	ASTM C793
VOC (g/L)	0	ASTM D 3960

Any rips, tears, or bond failure will be cause for rejection.

The two part epoxy primer shall be supplied for application to the vertical faces of the joint opening. The supplied primer shall be equally as effective when bonded to concrete or steel. This primer shall meet the following criteria:

Table 3
Physical Properties of Preformed Silicone Joint System Primer

Property	Requirement	Test Method
Viscosity (cps)	44	ASTM D 2196
Color	Light Amber	Visual
Solids (%)	41	ASTM D 4209
Specific Gravity	0.92	ASTM D 1217
Product Flash Point (°F, T.C.C.)	48	ASTM D 56
Package Stability	N/A	One year in tightly sealed containers
Cleaning	N/A	Mineral Spirits
VOC (g/L)	520	ASTM D 3960

- (d) Preformed Inverted EPDM Joint Seal. The preformed inverted EPDM joint seal used for this item shall conform to the following specifications:

Table 1
Physical Properties of Preformed Silicone Gland

Property	Requirement	Test Method
Rated Movement Capability	Up To 5 inch total	N/A
Tensile Strength, psi.	1200 psi min	ASTM D 412
Elongation	400 % min	ASTM D 412
Tear (Die C)	150 pli. min	ASTM D 624
Durometer Content	50 +/- 5 max	ASTM D 2240
Water Resistance (70 hrs @ 100c)	10% max	ASTM D 471
Ozone Resistance	100 min	ASTM D 1171

Table 2
Physical Properties of the V-Epoxy-R

V-Epoxy-R adhesive meets the requirements of ASTM C881 Type III, Grade 2. The adhesive shall also have the following properties:

Property	Requirement	Test Method
Color	Gray	Visual
Viscosity	45,000 CP (typ.)	N/A
Gel Time (minutes)	30 min.	ASTM C 881
Shelf Life (Separate Sealed Containers)	12 Months	N/A
Resistance to U.V.	No cracking, chalking, or degradation	ASTM C793
VOC (g/L)	0	ASTM D 3960

Any rips, tears, or bond failure will be cause for rejection.

- (e) Bonded Preformed Joint Seal. This joint system shall consist of preformed elastomeric seal bonded to the side walls of the joint opening using an adhesive as specified by the Manufacturer of the joint seal.

The bonded preformed joint seal shall be according to Table 1 of ASTM D2628 with the following exceptions: Compression set shall not be over 40 percent when tested according to Method B (Modified) of ASTM D 395 after 70 hours at 212 °F (100 °C). The Compression-Deflection requirement will not apply to the bonded preformed joint seal.

The adhesive shall be epoxy base, dual component, which resists salt, diluted acids, alkalis, solvents, greases, oils, moisture, sunlight and weathering. Temperatures up to 200 °F (93 °C) shall not reduce bond strength. At 68 °F (20 °C), the bond strength shall be a minimum of 1000 psi (6.9 MPa) within 24 hours.

Any primers or cleaning solutions used on the faces of the joint or on the profile of the sides of the bonded preformed joint seal shall be supplied by the manufacturer of the bonded preformed joint seal.

Any additional installation materials and adhesive for splicing joint sections shall be as supplied by the manufacturer of the preformed joint seal.

The Contractor shall submit the Manufacturer's material certification documentation stating that their materials meet the applicable requirements of this specification for the joint seal(s) installed.

CONSTRUCTION REQUIREMENTS

General. The Contractor shall furnish the Engineer with the manufacturer's product information and installation procedures at least two weeks prior to installation.

The minimum ambient air temperature in which the joint seal can be installed is 40° F (4.4° C) and rising, except for bonded preformed joint seals which shall not be installed when temperatures below 50 °F (10 °C) are predicted within a 48 hour period.

The joint surface shall be completely dry before installing the Joint Seal. For newly placed concrete, the concrete shall be fully cured and allowed to dry out a minimum of seven additional days prior to placement of the seal. Cold, wet, inclement weather will require an extended drying time.

The Joint Seal shall not be installed immediately after precipitation or if precipitation is forecasted for the day. Joint preparation and installation of Joint Seal shall be done during the same day.

Surface Preparation. Surface preparation shall be according to the joint seal manufacturer's written instructions.

After surface preparation is completed, the joint shall be cleaned of debris using compressed air with a minimum pressure of 90 psi (620 kPa). The air compressor shall be equipped with traps to prevent the inclusion of water and/or oil in the air line. The compressed air shall be according to the cleanliness requirements of ASTM D 4285.

When priming is required per the manufacturer's instruction, this operation shall immediately follow cleaning.

Joint Installation. The Joint installation shall be per the manufacturer's instructions; special attention shall be given to ensure the joint seal is properly recessed below the top of the riding surface as recommended by the manufacturer.

For bonded joint seals the seal shall be inserted into the joint and held tightly against both sides of the joint until sufficient bond strength has been developed to resist the expected expansion forces.

Opening to traffic. As these joint systems are supposed to be recessed below the top of the riding surface, there should be no restriction, based on the joint seal installation, on when these joints can be reopened to traffic.

Method of Measurement. The installed prefabricated joint seal will not be measured for payment.

Basis of Payment. The prefabricated joint seal will not be paid for separately but shall be considered included in the cost of the adjacent concrete work involved.

PREFORMED BRIDGE JOINT SEAL

Effective: December 21, 2016

Revised: June 28, 2024

Description. This work shall consist of furnishing all labor, equipment and materials necessary to prepare the joint opening and install preformed bridge joint seal(s) at the locations specified. Unless otherwise detailed on the plans or specified herein, the maximum rated movement for this joint type is 4 inches (100 mm).

Materials: Unless otherwise specified, one of the following prefabricated joint seals will be permitted.

- (a) Preformed Pre-compressed, Silicone Coated, Self-Expanding Sealant System. This Sealant system shall be comprised of three components: 1) cellular polyurethane foam impregnated with hydrophobic 100% acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone; 2) field-applied epoxy adhesive primer, 3) field-injected silicone sealant bands.

The preformed, pre-compressed silicone joint seal shall, as a minimum, be according to the following:

- The joint seal shall be held in place by a non-sag, high modulus silicone adhesive.
- The joint seal shall be compatible with the epoxy and header material.
- The joint seal shall withstand the effects of vertical and lateral movements, skew movements and rotational movement without adhesive or cohesive failure.
- The joint seal shall be designed so that, the material is capable of movement of +50%, -50% (100% total) of nominal material size. The gland shall not contain any open, unsealed joints along its length in its final condition.
- Changes in plane and direction shall be executed using factory fabricated transition assemblies fabricated to the angle(s) specified on the plans. The transitions shall be watertight at the inside and outside corners through the full movement of the product.
- The depth of the joint shall be recessed 3/4 in. (19 mm) below the riding surface throughout the normal limits of joint movement.
- The joint seal shall be resistant to ultraviolet rays.
- The joint seal shall be resistant to abrasion, oxidation, oils, gasoline, salt, and other materials that may be spilled on or applied to the surface.
- The manufacturer shall certify that the joint composition shall be free of any waxes or wax compounds; asphalts or asphalt compounds.

The joint material shall meet the following physical properties:

Property	Requirement	Test Method
Tensile Strength of Silicone Coating (min)	140 psi	ASTM D 412
UV Resistance of Joint System	No Changes--2000 Hours	ASTM G155-00A
Density of Cellular Polyurethane Foam (Unconfined)	4.0 lb/ cu ft (200kg/cu m)	ASTM D545
Heat Aging Effects (Silicone Coating)	No cracking, chalking	ASTM C 792
Joint System Operating temp range (min)	-40° F to 185° F	ASTM C 711

The adhesive shall be a two-component, 100% solid, modified epoxy meeting the requirements of ASTM C881, Type I, Grade 3, Class B & C. The adhesive shall also have the following properties:

Property	Requirement	Test method
Tensile Strength	2,500 psi (24 MPa) min.	ASTM D638
Compressive Strength	7000 psi (48 MPa) min.	ASTM D695
Bond Strength (Dry Cure)	2000 psi (28MPa) min	ASTM C882
Water Absorption	0.1% by weight	ASTM D570

The silicone band adhesive shall have the following properties:

Property	Requirement	Test Method
Movement Capability	+50/-50%	ASTM C 719
Elongation at Break	>600%	ASTM D 5893
Slump	≤0.3"	ASTM D 2202
Hardness (Shore A) max.	20	ASTM C 661
Tack free time (max)	60 minutes	ASTM C 679
Heat Aging Effects	No cracking, chalking	ASTM C 792
Resilience	≥ 75%	ASTM D5329
Bond	0% Adhesive or Cohesive Failure after 5 cycles @100%extension	ASTM D 5329

- (b) Preformed Silicone Joint Seal. The preformed silicone joint seal used for this item shall conform to the following specifications:

Table 1
Physical Properties of Preformed Silicone Gland

Property	Requirement	Test Method
Rated Movement Capability	+2 ¼ inch total	N/A
Tensile Strength, psi.	1000 min	ASTM D 412
Elongation	400% min	ASTM D 412
Tear (die B)	100 ppi. min	ASTM D 624
Hardness Durometer (Shore A).	55 +/- 5 max	ASTM D 2240
Compression set at 212°F, 70 hrs	30% max	ASTM D 395
Heat Aged Properties	5pt max loss on Durometer	ASTM D 573
Tensile and Elongation % Loss	10 % max	

The color of the preformed silicone seal shall be black, made by the addition of Carbon Black fillers which increases UV resistance, tensile strength, and abrasion wear properties.

The locking adhesive shall be non-sag, high modulus silicone adhesive conforming to the following specifications:

Table 2
Physical Properties of the Silicone Locking Adhesive

Property	Requirement	Test Method
Tensile Strength, psi.	200 min	ASTM D 412
Elongation, %	450 min	ASTM D 412
Tack Free Time, minutes.	20 max.	ASTM C 679
Cure Time ¼" bead, hrs	24 max	ASTM C 679
Resistance to U.V.	No cracking, chalking, or degradation	ASTM C793
VOC (g/L)	55	ASTM D 3960

Any rips, tears, or bond failure will be cause for rejection.

The two-part epoxy primer shall be supplied for application to the vertical faces of the joint opening. The supplied primer shall be equally as effective when bonded to concrete or steel. This primer shall meet the following criteria:

Table 3
Physical Properties of Preformed Silicone Joint System Primer

Property	Requirement	Test Method
Viscosity (cps)	44	ASTM D 2196
Color	Light Amber	Visual
Solids (%)	41	ASTM D 4209
Specific Gravity	0.92	ASTM D 1217
Product Flash Point (°F, T.C.C.)	48	ASTM D 56
Package Stability	N/A	One year in tightly sealed containers
Cleaning	N/A	Mineral Spirits
VOC (g/L)	520	ASTM D 3960

- (c) Preformed Inverted EPDM Joint Seal. The preformed inverted EPDM joint seal used for this item shall conform to the following specifications:

Table 1
Physical Properties of Preformed Silicone Gland

Property	Requirement	Test Method
Rated Movement Capability	Up To 5 inch total	N/A
Tensile Strength, psi.	1200 psi min	ASTM D 412
Elongation	400 % min	ASTM D 412
Tear (Die C)	150 pli. min	ASTM D 624
Durometer Content	50 +/- 5 max	ASTM D 2240
Water Resistance (70 hrs @ 100c)	10% max	ASTM D 471
Ozone Resistance	100 min	ASTM D 1171
Color	Black	Visual

Table 2
Physical Properties of the V-Epoxy-R

V-Epoxy-R adhesive meets the requirements of ASTM C881 Type III, Grade 2. The adhesive shall also have the following properties:

Property	Requirement	Test Method
Color	Gray	Visual
Viscosity	45,000 CP (typ.)	N/A
Gel Time (minutes)	30 min.	ASTM C 881
Shelf Life (Separate Sealed Containers)	12 Months	N/A
Resistance to U.V.	No cracking, chalking, or degradation	ASTM C793
VOC (g/L)	55	ASTM D 3960

Any rips, tears, or bond failure will be cause for rejection.

- (d) Bonded Preformed Joint Seal. This joint system shall consist of preformed elastomeric seal bonded to the side walls of the joint opening using an adhesive as specified by the Manufacturer of the joint seal.

The bonded preformed joint seal shall be according to Table 1 of ASTM D2628 with the following exceptions: Compression set shall not be over 40 percent when tested according to Method B (Modified) of ASTM D 395 after 70 hours at 212 °F (100 °C). The Compression-Deflection requirement will not apply to the bonded preformed joint seal.

The adhesive shall be epoxy base, dual component, which resists salt, diluted acids, alkalis, solvents, greases, oils, moisture, sunlight and weathering. Temperatures up to 200 °F (93 °C) shall not reduce bond strength. At 68 °F (20 °C), the bond strength shall be a minimum of 1000 psi (6.9 MPa) within 24 hours.

Any primers or cleaning solutions used on the faces of the joint or on the profile of the sides of the bonded preformed joint seal shall be supplied by the manufacturer of the bonded preformed joint seal.

Any additional installation materials and adhesive for splicing joint sections shall be as supplied by the manufacturer of the preformed joint seal.

The Contractor shall submit the Manufacturer's material certification documentation stating that their materials meet the applicable requirements of this specification for the joint seal(s) installed.

CONSTRUCTION REQUIREMENTS

General. The Contractor shall furnish the Engineer with the manufacturer's product information and installation procedures at least two weeks prior to installation.

The minimum ambient air temperature in which the joint seal can be installed is 40° F (4.4° C) and rising, except for bonded preformed joint seals which shall not be installed when temperatures below 50 °F (10 °C) are predicted within a 48-hour period.

The joint surface shall be completely dry before installing the Joint Seal. For newly placed concrete, the concrete shall be fully cured and allowed to dry out a minimum of seven additional days prior to placement of the seal. Cold, wet, inclement weather will require an extended drying time.

The Joint Seal shall not be installed immediately after precipitation or if precipitation is forecasted for the day. Joint preparation and installation of Joint Seal shall be done during the same day.

Surface Preparation. Surface preparation shall be according to the joint seal manufacturer's written instructions.

After surface preparation is completed, the joint shall be cleaned of debris using compressed air with a minimum pressure of 90 psi (620 kPa). The air compressor shall be equipped with traps to prevent the inclusion of water and/or oil in the air line. The compressed air shall be according to the cleanliness requirements of ASTM D 4285.

When priming is required per the manufacturer's instruction, this operation shall immediately follow cleaning.

Joint Installation. The Joint installation shall be per the manufacturer's instructions; special attention shall be given to ensure the joint seal is properly recessed below the top of the riding surface as recommended by the manufacturer.

For bonded joint seals the seal shall be inserted into the joint and held tightly against both sides of the joint until sufficient bond strength has been developed to resist the expected expansion forces.

Opening to traffic. As these joint systems are supposed to be recessed below the top of the riding surface, there should be no restriction, based on the joint seal installation, on when these joints can be reopened to traffic.

Method of Measurement. The installed preformed joint seal will be measured for payment in feet (meters) measured along the centerline of joint, from out to out of the deck, no measurement will be made for joint material used to turn up into the parapet, sidewalk, or median.

Basis of Payment. The preformed bridge joint seal will be paid for at the contract unit price per foot (meter) for PREFORMED JOINT SEAL, of the design movement specified, rounded to the nearest half inch (13 mm).

ERECTION OF BRIDGE GIRDERS OVER OR ADJACENT TO RAILROADS

Effective: August 9, 2019

Description: In addition to the requirements of Article 504.06(d) and 505.08(e), the following shall apply.

The Contractor or sub-Contractor performing the erection of steel or concrete beams or girders over, or adjacent to (within 25 ft. of), active railroad tracks shall submit an erection plan to the Engineer for approval prior to starting the work.

Erection Plan: The Erection Contractor shall retain the services of an Illinois Licensed Structural Engineer 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 beams or girders.

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 members in conformance with the contract documents and as outlined herein. The erection plans shall address and account for all items pertinent to the 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 structure during all phases of 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 504.08 or 505.13 of the Standard Specifications.

BAR SPLICERS, HEADED REINFORCEMENT

Effective: September 2, 2022

Revised: October 27, 2023

Add the following to Article 508.08(b):

When bar splicers are epoxy-coated, all damaged or uncoated areas near the threaded ends shall be coated with a two-part epoxy according to ASTM D 3963 (D 3963M). All threaded ends of Stage II construction threaded splicer bars shall be coated according to ASTM D 3963 or dipped in an epoxy-mastic primer prior to joining the Stage II construction threaded splicer bar to the threaded coupler.

Add the following Article 508.02 (d)

Bar Terminators 1006.10(a)(1)h

Add the following paragraph after Article 508.08 (c):

Bar terminators are threaded, headed attachments to reinforcement to form headed reinforcement. When specified on the plans, a bar terminator shall be attached to the designated reinforcement for development.

Add the following 4th paragraph to Article 508.11:

Bar Terminators will be paid for at the contract unit price per each for BAR TERMINATORS.

Add the following to Article 1006.10(a)(1)g:

For bar splicers with welded connections between the threaded coupler and threaded rod, the Stage I construction threaded splicer bar shall be welded to the threaded coupler using an all-around fillet weld.

Add the following Article 1006.10(a)(1)h:

Bar Terminators. Designated bars shall use a bar terminator to form headed reinforcement. Headed reinforcement shall conform to ASTM A970 with threaded attachment; Class HA; and reinforcement bars conforming to ASTM A706, except the connection strength of the bar terminator to the reinforcement bar shall meet, in tension, at least 125 percent of the specified yield strength of the reinforcement bar. The bar terminator shall be on the Department's qualified product list.

When the reinforcement bar to receive the bar terminator is epoxy coated, the bar terminator shall also be epoxy coated according to ASTM A 775 (A 775M)

AGGREGATE SUBGRADE IMPROVEMENT (BDE)

Effective: April 1, 2012

Revised: April 1, 2022

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 (ASI).

303.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Coarse Aggregate	1004.07
(b) Reclaimed Asphalt Pavement (RAP)	1031.09

303.03 Equipment. The vibratory roller shall be according to Article 1101.01, or as approved by the Engineer. Vibratory machines, such as tampers, shall be used in areas where rollers do not fit.

303.04 Soil Preparation. The minimum immediate bearing value (IBV) of the soil below the improved subgrade shall be according to the Department’s “Subgrade Stability Manual” for the aggregate thickness specified.

303.05 Placing and Compacting. The maximum nominal lift thickness of aggregate gradations CA 2, CA 6, and CA 10 when compacted shall be 9 in. (225 mm). The maximum nominal lift thickness of aggregate gradations CS 1, CS 2, and RR 1 when compacted shall be 24 in. (600 mm).

The top surface of the aggregate subgrade improvement shall consist of a layer of capping aggregate gradations CA 6 or CA 10 that is 3 in. (75 mm) thick after compaction. Capping aggregate will not be required when aggregate subgrade improvement is used as a cubic yard pay item for undercut applications.

Each lift of aggregate 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.

303.06 Finishing and Maintenance. 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.

303.07 Method of Measurement. This work will be measured for payment according to Article 311.08.

303.08 Basis of Payment. This work will be paid for at the contract unit price per cubic yard (cubic meter) or ton (metric ton) for AGGREGATE SUBGRADE IMPROVEMENT or at the contract unit price per square yard (square meter) for AGGREGATE SUBGRADE IMPROVEMENT, of the thickness specified."

Add the following to Section 1004 of the Standard Specifications:

"1004.07 Coarse Aggregate for Aggregate Subgrade Improvement (ASI). 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. In applications where greater than 24 in. (600 mm) of ASI material is required, gravel may be used below the top 12 in (300 mm) of ASI.
- (b) Quality. The coarse aggregate shall consist of sound durable particles reasonably free of deleterious materials.
- (c) Gradation.

- (1) The coarse aggregate gradation for total ASI thickness less than or equal to 12 in. (300 mm) shall be CA 2, CA 6, CA 10, or CS 1.

The coarse aggregate gradation for total ASI thickness greater than 12 in. (300 mm) shall be CS 1 or CS 2 as shown below or RR 1 according to Article 1005.01(c).

COARSE AGGREGATE SUBGRADE GRADATIONS					
Grad No.	Sieve Size and Percent Passing				
	8"	6"	4"	2"	#4
CS 1	100	97 ± 3	90 ± 10	45 ± 25	20 ± 20
CS 2		100	80 ± 10	25 ± 15	

COARSE AGGREGATE SUBGRADE GRADATIONS (Metric)					
Grad No.	Sieve Size and Percent Passing				
	200 mm	150 mm	100 mm	50 mm	4.75 mm
CS 1	100	97 ± 3	90 ± 10	45 ± 25	20 ± 20
CS 2		100	80 ± 10	25 ± 15	

- (2) Capping aggregate shall be gradation CA 6 or CA 10."

Add the following to Article 1031.09 of the Standard Specifications:

“(b) RAP in Aggregate Subgrade Improvement (ASI). RAP in ASI shall be according to Articles 1031.01(a), 1031.02(a), 1031.06(a)(1), and 1031.06(a)(2), and the following.

- (1) The testing requirements of Article 1031.03 shall not apply.
- (2) Crushed RAP used for the lower lift may be mechanically blended with aggregate gradations CS 1, CS 2, and RR 1 but it shall be no greater than 40 percent of the total product volume. RAP agglomerations shall be no greater than 4 in. (100 mm).
- (3) For capping aggregate, well graded RAP having 100 percent passing the 1 1/2 in. (38 mm) sieve may be used when aggregate gradations CS 1, CS 2, CA 2, or RR 1 are used in the lower lift. FRAP will not be permitted as capping material.

Blending shall be through calibrated interlocked feeders or a calibrated blending plant such that the prescribed blending percentage is maintained throughout the blending process. The calibration shall have an accuracy of ± 2.0 percent of the actual quantity of material delivered.”

CEMENT, FINELY DIVIDED MINERALS, ADMIXTURES, CONCRETE, AND MORTAR (BDE)

Effective: January 1, 2025

Revised: January 1, 2026

Revise the first paragraph of Article 285.05 of the Standard Specifications to read:

“**285.05 Fabric Formed Concrete Revetment Mat.** The grout shall consist of a mixture of cement, fine aggregate, and water so proportioned and mixed as to provide a pumpable slurry. Fly ash or ground granulated blast furnace (GGBF) slag, and concrete admixtures may be used at the option of the Contractor. The grout shall have an air content of not less than 6.0 percent nor more than 9.0 percent of the volume of the grout. The mix shall obtain a compressive strength of 2500 psi (17,000 kPa) at 28 days according to Article 1020.09.”

Revise Article 302.02 of the Standard Specifications to read:

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

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Hydrated Lime	1012.01
(d) By-Product, Hydrated Lime	1012.02
(e) By-Product, Non-Hydrated Lime	1012.03
(f) Lime Slurry	1012.04
(g) Fly Ash	1010
(h) Soil for Soil Modification (Note 1)	1009.01
(i) Bituminous Materials (Note 2)	1032

Note 1. This soil requirement only applies when modifying with lime (slurry or dry).

Note 2. The bituminous materials used for curing shall be emulsified asphalt RS-2, CRS-2, HFE 90, or HFE 150; rapid curing liquid asphalt RC-70; or medium curing liquid asphalt MC-70 or MC-250."

Revise Article 312.07(c) of the Standard Specifications to read:

"(c) Cement 1001"

Add Article 312.07(i) of the Standard Specifications to read:

"(i) Ground Granulated Blast Furnace (GGBF) Slag 1010"

Revise the first paragraph of Article 312.09 of the Standard Specifications to read:

"312.09 Proportioning and Mix Design. At least 60 days prior to start of placing CAM II, the Contractor shall submit samples of materials to be used in the work for proportioning and testing. The mixture shall contain a minimum of 200 lb (120 kg) of cement per cubic yard (cubic meter). Cement may be replaced with fly ash or ground granulated blast furnace (GGBF) slag according to Article 1020.05(c)(1) or 1020.05(c)(2), respectively, however the minimum cement content in the mixture shall be 170 lbs/cu yd (101 kg/cu m). Blends of coarse and fine aggregates will be permitted, provided the volume of fine aggregate does not exceed the volume of coarse aggregate. The Engineer will determine the proportions of materials for the mixture according to the "Portland Cement Concrete Level III Technician Course" manual. However, the Contractor may substitute their own mix design. Article 1020.05(a) shall apply, and a Level III PCC Technician shall develop the mix design."

Revise Article 352.02 of the Standard Specifications to read:

"352.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement (Note 1)	1001
(b) Soil for Soil-Cement Base Course	1009.03
(c) Water	1002
(d) Bituminous Materials (Note 2)	1032

Note 1. Bulk cement may be used for the traveling mixing plant method if the equipment for handling, weighing, and spreading the cement is approved by the Engineer.

Note 2. The bituminous materials used for curing shall be emulsified asphalt RS-2, CRS-2, HFE 90, or HFE 150; rapid curing liquid asphalt RC-70; or medium curing liquid asphalt MC-70 or MC-250."

Revise Article 404.02 of the Standard Specifications to read:

“404.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fine Aggregate	1003.08
(d) Bituminous Material (Tack Coat)	1032.06
(e) Emulsified Asphalts (Note 1) (Note 2)	1032.06
(f) Fiber Modified Joint Sealer	1050.05
(g) Additives (Note 3)	

Note 1. When used for slurry seal, the emulsified asphalt shall be CQS-1h according to Article 1032.06(b).

Note 2. When used for micro-surfacing, the emulsified asphalt shall be CQS-1hP according to Article 1032.06(e).

Note 3. Additives may be added to the emulsion mix or any of the component materials to provide the control of the quick-traffic properties. They shall be included as part of the mix design and be compatible with the other components of the mix.

Revise the last sentence of the fourth paragraph of Article 404.08 of the Standard Specifications to read:

“When approved by the Engineer, the sealant may be dusted with fine sand, cement, or mineral filler to prevent tracking.”

Revise Note 2 of Article 516.02 of the Standard Specifications to read:

“Note 2. The sand-cement grout mix shall be according to Section 1020 and shall be a 1:1 blend of sand and cement comprised of a Type I, IL, or II cement at 185 lb/cu yd (110 kg/cu m). The maximum water cement ratio shall be sufficient to provide a flowable mixture with a typical slump of 10 in. (250 mm).”

Revise Note 2 of Article 543.02 of the Standard Specifications to read:

“Note 2. The grout mixture shall be 6.50 hundredweight/cu yd (385 kg/cu m) of cement plus fine aggregate and water. Fly ash or ground granulated blast furnace (GGBF) slag may replace a maximum of 5.25 hundredweight/cu yd (310 kg/cu m) of the cement. The water/cement ratio, according to Article 1020.06, shall not exceed 0.60. An air-entraining admixture shall be used to produce an air content, according to Article 1020.08, of not less than 6.0 percent nor more than 9.0 percent of the volume of the grout. The Contractor shall have the option to use a water-reducing or high range water-reducing admixture.”

Revise Article 583.01 of the Standard Specifications to read:

“583.01 Description. This work shall consist of placing cement mortar along precast, prestressed concrete bridge deck beams as required for fairing out any unevenness between adjacent deck beams prior to placing of waterproofing membrane and surfacing.”

Revise Article 583.02(a) of the Standard Specifications to read:

“(a) Cement 1001”

Revise the first paragraph of Article 583.03 of the Standard Specifications to read:

“ 583.03 General. This work shall only be performed when the air temperature is 45 °F (7 °C) and rising. The mixture for cement mortar shall consist of three parts sand to one part cement by volume. The amount of water shall be no more than that necessary to produce a workable, plastic mortar.”

Revise Article 606.02(h) of the Standard Specifications to read:

“(h) Fibers (Note 1) 1014”

Revise Note 1 in Article 606.02(h) of the Standard Specifications to read:

“Note 1. Fibers, when required, shall only be used in the concrete mixture for slipform applications.”

Revise the third paragraph in Article 606.10 of the Standard Specifications to read:

“Welded wire fabric shall be 6 x 6 in. (150 x 150 mm) mesh, #4 gauge (5.74 mm), 58 lb (26 kg) per 100 sq ft (9 sq m).”

Revise Article 1001.01(d) of the Standard Specifications to read:

“(d) Rapid Hardening Cement. Rapid hardening cement shall be according to the Bureau of Materials Policy Memorandum “Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants”, and ASTM C 1600, Type URH, Type VRH, or Type RH-CAC. It shall be used according to Article 1020.04 or when approved by the Engineer. The Contractor shall submit a report from the manufacturer or an independent lab that contains results for testing according to ASTM C 1600 which shows the cement meets the requirements of either Type URH, Type VRH, or Type RH-CAC. Test data shall be less than 1 year old from the date of submittal.

Revise Article 1001.01(e) of the Standard Specifications to read:

- “(e) Other Cements. Other cements shall be according to the Bureau of Materials Policy Memorandum “Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants”, and ASTM C 1157 or ASTM C 1600, as applicable. Other cements shall be used according to Article 1020.04 or when approved by the Engineer. For cements according to ASTM C 1157, the Contractor shall submit a report from the manufacturer or an independent lab that contains results of tests which shows the cement meets the requirements Type GU, HE, MS, MH, or LH. For cements according to ASTM C 1600, the Contractor shall submit a report from the manufacturer or an independent lab that contains results of tests which shows the cement meets the requirements Type MRH or GRH. Test data shall be less than 1 year old from the date of submittal.”

Revise Article 1002.02 of the Standard Specifications to read:

“**1002.02 Quality.** Water used with cement in concrete or mortar and water used for curing concrete shall be clean, clear, and free from sugar. In addition, water shall be tested and evaluated for acceptance according to one of the following options.

OPTION 1.

(a) Acceptable limits for acidity and alkalinity when tested according to ITP T 26.

- (1) Acidity -- 0.1 Normal NaOH 2 ml max.*
(2) Alkalinity -- 0.1 Normal HCl..... 10 ml max.*
*To neutralize 200 ml sample.

(b) Acceptable limits for solids when tested according to the following.

- (1) Organic (ITP T 26) 0.02% max.
(2) Inorganic (ITP T 26) 0.30% max.
(3) Sulfate (SO₄) (ASTM D 516-82) 0.05% max.
(4) Chloride (ASTM D 512) 0.06% max.

(c) The following tests shall be performed on the water sample and on deionized water. The same cement and sand shall be used for both tests.

- (1) Unsoundness (ASTM C 151).
(2) Initial and Final Set Time (ASTM C 266).
(3) Strength (ASTM C 109).

The test results for the water sample shall not deviate from the test results for the deionized water, except as allowed by the precision in the test method.

OPTION 2. Water shall meet the requirements ASTM C 1602 Tables 1 and 2 as outlined in Sections 5.1, 5.2, and 5.4.”

Revise Note 2/ in Article 1003.01(b) of the Standard Specifications to read:

“2/ Applies only to sand. Sand exceeding the colorimetric test standard of 11 (Illinois Modified AASHTO T 21) will be checked for mortar making properties according to Illinois Modified ASTM C 87 and shall develop a compressive strength at the age of 14 days when using Type I, IL, or II cement of not less than 95 percent of the comparable standard.

Revise the second sentence of Article 1003.02(e)(1) of the Standard Specifications to read:

“The test will be performed with Type I, IL, or II portland cement having a total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of 0.90 percent or greater.”

Revise the first sentence of the second paragraph of Article 1003.02(e)(3) of the Standard Specifications to read:

“The ASTM C 1293 test shall be performed with Type I, IL, or II portland cement having a total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of 0.80 percent or greater.”

Revise the second sentence of Article 1004.02(g)(1) of the Standard Specifications to read:

“The test will be performed with Type I, IL, or II portland cement having a total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of 0.90 percent or greater.”

Add the following Section to the Standard Specifications.

“SECTION 1014. FIBERS FOR CONCRETE

1014.01 General. Fibers used in concrete shall be Type II or Type III (polyolefin or carbon) according to ASTM C 1116. The testing required for Type II fibers or Type III polyolefin fibers shall be performed by an independent lab a minimum of once every five years, and the test results provided to the Department. Manufacturers of Type III carbon fibers shall provide materials certification documentation not more than 6 years old a minimum of once every 5 years to the Department. The Department will maintain a qualified product list. The method of inclusion of fibers into concrete mixtures shall be according to the manufacturer’s specifications.

At the discretion of the Engineer, the concrete mixture shall be evaluated in a field demonstration for fiber clumping, ease of placement, and ease of finishing. The field demonstration shall consist of a minimum 2 cu yd (1.5 cu m) trial batch placed in a 12 ft x 12 ft (3.6 m x 3.6 m) slab.

1014.02 Concrete Gutter, Curb, Median and Paved Ditch. Fibers shall be Type III. Fibers shall have a minimum length of 1/2 in. (13 mm) and a maximum length of 0.75 in. (19 mm). The maximum dosage rate in the concrete mixture shall not exceed 1.5 lb/cu yd (0.9 kg/cu m). The minimum dosage rate shall be per the manufacturer’s recommendation.

1014.03 Concrete Inlay or Overlay. Fibers shall be Type III. Fibers shall have a minimum length of 1.0 in. (25 mm), a maximum length of 2 1/2 in. (63 mm), and a maximum aspect ratio (length divided by the equivalent diameter of the fiber) of 150. The maximum dosage rate shall not exceed 5.0 lb/cu yd (3.0 kg/cu m). The minimum dosage rate shall be per the manufacturer's recommendation.

1014.04 Bridge Deck Fly Ash, Ground Granulated Blast Furnace (GGBF) Slag, High Reactivity Metakaolin, or Microsilica (Silica Fume) Concrete Overlay. Fibers shall be Type III. The dosage rate shall be a minimum of 3.0 lb/cu yd (1.8 kg/cu m), unless a field demonstration according to Article 1014.01 indicates that a lower dosage rate is necessary. Based on the results of the field demonstration, the Department has the option to reduce the dosage rate of fibers, but the dosage will not be reduced to less than 2.0 lb / cu yd (1.2 kg/cu m).

1014.05 Bridge Deck Latex Concrete Overlay. Fibers shall be Type II or III. Fibers shall have a minimum length of 0.75 in. (19 mm), a maximum length of 1.75 in. (45 mm), and an aspect ratio (length divided by the equivalent diameter of the fiber) of between 70 and 100. The dosage rate shall be a minimum of 3.0 lb/cu yd (1.8 kg/cu m), unless a field demonstration according to Article 1014.01 indicates that a lower dosage rate is necessary. Based on the results of the field demonstration, the Department has the option to reduce the dosage rate of fibers, but the dosage will not be reduced to less than 2.0 lb/cu yd (1.2 kg/cu m)."

Add the following Section to the Standard Specifications:

"SECTION 1015. HIGH PERFORMANCE SHOTCRETE

1015.01 Packaged Shotcrete With Aggregate. The packaged shotcrete with aggregate shall be a pre-blended dry combination of materials for the wet-mix shotcrete method according to ASTM C 1480, Type FA or CA, Grade FR, Class I. The fibers shall be Type III according to Article 1014.01. The cement and finely divided minerals in the mixture shall be a minimum 6.65 cwt/cu yd (395 kg/cu m), and the portland cement shall not be below 4.70 cwt/cu yd (279 kg/cu m). Microsilica is required in the mixture and shall be a minimum of 5 percent by weight (mass) of cementitious material, and a maximum of 10 percent. Strength requirements shall be according to ASTM C 1480 except that the strength at 28 days shall be at least 4000 psi (27,500 kPa). Strength testing shall be according to ASTM C 1140. The air content as shot shall be 4.0 – 8.0 percent when tested according to AASHTO T 152, and the coarse aggregate shall be a maximum size of 1/2 in. (12.5 mm).

The packaged shotcrete shall have a water soluble chloride ion content of less than 0.15% by weight of cementitious material when tested according to ASTM C 1218 or AASHTO T 260.

The testing according to ASTM C 1480, ASTM C 1140, AASHTO 152, and ASTM C 1218 or AASHTO T 260 shall be performed by an independent lab a minimum of once every 5 years, and the test results shall be provided to the Department. The Department will maintain a qualified product list. Batching and mixing shall be per the manufacturer's recommendations.

1015.02 Packaged Shotcrete Without Aggregate. The packaged shotcrete that does not include pre-blended aggregate shall be according to Article 1015.01, except the added aggregate shall be according to Articles 1003.02 and 1004.02. The aggregate gradation shall be according to the manufacturer. The Department will maintain a qualified product list. Batching and mixing shall be per the manufacturer's recommendations."

Revise Section 1017 of the Standard Specifications to read:

"SECTION 1017. PACKAGED, DRY, COMBINED MATERIALS FOR MORTAR AND CONCRETE

1017.01 Mortar. The mortar shall be high-strength according to ASTM C 387 and shall have a minimum 80.0 percent relative dynamic modulus of elasticity when tested according to AASHTO T 161. For prestressed concrete applications, the mortar shall have a water-soluble chloride ion content of less than 0.06 percent by weight of cementitious material when tested according to ASTM C 1218 or AASHTO T 260; and for non-prestressed concrete applications, the water soluble chloride content shall be less than 0.15 percent by weight of cementitious material. The testing according to ASTM C 387, AASHTO T 161, and either ASTM C 1218 or AASHTO T 260 shall be performed by an independent lab a minimum of once every five years, and the test results shall be provided to the Department. The Department will maintain a qualified product list. Mixing of the high-strength mortar shall be according to the manufacturer's specifications.

1017.02 Concrete. The materials, testing, and preparation of aggregate for the "high slump" packaged concrete mixture shall be according to ASTM C 387. The mixture shall be air entrained, the slump shall be 5-10 in. (125-250 mm), and the coarse aggregate shall be a maximum size of 1/2 in. (12.5 mm). Strength requirements shall be according to ASTM C 387 except that the strength at 28 days shall be at least 4000 psi (27,500 kPa). The "high slump" packaged concrete mixture shall have a water soluble chloride ion content of less than 0.15% by weight of cementitious material when tested according to ASTM C 1218 or AASHTO T 260. The testing according to ASTM C 387, and either ASTM C 1218 or AASHTO T 260 shall be performed by an independent lab a minimum of once every 5 years, and the test results shall be provided to the Department. The Department will maintain a qualified product list. Mixing shall be per the manufacturer's recommendations.

1017.02 Self-Consolidating Concrete. The materials, testing, and preparation of aggregate for the "self-consolidating concrete" packaged concrete mixture shall be according to ASTM C 387. The mixture shall be air entrained, it should be uniformly graded, and the coarse aggregate shall be a maximum size of 1/2 in. (12.5 mm). Strength requirements shall be according to ASTM C 387 except that the strength at 28 days shall be at least 4000 psi (27,500 Pa). Slump flow range shall be 22 in. (550 mm) minimum to 28 in. (700 mm) maximum when tested according to AASHTO T 347. The visual stability index shall be a maximum of 1 when tested according to AASHTO T 351. At the option of the manufacturer, either the J-Ring value shall be a maximum of 2 in. (50 mm) when tested according to AASHTO T 347 or the L-Box blocking ratio shall be a minimum of 80 percent when tested according to AASHTO T 419. The hardened visual stability index shall be a maximum of 1 when tested according to AASHTO R 81.

The “self -consolidating concrete” packaged concrete mixture shall have a water soluble chloride ion content of less than 0.15 percent by weight of cementitious material when tested according to ASTM C 1218 or AASHTO T 260.

The testing according to ASTM C 387, AASHTO T 347, AASHTO T 351, AASHTO T 419, AASHTO R 81, ASTM C 1218 and AASHTO T 260 shall be performed by an independent lab a minimum of once every 5 years, and the test results shall be provided to the Department. The Department will maintain a qualified product list. Mixing shall be per the manufacturer’s recommendations.”

Revise Article 1018.01 of the Standard Specifications to read:

“1018.01 Requirements. The rapid hardening mortar or concrete shall be according to ASTM C 928 and shall have successfully completed and remain current with the AASHTO Product Eval and Audit Rapid Hardening Concrete Patching Materials (RHCP) testing program. R1, R2, or R3 concrete shall be air entrained, the slump shall be 5-10 in. (125-250 mm), and the coarse aggregate shall be a maximum size of 1/2 in. (12.5 mm). For prestressed concrete applications, the mortar or concrete shall have a water-soluble chloride ion content of less than 0.06 percent by weight of cementitious material when tested according to ASTM C 1218 or AASHTO T 260; and for non-prestressed concrete applications, the water soluble chloride content shall be less than 0.15 percent by weight of cementitious material. The Department will maintain a qualified product list. Mixing of the mortar or concrete shall be according to the manufacturer’s specifications..”

Revise Article 1019.02 of the Standard Specifications to read:

“1019.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fine Aggregate for Controlled Low-Strength Material (CLSM)	1003.06
(d) Fly Ash	1010
(e) Ground Granulated Blast Furnace (GGBF) Slag.....	1010
(f) Admixtures (Note 1)	

Note 1. The air-entraining admixture may be in powder or liquid form. The air content produced by the admixture shall be 15-25 percent when incorporated into Mix 2 or an equivalent mixture as determined by the Department and tested according to AASHTO T 121 or AASHTO T 152. The testing according to AASHTO T 121 or AASHTO T 152 shall be performed by an independent lab a minimum of once every five years, and the test results shall be provided to the Department. The Department will maintain a qualified product list.”

Revise the third paragraph of Article 1019.04 of the Standard Specifications to read:

“The Engineer will instruct the Contractor to adjust the proportions of the mix design in the field as needed to meet the design criteria, provide adequate flowability, maintain proper solid suspension, or other criteria established by the Engineer.”

Revise Article 1019.05 of the Standard Specifications to read:

“1019.05 Department Mix Design. The Department mix design shall be Mix 1, 2, or 3 and shall be proportioned to yield approximately one cubic yard (cubic meter).

Mix 1	
Cement	50 lb (30 kg)
Fly Ash – Class C or F, and/or GGBF Slag	125 lb (74 kg)
Fine Aggregate – Saturated Surface Dry	2900 lb (1720 kg)
Water	50-65 gal (248-322 L)
Air Content	No air is entrained

Mix 2	
Cement	125 lb (74 kg)
Fine Aggregate – Saturated Surface Dry	2500 lb (1483 kg)
Water	35-50 gal (173-248 L)
Air Content	15-25 %

Mix 3	
Cement	40 lb (24 kg)
Fly Ash – Class C or F, and/or GGBF Slag	125 lb (74 kg)
Fine Aggregate – Saturated Surface Dry	2500 lb (1483 kg)
Water	35-50 gal (179-248 L)
Air Content	15-25 %”

Revise Article 1020.04, Table 1, Note (8) of the Standard Specifications to read:

“(8) In addition to the Type III portland cement, 100 lb/cu yd of ground granulated blast-furnace slag and 50 lb/cu yd of microsilica (silica fume) shall be used. For an air temperature greater than 85 °F, the Type III portland cement may be replaced with Type I, IL, or II portland cement.”

Revise Article 1020.04, Table 1 (Metric), Note (8) of the Standard Specifications to read:

“(8) In addition to the Type III portland cement, 60 kg/cu m of ground granulated blast-furnace slag and 30 kg/cu m of microsilica (silica fume) shall be used. For an air temperature greater than 30 °C, the Type III portland cement may be replaced with Type I, IL, or II portland cement.”

Revise Note 9 of Table 1 of Article 1020.04 of the Standard Specifications to read:

“(9) The cement shall be a rapid hardening according to Article 1001.01(d). Minimum or maximum cement factor may be adjusted when approved by the Engineer.”

Revise the second paragraph of Article 1020.05(a) of the Standard Specifications to read:

“For a mix design using a portland-pozzolan cement, portland blast-furnace slag cement, portland-limestone cement, or replacing portland cement with finely divided minerals per Articles 1020.05(c) and 1020.05(d), the Contractor may submit a mix design with a minimum portland cement content less than 400 lbs/cu yd (237 kg/cu m), but not less than 375 lbs/cu yd (222 kg/cu m), if the mix design is shown to have a minimum relative dynamic modulus of elasticity of 80 percent determined according to AASHTO T 161. Testing shall be performed by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete.”

Revise the first sentence of the first paragraph of Article 1020.05(b) of the Standard Specifications to read:

“Corrosion inhibitors and concrete admixtures shall be according to the qualified product lists.”

Delete the fourth and fifth sentences of the second paragraph of Article 1020.05(b) of the Standard Specifications.

Revise Article 1020.05(b)(5) of the Standard Specifications to read:

“(5) For Class PP-4 concrete, a high range water-reducing admixture, retarder, and/or hydration stabilizer may be used in addition to the air-entraining admixture. The Contractor also has the option to use a water-reducing admixture with the high range water-reducing admixture. An accelerator shall not be used. A mobile portland cement concrete plant shall be used to produce the patching mixture.

For PP-5 concrete, a non-chloride accelerator, high range water-reducing admixture, retarder, hydration stabilizer, and/or air-entraining admixture may be used. The accelerator, high range water-reducing admixture, retarder, hydration stabilizer, and/or air-entraining admixture shall be per the Contractor’s recommendation and dosage. The qualified product list of concrete admixtures shall not apply. A mobile portland cement concrete plant shall be used to produce the patching mixture.”

Revise second paragraph of Article 1020.05(b)(10) of the Standard Specifications to read:

“When calcium nitrite is used, it shall be added at the rate of 4 gal/cu yd (20 L/cu m) and shall be added to the mix immediately after all compatible admixtures have been introduced to the batch. Other corrosion inhibitors shall be added per the manufacturer’s specifications.”

Delete the third paragraph of Article 1020.05(b)(10) of the Standard Specifications.

Revise Article 1020.15(b)(1)c. of the Standard Specifications to read:

- “c. The minimum portland cement content in the mixture shall be 375 lbs/cu yd (222 kg/cu m). When the total of organic processing additions, inorganic processing additions, and limestone addition exceed 5.0 percent in the cement, the minimum portland cement content in the mixture shall be 400 lbs/cu yd (237 kg/cu m). For a drilled shaft, foundation, footing, or substructure, the minimum portland cement may be reduced to as low as 330 lbs/cu yd (196 kg/cu m) if the concrete has adequate freeze/thaw durability. The Contractor shall provide freeze/thaw test results according to AASHTO T 161, and the relative dynamic modulus of elasticity of the mix design shall be a minimum of 80 percent. Testing shall be performed by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete. Freeze/thaw testing will not be required for concrete that will not be exposed to freezing and thawing conditions as determined by the Engineer.”

Revise Article 1021.01 of the Standard Specifications to read:

“1021.01 General. Admixtures shall be furnished in liquid or powder form ready for use. The admixtures shall be delivered in the manufacturer's original containers, bulk tank trucks or such containers or tanks as are acceptable to the Engineer. Delivery shall be accompanied by a ticket which clearly identifies the manufacturer, the date of manufacture, and trade name of the material. Containers shall be readily identifiable as to manufacturer, the date of manufacture, and trade name of the material they contain.

Concrete admixtures shall be on one of the Department's qualified product lists. Unless otherwise noted, admixtures shall have successfully completed and remain current with the AASHTO Product Eval and Audit Concrete Admixture (CADD) testing program. For admixture submittals to the Department; the product brand name, manufacturer name, admixture type or types, an electronic link to the product's technical data sheet, and the NTPEP testing number which contains an electronic link to all test data shall be provided. In addition, a letter shall be submitted certifying that no changes have been made in the formulation of the material since the most current round of tests conducted by AASHTO Product Eval and Audit. After 28 days of testing by AASHTO Product Eval and Audit, air-entraining admixtures may be provisionally approved and used on Departmental projects. For all other admixtures, unless otherwise noted, the time period after which provisionally approved status may be earned is 6 months.

The manufacturer shall include the following in the submittal to the AASHTO Product Eval and Audit CADD testing program: the manufacturing range for specific gravity, the midpoint and manufacturing range for residue by oven drying, and manufacturing range of pH. The submittal shall also include an infrared spectrophotometer trace no more than five years old.

For air-entraining admixtures according to Article 1021.02, the specific gravity allowable manufacturing range established by the manufacturer shall be according to AASHTO M 194. For residue by oven drying and pH, the allowable manufacturing range and test methods shall be according to AASHTO M 194.

For admixtures according to Articles 1021.03, 1021.04, 1021.05, 1021.06, 1021.07, and 1021.08, the pH allowable manufacturing range established by the manufacturer shall be according to ASTM E 70. For specific gravity and residue by oven drying, the allowable manufacturing range and test methods shall be according to AASHTO M 194.

All admixtures, except chloride-based accelerators, shall contain a maximum of 0.3 percent chloride by weight (mass) as determined by an appropriate test method. To verify the test result, the Department will use Illinois Modified AASHTO T 260, Procedure A, Method 1.

Prior to final approval of an admixture, the Engineer reserves the right to request a sample for testing. The test and reference concrete mixtures tested by the Engineer will contain a cement content of 5.65 cwt/cu yd (335 kg/cu m). For freeze-thaw testing, the Department will perform the test according to Illinois Modified AASHTO T 161. The flexural strength test will be performed according to AASHTO T 177. If the Engineer decides to test the admixture, the manufacturer shall submit AASHTO T 197 water content and set time test results on the standard cement used by the Department. The manufacturer may select their lab or an independent lab to perform this testing. The laboratory is not required to be accredited by AASHTO.

Random field samples may be taken by the Department to verify an admixture meets specification. A split sample will be provided to the manufacturer if requested. Admixtures that do not meet specification requirements or an allowable manufacturing range established by the manufacturer shall be replaced with new material.”

Revise Article 1021.03 of the Standard Specifications to read:

“1021.03 Retarding and Water-Reducing Admixtures. The admixture shall be according to the following.

- (a) Retarding admixtures shall be according to AASHTO M 194, Type B (retarding) or Type D (water-reducing and retarding).
- (b) Water-reducing admixtures shall be according to AASHTO M 194, Type A.
- (c) High range water-reducing admixtures shall be according to AASHTO M 194, Type F (high range water-reducing) or Type G (high range water-reducing and retarding).”

Revise Article 1021.05 of the Standard Specifications to read:

“1021.05 Self-Consolidating Admixtures. Self-consolidating admixture systems shall consist of either a high range water-reducing admixture only or a high range water-reducing admixture combined with a separate viscosity modifying admixture. The one or two component admixture system shall be capable of producing a concrete that can flow around reinforcement and consolidate under its own weight without additional effort and without segregation.

High range water-reducing admixtures shall be according to AASHTO M 194, Type F.

Viscosity modifying admixtures shall be according to AASHTO M 194, Type S (specific performance).”

Revise Article 1021.06 of the Standard Specifications to read:

“1021.06 Rheology-Controlling Admixture. Rheology-controlling admixtures shall be capable of producing a concrete mixture with a lower yield stress that will consolidate easier for slipform applications used by the Contractor. Rheology-controlling admixtures shall be according to AASHTO M 194, Type S (specific performance).”

Revise Article 1021.07 of the Standard Specifications to read:

“1021.07 Corrosion Inhibitor. The corrosion inhibitor shall be according to one of the following.

- (a) Calcium Nitrite. Corrosion inhibitors shall contain a minimum 30 percent calcium nitrite by weight (mass) of solution and shall comply with either the requirements of AASHTO M 194, Type C (accelerating) or the requirements of ASTM C 1582. The corrosion inhibiting performance requirements of ASTM C 1582 shall not apply.
- (b) Other Materials. The corrosion inhibitor shall be according to ASTM C 1582.

For submittals requiring testing according to ASTM M 194, Type C (accelerating), the admixture shall meet the requirements of the AASHTO Product Eval and Audit CADD testing program according to Article 1021.01.

For submittals requiring testing according to ASTM C 1582, a report prepared by an independent laboratory accredited by AASHTO re:source for portland cement concrete shall be provided. The report shall show the results of physical tests conducted no more than five years prior to the time of submittal, according to applicable specifications. However, ASTM G 109 test information specified in ASTM C 1582 is not required to be from an independent accredited lab. All other information in ASTM C 1582 shall be from an independent accredited lab. Test data and other information required to be submitted to AASHTO Product Eval and Audit according to Article 1021.01, shall instead be submitted directly to the Department.”

Add Article 1021.08 of the Standard Specifications as follows:

“1021.08 Other Specific Performance Admixtures. Other specific performance admixtures shall, at a minimum, be according to AASHTO M 194, Type S (specific performance). The Department also reserves the right to require other testing, as determined by the Engineer, to show evidence of specific performance characteristics.

Initial testing according to AASHTO M 194 may be conducted under the AASHTO Product Eval and Audit CADD testing program according to Article 1021.01, or by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete. In either case, test data and other information required to be submitted to AASHTO Product Eval and Audit according to Article 1021.01, shall also be submitted directly to the Department. The independent accredited lab report shall show the results of physical tests conducted no more than five years prior to the time of submittal, according to applicable specifications.”

Add Article 1021.09 of the Standard Specifications as follows:

“1021.09 Latex Admixtures. The latex admixture shall be a uniform, homogeneous, non-toxic, film-forming, polymeric emulsion in water to which all stabilizers have been added at the point of manufacture. The latex admixture shall not contain any chlorides and shall contain 46-49 percent solids.

In lieu of meeting the requirements of Article 1021.01, the Contractor shall submit a manufacturer's certification that the latex emulsion meets the requirements of FHWA Research Report RD-78-35, Chapter VI. The certificate shall include the date of manufacture of the latex admixture, batch or lot number, quantity represented, manufacturer's name, and the location of the manufacturing plant. The latex emulsion shall be sampled and tested in accordance with RD-78-35, Chapter VII, Certification Program.

The latex admixture shall be packaged and stored in containers and storage facilities which will protect the material from freezing and from temperatures above 85°F (30°C). Additionally, the material shall not be stored in direct sunlight and shall be shaded when stored outside of buildings during moderate temperatures.”

Revise Article 1024.01 of the Standard Specifications to read:

“1024.01 Requirements for Grout. The grout shall be proportioned by dry volume, thoroughly mixed, and shall have a minimum temperature of 50 °F (10 °C). Water shall not exceed the minimum needed for placement and finishing.

Materials for the grout shall be according to the following.

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fine Aggregate	1003.02
(d) Fly Ash	1010
(e) Ground Granulated Blast Furnace (GGBF) Slag.....	1010
(f) Concrete Admixtures	1021”

Revise Note 1 of Article 1024.02 of the Standard Specifications to read:

“Note 1. Nonshrink grout shall be according to ASTM C 1107.

For prestressed concrete applications, the nonshrink grout shall have a water soluble chloride ion content of less than 0.06 percent by weight of cementitious material when tested according to ASTM C 1218 or AASHTO T 260; and for non-prestressed concrete applications, the water soluble chloride ion content shall be less than 0.15 percent by weight of cementitious material. The testing according to ASTM 1107, and either ASTM C 1218 or AASHTO T 260 shall be performed by an independent lab a minimum of once every five years, and the test results shall be provided to the Department. The Department will maintain a qualified product list. Mixing of the nonshrink grout shall be according to the manufacturer’s specifications.”

Revise Article 1029.02 of the Standard Specifications to read:

“ **1029.02 Materials.** Materials shall be according to the following.

Item	Article/Section
(a) Cement.....	1001
(b) Fly Ash	1010
(c) Ground Granulated Blast Furnace (GGBF) Slag	1010
(d) Water.....	1002
(e) Fine Aggregate.....	1003
(f) Concrete Admixtures	1021
(g) Foaming Agent (Note 1)	

Note 1. The manufacturer shall submit infrared spectrophotometer trace and test results indicating the foaming agent meets the requirements of ASTM C 869 in order to be on the Department’s qualified product list. Submitted data/results shall not be more than five years old.”

Revise the second paragraph of Article 1103.03(a)(4) the Standard Specifications to read:

“The dispenser system shall provide a visual indication that the liquid admixture is actually entering admixtures dosed at rates of 25 oz/cwt (1630 mL/100 kg) or greater, such as accelerating admixtures, corrosion inhibitors, and viscosity modifying admixtures.”

Revise Article 1103.04 of the Standard Specifications to read:

“ **1103.04 Mobile Portland Cement Concrete Plants.** The mobile concrete plant shall be according to AASHTO M 241 and the Bureau of Materials Policy Memorandum “Approval of Volumetric Mobile Mixers for Concrete”. The mixer shall be capable of carrying sufficient unmixed materials to produce not less than 6 cu yd (4.6 cu m) of concrete.”

Revise the first two sections of Check Sheet #11 “Subsealing of Concrete Pavements” of the Recurring Special Provisions to read:

“Description. This work shall consist of filling voids beneath rigid and composite pavements with cement grout.

Materials. Materials shall be according to the following Articles/Sections of the Standard Specifications:

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fly Ash	1010
(d) Ground Granulated Blast Furnace (GGBF) Slag.....	1010
(e) Admixtures	1021
(f) Packaged Rapid Hardening Mortar or Concrete	1018”

Revise the Materials section of Check Sheet #28 “Portland Cement Concrete Inlay or Overlay” of the Recurring Special Provisions to read:

“Materials. Materials shall be according to the following Articles/Sections of the Standard Specifications.

Item	Article/Section
(a) Portland Cement Concrete (Note 1)	1020
(b) Fibers for Concrete.....	1014
(c) Protective Coat.....	1023.01

Note 1. Class PV concrete shall be used, except the cement factor for central mixed concrete shall be 6.05 cwt/cu yd (360 kg/cu m). A cement factor reduction according to Article 1020.05(b)(8) of the Standard Specifications will be permitted. CA 5 shall not be used and CA 7 may only be used for overlays that are a minimum of 4.5 in. (113 mm) thick. The Class PV concrete shall have a minimum flexural strength of 550 psi (3800 kPa) or a minimum compressive strength of 3000 psi (20,700 kPa) at 14 days.”

COMPENSABLE DELAY COSTS (BDE)

Effective: June 2, 2017

Revised: April 1, 2019

Revise Article 107.40(b) of the Standard Specifications to read:

“(b) Compensation. Compensation will not be allowed for delays, inconveniences, or damages sustained by the Contractor from conflicts with facilities not meeting the above definition; or if a conflict with a utility in an unanticipated location does not cause a shutdown of the work or a documentable reduction in the rate of progress exceeding the limits set herein. The provisions of Article 104.03 notwithstanding, compensation for delays caused by a utility in an unanticipated location will be paid according to the provisions of this Article governing minor and major delays or reduced rate of production which are defined as follows.

- (1) Minor Delay. A minor delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two hours, but not to exceed two weeks.
- (2) Major Delay. A major delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two weeks.
- (3) Reduced Rate of Production Delay. A reduced rate of production delay occurs when the rate of production on the work in conflict with the utility in an unanticipated location decreases by more than 25 percent and lasts longer than seven calendar days.”

Revise Article 107.40(c) of the Standard Specifications to read:

“(c) Payment. Payment for Minor, Major, and Reduced Rate of Production Delays will be made as follows.

- (1) Minor Delay. Labor idled which cannot be used on other work will be paid for according to Article 109.04(b)(1) and (2) for the time between start of the delay and the minimum remaining hours in the work shift required by the prevailing practice in the area.

Equipment idled which cannot be used on other work, and which is authorized to standby on the project site by the Engineer, will be paid for according to Article 109.04(b)(4).

- (2) Major Delay. Labor will be the same as for a minor delay.

Equipment will be the same as for a minor delay, except Contractor-owned equipment will be limited to two weeks plus the cost of move-out to either the Contractor's yard or another job and the cost to re-mobilize, whichever is less. Rental equipment may be paid for longer than two weeks provided the Contractor presents adequate support to the Department (including lease agreement) to show retaining equipment on the job is the most economical course to follow and in the public interest.

- (3) Reduced Rate of Production Delay. The Contractor will be compensated for the reduced productivity for labor and equipment time in excess of the 25 percent threshold for that portion of the delay in excess of seven calendar days. Determination of compensation will be in accordance with Article 104.02, except labor and material additives will not be permitted.

Payment for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be determined according to Article 109.13."

Revise Article 108.04(b) of the Standard Specifications to read:

"(b) No working day will be charged under the following conditions.

- (1) When adverse weather prevents work on the controlling item.
- (2) When job conditions due to recent weather prevent work on the controlling item.
- (3) When conduct or lack of conduct by the Department or its consultants, representatives, officers, agents, or employees; delay by the Department in making the site available; or delay in furnishing any items required to be furnished to the Contractor by the Department prevents work on the controlling item.
- (4) When delays caused by utility or railroad adjustments prevent work on the controlling item.
- (5) When strikes, lock-outs, extraordinary delays in transportation, or inability to procure critical materials prevent work on the controlling item, as long as these delays are not due to any fault of the Contractor.
- (6) When any condition over which the Contractor has no control prevents work on the controlling item."

Revise Article 109.09(f) of the Standard Specifications to read:

“(f) Basis of Payment. After resolution of a claim in favor of the Contractor, any adjustment in time required for the work will be made according to Section 108. Any adjustment in the costs to be paid will be made for direct labor, direct materials, direct equipment, direct jobsite overhead, direct offsite overhead, and other direct costs allowed by the resolution. Adjustments in costs will not be made for interest charges, loss of anticipated profit, undocumented loss of efficiency, home office overhead and unabsorbed overhead other than as allowed by Article 109.13, lost opportunity, preparation of claim expenses and other consequential indirect costs regardless of method of calculation.

The above Basis of Payment is an essential element of the contract and the claim cost recovery of the Contractor shall be so limited.”

Add the following to Section 109 of the Standard Specifications.

“**109.13 Payment for Contract Delay.** Compensation for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be allowed when such costs result from a delay meeting the criteria in the following table.

Contract Type	Cause of Delay	Length of Delay
Working Days	Article 108.04(b)(3) or Article 108.04(b)(4)	No working days have been charged for two consecutive weeks.
Completion Date	Article 108.08(b)(1) or Article 108.08(b)(7)	The Contractor has been granted a minimum two week extension of contract time, according to Article 108.08.

Payment for each of the various costs will be according to the following.

(a) Escalated Material and/or Labor Costs. When the delay causes work, which would have otherwise been completed, to be done after material and/or labor costs have increased, such increases will be paid. Payment for escalated material costs will be limited to the increased costs substantiated by documentation furnished by the Contractor. Payment for escalated labor costs will be limited to those items in Article 109.04(b)(1) and (2), except the 35 percent and 10 percent additives will not be permitted.

(b) Extended Project Overhead. For the duration of the delay, payment for extended project overhead will be paid as follows.

(1) Direct Jobsite and Offsite Overhead. Payment for documented direct jobsite overhead and documented direct offsite overhead, including onsite supervisory and administrative personnel, will be allowed according to the following table.

Original Contract Amount	Supervisory and Administrative Personnel
Up to \$5,000,000	One Project Superintendent
Over \$ 5,000,000 - up to \$25,000,000	One Project Manager, One Project Superintendent or Engineer, and One Clerk
Over \$25,000,000 - up to \$50,000,000	One Project Manager, One Project Superintendent, One Engineer, and One Clerk
Over \$50,000,000	One Project Manager, Two Project Superintendents, One Engineer, and One Clerk

(2) Home Office and Unabsorbed Overhead. Payment for home office and unabsorbed overhead will be calculated as 8 percent of the total delay cost.

(c) Extended Traffic Control. Traffic control required for an extended period of time due to the delay will be paid for according to Article 109.04.

When an extended traffic control adjustment is paid under this provision, an adjusted unit price as provided for in Article 701.20(a) for increase or decrease in the value of work by more than ten percent will not be paid.

Upon payment for a contract delay under this provision, the Contractor shall assign subrogation rights to the Department for the Department's efforts of recovery from any other party for monies paid by the Department as a result of any claim under this provision. The Contractor shall fully cooperate with the Department in its efforts to recover from another party any money paid to the Contractor for delay damages under this provision."

CONCRETE SEALER (BDE)

Effective: November 1, 2023

Replace Section 1026 of the Standard Specifications with the following:

“SECTION 1026. CONCRETE SEALER

1026.01 General. Sealer types shall be according to the listing in AASHTO M 224. All concrete sealer types shall meet the sealer requirements of AASHTO M 224 when tested in accordance with AASHTO T 384. The sealer shall be listed on the Department’s qualified product list.

The sealer shall have a clear or amber color when dry.

The Department will perform the sealer characterization properties of ATR-FTIR spectra, total solids, and specific gravity in accordance with AASHTO M 224.”

CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE)

Effective: June 1, 2010

Revised: January 1, 2025

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 according to the table below.

Horsepower Range	Model Year and Older
50-99	2003
100-299	2002
300-599	2000
600-749	2001
750 and up	2005

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* (<https://www.epa.gov/verified-diesel-tech/verified-technologies-list-clean-diesel>), 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.

FUEL COST ADJUSTMENT (BDE)

Effective: April 1, 2009

Revised: August 1, 2017

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 with their bid whether or not this special provision will be part of the contract. 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.

HOT-MIX ASPHALT – LONGITUDINAL JOINT SEALANT (BDE)

Effective: November 1, 2022

Revised: August 1, 2023

Add the following after the second sentence in the eighth paragraph of Article 406.06(h)(2) of the Standard Specifications:

“If rain is forecasted and traffic is to be on the LJS or if pickup/tracking of the LJS material is likely, the LJS shall be covered immediately following its application with FA 20 fine aggregate mechanically spread uniformly at a rate of 1.5 ± 0.5 lb/sq yd (0.75 ± 0.25 kg/sq m). Fine aggregate landing outside of the LJS shall be removed prior to application of tack coat.”

Add the following after the first sentence in the ninth paragraph of Article 406.06(h)(2) of the Standard Specifications:

“LJS half-width shall be applied at a width of 9 ± 1 in. (225 ± 25 mm) in the immediate lane to be placed with the outside edge flush with the joint of the next HMA lift. The vertical face of any longitudinal joint remaining in place shall also be coated.”

Add the following after the eleventh paragraph of Article 406.06(h)(2) of the Standard Specifications:

“LJS Half-Width Application Rate, lb/ft (kg/m) ^{1/}			
Lift Thickness, in. (mm)	Coarse Graded Mixture (IL-19.0, IL-19.0L, IL-9.5, IL-9.5L, IL-4.75)	Fine Graded Mixture (IL-9.5FG)	SMA Mixture (SMA-9.5, SMA-12.5)
$\frac{3}{4}$ (19)	0.44 (0.66)		
1 (25)	0.58 (0.86)		
$1 \frac{1}{4}$ (32)	0.66 (0.98)	0.44 (0.66)	
$1 \frac{1}{2}$ (38)	0.74 (1.10)	0.48 (0.71)	0.63 (0.94)
$1 \frac{3}{4}$ (44)	0.82 (1.22)	0.52 (0.77)	0.69 (1.03)
2 (50)	0.90 (1.34)	0.56 (0.83)	0.76 (1.13)
$\geq 2 \frac{1}{4}$ (60)	0.98 (1.46)		

1/ The application rate includes a surface demand for liquid. The thickness of the LJS may taper from the center of the application to a lesser thickness on the edge of the application, provided the correct width and application rate are maintained.”

Revise the second paragraph of Article 406.13(b) of the Standard Specifications to read:

“Aggregate for covering tack, LJS, or FLS will not be measured for payment.”

Add the following to the end of the second paragraph of Article 406.14 of the Standard Specifications:

“Longitudinal joint sealant (LJS) half-width will be paid for at the contract unit price per foot (meter) for LONGITUDINAL JOINT SEALANT, HALF-WIDTH.”

PAVEMENT MARKING (BDE)

Effective: April 1, 2025

Revised: November 1, 2025

Revise the fourth sentence of the fourth paragraph of Article 780.05 of the Standard Specifications to read:

“Grooves for letters and symbols shall be cut in a rectangular shape or in the shape of the proposed marking so the entire marking will fit within the limits of the grooved area.”

Revise the last sentence of the third paragraph of Article 780.08 of the Standard Specifications to read:

“The Contractor shall install the preformed plastic pavement markings according to the manufacturer’s recommendations.”

Revise the second sentence of the first paragraph of Article 780.13 of the Standard Specifications to read:

“In addition, thermoplastic, preformed plastic, epoxy, preformed thermoplastic, polyurea, and modified urethane pavement markings will be inspected following a winter performance period that extends from November 15 to April 1 of the next year.”

PAVEMENT PATCHING (BDE)

Effective: August 1, 2025

Revise the first sentence of the last paragraph of Article 442.06(a)(2) of the Standard Specifications to read:

“Type IV patches shall be reinforced with welded wire reinforcement according to the details shown on the plans.”

Revise Article 442.06(a)(3) of the Standard Specifications to read:

“(3) Class C Patching. Patches adjacent to a new lane of pavement, new portland cement concrete shoulder, or new curb and gutter of more than 20 ft (6 m) in length shall be tied with No. 6 (No. 19) tie bars, 24 in. (600 mm) long, embedded 8 in. (200 mm) at 36 in. (900 mm) centers according to Article 420.05(b).

When the patched pavement is not to be resurfaced, transverse contraction joints shall be formed on 15 ft (4.5 m) to 20 ft (6 m) centers by sawing in all patches that are more than 20 ft (6 m) in length. They shall be placed in line with joints or cracks in the existing slab whenever possible.”

Revise the eighth paragraph of Article 442.11 of the Standard Specifications to read:

“Pavement tie bars for patches will be paid for at the contract unit price per each for TIE BARS, of the diameter specified.”

PERFORMANCE GRADED ASPHALT BINDER (BDE)

Effective: January 1, 2023

Revise Article 1032.05 of the Standard Specifications to read:

“**1032.05 Performance Graded Asphalt Binder.** These materials will be accepted according to the Bureau of Materials Policy Memorandum, “Performance Graded Asphalt Binder Qualification Procedure.” The Department will maintain a qualified producer list. These materials shall be free from water and shall not foam when heated to any temperature below the actual flash point. Air blown asphalt, recycle engine oil bottoms (ReOB), and polyphosphoric acid (PPA) modification shall not be used.

When requested, producers shall provide the Engineer with viscosity/temperature relationships for the performance graded asphalt binders delivered and incorporated in the work.

- (a) Performance Graded (PG) Asphalt Binder. The asphalt binder shall meet the requirements of AASHTO M 320, Table 1 "Standard Specification for Performance Graded Asphalt Binder" for the grade shown on the plans and the following.

Test	Parameter
Small Strain Parameter (AASHTO PP 113) BBR, ΔT_c , 40 hrs PAV (40 hrs continuous or 2 PAV at 20 hrs)	-5 °C min.

- (b) Modified Performance Graded (PG) Asphalt Binder. The asphalt binder shall meet the requirements of AASHTO M 320, Table 1 "Standard Specification for Performance Graded Asphalt Binder" for the grade shown on the plans.

Asphalt binder modification shall be performed at the source, as defined in the Bureau of Materials Policy Memorandum, "Performance Graded Asphalt Binder Qualification Procedure."

Modified asphalt binder shall be safe to handle at asphalt binder production and storage temperatures or HMA construction temperatures. Safety Data Sheets (SDS) shall be provided for all asphalt modifiers.

- (1) Polymer Modification (SB/SBS or SBR). Elastomers shall be added to the base asphalt binder to achieve the specified performance grade and shall be either a styrene-butadiene diblock, triblock copolymer without oil extension, or a styrene-butadiene rubber. The polymer modified asphalt binder shall be smooth, homogeneous, and be according to the requirements shown in Table 1 or 2 for the grade shown on the plans.

Table 1 - Requirements for Styrene-Butadiene Copolymer (SB/SBS) Modified Asphalt Binders		
Test	Asphalt Grade SB/SBS PG 64-28 SB/SBS PG 70-22	Asphalt Grade SB/SBS PG 64-34 SB/SBS PG 70-28 SB/SBS PG 76-22 SB/SBS PG 76-28
Separation of Polymer ITP, "Separation of Polymer from Asphalt Binder" Difference in °F (°C) of the softening point between top and bottom portions	4 (2) max.	4 (2) max.
TESTS ON RESIDUE FROM ROLLING THIN FILM OVEN TEST (AASHTO T 240)		
Elastic Recovery ASTM D 6084, Procedure A, 77 °F (25 °C), 100 mm elongation, %	60 min.	70 min.

Table 2 - Requirements for Styrene-Butadiene Rubber (SBR) Modified Asphalt Binders		
Test	Asphalt Grade SBR PG 64-28 SBR PG 70-22	Asphalt Grade SB/SBS PG 64-34 SB/SBS PG 70-28 SBR PG 76-22 SBR PG 76-28
Separation of Polymer ITP, "Separation of Polymer from Asphalt Binder" Difference in °F (°C) of the softening point between top and bottom portions	4 (2) max.	4 (2) max.
Toughness ASTM D 5801, 77 °F (25 °C), 20 in./min. (500 mm/min.), in.-lbs (N-m)	110 (12.5) min.	110 (12.5) min.
Tenacity ASTM D 5801, 77 °F (25 °C), 20 in./min. (500 mm/min.), in.-lbs (N-m)	75 (8.5) min.	75 (8.5) min.
TESTS ON RESIDUE FROM ROLLING THIN FILM OVEN TEST (AASHTO T 240)		
Elastic Recovery ASTM D 6084, Procedure A, 77 °F (25 °C), 100 mm elongation, %	40 min.	50 min.

- (2) Ground Tire Rubber (GTR) Modification. GTR modification is the addition of recycled ground tire rubber to liquid asphalt binder to achieve the specified performance grade. GTR shall be produced from processing automobile and/or truck tires by the ambient grinding method or micronizing through a cryogenic process. GTR shall not exceed 1/16 in. (2 mm) in any dimension and shall not contain free metal particles, moisture that would cause foaming of the asphalt, or other foreign 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 "Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates" or AASHTO PP 74 "Standard Practice for Determination of Size and Shape of Glass Beads Used in Traffic Markings by Means of Computerized Optical Method", 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 μ m)	95 $\pm$ 5
No. 50 (300 μ m)	> 20

GTR modified asphalt binder shall be tested for rotational viscosity according to AASHTO T 316 using spindle S27. GTR modified asphalt binder shall be tested for original dynamic shear and RTFO dynamic shear according to AASHTO T 315 using a gap of 2 mm.

The GTR modified asphalt binder shall meet the requirements of Table 3.

Table 3 - Requirements for Ground Tire Rubber (GTR) Modified Asphalt Binders		
Test	Asphalt Grade GTR PG 64-28 GTR PG 70-22	Asphalt Grade GTR PG 76-22 GTR PG 76-28 GTR PG 70-28
TESTS ON RESIDUE FROM ROLLING THIN FILM OVEN TEST (AASHTO T 240)		
Elastic Recovery ASTM D 6084, Procedure A, 77 °F (25 °C), 100 mm elongation, %	60 min.	70 min.

- (3) Softener Modification (SM). Softener modification is the addition of organic compounds, such as engineered flux, bio-oil blends, modified vegetable oils, glycol amines, and fatty acid derivatives, to the base asphalt binder to achieve the specified performance grade. Softeners shall be dissolved, dispersed, or reacted in the asphalt binder to enhance its performance and shall remain compatible with the asphalt binder with no separation. Softeners shall not be added to modified PG asphalt binder as defined in Articles 1032.05(b)(1) or 1032.05(b)(2).

An Attenuated Total Reflectance-Fourier Transform Infrared spectrum (ATR-FTIR) shall be collected for both the softening compound as well as the softener modified asphalt binder at the dose intended for qualification. The ATR-FTIR spectra shall be collected on unaged softener modified binder, 20-hour Pressurized Aging Vessel (PAV) aged softener modified binder, and 40-hour PAV aged softener modified binder. The ATR-FTIR shall be collected in accordance with Illinois Test Procedure 601. The electronic files spectral files (in one of the following extensions or equivalent: *.SPA, *.SPG, *.IRD, *.IFG, *.CSV, *.SP, *.IRS, *.GAML, *. [0-9], *.IGM, *.ABS, *.DRT, *.SBM, *.RAS) shall be submitted to the Central Bureau of Materials.

Softener modified asphalt binders shall meet the requirements in Table 4.

Table 4 - Requirements for Softener Modified Asphalt Binders	
Test	Asphalt Grade
	SM PG 46-28 SM PG 46-34
	SM PG 52-28 SM PG 52-34
	SM PG 58-22 SM PG 58-28
	SM PG 64-22
Small Strain Parameter (AASHTO PP 113) BBR, ΔT_c , 40 hrs PAV (40 hrs continuous or 2 PAV at 20 hrs)	-5°C min.
Large Strain Parameter (Illinois Modified AASHTO T 391) DSR/LAS Fatigue Property, $\Delta G^* _{peak}$, τ , 40 hrs PAV (40 hrs continuous or 2 PAV at 20 hrs)	≥ 54 %

The following grades may be specified as tack coats.

Asphalt Grade	Use
PG 58-22, PG 58-28, PG 64-22	Tack Coat"

Revise Article 1031.06(c)(1) and 1031.06(c)(2) of the Standard Specifications to read:

“(1) RAP/RAS. When RAP is used alone or RAP is used in conjunction with RAS, the percentage of virgin ABR shall not exceed the amounts listed in the following table.

HMA Mixtures - RAP/RAS Maximum ABR % ^{1/2/}			
Ndesign	Binder	Surface	Polymer Modified Binder or Surface ^{3/}
30	30	30	10
50	25	15	10
70	15	10	10
90	10	10	10

- 1/ For Low ESAL HMA shoulder and stabilized subbase, the RAP/RAS ABR shall not exceed 50 percent of the mixture.
 - 2/ When RAP/RAS ABR exceeds 20 percent, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent ABR would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).
 - 3/ The maximum ABR percentages for ground tire rubber (GTR) modified mixes shall be equivalent to the percentages specified for SBS/SBR polymer modified mixes.
- (2) FRAP/RAS. When FRAP is used alone or FRAP is used in conjunction with RAS, the percentage of virgin asphalt binder replacement shall not exceed the amounts listed in the following table.

HMA Mixtures - FRAP/RAS Maximum ABR % ^{1/ 2/}			
Ndesign	Binder	Surface	Polymer Modified Binder or Surface ^{3/}
30	55	45	15
50	45	40	15
70	45	35	15
90	45	35	15
SMA	- -	- -	25
IL-4.75	- -	- -	35

- 1/ For Low ESAL HMA shoulder and stabilized subbase, the FRAP/RAS ABR shall not exceed 50 percent of the mixture.
- 2/ When FRAP/RAS ABR exceeds 20 percent for all mixes, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent ABR would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).
- 3/ The maximum ABR percentages for GTR modified mixes shall be equivalent to the percentages specified for SBS/SBR polymer modified mixes.”

Add the following to the end of Note 2 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 shall be capable of providing continuous mechanical mixing throughout and/or 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.”

PREFORMED PLASTIC PAVEMENT MARKING (BDE)

Effective: June 2, 2024

Revise Article 1095.03(h) of the Standard Specifications to read:

“(h) Glass Beads. Glass beads shall be colorless and uniformly distributed throughout the yellow and white portions of the material only. A top coating of beads shall be bonded to or directly embedded into the surface of the markings such that the beads are not easily removed when the film is scratched firmly with a thumb nail.

The glass bead refractive index shall be tested using the liquid immersion method.

Type B material shall have an inner mix of glass beads with a minimum refractive index of 1.50 and a top coating of ceramic beads bonded to top urethane wear surface with a minimum refractive index of 1.70. Beads with a refractive index greater than 1.80 shall not be used.

Type C material shall have glass beads with a minimum refractive index of 1.50 and a layer of skid resistant ceramic particles bonded to the top urethane wear surface. The urethane wear surface shall have a nominal thickness of 5 mils (0.13 mm).”

Revise Article 1095.03(n) of the Standard Specifications to read:

“(n) Sampling and Inspection.

(1) Sample. Prior to approval and use of preformed plastic pavement markings, the manufacturer shall submit a notarized certification from an independent laboratory, together with the results of all tests, stating that the material meets the requirements as set forth herein. The independent laboratory test report shall state the lot tested, the manufacturer’s name, and the date of manufacture.

After initial approval by the Department, samples and certification by the manufacturer shall be submitted for each subsequent batch used. The manufacturer shall submit a certification stating that the material meets the requirements as set forth herein and is essentially identical to the material sent for qualification. The certification shall state the lot tested, the manufacturer’s name, and the date of manufacture.

(2) Inspection. The Contractor shall provide a manufacturer’s certification to the Engineer stating the material meets all requirements of this specification. All material samples for acceptance tests will be taken or witnessed by a representative of the Bureau of Materials and will be submitted to the Engineer of Materials, 126 East Ash Street, Springfield, Illinois 62704-4766 at least 30 days in advance of the pavement marking operations.”

RAISED REFLECTIVE PAVEMENT MARKERS (BDE)

Effective: November 1, 2025

Revise the eighth sentence of the second paragraph of Article 781.03(a) of the Standard Specifications to read:

“A rapid setting epoxy selected from the Department’s qualified product list for raised reflective pavement markers shall be poured into the cut to within 3/8 in. (9 mm) of the pavement surface.”

Revise the first sentence of Article 1096.01 of the Standard Specifications to read:

“1096.01 Raised Reflective Pavement Markers. Raised reflective pavement markers shall meet the following requirements and be on the Department’s qualified product list.”

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES (BDE)

Effective: January 1, 2024

Revised: April 1, 2024

Revise the first paragraph of Article 669.04 of the Standard Specifications to read:

“669.04 Regulated Substances Monitoring. Regulated substances monitoring includes environmental observation and field screening during regulated substances management activities. The excavated soil and groundwater within the work areas shall be managed as either uncontaminated soil, hazardous waste, special waste, or non-special waste.

As part of the regulated substances monitoring, the monitoring personnel shall perform and document the applicable duties listed on form BDE 2732 “Regulated Substances Monitoring Daily Record (RSMDR)”.

Revise the first two sentences of the nineteenth paragraph of Article 669.05 of the Standard Specifications to read:

“The Contractor shall coordinate waste disposal approvals with the disposal facility and provide the specific analytical testing requirements of that facility. The Contractor shall make all arrangements for collection, transportation, and analysis of landfill acceptance testing.”

Revise the last paragraph of Article 669.05 of the Standard Specifications to read:

“The Contractor shall select a permitted landfill facility or CCDD/USFO facility meeting the requirements of 35 Ill. Admin. Code Parts 810-814 or Part 1100, respectively. The Department will review and approve or reject the facility proposed by the Contractor based upon information provided in BDE 2730. The Contractor shall verify whether the selected facility is compliant with those applicable standards as mandated by their permit and whether the facility is presently, has previously been, or has never been, on the United States Environmental Protection Agency (U.S. EPA) National Priorities List or the Resource Conservation and Recovery Act (RCRA) List of Violating Facilities. The use of a Contractor selected facility shall in no manner delay the construction schedule or alter the Contractor's responsibilities as set forth.”

Revise the first paragraph of Article 669.07 of the Standard Specifications to read:

“669.07 Temporary Staging. Soil classified according to Articles 669.05(a)(2), (b)(1), or (c) may be temporarily staged at the Contractor's option. All other soil classified according to Articles 669.05(a)(1), (a)(3), (a)(4), (a)(5), (a)(6), or (b)(2) shall be managed and disposed of without temporary staging to the greatest extent practicable. If circumstances beyond the Contractor's control require temporary staging of these latter materials, the Contractor shall request approval from the Engineer in writing.

Topsoil for re-use as final cover which has been field screened and found not to exhibit PID readings over daily background readings as documented on the BDE 2732, visual staining or odors, and is classified according to Articles 669.05(a)(2), (a)(3), (a)(4), (b)(1), or (c) may be temporarily staged at the Contractor's option.”

Add the following paragraph after the sixth paragraph of Article 669.11 of the Standard Specifications.

“The sampling and testing of effluent water derived from dewatering discharges for priority pollutants volatile organic compounds (VOCs), priority pollutants semi-volatile organic compounds (SVOCs), or priority pollutants metals, will be paid for at the contract unit price per each for VOCS GROUNDWATER ANALYSIS using EPA Method 8260B, SVOCs GROUNDWATER ANALYSIS using EPA Method 8270C, or RCRA METALS GROUNDWATER ANALYSIS using EPA Methods 6010B and 7471A. This price shall include transporting the sample from the job site to the laboratory.”

Revise the first sentence of the eight paragraph of Article 669.11 of the Standard Specifications to read:

“Payment for temporary staging of soil classified according to Articles 669.05(a)(1), (a)(3), (a)(4), (a)(5), (a)(6), or (b)(2) to be managed and disposed of, if required and approved by the Engineer, will be paid according to Article 109.04.”

SHORT TERM AND TEMPORARY PAVEMENT MARKINGS (BDE)

Effective: April 1, 2024

Revised: April 2, 2024

Revise Article 701.02(d) of the Standard Specifications to read:

“(d) Pavement Marking Tapes (Note 3) 1095.06”

Add the following Note to the end of Article 701.02 of the Standard Specifications:

“Note 3. White or yellow pavement marking tape that is to remain in place longer than 14 days shall be Type IV tape.”

Revise Article 703.02(c) of the Standard Specifications to read:

“(c) Pavement Marking Tapes (Note 1) 1095.06”

Add the following Note to the end of Article 703.02 of the Standard Specifications:

“Note 1. White or yellow pavement marking tape that is to remain in place longer than 14 days shall be Type IV tape.”

Revise Article 1095.06 of the Standard Specifications to read:

“1095.06 Pavement Marking Tapes. Type I white or yellow marking tape shall consist of glass spheres embedded into a binder on a foil backing that is precoated with a pressure sensitive adhesive. The spheres shall be of uniform gradation and distributed evenly over the surface of the tape.

Type IV tape shall consist of white or yellow tape with wet reflective media incorporated to provide immediate and continuing retroreflection in wet and dry conditions. The wet retroreflective media shall be bonded to a durable polyurethane surface. The patterned surface shall have approximately 40 ± 10 percent of the surface area raised and presenting a near vertical face to traffic from any direction. The channels between the raised areas shall be substantially free of exposed reflective elements or particles.

Blackout tape shall consist of a matte black, non-reflective, patterned surface that is precoated with a pressure sensitive adhesive.

- (a) Color. The white and yellow markings shall meet the following requirements for daylight reflectance and color, when tested, using a color spectrophotometer with 45 degrees circumferential/zero degree geometry, illuminant D65, and two degree observer angle. The color instrument shall measure the visible spectrum from 380 to 720 nm with a wavelength measurement interval and spectral bandpass of 10 nm.

Color	Daylight Reflectance %Y
White	65 min.
Yellow *	36 - 59

*Shall match Aerospace Material Specification Standard 595 33538 (Orange Yellow) and the chromaticity limits as follows.

x	0.490	0.475	0.485	0.530
y	0.470	0.438	0.425	0.456

- (b) Retroreflectivity. The white and yellow markings shall be retroreflective. Reflective values measured in accordance with the photometric testing procedure of ASTM D 4061 shall not be less than those listed in the table below. The coefficient of retroreflected luminance, R_L , shall be expressed as average millicandelas/footcandle/sq ft (millicandelas/lux/sq m), measured on a 3.0 x 0.5 ft (900 mm x 150 mm) panel at 86 degree entrance angle.

Coefficient of Retroreflected Luminance, R_L , Dry					
Type I			Type IV		
Observation Angle	White	Yellow	Observation Angle	White	Yellow
0.2°	2700	2400	0.2°	1300	1200
0.5°	2250	2000	0.5°	1100	1000

Wet retroreflectance shall be measured for Type IV under wet conditions according to ASTM E 2177 and meet the following.

Wet Retroreflectance, Initial R_L	
Color	R_L 1.05/88.76
White	300
Yellow	200

- (c) Skid Resistance. The surface of Type IV and blackout markings shall provide a minimum skid resistance of 45 BPN when tested according to ASTM E 303.

- (d) Application. The pavement marking tape shall have a precoated pressure sensitive adhesive and shall require no activation procedures. Test pieces of the tape shall be applied according to the manufacturer's instructions and tested according to ASTM D 1000, Method A, except that a stiff, short bristle roller brush and heavy hand pressure will be substituted for the weighted rubber roller in applying the test pieces to the metal test panel. Material tested as directed above shall show a minimum adhesion value of 750 g/in. (30 g/mm) width at the temperatures specified in ASTM D 1000. The adhesive shall be resistant to oils, acids, solvents, and water, and shall not leave objectionable stains or residue after removal. The material shall be flexible and conformable to the texture of the pavement.
- (e) Durability. Type IV and blackout tape shall be capable of performing for the duration of a normal construction season and shall then be capable of being removed intact or in large sections at pavement temperatures above 40 °F (4 °C) either manually or with a roll-up device without the use of sandblasting, solvents, or grinding. The Contractor shall provide a manufacturer's certification that the material meets the requirements for being removed after the following minimum traffic exposure based on transverse test decks with rolling traffic.
- (1) Time in place - 400 days
 - (2) ADT per lane - 9,000 (28 percent trucks)
 - (3) Axle hits - 10,000,000 minimum

Samples of the material applied to standard specimen plates will be measured for thickness and tested for durability in accordance with ASTM D 4060, using a CS-17 wheel and 1000-gram load, and shall meet the following criteria showing no significant change in color after being tested for the number of cycles indicated.

Test	Type I	Type IV	Blackout
Minimum Initial Thickness, mils (mm)	20 (0.51)	65 (1.65) ^{1/} 20 (0.51) ^{2/}	65 (1.65) ^{1/} 20 (0.51) ^{2/}
Durability (cycles)	5,000	1,500	1,500

1/ Measured at the thickest point of the patterned surface.

2/ Measured at the thinnest point of the patterned surface.

The pavement marking tape, when applied according to the manufacturer's recommended procedures, shall be weather resistant and shall show no appreciable fading, lifting, or shrinkage during the useful life of the marking. The tape, as applied, shall be of good appearance, free of cracks, and edges shall be true, straight, and unbroken.

(f) Sampling and Inspection.

- (1) Sample. Prior to approval and use of Type IV pavement marking tape, the manufacturer shall submit a notarized certification from an independent laboratory, together with the results of all tests, stating that the material meets the requirements as set forth herein. The independent laboratory test report shall state the lot tested, the manufacturer's name, and the date of manufacture.

After initial approval by the Department, samples and certification by the manufacturer shall be submitted for each subsequent batch of Type IV tape used. The manufacturer shall submit a certification stating that the material meets the requirements as set forth herein and is essentially identical to the material sent for qualification. The certification shall state the lot tested, the manufacturer's name, and the date of manufacture.

- (2) Inspection. The Contractor shall provide a manufacturer's certification to the Engineer stating the material meets all requirements of this specification. All material samples for acceptance tests shall be taken or witnessed by a representative of the Bureau of Materials and shall be submitted to the Engineer of Materials, 126 East Ash Street, Springfield, Illinois 62704-4766 at least 30 days in advance of the pavement marking operations."

SIGN PANELS AND APPURTENANCES (BDE)

Effective: January 1, 2025

Revised: January 1, 2026

Add Article 720.02(c) of the Standard Specifications to read:

"(c) Aluminum Epoxy Mastic 1008.03"

Revise the second and third paragraphs of Article 720.02 of the Standard Specifications to read:

"The sign mounting support channel shall be manufactured from steel or aluminum and shall be according to Standard 720001.

Steel support channels shall be according to ASTM A 1011 (A 1011M), ASTM A 635 (A 635M), ASTM A 568 (A 568M), or ASTM A 684 (A 684M), and shall be galvanized. Galvanizing shall be according to ASTM A 653 (A 653M) when galvanized before fabrication, and AASHTO M 111 (M 111M) when galvanized after fabrication. Field or post fabricated drilled holes shall be spot painted with one coat of aluminum epoxy mastic paint prior to installation."

Revise the fifth paragraph of Article 720.02 of the Standard Specifications to read:

"The stainless steel banding for mounting signs or sign support channels to light or signal standards shall be according to ASTM A 240 (A 240M) Type 302 stainless steel."

Revise the first sentence of the tenth paragraph of Article 720.03 of the Standard Specifications to read:

“The backs of all sign panels shall be marked in a manner designed to last as long as the sign face material, in letters and numerals at least 3/8 in. (9.5 mm) but no more than 3/4 in. (19 mm) in height with the month and year of manufacture, the name of the sign manufacturer, the name of the sign sheeting manufacturer, the method of manufacture (“screened”, “EC film”, “direct applied”, or “digital print”), and the initials IDOT.”

Revise the first sentence of the fourth paragraph of Article 1091.03(a)(10) of the Standard Specifications to read:

“Transparent colors screened, or transparent acrylic electronic cutting films, or digital printing on white sheeting, shall meet the minimum initial coefficient of retroreflection values of the 0.2 degree observation angle, -4.0 degree entrance angle values as listed in the previous tables for the color being applied.”

Add the following after the fourth paragraph of Article 1091.03(a)(10) of the Standard Specifications:

“Digitally printed signs shall be produced using digital print technologies and ink systems, products and processes that comply with the sheeting manufacturer’s recommendation. The digitally printed signs shall be fabricated with a full sign protective overlay film designed to provide a smooth surface needed for retroreflectivity, and to protect the sign from fading and UV degradation. The overlamine shall comply with the sheeting manufacturer’s recommendations to ensure proper adhesion and transparency.”

Add the following after the third paragraph of Article 1106.01 of the Standard Specifications:

“Digitally printed signs may omit protective overlay film.”

SOURCE OF SUPPLY AND QUALITY REQUIREMENTS (BDE)

Effective: January 2, 2023

Revised: January 1, 2026

Revise the third through ninth paragraphs of Article 106.01 of the Standard Specifications to read:

“Articles, materials, and supplies shall be classified into only one of the following categories.

- (a) Iron and Steel. All iron and steel products, which are to be incorporated into the work, shall be domestically manufactured or produced and fabricated, unless an exception is expressly permitted under Federal and/or State law and written permission is given by the Department. The Contractor shall obtain from the iron or steel producer and/or fabricator, in addition to the mill analysis, a certification that all iron or steel materials meet these domestic source requirements.

The applications of all coatings, epoxy, galvanizing, painting, etc. to iron and steel products shall be domestically applied.

- (b) **Manufactured Products.** Manufactured products shall include articles, materials or supplies that have been processed into a specific form or shape; or have been combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies. Manufactured products incorporated into the work shall have the final assembly for the manufacturing process occur domestically.

A manufactured product may include components that are construction materials, iron or steel products, or exempt materials.

Precast concrete products and intelligent transportation systems (ITS) or other electronic hardware systems shall comply with the requirements of Article 106.01(a) in addition to the requirements of manufactured products.

- (c) **Construction Materials.** All manufacturing processes for construction materials shall occur within the United States. Construction materials shall include an article, material, or supply consisting of only one of the following.

- (1) Non-ferrous metals;
- (2) Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- (3) Glass (including optic glass);
- (4) Fiber optic cable (including drop cable);
- (5) Optical fiber;
- (6) Lumber;
- (7) Drywall;
- (8) Engineered wood.

Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material.

- (d) **Exempt Materials.** Materials exempt from domestic production requirements are cement or cementitious materials, aggregates, aggregate binding agents or additives, or items not permanently incorporated into the work. Exempt materials may be combined with other materials into a final form to produce a manufactured product.”

STEEL COST ADJUSTMENT (BDE)

Effective: April 2, 2004

Revised: November 1, 2025

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 with their bid whether or not this special provision will be part of the contract. 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, welded 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. The following documentation shall be furnished to the Engineer.

- (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 will be derived from submitted documentation.

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.

STRUCTURAL REPAIR OF CONCRETE (BDE)

Effective: January 1, 2026

Add the following Section 532 to the Standard Specifications:

“SECTION 532. STRUCTURAL REPAIR OF CONCRETE

532.01 Description. This work shall consist of repairing concrete on a bridge substructure, culvert, retaining wall, or other structure.

532.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Portland Cement Concrete (Note 1)	1020
(b) R1, R2, or R3 Concrete.....	1018
(c) Packaged, Dry, Combined Materials for Concrete.....	1017.02, 1017.03
(d) High Performance Shotcrete	1015
(e) Reinforcement Bars	1006.10
(f) Anchor Bolts	1006.09
(g) Water	1002
(h) Curing Compound.....	1022.01
(i) Cotton Mats	1022.02
(j) Protective Coat	1023
(k) Epoxy (Note 2).....	1025
(l) Mechanical Bar Splicers.....	508.06(c)
(m) Polymer Modified Portland Cement Mortar (Note 3)	

Note 1. The concrete shall be Class SI, except the cement and finely divided minerals shall be a minimum 6.65 cwt/cu yd (395 kg/cu m) with no reductions permitted, the cement shall not be below 4.70 cwt/cu yd (279 kg/cu m), the coarse aggregate shall be a CA 16, the strength shall be a minimum 4000 psi (27,500 kPa) at 28 days, and the slump shall be 5-10 in. (125-250 mm). A self-consolidating concrete mixture will also be permitted. Slump flow range, visual stability index, J-Ring, L-Box, and hardened visual stability index requirements shall be according to Article 1020.04.

Note 2. ASTM C 881, Type IV, Grade 2 or 3, Class A, B, or C may also be used.

Note 3. Polymer modified portland cement mortar shall be a packaged product consisting of cementitious materials, fine aggregate, and a polymer modifier; and shall have successfully completed and remain current with the AASHTO Product Eval and Audit Rapid Hardening Concrete Patching Materials (RHCP) testing program. The mortar shall be a workable mix capable of bonding and holding its own plastic weight when mixed and placed according to manufacturer's instructions on vertical and overhead surfaces. It shall have a minimum compressive strength of 1,500 psi (10,300 kPa) at 24 hours, 4,000 psi (27,500 kPa) at 7 days, and 5,000 psi (34,500 kPa) at 28 days when tested according to ASTM C 109 or AASHTO T 106. In addition, the mortar shall have a minimum bond strength of 1,500 psi (10,300 kPa) at 7 days when tested according to ASTM C 882. For prestressed concrete applications, the mortar shall have a water-soluble chloride ion content of less than 0.06 percent by weight of cementitious material when tested according to ASTM C 1218 or AASHTO T 260; and for non-prestressed concrete applications, the water-soluble chloride ion content shall be less than 0.15 percent by weight of cementitious material. The Department will maintain a Qualified Product List of Polymer Modified Portland Cement Mortar.

532.03 Equipment. Equipment shall be according to Article 503.03 and the following.

Item	Article/Section
(a) Hydrodemolition Equipment	1101.11
(b) High Performance Shotcrete Equipment (Note1)	

Note 1. The batching, mixing, pumping, hose, nozzle, and auxiliary equipment shall be for the wet-mix shotcrete method and meet the requirements of ACI 506R.

CONSTRUCTION REQUIREMENTS

532.04 General. The repair method shall be either formed concrete repair or shotcrete according to the following.

- (a) Formed Concrete Repair. For formed concrete repair, a subsequent patch to repair the placement point after initial concrete placement will not be allowed. As an example, this may occur in a vertical location located at the top of the repair.

Formed concrete repair shall not be used for overhead applications except as noted for polymer modified portland cement mortar.

Polymer modified portland cement mortar shall only be used for repairs between 3/8 in. (10 mm) and 2 in. (50 mm) deep on horizontal, vertical, and overhead surfaces.

- (b) Shotcrete. Shotcrete shall not be used for any repair greater than 6 in. (150 mm) in depth, except in horizontal applications where the shotcrete may be placed from above in one lift.

Shotcrete shall not be used for column repairs greater than 4 in. (100 mm) in depth, unless the shotcrete mixture contains 3/8 in. (9.5 mm) aggregate.

The Contractor shall provide a current copy of ACI 506R to the Engineer a minimum of one week prior to the start of construction.

The shotcrete personnel who perform the work shall have current American Concrete Institute (ACI) nozzle men certification for vertical wet and overhead wet applications, except one individual may be in training. This individual shall be adequately supervised by a certified ACI nozzle men as determined by the Engineer and a copy of the nozzle men certificate(s) provided to the Engineer.

532.05 Temporary Shoring or Cribbing. When a temporary shoring or cribbing support system is required, the Contractor shall provide details and computations, prepared and sealed by an Illinois Licensed Structural Engineer, to the Department for approval. Whenever possible, the support system shall be installed prior to starting the associated concrete removal. If no system is specified, but during the course of removal the need for temporary shoring or cribbing becomes apparent or is directed by the Engineer due to a structural concern, the Contractor shall not proceed with any further removal work until an approved support system is installed.

532.06 Concrete Removal. The Contractor shall provide ladders or other appropriate equipment for the Engineer to mark the removal areas. Repair configurations will be kept simple, and squared corners will be indicated whenever possible. The repair perimeter shall be sawed a depth of 1/2 in. (13 mm) or less, as required to avoid cutting the reinforcement. If the concrete is broken or removed beyond the limits of the initial saw cut, the new repair perimeter shall be recut. The areas to be repaired shall have all loose, unsound concrete removed completely by the use of hydrodemolition equipment or chipping hammer with a 15 lb. (7 kg) maximum class. The concrete removal shall extend along the reinforcement bar until the reinforcement is free of bond inhibiting corrosion. Reinforcement bars with 50 percent or more exposed area shall be undercut to a depth of 3/4 in. (19 mm) or the diameter of the reinforcement bar, whichever is greater.

The minimum repair depth shall be 1 in. (25 mm). The substrate profile shall be $\pm 1/16$ in. (± 1.5 mm). The perimeter of the repair area shall have a vertical face.

If sound concrete is encountered before existing reinforcement bars are exposed, further removal of concrete shall not be performed unless the minimum repair depth is not met.

If a repair is located at the ground line, any excavation required below the ground line to complete the repair shall be included in this work.

Once concrete removal has started, the Contractor shall have 14 calendar days to complete each repair location.

The Engineer shall be notified of concrete removal that exceeds 6 in. (150 mm) in depth, one fourth the cross section of a structural member, more than half the vertical column reinforcement is exposed in a cross section, more than six consecutive reinforcement bars are exposed in any direction, within 1.5 in. (38 mm) of a bearing area, or other structural concern. Excessive deterioration or removal may require further evaluation of the structure or installation of temporary shoring and cribbing support system.

532.07 Surface Preparation. Prior to placing the concrete or shotcrete, the Contractor shall blast clean the repair area and exposed reinforcement to provide a surface that is free of oil, dirt, and loose material.

The repair area and perimeter vertical face shall have a rough surface. Just prior to concrete or shotcrete placement, the repair area shall be saturated with water to a saturated surface-dry condition. Any standing water shall be removed.

If a succeeding layer of shotcrete is to be applied, the initial shotcrete surface and remaining exposed reinforcement shall be free of curing compound, oil, dirt, loose material, rebound, and overspray. Preparation may be by lightly brushing or blast cleaning if the previous shotcrete surface was less than 36 hours prior. If more than 36 hours prior, the surface shall be prepared by blast cleaning.

532.08 Reinforcement. Exposed reinforcement bars shall be cleaned of concrete and corrosion by blast cleaning. After cleaning, exposed reinforcement will be evaluated to determine if replacement or additional reinforcement bars are required.

Reinforcing bars that have been cut or have lost 25 percent or more of their original cross-sectional area shall be supplemented by new in kind reinforcement bars. New bars shall be lapped a minimum of 32 bar diameters to existing bars. A mechanical bar splicer shall be used when it is not feasible to provide the minimum bar lap. No welding of bars will be permitted.

Intersecting reinforcement bars shall be tightly secured to each other using 0.006 in. (0.15 mm) or heavier gauge tie wire and shall be adequately supported to minimize movement during concrete placement or application of shotcrete.

Where the depth of concrete removal is greater than 8 in. (205 mm) and there is no existing reinforcement extending into the repair area, the Contractor shall anchor the new concrete to the existing concrete with 3/4 in. (19 mm) diameter hook bolts spaced at 15 in. (380 mm) maximum centers both vertically and horizontally, and a minimum of 12 in. (305 mm) away from the perimeter of the repair according to Section 584.

532.09 Repair Methods. Within 3 calendar days of the surface preparation and after the repair areas are approved by the Engineer, the concrete or shotcrete shall be placed according to the following.

- (a) Formed Concrete Repair. Falsework and forms shall be according to Articles 503.05 and Article 503.06. Formwork shall provide a smooth and uniform concrete finish and shall approximately match the existing concrete structure. Air vents may be provided to reduce voids and improve surface appearance. The Contractor may use exterior mechanical vibration, as approved by the Engineer, to release air pockets. The concrete shall be Class SI concrete; packaged R1, R2, or R3 concrete; packaged, dry, combined materials for concrete; or polymer modified portland cement mortar. The concrete shall be placed and consolidated according to Article 503.07.

Curing shall be according to Article 1020.13.

The surfaces of the completed repair shall be finished according to Article 503.15.

- (b) Shotcrete. In the field, shotcrete shall be tested for air content according to Illinois Modified AASHTO T 152 or AASHTO T 152. The sample shall be obtained from the discharge end of the nozzle by shooting a pile large enough to scoop a representative amount for filling the air meter measuring bowl. Shotcrete shall not be shot directly into the measuring bowl for testing.

Compressive strength shall be according to ASTM C 1140, except the test panel shall be cured according to Article 1020.13(a)(3) or (5) while stored at the jobsite and during delivery to the laboratory. At the discretion of the Engineer, the test panel may be reduced to 18x18x3.5 in. (457x457x89 mm).

The method of alignment control (i.e., ground wires, guide strips, depth gages, depth probes, and formwork) to ensure the specified shotcrete thickness and reinforcing bar cover is obtained shall be according to ACI 506R. Ground wires shall be removed after completion of cutting operations. Guide strips and formwork shall be of dimensions and a configuration that do not prevent proper application of shotcrete. Metal depth gauges shall be cut 1/4 in. (6 mm) below the finished surface. All repaired members shall be restored as close as practicable to their original dimensions.

Air temperature limits according to the first paragraph of Article 1020.14(b) shall apply in cold weather. Shotcrete shall not be applied when the air temperature is greater than 90 °F (32 °C). The applied shotcrete shall have a minimum temperature of 50 °F (10 °C) and a maximum temperature of 90 °F (32 °C). The shotcrete shall not be applied during periods of rain unless protective covers or enclosures are installed. If necessary, lighting shall be provided to provide a clear view of the shooting area.

The shotcrete shall be applied according to ACI 506R and shall be done in a manner that does not result in cold joints, laminations, sandy areas, voids, sags, or separations. In addition, the shotcrete shall be applied in a manner that results in maximum densification of the shotcrete. Shotcrete which is identified as being unacceptable while still plastic shall be removed and re-applied.

The nozzle shall normally be at a distance of 2-5 ft. (0.6-1 m) from the receiving surface and shall be oriented at right angles to the receiving surface. Exceptions to this requirement will be permitted to fill corners, encase large diameter reinforcing bars, or as approved by the Engineer. For any exception, the nozzle shall never be oriented more than 4 degrees from the surface. Care shall be taken to keep the front face of the reinforcement bar clean during shooting operations. Shotcrete shall be built up from behind the reinforcement bar. Accumulations of rebound and overspray shall be continuously removed prior to application of new shotcrete. Rebound material shall not be incorporated in the work.

Whenever possible, shotcrete shall be applied to the full thickness in a single layer. When two or more layers are required, the minimum number shall be used and shall be done in a manner without sagging or separation. A flash coat (i.e. a thin layer of up to 1/4 in. (6 mm) applied shotcrete) may be used as the final lift for overhead applications.

Prior to application of a succeeding layer of shotcrete, the initial layer of shotcrete shall be prepared according to the surface preparation and reinforcement bar cleaning requirements. Upon completion of the surface preparation and reinforcement bar treatment, water shall be applied according to the surface preparation requirements unless the surface is moist. The second layer of shotcrete shall then be applied within 30 minutes.

Shotcrete shall be cut back to line and grade using trowels, cutting rods, screeds or other suitable devices. The shotcrete shall be allowed to stiffen sufficiently before cutting. For depressions, cut material may be used for small areas. Rebound material shall not be incorporated in the work. For the final finish, a wood float or a manufacturer approved finishing aid shall be used to approximately match the existing concrete texture.

Contractor operations for curing shall be continuous with shotcrete placement and finishing operations. Curing shall be accomplished using wetted cotton mats, membrane curing, or a combination of both. Cotton mats shall be applied according to Article 1020.13(a)(5), except the exposed layer of shotcrete shall be covered within 10 minutes after finishing and wet curing shall begin immediately. Curing compound shall be applied according to Article 1020.13(a)(4), except the curing compound shall be applied as soon as the shotcrete has hardened sufficiently to prevent marring the surface, and each of the two separate applications shall be applied in opposite directions to ensure coverage. Note 5 of the Index Table in Article 1020.13 shall also apply.

When a shotcrete layer is to be covered by a succeeding shotcrete layer within 36 hours, the repair area shall be protected by wet curing with either burlap or cotton mats until the succeeding layer is applied. Intermittent hand fogging may be used for the first hour and a half if wet curing with mats begins within 10 minutes after fogging has ceased.

The curing period shall be for 7 days, except when there is a succeeding layer of shotcrete. In this instance, the initial shotcrete layer shall be cured until the surface preparation and reinforcement bar treatment is started.

The concrete or shotcrete shall not be placed when frost is present on the surface of the repair area, or the surface temperature of the repair area is less than 40 °F (4 °C). All repaired members shall be restored as close as practicable to their original dimensions.

If temperatures below 45 °F (7 °C) are forecast during the curing period, Protection Method I according to Article 1020.13(d)(1) or Protection Method II according to Article 1020.13(d)(2) shall be used.

532.10 Protective Coat. Protective coat shall be applied to the completed repair at reinforcement bar locations with less than 3/4 in. (19 mm) of cover according to Article 503.19, except blast cleaning shall be performed to remove curing compound.

532.11 Inspection. After curing but no sooner than 28 days after placement of concrete or shotcrete, the Contractor shall provide ladders or other necessary equipment for the Engineer to inspect the repaired areas.

A repaired area with cracks, voids, or delamination shall be considered as nonconforming. Any of the following shall be cause for removal and replacement of a repaired area.

- (a) A single surface crack greater than 0.01 in. (0.25 mm) in width and greater than 12 in. (300 mm) in length.
- (b) Two or more surface cracks greater than 0.01 in. (0.25 mm) in width that total greater than 24 in. (600 mm) in length.
- (c) Map cracking in one or more regions totaling 15 percent or more of the gross surface area of the repair.
- (d) Two or more surface voids with least dimension of 3/4 in. (19 mm) each.
- (e) A repaired area not within 1/4 in. (6 mm) of the original dimensions.

Cracks greater than 0.007 in. (0.2 mm) in width shall be repaired with epoxy according to Section 590. For cracks less than or equal to 0.007 in. (0.2 mm) in width, the epoxy shall be applied to the surface of the crack as determined by the Engineer. Voids shall be repaired according to Article 503.15.

532.12 Method of Measurement. This work will be measured for payment in place and the area computed in square feet (square meters). For a repair at a corner, both sides will be measured.

532.13 Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for STRUCTURAL REPAIR OF CONCRETE (DEPTH GREATER THAN 5 INCHES or STRUCTURAL REPAIR OF CONCRETE (DEPTH EQUAL TO OR LESS THAN 5 INCHES.

Concrete protected according to Article 1020.13(d) will be paid according to Article 503.22.

When not specified to be paid for elsewhere, the work to design, install, and remove the temporary shoring and cribbing will be paid according to Article 109.04.

With the exception of reinforcement damaged by the Contractor, supplemental reinforcement bars, mechanical bar splicers, hook bolts, and protective coat will be paid according to Article 109.04.”

SUBCONTRACTOR AND DBE PAYMENT REPORTING (BDE)

Effective: April 2, 2018

Add the following to Section 109 of the Standard Specifications.

“109.14 Subcontractor and Disadvantaged Business Enterprise Payment Reporting. The Contractor shall report all payments made to the following parties:

- (a) first tier subcontractors;
- (b) lower tier subcontractors affecting disadvantaged business enterprise (DBE) goal credit;
- (c) material suppliers or trucking firms that are part of the Contractor’s submitted DBE utilization plan.

The report shall be made through the Department’s on-line subcontractor payment reporting system within 21 days of making the payment.”

SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)

Effective: November 2, 2017

Revised: April 1, 2019

Replace the second paragraph of Article 109.12 of the Standard Specifications with the following:

“This mobilization payment shall be made at least seven days prior to the subcontractor starting work. The amount paid shall be at the following percentage of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor’s work.

Value of Subcontract Reported on Form BC 260A	Mobilization Percentage
Less than \$10,000	25%
\$10,000 to less than \$20,000	20%
\$20,000 to less than \$40,000	18%
\$40,000 to less than \$60,000	16%
\$60,000 to less than \$80,000	14%
\$80,000 to less than \$100,000	12%
\$100,000 to less than \$250,000	10%
\$250,000 to less than \$500,000	9%
\$500,000 to \$750,000	8%
Over \$750,000	7%”

SUBMISSION OF BIDDERS LIST INFORMATION (BDE)

Effective: January 2, 2025

Revised: March 2, 2025

In accordance with 49 CFR 26.11(c) all DBE and non-DBEs who bid as prime contractors and subcontractors shall provide bidders list information, including all DBE and non-DBE firms from whom the bidder has received a quote or bid to work as a subcontractor, whether or not the bidder has relied upon that bid in placing its bid as the prime contractor.

The bidders list information shall be submitted with the bid using the link provided within the “Integrated Contractor Exchange (iCX)” application of the Department’s “EBids System”.

SUBMISSION OF PAYROLL RECORDS (BDE)

Effective: April 1, 2021

Revised: November 2, 2023

FEDERAL AID CONTRACTS. Revise the following section of Check Sheet #1 of the Recurring Special Provisions to read:

“STATEMENTS AND PAYROLLS

The payroll records shall include the worker's name, social security number, last known address, telephone number, email address, classification(s) of work actually performed, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof), daily and weekly number of hours actually worked in total, deductions made, and actual wages paid.

The Contractor and each subcontractor shall submit certified payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers, last known addresses, telephone numbers, and email addresses shall not be included on weekly submittals. Instead, the payrolls need only include an identification number for each employee (e.g., the last four digits of the employee's social security number). The submittals shall be made using LCPTracker Pro software. The software is web-based and can be accessed at <https://lcptracker.com/>. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option (“No Work”, “Suspended”, or “Complete”) selected.”

STATE CONTRACTS. Revise Item 3 of Section IV of Check Sheet #5 of the Recurring Special Provisions to read:

- “3. Submission of Payroll Records. The Contractor and each subcontractor shall, no later than the 15th day of each calendar month, file a certified payroll for the immediately preceding month to the Illinois Department of Labor (IDOL) through the Illinois Prevailing Wage Portal in compliance with the State Prevailing Wage Act (820 ILCS 130). The portal can be found on the IDOL website at <https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/Prevailing-Wage-Portal.aspx>. Payrolls shall be submitted in the format prescribed by the IDOL.

In addition to filing certified payroll(s) with the IDOL, the Contractor and each subcontractor shall certify and submit payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers shall not be included on weekly submittals. Instead, the payrolls shall include an identification number for each employee (e.g., the last four digits of the employee's social security number). In addition, starting and ending times of work each day may be omitted from the payroll records submitted. The submittals shall be made using LCPTracker Pro software. The software is web-based and can be accessed at <https://lcptracker.com/>. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option (“No Work”, “Suspended”, or “Complete”) selected.”

SURFACE TESTING OF PAVEMENTS – IRI (BDE)

Effective: January 1, 2021

Revised: January 1, 2023

Description. This work shall consist of testing the ride quality of the finished surface of pavement sections with new concrete pavement, PCC overlays, full-depth HMA, and HMA overlays with at least 2.25 in. (57 mm) total thickness of new HMA combined with either HMA binder or HMA surface removal, according to Illinois Test Procedure 701, "Ride Quality Testing Using the International Roughness Index (IRI)". Work shall be according to Sections 406, 407, or 420 of the Standard Specifications, except as modified herein.

Hot-Mix Asphalt (HMA) Overlays

Add the following to Article 406.03 of the Standard Specifications:

"(n) Pavement Surface Grinding Equipment.....1101.04"

Revise Article 406.11 of the Standard Specifications to read:

"406.11 Surface Tests. Prior to HMA overlay pavement improvements, the Engineer will measure the smoothness of the existing high-speed mainline pavement. The Contractor shall measure the smoothness of the finished high-speed mainline, low-speed mainline, and miscellaneous pavements after the pavement improvement is complete but within the same construction season. Testing shall be performed in the presence of the Engineer and according to Illinois Test Procedure 701. The pavement will be identified as high-speed mainline, low-speed mainline, or miscellaneous as follows.

(a) Test Sections.

- (1) High-Speed Mainline Pavement. High-speed mainline pavement consists of pavements, ramps, and loops with a posted speed limit greater than 45 mph. These sections shall be tested with an inertial profiling system (IPS).
- (2) Low-Speed Mainline Pavement. Low-speed mainline pavement consists of pavements, ramps, and loops with a posted speed limit of 45 mph or less. These sections shall be tested using a 16 ft (5 m) straightedge or with an IPS analyzed using the rolling 16 ft (5 m) straightedge simulation in ProVAL.
- (3) Miscellaneous Pavement. Miscellaneous pavement are segments that either cannot readily be tested by an IPS or conditions beyond the control of the Contractor preclude the achievement of smoothness levels typically achievable with mainline pavement construction. This may include the following examples or as determined by the Engineer.

- a. Pavement on horizontal curves with a centerline radius of curvature of less than or equal to 1,000 ft (300 m) and the pavement within the superelevation transition of such curves;
- b. Pavement on vertical curves having a length less than or equal to 200 ft (60 m) in combination with an algebraic change in tangent grade greater than or equal to 3 percent as may occur on urban ramps or other constricted-space facilities;
- c. The first and last 50 ft (15 m) of a pavement section where the Contractor is not responsible for the adjoining surface;
- d. Intersections and the 25 ft (7.6 m) before and after an intersection or end of radius return;
- e. Variable width pavements;
- f. Side street returns, to the end of radius return;
- g. Crossovers;
- h. Pavement connector for bridge approach slab;
- i. Bridge approach slab;
- j. Pavement that must be constructed in segments of 600 ft (180 m) or less;
- k. Pavement within 25 ft (7.6 m) of manholes, utility structures, at-grade railroad crossings, or other appurtenances;
- l. Turn lanes; and
- m. Pavement within 5 ft (1.5 m) of jobsite sampling locations for HMA volumetric testing that fall within the wheel path.

Miscellaneous pavement shall be tested using a 16 ft (5 m) straightedge.

- (4) International Roughness Index (IRI). An index computed from a longitudinal profile measurement using a quarter-car simulation at a simulation speed of 50 mph (80 km/h).

- (5) Mean Roughness Index (MRI). The average of the IRI values for the right and left wheel tracks.
 - a. MRI_o . The MRI of the existing pavement prior to construction.
 - b. MRI_i . The MRI value that warrants an incentive payment.
 - c. MRI_F . The MRI value that warrants full payment.
 - d. MRI_D . The MRI value that warrants a financial disincentive.
 - (6) Areas of Localized Roughness (ALR). Isolated areas of roughness, which can cause significant increase in the calculated MRI for a given subplot.
 - (7) Sublot. A continuous strip of pavement 0.1 mile (160 m) long and one lane wide. A partial subplot greater than or equal to 264 ft (80 m) will be subject to the same evaluation as a whole subplot. Partial sublots less than 264 ft (80 m) shall be included with the previous subplot for evaluation purposes.
- (b) Corrective Work. Corrective work shall be completed according to the following.
- (1) High-Speed Mainline Pavement. For high-speed mainline pavement, any 25 ft (7.6 m) interval with an ALR in excess of 200 in./mile (3,200 mm/km) will be identified by the Engineer and shall be corrected by the Contractor. Any subplot having a MRI greater than MRI_D , including ALR, shall be corrected to reduce the MRI to the MRI_F , or replaced at the Contractor's option.
 - (2) Low-Speed Mainline Pavement. Surface variations in low-speed mainline pavement which exceed the 5/16 in. (8 mm) tolerance will be identified by the Engineer and shall be corrected by the Contractor.
 - (3) Miscellaneous Pavements. Surface variations in miscellaneous pavement which exceed the 5/16 in. (8 mm) tolerance will be identified by the Engineer and shall be corrected by the Contractor.

Corrective work shall be completed with pavement surface grinding equipment or by removing and replacing the pavement. Corrective work shall be applied to the full lane width. When completed, the corrected area shall have uniform texture and appearance, with the beginning and ending of the corrected area perpendicular to the centerline of the paved surface.

Upon completion of the corrective work, the surface of the subplot(s) shall be retested. The Contractor shall furnish the data and reports to the Engineer within 2 working days after corrections are made. If the MRI and/or ALR still do not meet the requirements, additional corrective work shall be performed.

Corrective work shall be at no additional cost to the Department.

- (c) Smoothness Assessments. Assessments will be paid to or deducted from the Contractor for each subplot of high-speed mainline pavement per the Smoothness Assessment Schedule. Assessments will be based on the MRI of each subplot prior to performing any corrective work unless the Contractor has chosen to remove and replace the pavement. For pavement that is replaced, assessments will be based on the MRI determined after replacement.

The upper MRI thresholds for high-speed mainline pavement are dependent on the MRI of the existing pavement before construction (MRI_0) and shall be determined as follows.

Upper MRI Thresholds ^{1/}	MRI Thresholds (High-Speed, HMA Overlay)	
	$MRI_0 \leq 125.0$ in./mile ($\leq 1,975$ mm/km)	$MRI_0 > 125.0$ in./mile ^{1/} ($> 1,975$ mm/km)
Incentive (MRI_I)	45.0 in./mile (710 mm/km)	$0.2 \times MRI_0 + 20$
Full Pay (MRI_F)	75.0 in./mile (1,190 mm/km)	$0.2 \times MRI_0 + 50$
Disincentive (MRI_D)	100.0 in./mile (1,975 mm/km)	$0.2 \times MRI_0 + 75$

1/ MRI_0 , MRI_I , MRI_F , and MRI_D shall be in in./mile for calculation.

Smoothness assessments for high-speed mainline pavement shall be determined as follows.

SMOOTHNESS ASSESSMENT SCHEDULE (High-Speed, HMA Overlay)	
Mainline Pavement MRI Range	Assessment Per Sublot ^{1/}
$MRI \leq MRI_I$	$+ (MRI_I - MRI) \times \$20.00$ ^{2/}
$MRI_I < MRI \leq MRI_F$	$+ \$0.00$
$MRI_F < MRI \leq MRI_D$	$- (MRI - MRI_F) \times \$8.00$
$MRI > MRI_D$	$- \$200.00$

1/ MRI , MRI_I , MRI_F , and MRI_D shall be in in./mile for calculation.

2/ The maximum incentive amount shall not exceed \$300.00.

Smoothness assessments will not be paid or deducted until all other contract requirements for the pavement are satisfied. Pavement that is corrected or replaced for reasons other than smoothness, shall be retested as stated herein."

Hot-Mix Asphalt (HMA) Pavement (Full-Depth)

Revise the first paragraph of Article 407.03 of the Standard Specifications to read:

“407.03 Equipment. Equipment shall be according to Article 406.03.”

Revise Article 407.09 of the Standard Specifications to read:

“407.09 Surface Tests. The finished surface of the pavement shall be tested for smoothness according to Article 406.11, except as follows:

The testing of the existing pavement prior to improvements shall not apply and the smoothness assessment for high-speed mainline pavement shall be determined according to the following table.

SMOOTHNESS ASSESSMENT SCHEDULE (High-Speed, Full-Depth HMA)	
Mainline Pavement MRI, in./mile (mm/km)	Assessment Per Sublot ^{1/}
≤ 45.0 (710)	+ (45 – MRI) × \$45.00 ^{2/}
> 45.0 (710) to 75.0 (1,190)	+ \$0.00
> 75.0 (1,190) to 100.0 (1,580)	– (MRI – 75) × \$20.00
> 100.0 (1,580)	– \$500.00

1/ MRI shall be in in./mile for calculation.

2/ The maximum incentive amount shall not exceed \$800.00.”

Portland Cement Concrete Pavement

Delete Article 420.03(i) of the Standard Specifications.

Revise Article 420.10 of the Standard Specifications to read:

“420.10 Surface Tests. The finished surface of the pavement shall be tested for smoothness according to Article 406.11, except as follows.

The testing of the existing pavement prior to improvements shall not apply. The Contractor shall measure the smoothness of the finished surface of the pavement after the pavement has attained a flexural strength of 250 psi (3,800 kPa) or a compressive strength of 1,600 psi (20,700 kPa).

Membrane curing damaged during testing shall be repaired as directed by the Engineer at no additional cost to the Department.

- (a) Corrective Work. No further texturing for skid resistance will be required for areas corrected by grinding. Protective coat shall be reapplied to areas ground according to Article 420.18 at no additional cost to the Department.

Jointed portland cement concrete pavement corrected by removal and replacement, shall be corrected in full panel sizes.

- (b) Smoothness Assessments. Smoothness assessment for high-speed mainline pavement shall be determined as follows.

SMOOTHNESS ASSESSMENT SCHEDULE (High-Speed, PCC)	
Mainline Pavement MRI, in./mile (mm/km) ^{3/}	Assessment Per Sublot ^{1/}
≤ 45.0 (710)	$+ (45 - \text{MRI}) \times \$60.00$ ^{2/}
> 45.0 (710) to 75.0 (1,190)	$+ \$0.00$
> 75.0 (1,190) to 100.0 (1,580)	$- (\text{MRI} - 75) \times \$37.50$
> 100.0 (1,580)	$- \$750.00$

1/ MRI shall be in in./mile for calculation.

2/ The maximum incentive amount shall not exceed \$1200.00.

3/ If pavement is constructed with traffic in the lane next to it, then an additional 10 in./mile will be added to the upper thresholds.”

Removal of Existing Pavement and Appurtenances

Revise the first paragraph of Article 440.04 of the Standard Specifications to read:

“440.04 HMA Surface Removal for Subsequent Resurfacing. The existing HMA surface shall be removed to the depth specified on the plans with a self-propelled milling machine. The removal depth may be varied slightly at the discretion of the Engineer to satisfy the smoothness requirements of the finished pavement. The temperature at which the work is performed, the nature and condition of the equipment, and the manner of performing the work shall be such that the milled surface is not torn, gouged, shoved or otherwise damaged by the milling operation. Sufficient cutting passes shall be made so that all irregularities or high spots are eliminated to the satisfaction of the Engineer. When tested with a 16 ft (5 m) straightedge, the milled surface shall have no surface variations in excess of 3/16 in. (5 mm).”

General Equipment

Revise Article 1101.04 of the Standard Specifications to read:

“1101.04 Pavement Surface Grinding Equipment. The pavement surface grinding device shall have a minimum effective head width of 3 ft (0.9 m).

- (a) Diamond Saw Blade Machine. The machine shall be self-propelled with multiple diamond saw blades.
- (b) Profile Milling Machine. The profile milling machine shall be a drum device with carbide or diamond teeth with spacing of 0.315 in. (8 mm) or less and maintain proper forward speed for surface texture according to the manufacturer’s specifications.”

SURVEYING SERVICES (BDE)

Effective: April 1, 2025

Delete the fourth paragraph of Article 667.04 of the Standard Specifications.

Delete Section 668 of the Standard Specifications.

TEMPORARY CONCRETE BARRIER (BDE)

Effective: January 1, 2026

Add the following to Article 704.02 of the Standard Specifications:

“(f) Type C Reflector 1097.02(c)”

TRAINING SPECIAL PROVISIONS (BDE)

Effective: October 15, 1975

Revised: September 2, 2021

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 2. In the event the Contractor subcontracts a portion of the contract work, it 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 ensure 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 it employs 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 it 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 or she has successfully completed a training course leading to journeyman status or in which he or she 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 Employment Training Administration 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 its performance under this Training Special Provision.

For contracts with an awarded contract value of \$500,000 or more, the Contractor is required to comply with the Illinois Works Apprenticeship Initiative (30 ILCS 559/20-20 to 20-25) and all applicable administrative rules to the extent permitted by Section 20-20(g). For federally funded projects, the number of trainees to be trained under this contract, as stated in the Training Special Provisions, will be the established goal for the Illinois Works Apprenticeship Initiative 30 ILCS 559/20-20(g). The Contractor shall make a good faith effort to meet this goal. For federally funded projects, the Illinois Works Apprenticeship Initiative will be implemented using the FHWA approved OJT procedures. The Contractor must comply with the recordkeeping and reporting obligations of the Illinois Works Apprenticeship Initiative for the life of the project, including the certification as to whether the trainee/apprentice labor hour goals were met.

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

Effective: August 1, 2012

Revised: February 2, 2017

In addition to the Contractor's equal employment opportunity (EEO) affirmative action efforts undertaken as required by this Contract, the Contractor is encouraged to participate in the incentive program described below to provide additional on-the-job training to certified graduates of the IDOT pre-apprenticeship training program, as outlined in this Special Provision.

IDOT funds, and various Illinois community colleges operate, pre-apprenticeship training programs throughout the State to provide training and skill-improvement opportunities to promote the increased employment of minority groups, disadvantaged persons and women in all aspects of the highway construction industry. The intent of this IDOT Pre-Apprenticeship Training Program Graduate (TPG) special provision (Special Provision) is to place these certified program graduates on the project site for this Contract in order to provide the graduates with meaningful on-the-job training. Pursuant to this Special Provision, the Contractor must make every reasonable effort to recruit and employ certified TPG trainees to the extent such individuals are available within a practicable distance of the project site.

Specifically, participation of the Contractor or its subcontractor in the Program entitles the participant to reimbursement for graduates' hourly wages at \$15.00 per hour per utilized TPG trainee, subject to the terms of this Special Provision. Reimbursement payment will be made even though the Contractor or subcontractor may also receive additional training program funds from other non-IDOT sources for other non-TPG trainees on the Contract, provided such other source does not specifically prohibit the Contractor or subcontractor from receiving reimbursement from another entity through another program, such as IDOT through the TPG program. With regard to any IDOT funded construction training program other than TPG, however, additional reimbursement for other IDOT programs will not be made beyond the TPG Program described in this Special Provision when the TPG Program is utilized.

No payment will be made to the Contractor if the Contractor or subcontractor fails to provide the required on-site training to TPG trainees, as solely determined by IDOT. A TPG trainee must begin training on the project as soon as the start of work that utilizes the relevant trade skill and the TPG trainee must remain on the project site through completion of the Contract, so long as training opportunities continue to exist in the relevant work classification. Should a TPG trainee's employment end in advance of the completion of the Contract, the Contractor must promptly notify the IDOT District EEO Officer for the Contract that the TPG's involvement in the Contract has ended. The Contractor must supply a written report for the reason the TPG trainee involvement terminated, the hours completed by the TPG trainee on 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 separated TPG trainee.

Finally, the Contractor must maintain all records it creates as a result of participation in the Program on the Contract, and furnish periodic written reports to the IDOT District EEO Officer that document its contractual performance under and compliance with this Special Provision. Finally, through participation in the Program and reimbursement of wages, the Contractor is not relieved of, and IDOT has not waived, the requirements of any federal or state labor or employment law applicable to TPG workers, including compliance with the Illinois Prevailing Wage Act.

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 each utilized certified TPG Program trainee (TRAINEES TRAINING PROGRAM GRADUATE). The estimated total number of hours, unit price, and total price must be included in the schedule of prices for the Contract submitted by Contractor prior to beginning work. The initial number of TPG trainees for which the incentive is available for this contract is 2.

The Department has contracted with several educational institutions to provide screening, tutoring and pre-training to individuals interested in working as a TPG trainee in various areas of common construction trade work. Only individuals who have successfully completed a Pre-Apprenticeship Training Program at these IDOT approved institutions are eligible to be TPG trainees. To obtain a list of institutions that can connect the Contractor with eligible TPG trainees, the Contractor may contact: HCCTP TPG Program Coordinator, Office of Business and Workforce Diversity (IDOT OBWD), Room 319, Illinois Department of Transportation, 2300 S. Dirksen Parkway, Springfield, Illinois 62764. Prior to commencing construction with the utilization of a TPG trainee, the Contractor must submit documentation to the IDOT District EEO Officer for the Contract that provides the names and contact information of the TPG trainee(s) to be trained in each selected work classification, proof that that the TPG trainee(s) has successfully completed a Pre-Apprenticeship Training Program, proof that the TPG is in an Apprenticeship Training Program approved by the U.S. Department of Labor Bureau of Apprenticeship Training, and the start date for training in each of the applicable work classifications.

To receive payment, the Contractor must provide training opportunities aimed at developing a full journeyworker in the type of trade or job classification involved. During the course of performance of the Contract, the Contractor may seek approval from the IDOT District EEO Officer to employ additional eligible TPG trainees. In the event the Contractor subcontracts a portion of the contracted work, it must determine how many, if any, of the TPGs will be trained by the subcontractor. Though a subcontractor may conduct training, the Contractor retains the responsibility for meeting all requirements imposed by this Special Provision. The Contractor must also include this Special Provision in any subcontract where payment for contracted work performed by a TPG trainee will be passed on to a subcontractor.

Training through the Program is intended to move TPGs toward journeyman status, which is the primary objective of this Special Provision. Accordingly, the Contractor must make every effort to enroll TPG trainees by recruitment through the Program participant educational institutions to the extent eligible TPGs are available within a reasonable geographic area of the project. The Contractor is responsible for demonstrating, through documentation, the recruitment efforts it has undertaken prior to the determination by IDOT whether the Contractor is in compliance with this Special Provision, and therefore, entitled to the Training Program Graduate reimbursement of \$15.00 per hour.

Notwithstanding the on-the-job training requirement of this TPG Special Provision, some minimal off-site training is permissible as long as the offsite training is an integral part of the work of the contract, and does not compromise or conflict with the required on-site training that is central to the purpose of the Program. No individual may be employed as a TPG trainee in any work classification in which he/she has previously successfully completed a training program leading to journeyman status in any trade, or in which he/she has worked at a journeyman level or higher.

VEHICLE AND EQUIPMENT WARNING LIGHTS (BDE)

Effective: November 1, 2021

Revised: November 1, 2022

Add the following paragraph after the first paragraph of Article 701.08 of the Standard Specifications:

“The Contractor shall equip all vehicles and equipment with high-intensity oscillating, rotating, or flashing, amber or amber-and-white, warning lights which are visible from all directions. In accordance with 625 ILCS 5/12-215, the lights may only be in operation while the vehicle or equipment is engaged in construction operations.”

WORK ZONE TRAFFIC CONTROL DEVICES (BDE)

Effective: March 2, 2020

Revised: January 1, 2026

Add the following to Article 701.03 of the Standard Specifications:

“(q) Temporary Sign Supports 1106.02”

Revise Article 701.03(p) of the Standard Specifications to read:

“(p) Detectable Pedestrian Channelizing Barricades 1106.02(m)”

Revise the third paragraph of Article 701.14 of the Standard Specifications to read:

“For temporary sign supports, the Contractor shall provide a FHWA eligibility letter for each device used on the contract. The letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device. The signs shall be supported within 20 degrees of vertical. Weights used to stabilize signs shall be attached to the sign support per the manufacturer’s specifications.”

Revise the first paragraph of Article 701.15 of the Standard Specifications to read:

“ **701.15 Traffic Control Devices.** For devices that must meet crashworthiness standards, the Contractor shall provide a manufacturer’s self-certification or a FHWA eligibility letter for each Category 1 device and a FHWA eligibility letter for each Category 2 and Category 3 device used on the contract. The self-certification or letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device.”

Revise the first six paragraphs of Article 1106.02 of the Standard Specifications to read:

“ **1106.02 Devices.** Work zone traffic control devices and combinations of devices shall meet crashworthiness standards for their respective categories. The categories are as follows.

Category 1 includes small, lightweight, channelizing and delineating devices that have been in common use for many years and are known to be crashworthy by crash testing of similar devices or years of demonstrable safe performance. These include cones, tubular markers, plastic drums, and delineators, with no attachments (e.g. lights). Category 1 devices shall be MASH compliant.

Category 2 includes devices that are not expected to produce significant vehicular velocity change but may otherwise be hazardous. These include vertical panels with lights, barricades, temporary sign supports, and Category 1 devices with attachments (e.g. drums with lights). Category 2 devices shall be MASH compliant.

Category 3 includes devices that are expected to cause significant velocity changes or other potentially harmful reactions to impacting vehicles. These include crash cushions (impact attenuators), truck mounted attenuators, and other devices not meeting the definitions of Category 1 or 2. Category 3 devices manufactured after December 31, 2019 shall be MASH compliant. Category 3 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350, may be used on contracts let before December 31, 2029. Category 3 devices shall be crash tested for Test Level 3 or the test level specified.

Category 4 includes portable or trailer-mounted devices such as sign supports, speed feedback displays, arrow boards, changeable message signs, temporary traffic signals, and area lighting supports. It is preferable for Category 4 devices manufactured after December 31, 2019 to be MASH-16 compliant; however, there are currently no crash tested devices in this category, so it remains exempt from the NCHRP 350 or MASH compliance requirement.

For each type of device, when no more than one MASH compliant is available, an NCHRP 350 compliant device may be used, even if manufactured after December 31, 2019.”

Revise the first paragraph of Section 1106.02(a) of the Standard Specifications to read:

- “(a) Lights. Lights shall meet the requirements of Chapter 13 of the “Equipment and Materials Standards of the Institute of Transportation Engineers,” 1998, Institute of Transportation Engineers, and shall be visible on a clear night from a distance of 3000 ft (900 m). Lights are classified as follows.”

Revise Articles 1106.02(g), 1106.02(k), 1106.02(l), and 1106.02(m) of the Standard Specifications to read:

- “(g) Truck Mounted/Trailer Mounted Attenuators. The attenuator shall be approved for use at Test Level 3. Test Level 2 may be used for normal posted speeds less than or equal to 45 mph.

- (k) Temporary Water Filled Barrier. The water filled barrier shall be a lightweight plastic shell designed to accept water ballast and be on the Department’s qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings.

- (l) Movable Traffic Barrier. The movable traffic barrier shall be on the Department’s qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings. The barrier shall be capable of being moved on and off the roadway on a daily basis.

- (m) Detectable Pedestrian Channelizing Barricades. The top panel or handrail shall be continuous and there should be at least a 2 in. (50 mm) gap between the hand trailing edge and its support. When visible to vehicular traffic, the top rail shall have alternating white and orange retroreflective stripes sloping at 45 degrees. The bottom panel shall be continuous and have alternating white and orange retroreflective stripes sloping at 45 degrees. Barricade stripes shall be 6 in. (150 mm) in width. The predominant color for other barricade components shall be white, orange, or silver.”

PROJECT LABOR AGREEMENT

Effective: May 18, 2007

Revised: April 1, 2025

Description. The Illinois Project Labor Agreements Act, 30 ILCS 571, states that the State of Illinois has a compelling interest in awarding public works contracts so as to ensure the highest standards of quality and efficiency at the lowest responsible cost. A project labor agreement (PLA) is a form of pre-hire collective bargaining agreement covering all terms and conditions of employment on a specific project that is intended to support this compelling interest. It has been determined by the Department that a PLA is appropriate for the project that is the subject of this contract. The PLA document, provided below, only applies to the construction site for this contract. It is the policy of the Department on this contract, and all construction projects, to allow all contractors and subcontractors to compete for contracts and subcontracts without regard to whether they are otherwise parties to collective bargaining agreements.

The Department reserves the right to rescind the PLA requirement from this project in the event FHWA disapproves of the inclusion of the PLA terms for this project. The contractor, by bidding, agrees that any rescission of the PLA requirement shall not constitute grounds for the withdrawal of its bid and further agrees to remove the PLA requirement from this contract upon notice from the Department should such be necessary at a later date.

Execution of Letter of Assent. A copy of the PLA applicable to this project is included as part of this special provision. As a condition of the award of the contract, the successful bidder and each of its subcontractors shall execute a "Contractor Letter of Assent", in the form attached to the PLA as Exhibit A. The successful bidder shall submit a Subcontractor's Contractor Letter of Assent to the Department prior to the subcontractor's performance of work on the project. Upon request, copies of the applicable collective bargaining agreements will be provided by the appropriate signatory labor organization at the pre-job conference.

Quarterly Reporting. Section 37 of the Illinois Project Labor Agreements Act requires the Department to submit quarterly reports regarding the number of minorities and females employed under PLAs. To assist in this reporting effort, the Contractor shall provide a quarterly workforce participation report for all minority and female employees working under the PLA of this contract. The data shall be reported on Construction Form BC 820, Project Labor Agreement (PLA) Workforce Participation Quarterly Reporting Form available on the Department's website <https://idot.illinois.gov/content/dam/soi/en/web/idot/documents/idot-forms/bc/bc-820.pdf>.

The report shall be submitted no later than the 15th of the month following the end of each quarter (i.e., April 15 for the January – March reporting period). The form shall be emailed to DOT.PLA.Reporting@illinois.gov or faxed to (217) 524-4922.

Any costs associated with complying with this provision 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.

Illinois Department of Transportation
PROJECT LABOR AGREEMENT

This Project Labor Agreement ("PLA" or "Agreement") is entered into this _____ day of _____, 2026, by and between the Illinois Department of Transportation ("IDOT" or "Department") in its proprietary capacity, and each relevant Illinois AFL-CIO Building Trades signatory hereto as determined by the Illinois AFL-CIO Statewide Project Labor Agreement Committee on behalf of each of its affiliated members (individually and collectively, the "Unions"). This PLA shall apply to Construction Work (as defined herein) to be performed by IDOT's Prime Contractor and each of its subcontractors of whatever tier ("Subcontractor" or "Subcontractors") on Contract No. 62U12(hereinafter, the "Project").

ARTICLE 1 - INTENT AND PURPOSES

- 1.1 This PLA is entered into in accordance with the Project Labor Agreement Act ("Act", 30 ILCS 571). It is mutually understood and agreed that the terms and conditions of this PLA are intended to promote the public interest in obtaining timely and economical completion of the Project by encouraging productive and efficient construction operations; by establishing a spirit of harmony and cooperation among the parties; and by providing for peaceful and prompt settlement of any and all labor grievances or jurisdictional disputes of any kind without strikes, lockouts, slowdowns, delays, or other disruptions to the prosecution of the work. The parties acknowledge the obligations of the Contractors and Subcontractors to comply with the provisions of the Act. The parties will work with the Contractors and Subcontractors within the parameters of other statutory and regulatory requirements to implement the Act's goals and objectives.
- 1.2 As a condition of the award of the contract for performance of work on the Project, IDOT's Prime Contractor and each of its Subcontractors shall execute a "Contractor Letter of Assent", in the form attached hereto as Exhibit A, prior to commencing Construction Work on the Project. The Contractor shall submit a Subcontractor's Contractor Letter of Assent to the Department prior to the Subcontractor's performance of Construction Work on the Project. Upon request copies of the applicable collective bargaining agreements will be provided by the appropriate signatory labor organization consistent with this Agreement and at the pre-job conference referenced in Article III, Section 3.1.

- 1.3 Each Union affiliate and separate local representing workers engaged in Construction Work on the Project in accordance with this PLA are bound to this agreement by the Illinois AFL-CIO Statewide Project Labor Agreement Committee which is the central committee established with full authority to negotiate and sign PLAs with the State on behalf of all respective crafts. Upon their signing the Contractor Letter of Assent, the Prime Contractor, each Subcontractor, and the individual Unions shall thereafter be deemed a party to this PLA. No party signatory to this PLA shall, contract or subcontract, nor permit any other person, firm, company, or entity to contract or subcontract for the performance of Construction Work for the Project to any person, firm, company, or entity that does not agree in writing to become bound for the term of this Project by the terms of this PLA prior to commencing such work and to the applicable area-wide collective bargaining agreement(s) with the Union(s) signatory hereto.
- 1.4 It is understood that the Prime Contractor(s) and each Subcontractor will be considered and accepted by the Unions as separate employers for the purposes of collective bargaining, and it is further agreed that the employees working under this PLA shall constitute a bargaining unit separate and distinct from all others. The parties hereto also agree that this PLA shall be applicable solely with respect to this Project, and shall have no bearing on the interpretation of any other collective bargaining agreement or as to the recognition of any bargaining unit other than for the specific purposes of this Project.
- 1.5 In the event of a variance or conflict, whether explicit or implicit, between the terms and conditions of this PLA and the provisions of any other applicable national, area, or local collective bargaining agreement, the terms and conditions of this PLA shall supersede and control. For any work performed under the NTL Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, the National Agreement of the International Union of Elevator Constructors, and for any instrument calibration work and loop checking performed under the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, the preceding sentence shall apply only with respect to Articles I, II, V, VI, and VII.

- 1.6 Subject to the provisions of paragraph 1.5 of this Article, it is the parties' intent to respect the provisions of any other collective bargaining agreements that may now or hereafter pertain, whether between the Prime Contractor and one or more of the Unions or between a Subcontractor and one or more of the Unions. Accordingly, except and to the extent of any contrary provision set forth in this PLA, the Prime Contractor and each of its Subcontractors agrees to be bound and abide by the terms of the following in order of precedence: (a) the applicable collective bargaining agreement between the Prime Contractor and one or more of the Unions made signatory hereto; (b) the applicable collective bargaining agreement between a Subcontractor and one or more of the Unions made signatory hereto; or (c) the current applicable area collective bargaining agreement for the relevant Union that is the agreement certified by the Illinois Department of Labor for purposes of establishing the Prevailing Wage applicable to the Project. The Union will provide copies of the applicable collective bargaining agreements pursuant to part (c) of the preceding sentence to the Prime Contractor. Assignments by the Contractors or Subcontractors amongst the trades shall be consistent with area practices; in the event of unresolved disagreements as to the propriety of such assignments, the provisions of Article VI shall apply.
- 1.7 Subject to the limitations of paragraphs 1.4 to 1.6 of this Article, the terms of each applicable collective bargaining agreement as determined in accordance with paragraph 1.6 are incorporated herein by reference, and the terms of this PLA shall be deemed incorporated into such other applicable collective bargaining agreements only for purposes of their application to the Project.
- 1.8 To the extent necessary to comply with the requirements of any fringe benefit fund to which the Prime Contractor or Subcontractor is required to contribute under the terms of an applicable collective bargaining agreement pursuant to the preceding paragraph, the Prime Contractor or Subcontractor shall execute all "Participation Agreements" as may be reasonably required by the Union to accomplish such purpose; provided, however, that such Participation Agreements shall, when applicable to the Prime Contractor or Subcontractor solely as a result of this PLA, be amended as reasonably necessary to reflect such fact. Upon written notice in the form of a lien of a Contractor's or Subcontractor's delinquency from any applicable fringe benefit fund, IDOT will withhold from the Contractor's periodic pay request an amount sufficient to extinguish any delinquency obligation of the Contractor or Subcontractor arising out of the Project.
- 1.9 In the event that the applicable collective bargaining agreement between a Prime Contractor and the Union or between the Subcontractor and the Union expires prior to the completion of this Project, the expired applicable contract's terms will be maintained until a new applicable collective bargaining agreement is ratified. The wages and fringe benefits included in any new applicable collective bargaining agreement will apply on and after the effective date of the newly negotiated collective bargaining agreement, except to the extent wage and fringe benefit retroactivity is specifically agreed upon by the relevant bargaining parties.

ARTICLE II – APPLICABILITY, RECOGNITION, AND COMMITMENTS

- 2.1 The term Construction Work as used herein shall include all “construction, demolition, rehabilitation, renovation, or repair” work performed by a “laborer or mechanic” at the “site of the work” for the purpose of “building” the specific structures and improvements that constitute the Project. Terms appearing within quotation marks in the preceding sentence shall have the meaning ascribed to them pursuant to 29 CFR Part 5 and Illinois labor laws.
- 2.2 By executing the Letters of Assent, Prime Contractor and each of its Subcontractors recognizes the Unions signatory to this PLA as the sole and exclusive bargaining representatives for their craft employees employed on the jobsite for this Project. Unions who are signatory to this PLA will have recognition on the Project for their craft.
- 2.3 The Prime Contractor and each of its Subcontractors retains and shall be permitted to exercise full and exclusive authority and responsibility for the management of its operations, except as expressly limited by the terms of this PLA or by the terms and conditions of the applicable collective bargaining agreement.
- 2.4 Except to the extent contrary to an express provision of the relevant collective bargaining agreement, equipment or materials used in the Project may be pre-assembled or pre-fabricated, and there shall be no refusal by the Union to handle, transport, install, or connect such equipment or materials. Equipment or materials delivered to the job-site will be unloaded and handled promptly without regard to potential jurisdictional disputes; any such disputes shall be handled in accordance with the provisions of this PLA.
- 2.5 The parties are mutually committed to promoting a safe working environment for all personnel at the job-site. It shall be the responsibility of each employer to which this PLA applies to provide and maintain safe working conditions for its employees, and to comply with all applicable federal, state, and local health and safety laws and regulations.
- 2.6 The use or furnishing of alcohol or drugs and the conduct of any other illegal activity at the job-site is strictly prohibited. The parties shall take every practical measure consistent with the terms of applicable collective bargaining agreements to ensure that the job-site is free of alcohol and drugs.
- 2.7 All parties to this PLA agree that they will not discriminate against any employee based on race, creed, religion, color, national origin, union activity, age, gender or sexual orientation and shall comply with all applicable federal, state, and local laws.

- 2.8 In accordance with the Act and to promote diversity in employment, IDOT will establish, in cooperation with the other parties, the apprenticeship hours which are to be performed by minorities and females on the Project. IDOT shall consider the total hours to be performed by these underrepresented groups, as a percentage of the workforce, and create aspirational goals for each Project, based on the level of underutilization for the service area of the Project (together "Project Employment Objectives"). IDOT shall provide a quarterly report regarding the racial and gender composition of the workforce on the Project.

Persons currently lacking qualifications to enter apprenticeship programs will have the opportunity to obtain skills through basic training programs as have been established by the Department. The parties will endeavor to support such training programs to allow participants to obtain the requisite qualifications for the Project Employment Objectives.

The parties agree that all Contractors and Subcontractors working on the Project shall be encouraged to utilize the maximum number of apprentices as permitted under the terms of the applicable collective bargaining agreements to realize the Project Employment Objectives.

The Unions shall assist the Contractor and each Subcontractor in efforts to satisfy Project Employment Objectives. A Contractor or Subcontractor may request from a Union specific categories of workers necessary to satisfy Project Employment Objectives. The application of this section shall be consistent with all local Union collective bargaining agreements, and the hiring hall rules and regulations established for the hiring of personnel, as well as the apprenticeship standards set forth by each individual Union.

- 2.9 The parties hereto agree that engineering consultants and materials testing employees, to the extent subject to the terms of this PLA, shall be fully expected to objectively and responsibly perform their duties and obligations owed to the Department without regard to the potential union affiliation of such employees or of other employees on the Project.
- 2.10 This Agreement shall not apply to IDOT employees or employees of any other governmental entity.

ARTICLE III - ADMINISTRATION OF AGREEMENT

- 3.1 In order to assure that all parties have a clear understanding of the PLA, and to promote harmony, at the request of the Unions a post-award pre-job conference will be held among the Prime Contractor, all Subcontractors and Union representatives prior to the start of any Construction Work on the Project. No later than the conclusion of such pre-job conference, the parties shall, among other matters, provide to one another contact information for their respective representatives (including name, address, phone number, facsimile number, e-mail). Nothing herein shall be construed to limit the right of the Department to discuss or explain the purpose and intent of this PLA with prospective bidders or other interested parties prior to or following its award of the job.
- 3.2 Representatives of the Prime Contractor and the Unions shall meet as often as reasonably necessary following award until completion of the Project to assure the effective implementation of this PLA.
- 3.3 Any notice contemplated under Article VI and VII of this Agreement to a signatory labor organization shall be made in writing to the Local Union with copies to the local union's International Representative.

ARTICLE IV - HOURS OF WORK AND GENERAL CONDITIONS

- 4.1 The standard work day and work week for Construction Work on the Project shall be consistent with the respective collective bargaining agreements. In the event Project site or other job conditions dictate a change in the established starting time and/or a staggered lunch period for portions of the Project or for specific crafts, the Prime Contractor, relevant Subcontractors and business managers of the specific crafts involved shall confer and mutually agree to such changes as appropriate. If proposed work schedule changes cannot be mutually agreed upon between the parties, the hours fixed at the time of the pre-job meeting shall prevail.
- 4.2 Shift work may be established and directed by the Prime Contractor or relevant Subcontractor as reasonably necessary or appropriate to fulfill the terms of its contract with the Department. If used, shift hours, rates and conditions shall be as provided in the applicable collective bargaining agreement.
- 4.3 The parties agree that chronic and/or unexcused absenteeism is undesirable and must be controlled in accordance with procedures established by the applicable collective bargaining agreement. Any employee disciplined for absenteeism in accordance with such procedures shall be suspended from all work on the Project for not less than the maximum period permitted under the applicable collective bargaining agreement.

- 4.4 Except as may be otherwise expressly provided by the applicable collective bargaining agreement, employment begins and ends at the Project site; employees shall be at their place of work at the starting time; and employees shall remain at their place of work until quitting time.
- 4.5 Except as may be otherwise expressly provided by the applicable collective bargaining agreement, there shall be no limit on production by workmen, no restrictions on the full use of tools or equipment, and no restrictions on efficient use of manpower or techniques of construction other than as may be required by safety regulations.
- 4.6 The parties recognize that specialized or unusual equipment may be installed on the Project. In such cases, the Union recognizes the right of the Prime Contractor or Subcontractor to involve the equipment supplier or vendor's personnel in supervising the setting up of the equipment, making modifications and final alignment, and performing similar activities that may be reasonably necessary prior to and during the start-up procedure in order to protect factory warranties. The Prime Contractor or Subcontractor shall notify the Union representatives in advance of any work at the job-site by such vendor personnel in order to promote a harmonious relationship between the equipment vendor's personnel and other Project employees.
- 4.7 For the purpose of promoting full and effective implementation of this PLA, authorized Union representatives shall have access to the Project job-site during scheduled work hours. Such access shall be conditioned upon adherence to all reasonable visitor and security rules of general applicability that may be established for the Project site at the pre-job conference or from time to time thereafter.

ARTICLE V – GRIEVANCE PROCEDURES FOR DISPUTES ARISING UNDER A PARTICULAR COLLECTIVE BARGAINING AGREEMENT

- 5.1 In the event a dispute arises under a particular collective bargaining agreement specifically not including jurisdictional disputes referenced in Article VI below, said dispute shall be resolved by the Grievance/Arbitration procedure of the applicable collective bargaining agreement. The resulting determination from this process shall be final and binding on all parties bound to its process.
- 5.2 Employers covered under this Agreement shall have the right to discharge or discipline any employee who violates the provisions of this Agreement. Such discharge or discipline by a contractor or subcontractor shall be subject to Grievance/Arbitration procedure of the applicable collective bargaining agreement only as to the fact of such violation of this agreement. If such fact is established, the penalty imposed shall not be disturbed. Work at the Project site shall continue without disruption or hindrance of any kind as a result of a Grievance/Arbitration procedure under this Article.

- 5.3 In the event there is a deadlock in the foregoing procedure, the parties agree that the matter shall be submitted to arbitration for the selection and decision of an Arbitrator governed under paragraph 6.8.

ARTICLE VI –DISPUTES: GENERAL PRINCIPLES

- 6.1 This Agreement is entered into to prevent strikes, lost time, lockouts and to facilitate the peaceful adjustment of jurisdictional disputes in the building and construction industry and to prevent waste and unnecessary avoidable delays and expense, and for the further purpose of at all times securing for the employer sufficient skilled workers.

- 6.2 A panel of Permanent Arbitrators are attached as addendum (A) to this agreement. By mutual agreement between IDOT and the Unions, the parties can open this section of the agreement as needed to make changes to the list of permanent arbitrators.

The arbitrator is not authorized to award back pay or any other damages for a miss assignment of work. Nor may any party bring an independent action for back pay or any other damages, based upon a decision of an arbitrator.

- 6.3 The PLA Jurisdictional Dispute Resolution Process (“Process”) sets forth the procedures below to resolve jurisdictional disputes between and among Contractors, Subcontractors, and Unions engaged in the building and construction industry. Further, the Process will be followed for any grievance or dispute arising out of the interpretation or application of this PLA by the parties except for the prohibition on attorneys contained in 6.11. All decisions made through the Process are final and binding upon all parties.

DISPUTE PROCESS

- 6.4 Administrative functions under the Process shall be performed through the offices of the President and/or Secretary-Treasurer of the Illinois State Federation of Labor, or their designated representative, called the Administrator. In no event shall any officer, employee, agent, attorney, or other representative of the Illinois Federation of Labor, AFL- CIO be subject to any subpoena to appear or testify at any jurisdictional dispute hearing.

- 6.5 There shall be no abandonment of work during any case participating in this Process or in violation of the arbitration decision. All parties to this Process release the Illinois State Federation of Labor (“Federation”) from any liability arising from its action or inaction and covenant not to sue the Federation, nor its officers, employees, agents or attorneys.

- 6.6 In the event of a dispute relating to trade or work jurisdiction, all parties, including the employers, Contractors or Subcontractors, agree that a final and binding resolution of the dispute shall be resolved as follows:
- (a) Representatives of the affected trades and the Contractor or Subcontractor shall meet on the job site within two (2) business days after receiving written notice in an effort to resolve the dispute. (In the event there is a dispute between local unions affiliated with the same International Union, the decision of the General President, or his/her designee, as the internal jurisdictional authority of that International Union, shall constitute a final and binding decision and determination as to the jurisdiction of work.)
 - (b) If no settlement is achieved subsequent to the preceding Paragraph, the matter shall be referred to the local area Building & Construction Trades Council, which shall meet with the affected trades within two (2) business days subsequent to receiving written notice. In the event the parties do not wish to avail themselves of the local Building & Construction Trades Council, the parties may elect to invoke the services of their respective International Representatives with no extension of the time limitations. An agreement reached at this Step shall be final and binding upon all parties.
 - (c) If no settlement agreement is reached during the proceedings contemplated by Paragraphs "a" or "b" above, the matter shall be immediately referred to the Illinois Jurisdictional Dispute Process for final and binding resolution of said dispute. Said referral submission shall be in writing and served upon the Illinois State Federation of Labor, or the Administrator, pursuant to paragraph 6.4 of this agreement. The Administrator shall, within three (3) days, provide for the selection of an available Arbitrator to hear said dispute within this time period. Upon good cause shown and determined by the Administrator, an additional three (3) day extension for said hearing shall be granted at the sole discretion of the Administrator. Only upon mutual agreement of all parties may the Administrator extend the hearing for a period in excess of the time frames contemplated under this Paragraph. Business days are defined as Monday through Friday, excluding contract holidays.
- 6.7 The primary concern of the Process shall be the adjustment of jurisdictional disputes arising out of the Project. A sufficient number of Arbitrators shall be selected from list of approved Arbitrators as referenced Sec. 6.2 and shall be assigned per Sec. 6.8. Decisions shall be only for the Project and shall become effective immediately upon issuance and complied with by all parties. The authority of the Arbitrator shall be restricted and limited specifically to the terms and provisions of Article VI and generally to this Agreement as a whole.

- 6.8 Arbitrator chosen shall be randomly selected based on the list of Arbitrators in Sec. 6.2 and geographical location of the jurisdictional dispute and upon his/her availability, and ability to conduct a Hearing within two (2) business days of said notice. The Arbitrator may issue a "bench" decision immediately following the Hearing or he/she may elect to only issue a written decision, said decision must be issued within two (2) business days subsequent to the completion of the Hearing. Copies of all notices, pleadings, supporting memoranda, decisions, etc. shall be provided to all disputing parties and the Illinois State Federation of Labor.

Any written decision shall be in accordance with this Process and shall be final and binding upon all parties to the dispute and may be a "short form" decision. Fees and costs of the arbitrator shall be divided evenly between the contesting parties except that any party wishing a full opinion and decision beyond the short form decision shall bear the reasonable fees and costs of such full opinion. The decision of the Arbitrator shall be final and binding upon the parties hereto, their members, and affiliates.

In cases of jurisdictional disputes or other disputes between a signatory labor organization and another labor organization, both of which is an affiliate or member of the same International Union, the matter or dispute shall be settled in the manner set forth by their International Constitution and/or as determined by the International Union's General President whose decision shall be final and binding upon all parties. In no event shall there be an abandonment of work.

- 6.9 In rendering a decision, the Arbitrator shall determine:
- (a) First, whether a previous agreement of record or applicable agreement, including a disclaimer agreement, between National or International Unions to the dispute or agreements between local unions involved in the dispute, governs;
 - (b) Only if the Arbitrator finds that the dispute is not covered by an appropriate or applicable agreement of record or agreement between the crafts to the dispute, he shall then consider the established trade practice in the industry and prevailing practice in the locality. Where there is a previous decision of record governing the case, the Arbitrator shall give equal weight to such decision of record, unless the prevailing practice in the locality in the past ten years favors one craft. In that case, the Arbitrator shall base his decision on the prevailing practice in the locality. Except, that if the Arbitrator finds that a craft has improperly obtained the prevailing practice in the locality through raiding, the undercutting of wages or by the use of vertical agreements, the Arbitrator shall rely on the decision of record and established trade practice in the industry rather than the prevailing practice in the locality; and,

- (c) Only if none of the above criteria is found to exist, the Arbitrator shall then consider that because efficiency, cost or continuity and good management are essential to the well being of the industry, the interests of the consumer or the past practices of the employer shall not be ignored.
 - (d) The arbitrator is not authorized to award back pay or any other damages for a mis-assignment of work. Nor may any party bring an independent action for back pay or any other damages, based upon a decision of an arbitrator.
- 6.10 The Arbitrator shall set forth the basis for his/her decision and shall explain his/her findings regarding the applicability of the above criteria. If lower ranked criteria are relied upon, the Arbitrator shall explain why the higher-ranked criteria were not deemed applicable. The Arbitrator's decision shall only apply to the Project. Agreements of Record, for other PLA projects, are applicable only to those parties signatory to such agreements. Decisions of Record are those that were either attested to by the former Impartial Jurisdictional Disputes Board or adopted by the National Arbitration Panel.
- 6.11 All interested parties, as determined by the Arbitrator, shall be entitled to make presentations to the Arbitrator. Any interested labor organization affiliated to the PLA Committee and party present at the Hearing, whether making a presentation or not, by such presence shall be deemed to accept the jurisdiction of the Arbitrator and to agree to be bound by its decision. In addition to the representative of the local labor organization, a representative of the labor organization's International Union may appear on behalf of the parties. Each party is responsible for arranging for its witnesses. In the event an Arbitrator's subpoena is required, the party requiring said subpoena shall prepare the subpoena for the Arbitrator to execute. Service of the subpoena upon any witness shall be the responsibility of the issuing party.

Attorneys shall not be permitted to attend or participate in any portion of a Hearing.

The parties are encouraged to determine, prior to Hearing, documentary evidence which may be presented to the Arbitrator on a joint basis.

- 6.12 The Order of Presentation in all Hearings before an Arbitrator shall be
- I. Identification and Stipulation of the Parties
 - II. Unions(s) claiming the disputed work presents its case
 - III. Union(s) assigned the disputed work presents its case
 - IV. Employer assigning the disputed work presents its case
 - V. Evidence from other interested parties (i.e., general contractor, project manager, owner)
 - VI. Rebuttal by union(s) claiming the disputed work
 - VII. Additional submissions permitted and requested by Arbitrator
 - VIII. Closing arguments by the parties

- 6.13 All parties bound to the provisions of this Process hereby release the Illinois State Federation of Labor and IDOT, their respective officers, agents, employees or designated representatives, specifically including any Arbitrator participating in said Process, from any and all liability or claim, of whatsoever nature, and specifically incorporating the protections provided in the Illinois Arbitration Act, as amended from time to time.
- 6.14 The Process, as an arbitration panel, nor its Administrator, shall have any authority to undertake any action to enforce its decision(s). Rather, it shall be the responsibility of the prevailing party to seek appropriate enforcement of a decision, including findings, orders or awards of the Arbitrator or Administrator determining non-compliance with a prior award or decision.
- 6.15 If at any time there is a question as to the jurisdiction of the Illinois Jurisdictional Dispute Resolution Process, the primary responsibility for any determination of the arbitrability of a dispute and the jurisdiction of the Arbitrator shall be borne by the party requesting the Arbitrator to hear the underlying jurisdictional dispute. The affected party or parties may proceed before the Arbitrator even in the absence or one or more stipulated parties with the issue of jurisdiction as an additional item to be decided by the Arbitrator. The Administrator may participate in proceedings seeking a declaration or determination that the underlying dispute is subject to the jurisdiction and process of the Illinois Jurisdictional Dispute Resolution Process. In any such proceedings, the non-prevailing party and/or the party challenging the jurisdiction of the Illinois Jurisdictional Dispute Resolution Process shall bear all the costs, expenses and attorneys' fees incurred by the Illinois Jurisdictional Dispute Resolution Process and/or its Administrator in establishing its jurisdiction.

ARTICLE VII - WORK STOPPAGES AND LOCKOUTS

- 7.1 During the term of this PLA, no Union or any of its members, officers, stewards, employees, agents or representatives shall instigate, support, sanction, maintain, or participate in any strike, picketing, walkout, work stoppage, slow down or other activity that interferes with the routine and timely prosecution of work at the Project site or at any other contractor's or supplier's facility that is necessary to performance of work at the Project site. Hand billing at the Project site during the designated lunch period and before commencement or following conclusion of the established standard workday shall not, in itself, be deemed an activity that interferes with the routine and timely prosecution of work on the Project.

7.2 Should any activity prohibited by paragraph 7.1 of this Article occur, the Union shall undertake all steps reasonably necessary to promptly end such prohibited activities.

7.2.A No Union complying with its obligations under this Article shall be liable for acts of employees for which it has no responsibility or for the unauthorized acts of employees it represents. Any employee who participates or encourages any activity prohibited by paragraph 7.1 shall be immediately suspended from all work on the Project for a period equal to the greater of (a) 60 days; or (b) the maximum disciplinary period allowed under the applicable collective bargaining agreement for engaging in comparable unauthorized or prohibited activity.

7.2.B Neither the PLA Committee nor its affiliates shall be liable for acts of employees for which it has no responsibility. The principal officer or officers of the PLA Committee will immediately instruct, order and use the best efforts of his office to cause the affiliated union or unions to cease any violations of this Article. The PLA Committee in its compliance with this obligation shall not be liable for acts of its affiliates. The principal officer or officers of any involved affiliate will immediately instruct, order or use the best effort of his office to cause the employees the union represents to cease any violations of this Article. A union complying with this obligation shall not be liable for unauthorized acts of employees it represents. The failure of the Contractor to exercise its rights in any instance shall not be deemed a waiver of its rights in any other instance.

During the term of this PLA, the Prime Contractor and its Subcontractors shall not engage in any lockout at the Project site of employees covered by this Agreement.

7.3 Upon notification of violations of this Article, the principal officer or officers of the local area Building and Construction Trades Council, and the Illinois AFL-CIO Statewide Project Labor Agreement Committee as appropriate, will immediately instruct, order and use their best efforts to cause the affiliated union or unions to cease any violations of this Article. A Trades Council and the Committee otherwise in compliance with the obligations under this paragraph shall not be liable for unauthorized acts of its affiliates.

7.4 In the event that activities in violation of this Article are not immediately halted through the efforts of the parties, any aggrieved party may invoke the special arbitration provisions set forth in paragraph 7.5 of this Article.

- 7.5 Upon written notice to the other involved parties by the most expeditious means available, any aggrieved party may institute the following special arbitration procedure when a breach of this Article is alleged:
- 7.5.A The party invoking this procedure shall notify the individual designated as the Permanent Arbitrator pursuant to paragraph 6.8 of the nature of the alleged violation; such notice shall be by the most expeditious means possible. The initiating party may also furnish such additional factual information as may be reasonably necessary for the Permanent Arbitrator to understand the relevant circumstances. Copies of any written materials provided to the arbitrator shall also be contemporaneously provided by the most expeditious means possible to the party alleged to be in violation and to all other involved parties.
- 7.5.B Upon receipt of said notice the Permanent Arbitrator shall set and hold a hearing within twenty-four (24) hours if it is contended the violation is ongoing, but not before twenty-four (24) hours after the written notice to all parties involved as required above.
- 7.5.C The Permanent Arbitrator shall notify the parties by facsimile or any other effective written means, of the place and time chosen by the Permanent Arbitrator for this hearing. Said hearing shall be completed in one session. A failure of any party or parties to attend said hearing shall not delay the hearing of evidence or issuance of an Award by the Permanent Arbitrator.
- 7.5.D The sole issue at the hearing shall be whether a violation of this Article has, in fact, occurred. An Award shall be issued in writing within three (3) hours after the close of the hearing, and may be issued without a written opinion. If any party desires a written opinion, one shall be issued within fifteen (15) days, but its issuance shall not delay compliance with, or enforcement of, the Award. The Permanent Arbitrator may order cessation of the violation of this Article, and such Award shall be served on all parties by hand or registered mail upon issuance.
- 7.5.E Such Award may be enforced by any court of competent jurisdiction upon the filing of the Award and such other relevant documents as may be required. Facsimile or other hardcopy written notice of the filing of such enforcement proceedings shall be given to the other relevant parties. In a proceeding to obtain a temporary order enforcing the Permanent Arbitrator's Award as issued under this Article, all parties waive the right to a hearing and agree that such proceedings may be ex parte. Such agreement does not waive any party's right to participate in a hearing for a final order of enforcement. The Court's order or orders enforcing the Permanent Arbitrator's Award shall be served on all parties by hand or by delivery to their last known address or by registered mail.

- 7.6 Individuals found to have violated the provisions of this Article are subject to immediate termination. In addition, IDOT reserves the right to terminate this PLA as to any party found to have violated the provisions of this Article.
- 7.7 Any rights created by statute or law governing arbitration proceedings inconsistent with the above procedure or which interfere with compliance therewith are hereby waived by parties to whom they accrue.
- 7.8 The fees and expenses of the Permanent Arbitrator shall be borne by the party or parties found in violation, or in the event no violation is found, such fees and expenses shall be borne by the moving party.

ARTICLE VIII – TERMS OF AGREEMENT

- 8.1 If any Article or provision of this Agreement shall be declared invalid, inoperative or unenforceable by operation of law or by any of the above mentioned tribunals of competent jurisdiction, the remainder of this Agreement or the application of such Article or provision to persons or circumstances other than those as to which it has been held invalid, inoperative or unenforceable shall not be affected thereby.
- 8.2 This Agreement shall be in full force as of and from the date of the Notice of Award until the Project contract is closed.
- 8.3 This PLA may not be changed or modified except by the subsequent written agreement of the parties. All parties represent that they have the full legal authority to enter into this PLA. This PLA may be executed by the parties in one or more counterparts.
- 8.4 Any liability arising out of this PLA shall be several and not joint. IDOT shall not be liable to any person or other party for any violation of this PLA by any other party, and no Contractor or Union shall be liable for any violation of this PLA by any other Contractor or Union.
- 8.5 The failure or refusal of a party to exercise its rights hereunder in one or more instances shall not be deemed a waiver of any such rights in respect of a separate instance of the same or similar nature.

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Addendum A

IDOT Slate of Permanent Arbitrators

1. Bruce Feldacker
2. Thomas F. Gibbons
3. Edward J. Harrick
4. Brent L. Motchan
5. Robert Perkovich
6. Byron Yaffee
7. Glenn A. Zipp

Exhibit A - Contractor Letter of Assent

(Date)

To All Parties:

In accordance with the terms and conditions of the contract for Construction Work on [Contract No. 62U12], this Letter of Assent hereby confirms that the undersigned Prime Contractor or Subcontractor agrees to be bound by the terms and conditions of the Project Labor Agreement established and entered into by the Illinois Department of Transportation in connection with said Project.

It is the understanding and intent of the undersigned party that this Project Labor Agreement shall pertain only to the identified Project. In the event it is necessary for the undersigned party to become signatory to a collective bargaining agreement to which it is not otherwise a party in order that it may lawfully make certain required contributions to applicable fringe benefit funds, the undersigned party hereby expressly conditions its acceptance of and limits its participation in such collective bargaining agreement to its work on the Project.

(Authorized Company Officer)

(Company)

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Non-segregated 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. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

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, United States Code, as required in 23 CFR 633.102(b) (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). 23 CFR 633.102(e).

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. 23 CFR 633.102(e).

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) in accordance with 23 CFR 633.102. 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 solicitation-for-bids or request-for-proposals 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). 23 CFR 633.102(b).

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. 23 CFR 633.102(d).

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. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A 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 Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), 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 Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), 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 Part 230, Subpart A, 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 (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 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 Part 35 and 29 CFR Part 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. 23 CFR 230.409 (g)(4) & (5).

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, sexual orientation, gender identity, 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 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 or other knowledgeable company official.

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, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure 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. 23 CFR 230.409. 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, sexual orientation, gender identity, 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, sexual orientation, gender identity, 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 thereunder. Employers must provide reasonable accommodation in all employment situations 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, sexual orientation, gender identity, 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, 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. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. 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 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 recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

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 more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, 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, sexual orientation, gender identity, 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), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

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 (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), 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 basic hourly 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. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act ([40 U.S.C. 3141\(2\)\(B\)](#)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. 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 must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. 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 classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH-1321) must 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. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in [29 CFR part 1](#), a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

(i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

(ii) The classification is used in the area by the construction industry; and

(iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must 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 be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate 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 used 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) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) 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 will be sent by the contracting officer by email to DBAconformance@dol.gov. 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.

(4) 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 will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The 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.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must 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.

d. *Fringe benefits not expressed as an hourly rate.*

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 may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* 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, in accordance with the criteria set forth in § 5.28, 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.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and 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.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its repurchase costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

3. Records and certified payrolls (29 CFR 5.5)

a. *Basic record requirements* (1) *Length of record retention.* All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) *Information required.* Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; 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 [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) *Additional records relating to fringe benefits.* Whenever the Secretary of Labor has found under paragraph 1.e. of this section 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 [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act, the contractor must 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.

(4) *Additional records relating to apprenticeship.* Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. *Certified payroll requirements* (1) *Frequency and method of submission.* The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) *Information required.* The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division website at <https://www.dol.gov/sites/dolgov/files/WHHD/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) *Statement of Compliance.* Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working 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 [29 CFR part 3](#); and

(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(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) *Use of Optional Form WH-347.* The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(3) of this section.

(5) *Signature.* The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification.* The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under [18 U.S.C. 1001](#) and [31 U.S.C. 3729](#).

(7) *Length of certified payroll retention.* The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents.* The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access (1) Required record disclosures and access to workers.* The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements.* If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, 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, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under [29 CFR part 6](#) any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices (1) Rate of pay.* Apprentices will be permitted to work at less than the predetermined rate for the work they perform 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 (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits.* Apprentices must 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, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio.* The allowable ratio of apprentices to journeymen on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must 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 this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates.* Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity.* The use of apprentices and journeymen under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

c. 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. 23 CFR 230.111(e)(2). 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 as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 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 as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, 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 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 [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, [18 U.S.C. 1001](#).

11. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#); or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#).

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), 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 watchpersons 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. 29 CFR 5.5.

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 and interest from the date of the underpayment. 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 watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* 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.

* \$31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, 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 that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901](#)–3907.

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or

d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

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" in paragraph 1 of Section VI 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: (based on longstanding interpretation)

- (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. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), 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. Pursuant to 23 CFR 635.116(c), 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. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

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 Part 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. 23 CFR 635.108.

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 Part 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). 29 CFR 1926.10.

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 Part 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 11, 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 (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

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. 2 CFR 180.220 and 1200.220.

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. 2 CFR 180.320.

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. 2 CFR 180.325.

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. 2 CFR 180.345 and 180.350.

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, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient 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 recipient or subrecipient 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. 2 CFR 180.330.

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. 2 CFR 180.220 and 180.300.

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. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. 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 System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

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 CFR 180.325.

* * * * *

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 CFR 180.335;.

(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, 2 CFR 180.800;

(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, 2 CFR 180.700 and 180.800; 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. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

* * * * *

3. 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). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant 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. 2 CFR 180.365.

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, Subpart I, 180.900 – 180.1020, 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 recipient or subrecipient 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 recipient or subrecipient 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. 2 CFR 1200.220 and 1200.332.

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. 2 CFR 180.220 and 1200.220.

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 System for Award Management website (<https://www.sam.gov>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

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. 2 CFR 180.325.

* * * * *

4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should 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 Part 20, App. A.

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.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor 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. 46 CFR 381.7.

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 Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY
SYSTEM OR APPALACHIAN LOCAL ACCESS**

ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)
This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.