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Letting August 4, 2017

Notice to Bidders, Specifications and Proposal



**Illinois Department
of Transportation**

Springfield, Illinois 62764

**Contract No. 60X76
COOK County
Section 2014-002R&B
Route FAI 90/94/290
Project NHPP-000V(127)
District 1 Construction Funds**

Prepared by

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Checked by



NOTICE TO BIDDERS

- 1. TIME AND PLACE OF OPENING BIDS.** Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). All bids must be submitted to the iCX system prior to 10:00 a.m. August 4, 2017 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. 60X76
COOK County
Section 2014-002R&B
Project NHPP-000V(127)
Route FAI 90/94/290
District 1 Construction Funds**

Reconstruction and widening of I-290 EB mainline pavement from Racine to Congress Parkway.

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

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

By Order of the
Illinois Department of Transportation

Randall S. Blankenhorn,
Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2017

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

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 4-1-16)
(Revised 1-1-17)

SUPPLEMENTAL SPECIFICATIONS

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STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction" adopted April 1, 2016, the latest edition of the "Manual of Uniform Traffic Control Devices for Streets and Highways, 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 Sheets included herein which apply to and govern the construction of the FAI Route 90/94/290 (I-90/94/290), Project NHPP-000V(127), Section 2014-002R&B, Cook County, Contract No. 60X76 and in case of conflict with any part or parts of said specifications, the said special provisions shall take precedence and shall govern.

LOCATION OF PROJECT

The project is located along FAI Route 90/94/290 from west of Racine to FAI Route 90/94 on FAI Route 290, and along a portion of the ramp between eastbound FAI Route 290 and southbound FAI Route 90/94 as well as the ramp between eastbound FAI Route 290 and northbound FAI Route 90/94. The gross and net length of the project is 3,776.54 feet (0.715 miles).

DESCRIPTION OF PROJECT

The work consists of the reconstruction of EB I-290, a portion of Ramp EN from EB I-290 to NB I-90/94, and a portion of Ramp ES from EB I-290 to SB I-90/94.

Work includes retaining wall construction, roadway reconstruction, erosion control and protection, utility relocation of existing storm sewers, watermain, non-special waste excavation, earth excavation and embankment, removal of existing improvements, miscellaneous storm sewers, pavements, pavement marking and signage, roadway lighting, ITS, traffic control and protection, urban enhancements and all incidental and collateral work necessary to complete the improvements as shown on the Plans and as described herein.

SOILS INFORMATION

Soil boring logs and generalized soil profiles are shown in the Plans for SN 016-1728, SN 016-1800, and SN 016-1801.

The reports below are available for inspection at IDOT District 1, 201 W. Center Court, Schaumburg, Illinois.

Roadway Geotechnical Report
Circle Interchange Reconstruction
I-290 From Loomis Street to I-90/94
Section 2013-077R, PTB 163/ITEM 001
IDOT D-91-227-13, Contract 60X77
Cook County, Illinois
Prepared by: Wang Engineering, Inc.
Original: July 14, 2015
Approved: September 4, 2015
(Includes Addendum / Disposition of Comments - Dated September 16, 2015)

Structure Geotechnical Report
Circle Interchange Reconstruction
Interstate 290 Retaining Wall 9 (Proposed SN 016-1728)
F.A.I. Route 290 (Eisenhower Expressway)
Station 5136+69.17 to Station 5139+07.34
Section 2014-002R&B
IDOT D-91-227-13 / PTB 163-001
Cook County, Illinois
Prepared by: Wang Engineering, Inc.
Original: November 17, 2016

Structure Geotechnical Report
Circle Interchange Reconstruction
Interstate 290 Retaining Wall 11
Station 5132+58.15 To Station 5133+00.00
PR SN 016-1800, Section 2014-002R&B
IDOT D-91-227-13 / PTB 163-001
Cook County, Illinois
Prepared by: Wang Engineering, Inc.
Original: November 17, 2016

Structure Geotechnical Report
Retaining Wall 12
Proposed SN 016-1801
F.A.I. Route 290
Section 2013-00BR, Contract 60X76
IDOT PTB 163-001
Cook County, Illinois
Prepared by: Wang Engineering, Inc.
Original: August 11, 2016
Approved: January 20, 2017

Geotechnical Design Memorandum
Sewer Pipe Jacking and Jacking/Receiving Pits
F.A.I. Route 290
Section 2013-00BR, Contract 60X76
IDOT D-91-227-13 / PTB 163-001
Cook County, Illinois
Prepared by: Wang Engineering, Inc.
Original: March 23, 2017

AVAILABLE RECORD DRAWINGS

The record drawings for recent nearby projects noted below are available for inspection at IDOT District 1, 201 W. Center Court, Schaumburg, Illinois. Additional design drawings and record drawings from original construction or previous rehabilitation projects are included for information within the Plans.

Contract No. 60W26
FAI Route 90/94/290
Harrison Street Bridge (WB) and Halsted Street Bridge
Section 2013-008R
Bridge Replacement, Roadway Reconstruction, Lighting and Traffic Signals
Cook County, Illinois
C-91-228-13
08/20/2013

Contract No. 60W71
FAI Route 90/94/290
From Circle Interchange to Harrison Street Bridge (East)
Section 2013-036R
Roadway Reconstruction, Resurfacing and Lighting
Cook County, Illinois
C-91-360-13
12/06/2013

Contract No. 60W29
Peoria Street Bridge at I-290/Congress Parkway (Circle Interchange)
Section 2013-011R
Bridge Replacement, Roadway Reconstruction, Lighting, CTA Rehabilitation
Cook County, Illinois
C-91-231-13
10/10/2013

Contract No. 60W25
Morgan Street Bridge at I-290/Congress Parkway (Circle Interchange)
Section 2013-007R
Reconstruction, Bridge Replacement, Lighting, Traffic Signals, and Watermain
Cook County, Illinois
C-91-22-13
05/14/2013

CONTRACTOR COOPERATION

The Contractor's attention is directed to the fact that other separate contracts may be under construction during the duration of this Contract. Adjacent contracts may consist of, but are not limited to projects near:

Contract 60X61	I-290 Westbound Auxiliary Lanes
Contract 60X62	Peoria Street Aesthetics (Jane Byrne Interchange)
Contract 60W28	NW Flyover Ramp (Jane Byrne Interchange)
Contract 62C92	Peoria Street Siphon Lining
Contract 60X77	Westbound I-290 Roadway Reconstruction Congress Parkway to Racine (Jane Byrne Interchange)
Contract 60X78	Bridge Westbound (East of Des Plaines) & I-290 Westbound Bridge Over I-90/94 (Jane Byrne Interchange)
Contract 60X99	Van Buren Street Bridge Reconstruction (Jane Byrne Interchange)
Contract 60X75	Bridge Eastbound (East of Des Plaines) & I-290 Eastbound Bridge Over I-90/94 (Jane Byrne Interchange)

Contract 60X95 Monroe Street Bridge Reconstruction
Contract 62A74 UIC Retaining Wall/ Water Main Rehabilitation
Contract 62A75 Jackson Boulevard Utility Relocation
Contract 62B76 N to E Congress Parkway
Contract 60X79 Ramp EN (Future Contract)
Contract 60X93 Interchange Ramp Completions (Future Contract)
Contract 60X07 I-55 / Lake Shore Drive Interchange
Contract 60L70 I-55 / Lake Shore Drive Interchange
Contract 46358 Section D-1 Sign Repl Contract 16-02
Contract #233702 Ashland Avenue – Kostner to Racine
University of Illinois- Chicago Projects In and Around the Building Housing the College of Urban Planning and Public Affairs (412 S. Peoria Street)
And others.

The Contractor will be governed by Article 105.08 of the Standard Specifications.

The Contractor will be required to attend a weekly coordination meeting at a time and location to be determined by the Department.

The Contractor will 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.

The cooperation between work under this contract and Contracts 60X75 and Contract 62A74 is essential due to the adjacent limits of construction and shared maintenance of traffic responsibilities along Eastbound I-290 and ramp ES. All traffic staging configurations and changes to staging along I-290 and ramps shall be coordinated with the contractor performing work under Contracts 60X75 and 62A74.

PROGRESS SCHEDULE

Description. Time is of the essence in this Contract. It may be necessary for the Contractor to work longer hours, use additional crews, and work during weekends in order to complete the work within the required time limit. The Contractor shall submit a Critical Path Method (CPM) Progress Schedule as described below for the Engineer's approval before the work can be started.

The Contractor will not be allowed any compensation for working longer hours or using extra shifts; and working on weekends or during Holidays; working during winter months, etc. to meet the specified Completion Date.

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

Requirements. The software shall produce an electronic progress schedule for submission to the department that is 100% compatible with Primavera SureTrak 3.0 Project Manager, published by Primavera Systems, Inc.

Format. The electronic schedule format shall contain the following:

- a. Project Name: (Optional).
- b. Template: Construction.
- c. Type: SureTrak: Native file format for stand-alone contracts.
- d. Planning Unit: Days (calendar working).
- e. Number/Version: Original or updated number.
- f. Start Date: Not later than ten days after execution of the contract.
- g. Must Finish Date: Completion date for completion date contracts.
- h. Project Title: Contract number.
- i. Company Name: Contractor's name.

Calendars.

a. Completion Date Contracts. The base calendar shall show the proposed working days of the week and the proposed number of work hours per day.

Schedule Development. The detailed schedule shall incorporate the entire contract time. The minimum number of activities shown on the schedule shall represent the work incorporating the pay items whose aggregate contract value constitutes 80 percent of the total contract value. These pay items shall be determined by starting with the pay item with the largest individual contract value and adding subsequent pay item contract values in descending order until 80 percent of the contract value has been attained. Any additional activities required to maintain the continuity of the schedule logic shall also be shown.

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

a. Activity Identification (ID) Numbers. The Contract shall utilize numerical designations to identify each activity. Numbering of activities shall be in increments of not less than ten digits.

b. A description of the work represented by the activity (maximum forty-five characters). The use of descriptions referring to a percentage of a multi-element item (i.e., construct deck 50%) shall not be used. Separate activities shall be included to represent different elements of multi-element items (i.e., forms, reinforcing, concrete, etc.). Multiple activities with the same work description shall include a location as part of the description.

c. Proposed activity duration shall be shown in whole days. The Contractor shall provide production rates to justify the activity duration. Schedule duration shall be contiguous and not interruptible.

The schedule shall indicate the sequence and interdependence of activities required for the prosecution of the work. The schedule logic shall not be violated.

Activities should be broken down such that each activity encompasses a single operation or tightly-integrated operations in a single, contiguous and continuous area of the project, with no activity exceeding \$200,000 without the consent of the Engineer.

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

Tabular Reports.

a. The following tabular reports will be required with each schedule submission:

1. Classic Gantt
2. Pert with Time Scale

b. The heading of each tabular report shall include, but not be limited to, the project name, contract number, Contractor name, report date, data date, report title and page number.

c. Each of the tabular reports shall also contain the following minimum information for each activity.

1. Activity ID
2. Activity Description
3. Original Duration (calendar day/working day)
4. Remaining Duration (calendar day/working day)
5. Activity Description
6. Early Start Date
7. Late Start Date
8. Early Finish Date
9. Late Finish Date
10. Percent Complete
11. Total Float
12. Calendar ID
13. Work performed by DBE Subcontractors and Trainees shall be shown in the Gantt Report.

d. Reports shall be printed in color on 11 in. x 17 in. (minimum) size sheets. The Classic Gantt shall show all columns, bars, column headings at the top, time scale at the top and shall show relationships.

Submission Requirements. The initial schedule shall be submitted prior to starting work but no later than five calendar days after execution of the contract. Updated schedules shall be submitted according to Article 108.02 except that as a minimum, updated schedules will be required at the 25, 50, and 75 percent completion points of the contract.

Updating.

- a. The Contractor shall not make any changes to the original duration, activity relationships, constraints, costs, add or delete activities, or alter the schedule's logic when updating the schedule.
- b. The originally approved baseline CPM schedule will be designated as the "Target Schedule" and shall only be changed based on a Change Order that extends the Contract duration. All updates will be plotted against the "Target Schedule." If the Contractor believes any such changes result in an overall increase in the contract time, the Contractor will immediately submit a request for extension of time along with the changed progress schedule and a detailed justification for the time extension request in accordance with Article 108.08.
- c. The updated information will include the original schedule detail and the following additional information:
 1. Actual start dates
 2. Actual finish dates
 3. Activity percent completion
 4. Remaining duration of activities in progress
 5. Identified or highlighted critical activities
- d. The Contractor shall submit scheduling documents in the same formats and number as indicated in this section.
- e. The Engineer shall withhold progress payments if the Contractor does not submit scheduled updates as required.
- f. Upon receipt of the CPM schedule update, the Engineer will review the schedule for conformance with the Contract Documents and degree of detail. The Engineer, within fourteen (14) Days after receipt of the Updated CPM Schedule and supporting documents, will approve or reject it with written comments. If the Updated CPM schedule is rejected, the Contractor must submit a Revised Updated CPM Schedule within seven (7) Days after the date of rejection.
- g. The updated progress schedule must accurately represent the Project's current status.

Contractor Changes to the Schedule.

The Contractor shall comply with the following requirements regarding proposed changes to the approved baseline CPM schedule:

- a. If the Contractor proposes to make any changes in the approved baseline CPM schedule, the Contractor shall notify the Engineer in writing, stating the reasons for the change, identifying each changed activity (including duration and interrelationships between activities) and providing a diskette of the proposed changed schedule. Every effort must be made by the Contractor to retain the original Activity ID numbers.
- b. The Engineer has the authority to approve or disapprove the proposed change in the baseline CPM schedule and shall do so in writing within ten (10) Days after receipt to the Contractor's submission.
- c. If the Engineer approves the change in the baseline. All monthly updates will be plotted against the new "Target Schedule".
- d. If the Engineer approves a portion of the change to the baseline CPM schedule, the Contractor shall submit a revised CPM schedule incorporating such change(s) within ten (10) Days after approval along with a written description of the change(s) to the schedule.

Recovery Schedule.

- a. The Contractor shall maintain an adequate work force and the necessary materials, supplies and equipment to meet the current approved baseline CPM schedule. In the event that the Contractor, in the judgment of the Engineer, is failing to meet the approved CPM schedule including any Contract milestones, the Contractor shall submit a recovery schedule.
- b. The recovery schedule shall set forth a plan to eliminate the schedule slippage (negative float). The plan must be specific to show the methods to achieve the recovery of time, i.e. increasing manpower, working overtime, weekend work, employing multiple shifts. All costs associated with implementing the recovery schedule shall be borne by the Contractor.
- c. Upon receipt of the CPM recovery schedule, the Engineer will review the schedule for conformance with the Contract Documents and degree of detail. The Engineer will approve the schedule or reject it with written comments within fourteen (14) Days of receipt of the recovery schedule and supporting documents. If the detailed CPM recovery schedule is rejected, the Contractor must submit a revised CPM recovery schedule within seven (7) Days of the date of rejection.

Revised Schedule.

The Engineer may direct the Contractor to revise the approved CPM schedule. Reasons for such direction may include, but are limited to, the following: (1) changes in the Work, (2) rephrasing of the Project or any phase, (3) a change in the duration of the Project or phase, and (4) acceleration of the Project or phase.

- a. The Engineer will direct the Contractor to provide a revised CPM schedule in writing.
- b. The Contractor will provide the revised CPM schedule within ten (10) Days of receipt of the Engineer's written direction.
- c. The Engineer has the authority, in its sole discretion, to approve or reject the revised CPM schedule and will do so in writing within ten (10) Days after receipt of the Contractor's submission. If the Engineer approves the revised schedule, such schedule will be designated the new "Target Schedule".

The schedule shall be submitted in the Sorted by Activity Layout (SORT4). The activities on the schedule shall be plotted using early start, late start, early finish, late finish and total finish.

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

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

The schedule shall indicate the critical path to contract completion. Only one controlling item shall be designated at any point in time on the schedule.

Acceptance or approval of any progress schedule by the Engineer shall not be construed to imply approval of any particular method of construction, sequence of construction, any implied or stated rate of production. Acceptance will not act as a waiver of the obligation of the Contractor to complete the work in accordance with the contract proposal, Plans and Specifications, modify any rights or obligations of the Department as set forth in the contract, nor imply any obligation of a third party. Acceptance shall not be construed to modify or amend the contract or the time limit(s) therein. Acceptance shall not relieve the Contractor of the responsibility for the accuracy of any of the information included on the schedule. Failure of the Contractor to include in the schedule any element of work required for the performance of the contract, any sequence of work required by the contract, or any known or anticipated condition affecting the work shall not excuse the Contractor from completing all work required within the time limit(s) specified in the contract notwithstanding acceptance of the schedule by the Engineer.

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

WINTER WORK

No adjustment will be made in the contract unit prices for any concrete if winter work is necessary to meet the required completion dates specified in the contract.

SUBMITTALS

There are elements of construction that may require long lead times between order and delivery to the project site for installation. The Contractor must prioritize timely submittals of shop drawings to minimize any delays in project execution.

The Contractor shall provide notice to the Engineer concerning shop drawing submittal schedules and when shop drawing submittal deadlines may be delayed.

MAINTENANCE OF ROADWAYS

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.

RESTRICTION ON WORKING DAYS AFTER A COMPLETION DATE

All temporary lane closures *on arterial streets* during the period governed by working days after a completion date will not be permitted during the hours of 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m. Monday through Friday.

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.

FAILURE TO COMPLETE THE WORK ON TIME

Effective: September 30, 1985

Revised: January 1, 2007

Should the Contractor fail to complete the work on or before the completion date as specified in the Special 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 **\$ 10,000**, 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.

COMPLETION DATE PLUS WORKING DAYS

Effective: September 30, 1985

Revised: January 1, 2007

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

"When a completion date plus working days is specified, the Contractor shall complete all contract items and safely open all roadways to traffic by 11:59 PM on **November 30, 2019**.

The Contractor must not close eastbound mainline I-290 lanes from Racine Avenue to Halsted Street prior to April 1, 2018.

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.

RAILROAD PROTECTIVE LIABILITY INSURANCE (BDE)

Effective: December 1, 1986

Revised: January 1, 2006

Description. Railroad Protective Liability and Property Damage Liability Insurance shall be carried according to Article 107.11 of the Standard Specifications. A separate policy is required for each railroad unless otherwise noted.

NAMED INSURED & ADDRESS	NUMBER & SPEED OF PASSENGER TRAINS	NUMBER & SPEED OF FREIGHT TRAINS
Chicago Transit Authority (CTA) 567 West Lake Street P.O.Box 7598 Chicago IL 60680-7598	Blue Line 382 trains/day@55mph.	-0-
DOT/AAR No.: N/A RR Division: CTA	RR Mile Post: N/A RR Sub-Division: Blue Line	
For Freight/Passenger Information Contact: <u>Mr. Abdin Carrillo</u>	Phone: <u>312/681-3913</u>	
For Insurance Information Contact: <u>Judith Tancula</u>	Phone: <u>312/681-2724</u>	

Approval of Insurance. The original and one certified copy of each required policy shall be submitted to the following address for approval:

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

The Contractor will be advised when the Department has received approval of the insurance from the railroad(s). Before any work begins on railroad right-of-way, the Contractor shall submit to the Engineer evidence that the required insurance has been approved by the railroad(s). The Contractor shall also provide the Engineer with the expiration date of each required policy.

Basis of Payment. Providing Railroad Protective Liability and Property Damage Liability Insurance will be paid for at the contract unit price per Lump Sum for RAILROAD PROTECTIVE LIABILITY INSURANCE.

AGGREGATE SURFACE COURSE FOR TEMPORARY ACCESS

Effective: April 1, 2001

Revised: January 2, 2007

Revise Article 402.10 of the Standard Specifications to read:

“402.10 For Temporary Access. The contractor shall construct and maintain aggregate surface course for temporary access to private entrances, commercial entrances and roads according to Article 402.07 and as directed by the Engineer.

The aggregate surface course shall be constructed to the dimensions and grades specified below, except as modified by the plans or as directed by the Engineer.

Private Entrance. The minimum width shall be 12 ft (3.6 m). The minimum compacted thickness shall be 6 in. (150 mm). The maximum grade shall be eight percent, except as required to match the existing grade.

Commercial Entrance. The minimum width shall be 24 ft (7.2 m). The minimum compacted thickness shall be 9 in. (230 mm). The maximum grade shall be six percent, except as required to match the existing grade.

Road. The minimum width shall be 24 ft (7.2 m). The minimum compacted thickness shall be 9 in. (230 mm). The grade and elevation shall be the same as the removed pavement, except as required to meet the grade of any new pavement constructed.

Maintaining the temporary access shall include relocating and/or regrading the aggregate surface course for any operation that may disturb or remove the temporary access. The same type and gradation of material used to construct the temporary access shall be used to maintain it.

When use of the temporary access is discontinued, the aggregate shall be removed and utilized in the permanent construction or disposed of according to Article 202.03.”

Add the following to Article 402.12 of the Standard Specifications:

“Aggregate surface course for temporary access will be measured for payment as each for every private entrance, commercial entrance or road constructed for the purpose of temporary access. If a residential drive, commercial entrance, or road is to be constructed under multiple stages, the aggregate needed to construct the second or subsequent stages will not be measured for payment but shall be included in the cost per each of the type specified.”

Revise the second paragraph of Article 402.13 of the Standard Specifications to read:

“Aggregate surface course for temporary access will be paid for at the contract unit price per each for TEMPORARY ACCESS (PRIVATE ENTRANCE), TEMPORARY ACCESS (COMMERCIAL ENTRANCE) or TEMPORARY ACCESS (ROAD).

Partial payment of the each amount bid for temporary access, of the type specified, will be paid according to the following schedule:

Upon construction of the temporary access, sixty percent of the contract unit price per each, of the type constructed, will be paid.

Subject to the approval of the Engineer for the adequate maintenance and removal of the temporary access, the remaining forty percent of the pay item will be paid upon the permanent removal of the temporary access.”

AGGREGATE FOR CONCRETE BARRIER (DISTRICT ONE)

Effective: February 11, 2004

Revised: January 24, 2008

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

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

ADJUSTMENTS AND RECONSTRUCTIONS

Effective: March 15, 2011

Revise the first paragraph of Article 602.04 to read:

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

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

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

Revise Article 603.05 to read:

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

Revise Article 603.06 to read:

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

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

Revise the first sentence of Article 603.07 to read:

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

AGGREGATE SUBGRADE IMPROVEMENT (D-1)

Effective: February 22, 2012

Revised: April 1, 2016

Add the following Section to the Standard Specifications:

“SECTION 303. AGGREGATE SUBGRADE IMPROVEMENT

303.01 Description. This work shall consist of constructing an aggregate subgrade improvement.

303.02 Materials. Materials shall be according to the following.

	Item	Article/Section	
(a)	Coarse Aggregate	1004.07	
(b)	Reclaimed Asphalt Pavement (RAP) (Notes 1, 2 and 3)		1031

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

Note 2. RAP having 100 percent passing the 1 1/2 in (37.5 mm) sieve and being well graded, may be used as capping aggregate in the top 3 in. (75 mm) when aggregate gradation CS 01 is used in lower lifts. When RAP is blended with any of the coarse aggregates, the blending shall be done with mechanically calibrated feeders. The final product shall not contain more than 40 percent by weight of RAP.

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

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

303.04 Soil Preparation. The stability of the soil shall be according to the Department's Subgrade Stability Manual for the aggregate thickness specified.

303.05 Placing Aggregate. The maximum nominal lift thickness of aggregate gradation CS 01 shall be 24 in. (600 mm).

303.06 Capping Aggregate. The top surface of the aggregate subgrade shall consist of a minimum 3 in. (75 mm) of aggregate gradations CA 06 or CA 10. When Reclaimed Asphalt Pavement (RAP) is used, it shall be crushed and screened where 100 percent is passing the 1 1/2 in. (37.5 mm) sieve and being well graded. RAP that has been fractionated to size will not be permitted for use in capping. Capping aggregate will not be required when the aggregate subgrade improvement is used as a cubic yard pay item for undercut applications. When RAP is blended with any of the coarse aggregates, the blending shall be done with mechanically calibrated feeders.

303.07 Compaction. All aggregate lifts shall be compacted to the satisfaction of the Engineer. If the moisture content of the material is such that compaction cannot be obtained, sufficient water shall be added so that satisfactory compaction can be obtained.

303.08 Finishing and Maintenance of Aggregate Subgrade Improvement. The aggregate subgrade improvement shall be finished to the lines, grades, and cross sections shown on the plans, or as directed by the Engineer. The aggregate subgrade improvement shall be maintained in a smooth and compacted condition.

303.09 Method of Measurement. This work will be measured for payment according to Article 311.08.

303.10 Basis of Payment. This work will be paid for at the contract unit price per cubic yard (cubic meter) for AGGREGATE SUBGRADE IMPROVEMENT or at the contract unit price per square yard (square meter) for AGGREGATE SUBGRADE IMPROVEMENT, of the thickness specified.

Add the following to Section 1004 of the Standard Specifications:

“1004.07 Coarse Aggregate for Aggregate Subgrade Improvement. The aggregate shall be according to Article 1004.01 and the following.

Description. The coarse aggregate shall be crushed gravel, crushed stone, or crushed concrete. The top 12 inches of the aggregate subgrade improvement shall be 3 inches of capping material and 9 inches of crushed gravel, crushed stone or crushed concrete. In applications where greater than 36 inches of subgrade material is required, rounded gravel, meeting the CS01 gradation, may be used beginning at a depth of 12 inches below the bottom of pavement.

Quality. The coarse aggregate shall consist of sound durable particles reasonably free of deleterious materials. Non-mechanically blended RAP may be allowed up to a maximum of 5.0 percent.

Gradation.

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

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

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

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

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

Effective: November 1, 2011

Revised: November 1, 2013

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

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

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

DRAINAGE AND INLET PROTECTION UNDER TRAFFIC (DISTRICT 1)

Effective: April 1, 2011

Revised: April 2, 2011

Add the following to Article 603.02 of the Standard Specifications:

- " (i) Temporary Hot-Mix Asphalt (HMA) Ramp (Note)..... 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.

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.

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

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

Placement shall be according to the manufacturer’s specifications.

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

EMBANKMENT

Effective: March 1, 2011

Revised: November 1, 2013

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

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

The laboratory Standard Dry Density shall be a minimum of 90 lb/cu ft (1450 kg/cu m) when determined according to AASHTO T 99 (Method C).

The organic content shall be less than ten percent determined according to AASHTO T 194 (Wet Combustion).

Soils which demonstrate the following properties shall be restricted to the interior of the embankment and shall be covered on both the sides and top of the embankment by a minimum of 3 ft (900 mm) of soil not considered detrimental in terms of erosion potential or excess volume change.

A grain size distribution with less than 35 percent passing the number 75 um (#200) sieve.

A plasticity index (PI) of less than 12.

A liquid limit (LL) in excess of 50.

Reclaimed asphalt shall not be used within the ground water table or as a fill if ground water is present.

The RAP used shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Pavement (RAP) for Aggregate Applications". Gradation deleterious count shall not exceed 10% of total RAP and 5% of other by total weight.

CONSTRUCTION REQUIREMENTS

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

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

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

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

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

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

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

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

ENGINEER'S FIELD OFFICE TYPE A (SPECIAL)

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 (D-1)

Effective: January 1, 2011

Revised: April 29, 2016

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

"1004.03 Coarse Aggregate for Hot-Mix Asphalt (HMA). The aggregate shall be according to Article 1004.01 and the following.

(a) Description. The coarse aggregate for HMA shall be according to the following table.

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

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 Leveling Binder IL-9.5 or IL-9.5L SMA Ndesign 50 Surface	<u>Allowed Alone or in Combination</u> ^{5/} : Crushed Gravel Carbonate Crushed Stone ^{2/} Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag ^{4/} Crushed Concrete ^{3/}
HMA High ESAL	D Surface and Leveling Binder IL-9.5 SMA Ndesign 50 Surface	<u>Allowed Alone or in Combination</u> ^{5/} : Crushed Gravel Carbonate Crushed Stone (other than Limestone) ^{2/} Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag ^{4/} Crushed Concrete ^{3/}
		<u>Other Combinations Allowed:</u>
		<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

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

Crushed steel slag allowed in shoulder surface only.

Carbonate crushed stone (limestone) and/or crushed gravel shall not be used in SMA Ndesign 80. In SMA Ndesign 50, carbonate crushed stone shall not be blended with any of the other aggregates allowed alone in Ndesign 50 SMA binder or Ndesign 50 SMA surface.

Crushed concrete will not be permitted in SMA mixes.

Crushed steel slag shall not be used as leveling binder.

When combinations of aggregates are used, the blend percent measurements shall be by volume.”

Combining different types of aggregate will not be permitted in SMA Ndesign 80.”

SLIPFORM PAVING (D-1)

Effective: November 1, 2014

Revise Article 1020.04 Table 1, Note (5) Standard Specifications to read:

“The slump range for slipform construction shall be ½ to 1 ½ in.”

Revise Article 1020.04 Table 1 (metric), Note (5) of Standard Specifications to read:

“The slump range for slipform construction shall be 13 to 40 mm.”

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

Effective: June 29, 2006

Revised: April 1, 2016

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

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

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

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

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

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

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

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

“(c) RAP Materials (Note 5)1031”

Add the following note to 1030.02 of the Standard Specifications:

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

HMA MIXTURE DESIGN REQUIREMENTS (D-1)

Effective: January 1, 2013

Revised: April 1, 2016

1) Design Composition and Volumetric Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

1/ Uses 19.0L binder mix.

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

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

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

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

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

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

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

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

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

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

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

Based on percent of total aggregate weight.

The mixture composition shall not exceed 44 percent passing the #8 (2.36 mm) sieve for surface courses with Ndesign = 90.

Additional minus No. 200 (0.075 mm) material required by the mix design shall be mineral filler, unless otherwise approved by the Engineer.

The maximum percent passing the #635 (20 µm) sieve shall be ≤ 3 percent.

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.

When establishing the Adjusted Job Mix Formula (AJMF) the percent passing the #8 (2.36 mm) sieve shall not be adjusted below 34 percent.

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

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

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

Maximum Draindown for IL-4.75 shall be 0.3 percent

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

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

“(3) SMA Mixtures.

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

Maximum draindown shall be 0.3 percent. The draindown shall be determined at the JMF asphalt binder content at the mixing temperature plus 30 °F.

Applies when specific gravity of coarse aggregate is ≥ 2.760 .

Applies when specific gravity of coarse aggregate is < 2.760 .

Blending of different types of aggregate will not be permitted.

For surface course, the coarse aggregate can be crushed steel slag, crystalline crushed stone or crushed sandstone. For binder course, coarse aggregate shall be crushed stone (dolomite), crushed gravel, crystalline crushed stone, or crushed sandstone.

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

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

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

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

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

Sufficient collected dust (baghouse) is available for production of the SMA mix for the entire project.

A mix design was prepared based on collected dust (baghouse).

2) Design Verification and Production

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

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

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

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

Illinois Modified AASHTO T 324 Requirements ^{1/}

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

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

Note: For SMA Designs (N-80) the maximum rut depth is 6.0 mm at 20,000 repetitions.
 For IL 4.75mm Designs (N-50) the maximum rut depth is 9.0mm at 15,000 repetitions.

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

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

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

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

“The Hamburg Wheel test shall also be conducted on all HMA mixtures from a sample taken within the first 500 tons (450 metric tons) on the first day of production or during start up with a split reserved for the Department. The mix sample shall be tested according to the Illinois Modified AASHTO T 324 and shall meet the requirements specified herein. Mix production shall not exceed 1500 tons (1350 metric tons) or one day’s production, whichever comes first, until the testing is completed and the mixture is found to be in conformance. The requirement to cease mix production may be waived if the plant produced mixture demonstrates conformance prior to start of mix production for a contract.

If the mixture fails to meet the Hamburg Wheel criteria, no further mixture will be accepted until the Contractor takes such action as is necessary to furnish a mixture meeting the criteria”

Method of Measurement:

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

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

Basis of Payment.

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

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

PUBLIC CONVENIENCE AND SAFETY (D-1)

Effective: May 1, 2012

Revised: July 15, 2012

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

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

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

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

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

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

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

Effective: November 1, 2012

Revise: April 1, 2017

Revise Section 1031 of the Standard Specifications to read:

“SECTION 1031. RECLAIMED ASPHALT PAVEMENT AND RECLAIMED ASPHALT SHINGLES

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

- (a) Reclaimed Asphalt Pavement (RAP). RAP is the material resulting from cold milling or crushing an existing hot-mix asphalt (HMA) pavement. RAP will be considered processed FRAP after completion of both crushing and screening to size. The Contractor shall supply written documentation that the RAP originated from routes or airfields under federal, state, or local agency jurisdiction.

(b) Reclaimed Asphalt Shingles (RAS). Reclaimed asphalt shingles (RAS). RAS is from the processing and grinding of preconsumer or post-consumer shingles. RAS shall be a clean and uniform material with a maximum of 0.5 percent unacceptable material, as defined in Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Shingle (RAS) Sources", by weight of RAS. All RAS used shall come from a Bureau of Materials and Physical Research approved processing facility where it shall be ground and processed to 100 percent passing the 3/8 in. (9.5 mm) sieve and 90 percent passing the #4 (4.75 mm) sieve. RAS shall meet the testing requirements specified herein. In addition, RAS shall meet the following Type 1 or Type 2 requirements.

(1) Type 1. Type 1 RAS shall be processed, preconsumer asphalt shingles salvaged from the manufacture of residential asphalt roofing shingles.

(2) Type 2. Type 2 RAS shall be processed post-consumer shingles only, salvaged from residential, or four unit or less dwellings not subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP).

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

(a) RAP Stockpiles. The Contractor shall construct individual, sealed RAP stockpiles meeting one of the following definitions. Additional processed RAP (FRAP) shall be stockpiled in a separate working pile, as designated in the QC Plan, and only added to the sealed stockpile when test results for the working pile are complete and are found to meet tolerances specified herein for the original sealed FRAP stockpile. Stockpiles shall be sufficiently separated to prevent intermingling at the base. All stockpiles (including unprocessed RAP and FRAP) shall be identified by signs indicating the type as listed below (i.e. "Non- Quality, FRAP -#4 or Type 2 RAS", etc...).

(1) Fractionated RAP (FRAP). FRAP shall consist of RAP from Class I, Superpave HMA (High and Low ESAL) or equivalent mixtures. The coarse aggregate in FRAP shall be crushed aggregate and may represent more than one aggregate type and/or quality, but shall be at least C quality. All FRAP shall be processed prior to testing and sized into fractions with the separation occurring on or between the #4 (4.75 mm) and 1/2 in. (12.5 mm) sieves. Agglomerations shall be minimized such that 100 percent of the RAP in the coarse fraction shall pass the maximum sieve size specified for the mix the FRAP will be used in.

- (2) Restricted FRAP (B quality) stockpiles shall consist of RAP from Class I, Superpave (High ESAL), or HMA (High ESAL). If approved by the Engineer, the aggregate from a maximum 3.0 in. (75 mm) single combined pass of surface/binder milling will be classified as B quality. All millings from this application will be processed into FRAP as described previously.
- (3) Conglomerate. Conglomerate RAP stockpiles shall consist of RAP from Class I, Superpave HMA (High and Low ESAL) or equivalent mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality, but shall be at least C quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate RAP shall be processed (FRAP) prior to testing. Conglomerate RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.
- (4) Conglomerate "D" Quality (DQ). Conglomerate DQ RAP stockpiles shall consist of RAP from HMA shoulders, bituminous stabilized subbases or Superpave (Low ESAL)/HMA (Low ESAL) IL-19.0L binder mixture. The coarse aggregate in this RAP may be crushed or round but shall be at least D quality. This RAP may have an inconsistent gradation and/or asphalt binder content. Conglomerate DQ RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.
- (5) Non-Quality. RAP stockpiles that do not meet the requirements of the stockpile categories listed above shall be classified as "Non-Quality".

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

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

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

Records identifying the shingle processing facility supplying the RAS, RAS type, and lot number shall be maintained by project contract number and kept for a minimum of three years.

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

- (a) FRAP Testing. When used in HMA, the FRAP shall be sampled and tested either during processing or after stockpiling. It shall also be sampled during HMA production.
- (1) During Stockpiling. For testing during stockpiling, washed extraction samples shall be run at the minimum frequency of one sample per 500 tons (450 metric tons) for the first 2000 tons (1800 metric tons) and one sample per 2000 tons (1800 metric tons) thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons (3600 metric tons).
 - (2) Incoming Material. For testing as incoming material, washed extraction samples shall be run at a minimum frequency of one sample per 2000 tons (1800 metric tons) or once per week, whichever comes first.
 - (3) After Stockpiling. For testing after stockpiling, the Contractor shall submit a plan for approval to the District proposing a satisfactory method of sampling and testing the RAP/FRAP pile either in-situ or by restockpiling. The sampling plan shall meet the minimum frequency required above and detail the procedure used to obtain representative samples throughout the pile for testing.

Before extraction, each field sample of FRAP, shall be split to obtain two samples of test sample size. One of the two test samples from the final split shall be labeled and stored for Department use. The Contractor shall extract the other test sample according to Department procedure. The Engineer reserves the right to test any sample (split or Department-taken) to verify Contractor test results.

- (b) RAS Testing. RAS shall be sampled and tested during stockpiling according to Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Shingle (RAS) Sources". The Contractor shall also sample as incoming material at the HMA plant.
- (1) During Stockpiling. Washed extraction and testing for unacceptable materials shall be run at the minimum frequency of one sample per 200 tons (180 metric tons) for the first 1000 tons (900 metric tons) and one sample per 1000 tons (900 metric tons) thereafter. A minimum of five samples are required for stockpiles less than 1000 tons (900 metric tons). Once a ≤ 1000 ton (900 metric ton), five-sample/test stockpile has been established it shall be sealed. Additional incoming RAS shall be in a separate working pile as designated in the Quality Control plan and only added to the sealed stockpile when the test results of the working pile are complete and are found to meet the tolerances specified herein for the original sealed RAS stockpile.
- (2) Incoming Material. For testing as incoming material at the HMA plant, washed extraction shall be run at the minimum frequency of one sample per 250 tons (227 metric tons). A minimum of five samples are required for stockpiles less than 1000 tons (900 metric tons). The incoming material test results shall meet the tolerances specified herein.

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

Before extraction, each field sample shall be split to obtain two samples of test sample size. One of the two test samples from the final split shall be labeled and stored for Department use. The Contractor shall extract the other test sample according to Department procedures. The Engineer reserves the right to test any sample (split or Department-taken) to verify Contractor test results.

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

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

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

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

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

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

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

(b) Evaluation of RAS Test Results. All of the test results, with the exception of percent unacceptable materials, shall be compiled and averaged for asphalt binder content and gradation. A five test average of results from the original pile will be used in the mix designs. Individual test results run thereafter, when compared to the average used for the mix design, will be accepted if within the tolerances listed below.

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

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

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

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

The Engineer will notify the Contractor of observed deficiencies.

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

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

1/ Based on washed extraction.

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

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

1031.05 Quality Designation of Aggregate in RAP and FRAP.

- (a) RAP. The aggregate quality of the RAP for homogeneous, conglomerate, and conglomerate "D" quality stockpiles shall be set by the lowest quality of coarse aggregate in the RAP stockpile and are designated as follows.

- (1) RAP from Class I, Superpave/HMA (High ESAL), or (Low ESAL) IL-9.5L surface mixtures are designated as containing Class B quality coarse aggregate.
- (2) RAP from Superpave/HMA (Low ESAL) IL-19.0L binder mixture is designated as Class D quality coarse aggregate.
- (3) RAP from Class I, Superpave/HMA (High ESAL) binder mixtures, bituminous base course mixtures, and bituminous base course widening mixtures are designated as containing Class C quality coarse aggregate.
- (4) RAP from bituminous stabilized subbase and BAM shoulders are designated as containing Class D quality coarse aggregate.

- (b) FRAP. If the Engineer has documentation of the quality of the FRAP aggregate, the Contractor shall use the assigned quality provided by the Engineer.

If the quality is not known, the quality shall be determined as follows. Fractionated RAP stockpiles containing plus #4 (4.75 mm) sieve coarse aggregate shall have a maximum tonnage of 5,000 tons (4,500 metric tons). The Contractor shall obtain a representative sample witnessed by the Engineer. The sample shall be a minimum of 50 lb (25 kg). The sample shall be extracted according to Illinois Modified AASHTO T 164 by a consultant laboratory prequalified by the Department for the specified testing. The consultant laboratory shall submit the test results along with the recovered aggregate to the District Office. The cost for this testing shall be paid by the Contractor. The District will forward the sample to the Bureau of Materials and Physical Research Aggregate Lab for MicroDeval Testing, according to ITP 327. A maximum loss of 15.0 percent will be applied for all HMA applications. The fine aggregate portion of the fractionated RAP shall not be used in any HMA mixtures that require a minimum of "B" quality aggregate or better, until the coarse aggregate fraction has been determined to be acceptable thru a MicroDeval Testing.

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

(a) FRAP. The use of FRAP in HMA shall be as follows.

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

(b) RAS. RAS meeting Type 1 or Type 2 requirements will be permitted in all HMA applications as specified herein.

- (c) FRAP and/or RAS Usage Limits. Type 1 or Type 2 RAS may be used alone or in conjunction with FRAP in HMA mixtures up to a maximum of 5.0 percent by weight of the total mix.

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

Max Asphalt Binder Replacement for FRAP with RAS Combination

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

- 1/ For Low ESAL HMA shoulder and stabilized subbase, the percent asphalt binder replacement shall not exceed 50 % of the total asphalt binder in the mixture.
- 2/ When the binder replacement exceeds 15 % for all mixes, except for SMA and IL-4.75, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 % binder replacement using a virgin asphalt binder grade of PG64-22 will be reduced to a PG58-28). When constructing full depth HMA and the ABR is less than 15 %, the required virgin asphalt binder grade shall be PG64-28.
- 3/ When the ABR for SMA or IL-4.75 is 15 % or less, the required virgin asphalt binder shall be SBS PG76-22 and the elastic recovery shall be a minimum of 80. When the ABR for SMA or IL-4.75 exceeds 15%, the virgin asphalt binder grade shall be SBS PG70-28 and the elastic recovery shall be a minimum of 80.
- 4/ When FRAP or RAS is used alone, the maximum percent asphalt binder replacement designated on the table shall be reduced by 10 %.

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

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

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

To remove or reduce agglomerated material, a scalping screen, gator, crushing unit, or comparable sizing device approved by the Engineer shall be used in the RAS and FRAP feed system to remove or reduce oversized material. If material passing the sizing device adversely affects the mix production or quality of the mix, the sizing device shall be set at a size specified by the Engineer.

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

- (a) RAS. RAS shall be incorporated into the HMA mixture either by a separate weight depletion system or by using the RAP weigh belt. Either feed system shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all rates of production and batch sizes. The portion of RAS shall be controlled accurately to within ± 0.5 percent of the amount of RAS utilized. When using the weight depletion system, flow indicators or sensing devices shall be provided and interlocked with the plant controls such that the mixture production is halted when RAS flow is interrupted.

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

(1) Dryer Drum Plants.

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

- (2) Batch Plants.
- a. Date, month, year, and time to the nearest minute for each print.
 - b. HMA mix number assigned by the Department.
 - c. Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram).
 - d. Mineral filler weight to the nearest pound (kilogram).
 - f. RAS and FRAP weight to the nearest pound (kilogram).
 - g. Virgin asphalt binder weight to the nearest pound (kilogram).
 - h. Residual asphalt binder in the RAS and FRAP material as a percent of the total mix to the nearest 0.1 percent.

The printouts shall be maintained in a file at the plant for a minimum of one year or as directed by the Engineer and shall be made available upon request. The printing system will be inspected by the Engineer prior to production and verified at the beginning of each construction season thereafter.

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

The use of RAP or FRAP in aggregate surface course and aggregate shoulders shall be as follows.

- (a) Stockpiles and Testing. RAP stockpiles may be any of those listed in Article 1031.02, except "Non-Quality" and "FRAP". The testing requirements of Article 1031.03 shall not apply. RAP used shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Pavement (RAP) for Aggregate Applications".
- (b) Gradation. The RAP material shall meet the gradation requirements for CA 6 according to Article 1004.01(c), except the requirements for the minus No. 200 (75 μ m) sieve shall not apply. The sample for the RAP material shall be air dried to constant weight prior to being tested for gradation."

STATUS OF UTILITIES (D-1)

Effective: June 1, 2016

Utility companies and/or municipal owners located within the construction limits of this project have provided the following information in regard to 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 in the action column; 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 1

STAGE / LOCATION	TYPE	DESCRIPTION	RESPONSIBLE AGENCY	ACTION
EB I-290 Station 5123+95	Electric	Electric line (2-4") crosses from Congress Parkway underneath the proposed improvements along EB I-290.	ComEd/CTA	Electric line to be relocated by ComEd/CTA. Days to relocate unknown
EB I-290 Station 5141+14	Electric	Electric line (2-4") crosses from Congress Parkway underneath the proposed improvements along EB I-290.	ComEd/CTA	Electric line to be relocated by ComEd/CTA. Days to relocate unknown
Ramp ES Station 1510+50	AT&T	AT&T line combined 36 duct package north of Harrison Street is 3' clear from the bottom of the duct to the 42" storm sewer. Elevation based on geospatial data.	AT&T	Existing elevations of AT&T facilities shall be confirmed by AT&T.

Stages 1, 2 and 3

STAGE / LOCATION	TYPE	DESCRIPTION	RESPONSIBLE AGENCY	ACTION
EB Congress Parkway Station 5150+63	Telephone/Fiber Optic	Duct package west of Halsted Street is located underneath the proposed improvements along EB I-290, above the proposed storm sewer along EB I-290 and is located at the bottom of proposed Retaining Wall 12 (SN 016-1801).	AT&T	AT&T maintains a large duct package west of Halsted Street crossing EB I-290. The duct was previously located using geospatial equipment. Duct elevations shown in the Plans are based upon this locate performed on behalf of AT&T. Further locate studies are currently being completed to confirm geospatial elevations. AT&T will locate edges of duct package during construction prior to installation of drilled shafts. Drilled shafts for the retaining wall will be spaced according to the locate information. The duct package should be exposed by the contractor prior to beginning drilling and location confirmed. For excavation all work shall be 2 feet clear of the duct.
EB I-290 Station 5148+88	CTA Electrical	CTA Impedance Bond	CTA	CTA Impedance Bond to be relocated to the North side of the tracks by CTA. Contractor to submit process plan for work

STAGE / LOCATION	TYPE	DESCRIPTION	RESPONSIBLE AGENCY	ACTION
				requiring relocation of Impedance Bond, see CTA Flagging and Coordination special provision for details. Days to relocate unknown
EB I-290 Station 5150+75	CTA Electrical	CTA Impedance Bond near Peoria Street	CTA	CTA Impedance Bond to be relocated to the East by CTA. Contractor to submit process plan for work requiring relocation of Impedance Bond, see CTA Flagging and Coordination special provision for details. Days to relocate unknown
Van Buren Station 5119+53	Test Station	Gas Main Test Station	Peoples Gas	Peoples Gas test station to be relocated as needed during construction. Contact Max Meredith (773) 395-7496 a minimum of three days prior to construction to set up on-site inspection.

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	Address	Phone	e-mail address
ComEd	Peter Kratzer	Facility Relocation Dept. 7601 S Lawndale Avenue Chicago, IL 60652	708-518-6209	Peter.Kratzer@ComEd.com
Peoples Gas	Chuck Creager	Peoples Energy 200 E. Randolph St., 21 st FL Chicago, IL 60601	312-240-7189	crcreager@peoplesgasdelivery.com
CDWM (Water Section)	Brian McGahan (CTR Joint Venture)	CTR Joint Venture Jardine Water Purification Plant 1000 E Ohio St +51 Chicago, IL 60611	312-742-5919	Brian.McGahan@ctrwater.net
AT&T	Jamie Gwin; Stan Plodzien	AT&T Civic Project Eng 1000 Commerce Drive Oak Brook, IL 60523	630-573-5423;630-573-5453	jg8128@att.com; sp3264@att.com
CTA	Mike McCarthy	Chicago Transit Partners 567 W. Lake Street, 9th Floor Chicago, IL 60661	312-681-4833	mmccarthy.ctp@transitchicago.com

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 owners part can be secured.

Stage 1

STAGE / LOCATION	TYPE	DESCRIPTION	OWNER	ACTION
EB I-290 Station 5119+53	Gas main (36")	Gas main crossing under EB I-290 pavement and near Loomis Street under noise wall, clear of impacts.	Peoples Gas	Gas line to be watched and protected. Noise wall will need to be designed to accommodate existing gas main crossing. Peoples Gas has installed stand pipe to show location by the proposed noise wall.
EB Congress Parkway Station 5149+19	Gas main	20" low pressure gas main was previously retired and filled by Peoples Gas	Peoples Gas	The depth of the abandoned gas main is unknown. If the retired main conflicts with proposed work, the contractor will remove the retired main within the work area.
Halsted Street over I-290	Electric Service	ComEd maintains active distribution services in conduits attached to the east side of the bridge structure.	ComEd	Existing ComEd facilities shall not be disturbed.
Morgan Street over I-290	Electric Service	ComEd maintains active distribution services in conduits attached to the west side of the bridge structure.	ComEd	Existing ComEd facilities shall not be disturbed.

STAGE / LOCATION	TYPE	DESCRIPTION	OWNER	ACTION
Racine Avenue over I-290	Electric Service	ComEd maintains active distribution services in conduits attached to the bridge structure.	ComEd	Existing ComEd facilities shall not be disturbed.
Ramp ES Station 1510+50	Electric	Electric line combined 36 duct package north of Harrison Street is 3.5' clear from the bottom of the duct to the 42" storm sewer. Elevation based on geospatial and test hole data.	ComEd	Existing ComEd facilities shall not be disturbed
Peoria Street over I-290	Telephone/ Fiber Optic	AT&T maintains active communication facilities in conduits attached to the bridge structure.	AT&T	Existing AT&T facilities shall not be disturbed.
Peoria Street over I-290	Telephone/ Fiber Optic	UIC maintains active communication facilities in conduits attached to the bridge structure.	University of Illinois at Chicago (UIC)	Existing UIC facilities shall not be disturbed.
EB I-290 Station 5140+02	Water	The existing 36" water main is located underneath the proposed EB I-290 improvements, underneath the proposed storm sewer and crosses the existing retaining wall 10 to remain.	Chicago Department of Water Management	The contractor shall take caution when working above or adjacent to the water facilities.
EB Congress Parkway Station 5149+04	Water	The existing 16" water main is located underneath the proposed EB I-290 improvements, underneath the proposed storm sewer and crosses the proposed retaining wall 12 (SN 016-1801)	Chicago Department of Water Management	The contractor shall take caution when working above or adjacent to the water facilities.

STAGE / LOCATION	TYPE	DESCRIPTION	OWNER	ACTION
		improvements. An existing riser structure on the south side of I-290 is located just south of the proposed retaining wall location. Elevations shown in the plans are based on record information.		
EB I-290 Station 5145+13	Siphon Sewer	The existing siphon sewer is located underneath the proposed EB I-290 improvements. The siphon consists of a 42" RCP, 36" RCP and 14" DIP encased in a concrete box. Profile information is shown in the plans based on record information.	Chicago Department of Water Management	Siphon pipes shall not be disturbed.
W Congress Parkway (EB I-290 Station 5126+16 to 5131+80)	Water main	Existing water main (unknown size) is located underneath Congress Parkway adjacent to proposed work area.	Chicago Department of Water Management	The Contractor shall take caution when working adjacent to the water main.

STAGE / LOCATION	TYPE	DESCRIPTION	OWNER	ACTION
Harrison Field (south of EB I-290) (EB I-290 Station 5146+26 to 5150+50)	Water main	Existing 12" water main located south of the existing retaining wall along the south side of EB I-290 from Peoria Street to Halsted Street was previously abandoned as part of Contract 60W26. Proposed retaining wall 12 (SN 016-1801) and storm sewer construction may expose portions of the abandoned water main.	Chicago Department of Water Management	If abandoned water main is encountered during proposed retaining wall and storm sewer work, contractor shall cut and cap with coordination with Chicago Department of Water Management.
Ramp ES and 1513+15 1514+73	Water main	54" Watermain to remain, storm sewer to be jacked underneath	Chicago Department of Water Management	Existing 54" The Contractor shall take caution when working adjacent to the water main.
EB I-290 Station 5126+24	Fire Hydrant	Fire Hydrant along local Congress Parkway	Chicago Department of Water Management	Fire hydrant to be watched and protected. Existing retaining wall work will accommodate existing fire hydrant.
EB I-290 Station 5128+67	Fire Hydrant	Fire Hydrant along local Congress Parkway	Chicago Department of Water Management	Fire hydrant to be watched and protected. Existing retaining wall work will accommodate existing fire hydrant.

Stage 2/3

STAGE / LOCATION	TYPE	DESCRIPTION	OWNER	ACTION
All Stage 1 Items same for Stage 2 and Stage 3				

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

Agency/Company Responsible to Resolve Conflict	Name of contact	Address	Phone	e-mail address
ComEd	Peter Kratzer	Facility Relocation Dept. 7601 S Lawndale Avenue Chicago, IL 60652	708-518-6209	Peter.Kratzer@ComEd.com
Peoples Gas	Chuck Creager	Peoples Energy 200 E. Randolph St., 21 st FL Chicago, IL 60601	312-240-7189	crcreager@peoplesgasdelivery.com
CDWM (Water Section)	Brian McGahan (CTR Joint Venture)	CTR Joint Venture Jardine Water Purification Plant 1000 E Ohio St +51 Chicago, IL 60611	312-742-5919	Brian.McGahan@ctrwater.net
CDWM (Sewer Section)	Sid Osakada	1000 E Ohio St +51, Room 313 Chicago, IL 60611	312-744-0344	Sid.osakada@cityofchicago.org
AT&T	Jamie Gwin; Stan Plodzien	AT&T Civic Project Eng 1000 Commerce Drive Oak Brook, IL 60523	630-573-5423; 630-573-5453	jg8128@att.com; sp3264@att.com
CTA	Mike McCarthy	Chicago Transit Partners 567 W. Lake Street, 9th Floor Chicago, IL 60661	312-681-4833	mmccarthy.ctp@transitchicago.com

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

Estimated duration of time provided in the action column 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 dates 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. The Department's contractor is responsible for contacting J.U.L.I.E. prior to any and all excavation work.

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 shall be performed according to Article 107.12 of the Standard Specifications and this specification. This specification generally conforms to CTA Master Specification Section 01 35 15, "Special Project Procedures for Adjacent Construction." No interruption to CTA service will be allowed unless approved in writing by the CTA.

The CTA's Representative for this project will be:

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

1.01 SUMMARY

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

- C. Prior to the start of any work on or over the CTA's right-of-way, the Contractor shall meet with the CTA Representative to determine his requirements for flagmen and all other necessary items related to the work activities on, over and next to the CTA facilities and to receive CTA's approval for the Contractor's proposed operations. At least twenty-one (21) calendar days prior to the start of work the Contractor must request CTA to prepare a Right-of-Entry document. The Contractor must also conform to all requirements of the "CTA Requirements for Contractors Working along the Right-of-Way (R.O.W.)".
- 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. If 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.

1.02 PROJECT CONDITIONS

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

- E. The CTA may review of 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).
 1. No. 7037, "Flagging on the Right-of-Way".
 2. No. 7038, "Train Operation Through Slow Zones".
 3. No. 7041, "Slow Zones".
 4. No. 8111, "Workers Ahead Warning System".
 5. No. 8130, "Safety on Rapid Transit Tracks".
 6. No. 8212, "Test Train Procedures"
 7. Sketch 2000-SZ-1, Slow Zone Equipment

1.03 REIMBURSEMENT OF COSTS

- A. The cost of all flagmen, infrastructure crews, engineering inspection, switchmen, and other workmen furnished by the CTA and authorized by the Engineer shall be paid for directly to the CTA by the Contractor.
- B. The costs associated with Track Access Occurrences granted and established by the CTA shall be paid for directly to the CTA by the Contractor.
- C. The amount paid to the Contractor shall be the amount charged to the Contractor for all authorized CTA charges including CTA additive rates audited and accepted by the Department, according to Article 107.12 and Article 109.05 of the Standard Specifications.
- D. Following approval of the CTA invoices by the Department, the Contractor shall pay all monies to the CTA as invoiced and shall submit to the Department certified and notarized evidence of the amount of payments. No overhead or profit will be allowed on these payments.
- E. 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.

1.04 RAIL SAFETY TRAINING

- A. All Contractor and Subcontractor employees assigned to work on, over or near the CTA Right-of-Way shall be required to attend an all-day Rail Right-of-Way Safety Training Session in accordance with the CTA Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System. The cost of this training is currently \$200.00 per employee, paid by the Contractor in advance. The certification is good for one calendar year from the date of issuance. The Contractor shall coordinate rail safety training with the Engineer. The cost of training shall be paid directly to the CTA by the Contractor.
- B. Rail Right-of-Way Safety Training for Contractor and subcontractor personnel will be scheduled by CTA as training slots become available. The Contractor is advised that the Contractor's failure to request training sufficiently in advance of when the employee is required on the work site shall not be cause for relaxing the requirement for Rail Right-of-Way Safety Training.
- C. The \$200.00 fee is non-refundable. If any individual fails to report for training or is rejected for training and must be rescheduled, an additional \$200.00 will be required. No additional compensation will be made for the rescheduling of any training.
- D. Upon successful completion of CTA Rail Safety Training, each trainee will be issued a non-transferable Rail Safety Tour Identification Card with the trainee's photo and a decal with pressure sensitive adhesive to be affixed on the hard hat. The Rail Safety Tour Identification Card and the decal are valid for one (1) year from the date of issue. The validity of the Card and the decal are in no way related to the length of this Contract.
- E. Contractor and Subcontractor personnel must renew their Rail Safety Tour Identification Cards annually by successfully completing Rail Safety Training again. Contractor or Subcontractor personnel who fail to maintain a valid Rail Safety Tour Identification Card are not permitted to work on, above or adjacent to the CTA Rail Right of Way and CTA reserves the right to remove such personnel from the work site.
- F. The costs incurred by the Contractor for CTA Rail Safety Training will not be reimbursed.

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

- A. Contractor's and Subcontractor's employees assigned to work on the CTA Right-of-Way:
1. Contractor's and Subcontractor's employees will be given individual property permits. These permits shall be carried by each employee at all times while on CTA property. All permits issued shall be returned to CTA at the completion of the project, if the employee no longer works on this project, or on the date of expiration.
 2. Each employee shall carry a valid Rail Safety Tour Identification Card at all times while on CTA right-of-way in accordance with Article 2-2 of the CTA Safety Manual.
 3. All employees shall wear an undamaged hard hat with current rail safety sticker affixed, CTA standard safety vest and eye protection at all times while on CTA right-of-way. Noise protection shall be used when necessary. The Contractor must also comply with all OSHA requirements as required for the work. The CTA shall provide the rail safety sticker to each Contractor employee upon successful completion of the Rail Right-of-Way Safety Training.
 4. Contractor personnel shall wear suitable work shoes with defined heel and non-slip soles. Steel toes or metal cleats on the sole or heel of shoes are prohibited. Shoelaces are to be kept short so they do not pose a tripping hazard. Athletic shoes, sandals, open-toed shoes, moccasins and/or shoes with heels higher than 1" are not permitted.
 5. Contractor personnel shall have a non-metallic, working flashlight after dark or when working in the subway.
- B. Contractor and Subcontractor employees assigned to work adjacent to or above the CTA right-of-way shall wear a CTA standard safety vest at all times. Personnel without current Rail Safety Training and a valid property permit shall not enter onto any CTA Right-of-Way.

1.06 WORK AREA AVAILABILITY

A. DEFINITIONS

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

7. SINGLE-TRACK: A temporary operation established by operating trains bi-directionally on one track while the adjacent track is taken out-of-service as defined in paragraph 1.05.a.4, above. Only one single-track at a time can be set up on a line and only for very limited time periods. If CTA or a separate contractor(s) request single track operations along the same line concurrently with the Contractor for this contract, CTA shall have the exclusive authority to determine which request shall be granted.
8. RUSH HOURS: Monday through Friday, from 0500 to 0900 hours and from 1500 to 1900 hours.
9. FLAGGER SHIFT: A flagger shift is defined as the services of a CTA Flagman up to, but no more than eight (8) hours including travel and required breaks. For example:
 - a. A Contractor five hour work shift which requires 3 flaggers will use 3 flagger shifts.
 - b. A Contractor eight hour work shift requiring 3 flaggers shall use 6 flagger shifts (because travel & break time will increase the flaggers work hours beyond eight).
 - c. A Contractor ten hour work shift requiring 3 flaggers will use 6 flagger shifts.
10. INFRASTRUCTURE SHIFT: An infrastructure shift is defined as up to, but no more than eight (8) hours worked per CTA Infrastructure employee. For example:
 - a. A Contractor five hour work shift requiring 2 signal maintainers will use 2 infrastructure shifts.
 - b. A Contractor eight hour work shift requiring 2 towermen shall use 2 infrastructure shifts.
 - c. A ten hour work shift requiring 2 lineman will use 4 infrastructure shifts.
11. PERSON-IN-CHARGE (PIC): A person or persons, specified in a CTA Rail Service Bulletin, who is solely in charge of a work zone and is the single point contact between CTA and all persons (Contractor's, CTA and others) working in a work zone. The Rail Service Bulletin may identify the PIC by name or by radio call number. The Engineer or the Engineer's designee shall serve as PIC.

12. POWER & WAY SERVICE BULLETIN (PWS Bulletin): A document authorized by the CTA Infrastructure Division intended to supplement a CTA Rail Service Bulletin by defining power/signal removal and restoration procedures and other work zone protection measures required to safely perform construction and/or maintenance work on or adjacent to the CTA Right-of-Way (ROW).

B. No service disruptions will be allowed for the completion of this work, except as noted herein. If the CTA deems it necessary, the CTA will impact operations to avoid a hazardous condition to either the passengers or employees and charge the Contractor for all associated costs and damages incurred. No compensation will be made for CTA charges to the Contractor due to unauthorized Contractor access or other unapproved impacts to CTA operations.

1.07 CTA OPERATING REQUIREMENTS

1. 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 1.07 "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.
2. 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.
3. 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.

4. 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).
5. Access control of the CTA Right-of-Way must be maintained at all times. This includes eliminating openings directly to the Right-of-Way where existing median barriers are to be removed. All planned removals of existing access control must be coordinated with the CTA, with plans for counter measures provided to the CTA at least three (3) weeks prior to removals. If the CTA grants the removal of a portion of the existing access control, the Contractor shall provide a fence system to enclose the Contractor's work area and provide a visual separation between the Contractor's work area and the CTA operating track(s). The fence shall be designed and installed to meet all CTA requirements, including, but not limited to, horizontal clearance requirements, minimum wind and vertical loading, foundation embedment, screening, fencing connections, installation requirements, maintenance of the fence throughout the installed period, removal of the fence at the completion of the period for the fence need and restoration of the CTA Right-of-Way. The Engineer and CTA shall approve all fence designs, components and installation procedures prior to the start of fence installation. The cost to design, install, maintain and remove the fence shall be considered included in the work required to be performed within the CTA Right-of-Way and will not be paid for separately.

1.08 ALLOWABLE HOURS OF CONSTRUCTION

- A. Construction activities within CTA Right-of-Way are not permitted during Rush Hours. Access to the underside of the existing or proposed bridge structure within the limits of the CTA Right-of-Way will not be permitted during Rush Hours.
- B. Construction activities within CTA Right-of-Way may be permitted during non-Rush Hour periods under flagging protection with the advance concurrence of the CTA as follows:
 1. Monday thru Friday: From 0900 to 1500 and 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 sixteen (16) 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 four (4) Weekend Single-Track Track Access Occurrences will be permitted. Construction activities within the CTA Right-of-Way may be permitted between the hours of 22:00 Friday night and 04:00 the following Monday morning, including any time required for test trains stipulated in the Rail Service Bulletin.
 - c. If proposed work requires that CTA operations be suspended due to any circumstance, the Engineer must be informed immediately to coordinate the service suspension with the CTA. Any reimbursement to the CTA for the granting of a Track Access Occurrence must be approved by the Engineer.
2. The exact dates and hours for all Track Access Occurrences are subject to change by the CTA depending on the nature of the work, access requirements of CTA personnel, work performed under separate contract or operational requirements of the CTA. The approval of specific dates and times for Track Access Occurrences on this Contract may be affected by major events or by a Track Access Occurrence scheduled elsewhere on that route or the CTA System. The CTA has indicated that they typically will not grant Track Access Occurrences on consecutive weekend periods in order to provide scheduled service to customers.
3. Contractors completing other Department projects may also request Track Access Occurrences along the same section of track as described herein. These projects are identified in CONTRACTOR COOPERATION. Provided these Track Access Occurrences are approved, scheduled and initiated by the CTA, the Contractor shall be able to access CTA Right-of-Way with no impact to the total count of Track Access Occurrences attributed to this Contract.

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

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

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

1.09 CONSTRUCTION PROCESS PLAN

- A. CTA will require the Contractor to submit a Construction Process Plan whenever any work, in the opinion of the CTA, affects the safety or causes disruption of service or inconvenience to transit users, CTA Operations or impacts CTA Right-of-Way including, but not limited to: protection of CTA tracks/ CTA Right-of-Way, demolition, temporary shoring installation, drilled shaft installation, pier construction, structural steel erection over CTA tracks/ CTA Right-of-Way, 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. SE calculations for permanent casings (drilled shafts)
 15. For construction processes where failure of temporary structures will result in service interruptions and/or damage to CTA infrastructure CTA will require calculations and drawings signed and sealed by an Illinois SE. These processes include but are not limited to temporary Earth Retention Structures, formwork, lift plans and demolition. CTA also reserves the right to require a 3rd party SE review of the calculations, drawings and installation.

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

6. Power, Signal Restoration (min 1 hour).
 7. Test train (min ½ hour).
- G. The CTA intends to issue Power & Way Service Bulletins to supplement CTA Rail Service Bulletins. The Power & Way Service Bulletins are intended to provide procedural guidelines for safely removing and restoring the CTA's power & way systems (primarily traction power & signal) within the limits defined by the contract and Contractors specific track outage plan(s).
- H. CTA labor shall be required to de-energize and re-energize traction power and perform such other work as may be deemed by the CTA to be required pursuant to the Contractor's work activities and authorized Track Access Occurrences, etc. CTA Signal Maintainer shall also be required to observe and witness the Contractor disconnection and reconnection of temporary signal work at each location where modifications are performed to support construction activities. One Signal Maintainer will be required to witness testing at each location or housing where it is taking place. CTA Signal Maintainer shall also be required to witness the Contractor restoration safety testing, prior to the line being returned to the CTA.
- I. Two Linemen will be required at each location where traction power is energized or de-energized. The Contractor's schedule must include travel time for the CTA Electrician's (min ½ hour) if they are to energize or de-energize traction power at more than one location.
- J. Failure of the Contractor to provide the CTA the minimum specified time required for the removal and restoration of all Power & Way systems within an authorized Track Access Occurrence will result in specified liquidated damages for failure to return track(s) to service in accordance with the contract requirements. There will be no reimbursement for liquidated damages charged to the Contractor by CTA. The following schedule for liquidated damages has been established by the CTA:

From 1 minute through 29 minutes delay - \$5,000.00

From 30 minutes through 59 minutes delay – an additional \$5,000.00

For each additional hour or fraction thereof - \$30,000.00 per hour

K. If the scope of work under this Contract includes construction activities adjacent to the existing CTA tunnels then 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. At its discretion, the CTA will provide available relevant existing plans for the Contractor's use.
3. 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.

4. 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.
5. 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. Monitoring shall consist of pre-construction and post-construction track surveys and daily monitoring of the CTA tracks for vertical or horizontal movements during operations that could potentially impact track stability (construction activities, including, but not limited to: excavation, ERS, pile driving, utility jacking, etc.); **monitoring also applies to any construction operations that CTA determines warrants monitoring.** Monitoring points are to be at least every 10' centers within the construction zone and 50' beyond the identified construction limits. Submit copies of reports daily to CTA for review. Maximum allowable horizontal and vertical movements are ¼ inch. If movements in excess of ¼ inch are detected, the contractor will discontinue construction operations immediately and notify the CTA. CTA will evaluate the track condition and determine what restorative work is required. The contractor will perform this required work at his/her expense prior to continuing remaining contract work. If track repairs are required, the contractor will hire a contractor experienced in CTA track work and approved by the CTA to perform the corrective repairs to the satisfaction of the CTA.
- 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. 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.
- F. 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.
- G. A minimum vertical clearance of 14'-6" (4.42 m) above the high running rail the CTA tracks must be provided at all times.

H. Protective Shield

1. The Contractor shall furnish, install, and later remove a protective shield to protect the CTA traffic from damage due to falling material and objects during construction.
2. Protective shield will be necessary for any demolition activities during the removal of the existing structure as well as superstructure construction of the proposed structure.
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 shield 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.

- I. 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. Before the start of construction, the Contractor will complete a pre-construction inspection of the existing CTA tunnel (with CTA in attendance) at locations to be determined by the CTA. Readily visible conditions and distress such as unusual cracks, obvious signs of leakage, settlement, etc. will be photographically recorded and documented by the Contractor. The Contractor will also make a DVD survey to provide a more complete general record of conditions in the CTA Tunnel. At the conclusion of the pre-construction survey, a report shall be prepared by the Contractor presenting the observed existing conditions and shall include written, videotaped and photographic documentation. The record shall then be used by the Contractor as a basis for comparison to distress that may occur after the survey. 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). If any damage is noted in the CTA Tunnel during the Contractor's operations then the Contractor shall stop work immediately and the necessary corrective measures shall be initiated as directed by the Engineer and the CTA. No additional compensation will be due the Contractor for repairing damage to the CTA tunnel. A post-construction survey shall be performed, with recordings and documentation the same as required in the pre-construction survey, to document the final condition of the CTA tunnel after all Contractor's operations, in the vicinity of the CTA tunnel, are complete.

1.12 TRACK FLAGGING OPERATIONS

- A. Temporary Track Flagging slow zones per CTA SOP 7041 and "CTA Safety Manual for Contract Construction on or Near 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 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.
- 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 1.111 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.

1.14 SUBWAY INFRASTRUCTURE PROTECTION

- A. In addition to the previous requirements established in order to execute work in and around the CTA facilities, the following locations are highlighted to ensure that CTA operations are unaffected.
 - 1. The CTA will make existing relevant plans of the existing CTA water services a minimum of one time during the bidding phase of the project. The invitation to view these plans will be conveyed at a date to be determined. The CTA may allow their plans to be transmitted to the Contractor during construction.

1.15 CTA UTILITIES

- A. Prior to the start of any work within the CTA Right-of-Way, including excavation, the Contractor shall coordinate locating existing CTA utilities. The utilities may include facilities in duct banks, buried conduits, direct bury cables, impedance bonds, aerial connections and other installations. The CTA utilities may include traction power facilities, signal system, communications and other critical infrastructure. Extreme care shall be exercised around any and all CTA utilities.

NON-SPECIAL WASTE CERTIFICATION

The Department or its authorized representative will certify and sign any required transportation documentation for non-special waste as the generator of pre-existing non-special waste for this project.

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES

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

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

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

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

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

Site 2615V-118 (IDOT ROW)

- Station 5117+35 to Station 5118+50 (CL EB I-290), 0 to 40 feet LT and 0 to 40 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5118+50 to Station 5119+45 (CL EB I-290), 0 to 40 feet LT and 0 to 40 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Carbazole, Dibenzo(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Lead and Manganese.
- Station 5119+45 to Station 5120+30 (CL EB I-290), 0 to 40 feet LT and 0 to 40 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene.
- Station 5120+30 to Station 5121+10 (CL EB I-290), 0 to 40 feet LT and 0 to 45 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene.
- Station 5121+10 to Station 5124+15 (CL EB I-290), 0 to 45 feet LT and 0 to 45 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5124+15 to Station 5125+40 (CL EB I-290), 0 to 45 feet LT and 0 to 40 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Lead, and Manganese.
- Station 5125+40 to Station 5127+50 (CL EB I-290), 0 to 45 feet LT and 0 to 30 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, and Manganese.
- Station 5127+50 to Station 5128+50 (CL EB I-290), 0 to 45 feet LT and 0 to 25 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.

- Station 5128+50 to Station 5129+50 (CL EB I-290), 0 to 45 feet LT and 0 to 25 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, and Manganese.
- Station 5129+50 to Station 5130+50 (CL EB I-290), 0 to 45 feet LT and 0 to 30 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, and Manganese.
- Station 5130+50 to Station 5131+50 (CL EB I-290), 0 to 45 feet LT and 0 to 30 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(b)(1) and shall be managed in accordance to Article 669.09.
- Station 5131+50 to Station 5132+50 (CL EB I-290), 0 to 45 feet LT and 0 to 30 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Naphthalene, and Manganese.
- Station 5132+50 to Station 5133+55 (CL EB I-290), 0 to 45 feet LT and 0 to 25 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5133+55 to Station 5134+60 (CL EB I-290), 0 to 45 feet LT and 0 to 25 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Lead, and Manganese.
- Station 5134+60 to Station 5135+65 (CL EB I-290), 0 to 45 feet LT and 0 to 25 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5135+65 to Station 5136+60 (CL EB I-290), 0 to 40 feet LT and 0 to 25 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Lead, and Manganese.

- Station 5136+60 to Station 5138+30 (CL EB I-290), 0 to 40 feet LT and 0 to 35 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5138+30 to Station 5139+50 (CL EB I-290), 0 to 40 feet LT and 0 to 40 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, and Bis(2-Ethylhexyl)phthalate.
- Station 5139+50 to Station 5140+60 (CL EB I-290), 0 to 40 feet LT and 0 to 40 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, and Manganese.
- Station 5140+60 to Station 5142+40 (CL EB I-290), 0 to 40 feet LT and 0 to 40 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5142+40 to Station 5143+25 (CL EB I-290), 0 to 40 feet LT and 0 to 35 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(b)(1) and shall be managed in accordance to Article 669.09.
- Station 5143+25 to Station 5147+55 (CL EB I-290), 0 to 40 feet LT and 0 to 30 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene.
- Station 5147+55 to Station 5148+30 (CL EB I-290), 0 to 40 feet LT and 0 to 40 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5148+30 to Station 5149+40 (CL EB I-290), 0 to 40 feet LT and 0 to 40 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene.
- Station 5149+40 to Station 5150+40 (CL EB I-290), 0 to 40 feet LT and 0 to 50 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.

- Station 5150+40 to Station 5151+45 (CL EB I-290), 0 to 40 feet LT and 0 to 65 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, and Manganese.
- Station 5151+45 to Station 5152+45 (CL EB I-290), 0 to 40 feet LT and 0 to 30 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5152+45 to Station 5153+70 (CL EB I-290), 0 to 40 feet LT and 0 to 30 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Lead, and Manganese.
- Station 5153+70 to Station 5155+35 (CL EB I-290), 0 to 40 feet LT and 0 to 30 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Lead, and Manganese.
- Station 1510+15 to Station 1510+70 (CL Ramp ES), 0 to 40 feet LT and 0 to 20 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, and Arsenic.
- Station 1510+70 to Station 1511+40 (CL Ramp ES), 0 to 10 feet LT and 0 to 20 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, and Arsenic.
- Station 1511+40 to Station 1512+50 (CL Ramp ES), 0 to 25 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(4) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, and Lead.

- Station 1512+50 to Station 1512+60 (CL Ramp ES), 0 to 10 feet LT and 0 to 25 feet RT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(4) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, and Lead.
- Station 1513+10 to Station 1514+45 (CL Ramp ES), 0 to 50 feet LT (IDOT ROW, PESA Site 2615V-118, IDOT ROW, 400-1600 blocks of I-290, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene.

At the IDOT ROW property (PESA Site 2615V-118), Naphthalene was detected at a concentration exceeding the TACO Tier 1 soil remediation objectives for the Construction Worker exposure route in soil boring X76-15, from the sample interval 0 to 4 feet deep, as noted in the Final Preliminary Site Investigation Report for this project, submitted May 5, 2017 by Weston Solutions, 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 669.06 of the Standard Specifications for Road and Bridge Construction manual.

Site 2615V-1 (I-90/94)

- Station 1516+60 to Station 5116+85 (CL Ramp ES), 35 to 190 feet LT (IDOT ROW, PESA Site 2615V-1, I-90/I-94 between Grand Avenue and W. 14th Street, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Arsenic.

Site 2615V-177 (UIC Pavilion)

- Station 5126+10 to Station 5128+50 (CL EB I-290), 30 to 60 feet RT (UIC Pavilion, PESA Site 2615V-177, 525 S. Racine Avenue, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5128+50 to Station 5129+50 (CL EB I-290), 30 to 50 feet RT (UIC Pavilion, PESA Site 2615V-177, 525 S. Racine Avenue, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene.

Site 2615V-178 (UIC Harrison Street Parking Structure)

- Station 5129+50 to Station 5132+50 (CL EB I-290), 30 to 50 feet RT (UIC Harrison Street Parking Structure, PESA Site 2615V-178, 1100 W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, and Manganese.

Site 2615V-179 (UIC Parking Lot #11)

- Station 5132+50 to Station 5133+85 (CL EB I-290), 25 to 65 feet RT (UIC Parking Lot #11, PESA Site 2615V-179, 1055 W. Congress Parkway, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 5133+85 to Station 5134+75 (CL EB I-290), 25 to 65 feet RT (UIC Parking Lot #11, PESA Site 2615V-179, 1055 W. Congress Parkway, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene.
- Station 5134+75 to Station 5136+60 (CL EB I-290), 25 to 65 feet RT (UIC Parking Lot #11, PESA Site 2615V-179, 1055 W. Congress Parkway, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.

Site 2615V-249 (UIC Education Building)

- Station 5136+60 to Station 5138+00 (CL EB I-290), 35 to 90 feet RT (UIC Education Building, PESA Site 2615V-249, 1040-1044 W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Arsenic, Lead, and Manganese.
- Station 5138+00 to Station 5139+10 (CL EB I-290), 40 to 80 feet RT (UIC Education Building, PESA Site 2615V-249, 1040-1044 W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Carbazole, Dibenzo(a,h)anthracene, Indeo(1,2,3-cd) pyrene, Lead, and Manganese.

Site 2615V-250 (UIC Parking Lot #9-9A)

- Station 5139+80 to Station 5141+55 (CL EB I-290), 40 to 70 feet RT (UIC Parking Lot #9-9A, PESA Site 2615V-250, 501 S. Morgan Street, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Lead, and Manganese.
- Station 5141+55 to Station 5143+25 (CL EB I-290), 30 to 60 feet RT (UIC Parking Lot #9-9A, PESA Site 2615V-250, 501 S. Morgan Street, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene.
- Station 5143+25 to Station 5144+35 (CL EB I-290), 30 to 60 feet RT (UIC Parking Lot #9-9A, PESA Site 2615V-250, 501 S. Morgan Street, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene.
- Station 5144+35 to Station 5145+80 (CL EB I-290), 30 to 60 feet RT (UIC Parking Lot #9-9A, PESA Site 2615V-250, 501 S. Morgan Street, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, and Lead.

Site 2615V-255 (UIC Harrison Field)

- Station 1501+25 to Station 1502+50 (CL Ramp ES), 0 to 60 feet RT (UIC Harrison Field, PESA Site 2615V-255, 800 block of W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Lead, and Manganese.
- Station 1502+50 to Station 1503+50 (CL Ramp ES), 0 to 70 feet RT (UIC Harrison Field, PESA Site 2615V-255, 800 block of W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Lead, and Manganese.
- Station 1503+50 to Station 1504+80 (CL Ramp ES), 10 to 70 feet RT (UIC Harrison Field, PESA Site 2615V-255, 800 block of W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Arsenic, Lead, and Mercury.
- Station 1504+80 to Station 1506+00 (CL Ramp ES), 0 to 20 feet LT and 0 to 70 feet RT (UIC Harrison Field, PESA Site 2615V-255, 800 block of W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Benzo(b)fluoranthene, Dibenzo(a,h)anthracene, Lead, and Manganese.

- Station 1506+00 to Station 1506+80 (CL Ramp ES), 0 to 20 feet LT and 0 to 20 feet RT (UIC Harrison Field, PESA Site 2615V-255, 800 block of W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Manganese.
- Station 1506+80 to Station 1507+50 (CL Ramp ES), 0 to 20 feet LT and 0 to 15 feet RT (UIC Harrison Field, PESA Site 2615V-255, 800 block of W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene.
- Station 1506+00 to Station 1507+65 (CL Ramp ES), 15 to 100 feet RT (UIC Harrison Field, PESA Site 2615V-255, 800 block of W. Harrison Street, Chicago). This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance to Article 669.09. Contaminants of concern sampling parameters: Benzo(a)pyrene, Trichloroethene, Arsenic, and Lead.

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

- Station 1503+50 to Station 1504+80 (CL Ramp ES), 10 to 70 feet RT (UIC Harrison Field, PESA Site 2615V-255, 800 block of W. Harrison Street, Chicago) – non-special waste. Contaminants of concern sampling parameters: Mercury, and Lead.

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 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.

TRAFFIC CONTROL PLAN

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: 701106, 701400, 701401, 701411, 701428, 701446, 701601, 701801, 701901, 704001, 720001, 720006, 780001, 781001, and 782006.

DETAILS: Maintenance of Traffic – General Notes, Narrative, Typical Sections, Stages 1, 2 and 3 and TC-08, TC-09, TC-10, TC-11, TC-12, TC-13, TC-16, TC-17, TC-18, TC-21, TC-22, and TC-27.

SPECIAL PROVISIONS:

Public Convenience and Safety (Dist. 1)
Maintenance of Roadways
Traffic Control Plan
Traffic Control and Protection (Arterials)
Traffic Control and Protection (Expressways)
Traffic Control for Work Zone Areas
Keeping the Expressway Open to Traffic
Failure to Open Traffic Lanes to Traffic
Staging and Interchange Restrictions
Road Construction Reporting and Signing for Vehicle Width Restrictions
Temporary Information Signing
Speed Display Trailer (D-1)
Traffic Control Surveillance (Expressways)
Temporary Epoxy Pavement Marking
Raised Reflective Pavement Marker, Reflector Removal
Work Zone Public Information Signs (Recurring SP #20)
Pavement Marking Blackout Tape (BDE)
Pavement Marking Removal (BDE)
Portable Changeable Message Signs (BDE)

TRAFFIC CONTROL AND PROTECTION (ARTERIALS)

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 lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

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

TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS)

Effective: March 8, 1996

Revised: March 1, 2017

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

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

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

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

Additional requirements for traffic control devices shall be as follows.

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

(b) Sign Requirements

(1) Sign Maintenance. Prior to the beginning of construction operations, the Contractor will be provided a sign log of all existing signs within the limits of the construction zone. The Contractor is responsible for verifying the accuracy of the sign log. Throughout the duration of this project, all existing traffic signs shall be maintained by the Contractor. All provisions of Article 107.25 of the Standard Specifications shall apply except the third paragraph shall be revised to read: "The Contractor shall maintain, furnish, and replace at his own expense, any traffic sign or post which has been damaged or lost by the Contractor or a third party.

(2) Work Zone Speed Limit Signs. Work zone speed limit signs shall be installed as required in Article 701.14(b) and as shown in the plans and Highway Standards. Based upon the existing posted speed limit, work zone speed limits shall be established and signed as follows.

a. Existing Speed Limit of 55mph or higher. The initial work zone speed limit assembly, located approximately 4200' before the closure, and shall be 55mph as shown in 701400. Additional work zone 45mph assemblies shall be used as required according to Article 701.14(b) and as shown in the Highway Standards and plans. WORK ZONE SPEED LIMIT 55 PHOTO ENFORCED assemblies may be omitted when this assembly would normally be placed within 1500 feet of the END WORK ZONE SPEED LIMIT sign. If existing speed limit is over 65mph then additional signage should be installed per 701400.

- b. Existing Speed Limit of 45mph. The advance 55mph work zone speed limit assembly shown in 701400 shall be replaced with a 45mph assembly. Additional work zone 45mph assemblies shall be used as required according to Article 701.14(b) and as shown in the Highway Standards and plans. WORK ZONE SPEED LIMIT 55 PHOTO ENFORCED assemblies shall be eliminated in all cases. END WORK ZONE SPEED LIMIT signs are required.
- (3) Exit Signs. The exit gore signs as shown in Standard 701411 shall be a minimum size of 48 inch by 48 inch with 12 inch capital letters and a 20 inch arrow. EXIT OPEN AHEAD signs shown in Standard 701411 shall be a minimum size of 48 inch by 48 inch with 8 inch capital letters.
- (4) Uneven Lanes Signs. The Contractor shall furnish and erect "UNEVEN LANES" signs (W8-11) on both sides of the expressway, at any time when the elevation difference between adjacent lanes open to traffic equals or exceeds one inch. Signs shall be placed 500' in advance of the drop-off, within 500' of every entrance, and a minimum of every mile.
- (c) Drums/Barricades. Check barricades shall be placed in work areas perpendicular to traffic every 1000', one per lane and per shoulder, to prevent motorists from using work areas as a traveled way. Check barricades shall also be placed in advance of each open patch, or excavation, or any other hazard in the work area, the first at the edge of the open traffic lane and the second centered in the closed lane. Check barricades, either Type I or II, or drums shall be equipped with a flashing light.
- To provide sufficient lane widths (10' minimum) for traffic and also working room, the Contractor shall furnish and install vertical barricades with steady burn lights, in lieu of Type II or drums, along the cold milling and asphalt paving operations. The vertical barricades shall be placed at the same spacing as the drums.
- (d) Vertical Barricades. Vertical barricades shall not be used in lane closure tapers, lane shifts, exit ramp gores, or staged construction projects lasting more than 12 hours. Also, vertical barricades shall not be used as patch barricades or check barricades. Special attention shall be given, and ballast provided per manufacture's specification, to maintain the vertical barricades in an upright position and in proper alignment.
- (e) Temporary Concrete Barrier Wall. Prismatic barrier wall reflectors shall be installed on both the face of the wall next to traffic, and the top of sections of the temporary concrete barrier wall as shown in Standard 704001. The color of these reflectors shall match the color of the edgelines (yellow on the left and crystal or white on the right). If the base of the temporary concrete barrier wall is 12 inches or less from the travel lane, then the lower slope of the wall shall also have a 6 inch wide temporary pavement marking edgeline (yellow on the left and white on the right).

- (f) Full Expressway Closures. Full Expressway Closures will only be permitted for a maximum of 15 minutes during the allowable hours listed in the Keeping the Expressway Open to Traffic Special Provision. During Full Expressway Closures, the Contractor will be required to close off all lanes except one, using Freeway Standard Closures. The Contractor will be required to provide one changeable message sign to be placed at the direction of the Engineer. The sign shall display a message as directed by the Engineer. A Maintenance of Traffic Plan shall be submitted to the District One Expressway Traffic Control Supervisor 14 days in advance of the planned work; including all stage changes. The Maintenance of Traffic Plan shall include, but not be limited to: lane and ramp closures, existing geometrics, and equipment and material location. The District One Expressway Traffic Control Supervisor (847-705-4151) shall be contacted at least 3 working days in advance of the proposed road closure and will coordinate the closure operation with police forces.

Method of Measurement. This item of work will be measured on a lump sum basis for furnishing, installing, maintaining, replacing, relocating, and removing traffic control devices required in the plans and these Special Provisions. Traffic control and protection required under 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.

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

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

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.

- (b) The Engineer may require additional traffic control be installed in accordance with standards and/or designs other than those included in the plans. In such cases, the standards and/or designs will be made available to the Contractor at least one week in advance of the change in traffic control. Payment for any additional traffic control required will be in accordance with Article 109.04 of the Standard Specifications.
- (c) Revisions in the phasing of construction or maintenance operations, requested by the Contractor, may require traffic control to be installed in accordance with standards and/or designs other than those included in the plans. Revisions or modifications to the traffic control shown in the contract shall be submitted by the Contractor for approval by the Engineer. No additional payment will be made for a Contractor requested modification.
- (d) Temporary concrete barrier wall will be measured and paid for according to Section 704.
- (e) Impact attenuators, temporary bridge rail, and temporary rumble strips will be paid for separately.
- (f) Temporary pavement markings shown on the Standard will be measured and paid for according to Section 703 and Section 780.
- (g) All pavement marking removal will be measured and paid for according to Section 703 or Section 783.
- (h) Temporary pavement marking on the lower slope of the temporary concrete barrier wall will be measured and paid for as TEMPORARY PAVEMENT MARKING, 6".
- (i) All barrier wall reflectors will be measured and paid for according to Section 782.
- (j) The Changeable Message Sign required for Full Expressway Closures shall not be paid for separately.

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

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

KEEPING THE EXPRESSWAY OPEN TO TRAFFIC

Effective: March 22, 1996

Revised: January 21, 2015

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

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

LOCATION: I-290: Central to Wells (4-lane Section)

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
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*	NOT		ALLOWED
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 (Sun)	to	7:00 AM (Sun)

* 3 Lane Closures will only be allowed from the left and are approved for specific operations only.

LOCATION: I-290: Central to Wells (3-lane Section)

WEEK NIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS		
Sunday - Thursday	1-Lane	11:00 PM	to	5:00 AM
	2-Lane	1:00 AM	To	5:00 AM
Friday	1-Lane	10:59 PM (Fri)	to	6:00 AM (Sat)
	2-Lane	NOT		ALLOWED
Saturday	1-Lane	11:59 PM (Sat)	to	8:00 AM (Sun)
	2-Lane	1:00 AM (Sun)	to	7:00 AM (Sun)

NOTE: A 1-lane closure in the 2 lane section shall follow the 2-lane hours in the table above.

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

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

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 three (3) mile gap between each other, in one direction of the expressway, shall be on the same side of the pavement. Lane closures on the same side of the pavement with a one (1) mile or less gap between the end of one work zone and the start of taper of next work zone should be connected. The maximum length of any lane closure on the project and combined with any adjacent projects shall be three (3) miles. Gaps between successive permanent lane closures shall be no less than two (2) miles in length.

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

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

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

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

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

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

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

FAILURE TO OPEN TRAFFIC LANES TO TRAFFIC

Effective: March 22, 1996

Revised: February 9, 2005

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

I-290 and Ramps: All Stages
 One lane or ramp blocked = \$1,700 /15 min.
 Two lanes blocked = \$3,500 /15 min.

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

STAGING AND INTERCHANGE RESTRICTIONS

Prior to the actual beginning and completion of the various stages of construction and traffic protection, the Contractor will be required to provide lane closures and barricade systems, for preparation work such as pavement marking removal, temporary lane marking, placing temporary concrete barrier, relocating existing guardrail, etc. These lane closures and barricade systems, including barricades, drums, cones, lights, signs, flaggers etc. shall be provided in accordance with details in the Plans and these Special Provisions and as approved by the Engineer.

The cost of this work will not be paid for separately but shall be considered included in the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS).

LANE AND RAMP CLOSURES

Prior to and after stage construction, temporary lane closures on I-290 will only be permitted at night during the allowable hours as listed in the Special Provision KEEPING THE EXPRESSWAY OPEN TO TRAFFIC. These hours also apply to temporary closures of the ramps, which are shown as open on the Maintenance of Traffic plan sheets.

For all ramp closures the Contractor shall furnish and install signage per District Detail TC-08, as directed by the Engineer.

The Contractor shall coordinate the work such that no two (2) adjacent entrance or exit ramps in one direction of the expressway are closed at the same time. The closing of ramps, which are used as the detour route for other roadways or ramps, is prohibited. 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.

The Contractor shall submit to the Department two (2) weeks ahead of time, in writing, the starting date for each of the extended ramp and/or lane closures. Approval from the Department is required prior to closing the ramp and/or lanes. Should the Contractor fail to complete the work and reopen the ramp to traffic within the allowable time limit, the Contractor shall be liable to the Department for liquidated damages as noted under FAILURE TO OPEN TRAFFIC LANES TO TRAFFIC

EXTENDED INTERSTATE RAMP AND MAINLINE CLOSURES

In addition to the lane restrictions and closures identified within the Special Provision for "Keeping the Expressway Open to Traffic", the Contractor will be permitted to close the following for extended periods as noted:

Ramp from Eastbound I-290 to Northbound I-90/94 (Ramp EN)

The ramp from eastbound I-290 to northbound I-90/94 may be closed for a period of ten (10) consecutive calendar days beginning no earlier than 10:59 PM on a Friday extending to no later than 04:00 AM on a Monday.

The extended closure is intended to provide a greater period of access to perform tasks including but not limited to pavement reconstruction along Ramp EN at the end of Stage 2 construction.

If the ramp has not be opened to traffic by the end time of the closure period described above and approved by the Department, including the removal of all advance signage directing traffic away from the ramp and to the approved detour route, Liquidated Damages as specified in the "Failure to Open Traffic Lanes" special provision shall be assessed to the Contract except the value applied shall be \$10,000 /day beyond the completion time listed above.

Ramp from Eastbound I-290 to Southbound I-90/94 (Ramp ES)

The left lane of the existing two lane ramp from eastbound I-290 to southbound I-90/94 (Ramp ES) may be closed along with shifting the single lane of ramp traffic onto the existing right shoulder, as depicted in Stage 1B of the Suggested Stages of Construction and Traffic Control Plans, for a maximum period of one hundred fifty (150) consecutive calendar days beginning no later than March 15, 2018. This date is contingent upon the Contractor for Contract 62A74 vacating the work zone along Ramp ES defined within Stage 1A of the Suggested Stages of Construction and Traffic Control Plans. Contract 62A74 requires that the right lane of Ramp ES be made available to traffic no later than March 15, 2018. Under no circumstances shall the exit ramp from eastbound I-290 to Taylor Street be closed to traffic unless approved in advance by the Department.

The ramp configuration is to provide access to the jacking/receiving pit areas along the ramp to perform proposed storm sewer construction.

Once no more than 150 days have passed after the above change in Ramp ES traffic configuration, the Contractor is required to shift the single lane of ramp traffic back into the left lane south of Harrison Street to provide the necessary work zone as depicted in Stage 1C of the Suggested Stages of Construction and Traffic Control Plans.

If Ramp ES has not been shifted to the left lane as directed above, by the end time of the closure period described above, and approved by the Department, Liquidated Damages as specified in the "Failure to Open Traffic Lanes" special provision shall be assessed to the Contract except the value applied shall be \$10,000 /day beyond the completion time listed above.

Ramp from Westbound I-290 to Southbound I-90/94 (Ramp WS)

The ramp from westbound I-290 to southbound I-90/94 may be closed for a period of ninety (90) consecutive calendar days.

The extended closure is to provide access to perform tasks including but not limited to storm sewer construction along I-90/94 during Stage 1B construction.

If the ramp has not be opened to traffic by the end time of the closure period described above and approved by the Department, including the removal of all advance signage directing traffic away from the ramp and to the approved detour route, Liquidated Damages as specified in the "Failure to Open Traffic Lanes" special provision shall be assessed to the Contract except the value applied shall be \$10,000 /day beyond the completion time listed above.

Ramp from Southbound I-90/94 to Taylor Street

The ramp from southbound I-90/94 to Taylor Street may be closed for a period of ninety (90) consecutive calendar days.

The extended closure is to provide access to perform tasks including but not limited to storm sewer construction along I-90/94 during Stage 1B construction.

If the ramp has not be opened to traffic by the end time of the closure period described above and approved by the Department, including the removal of all advance signage directing traffic away from the ramp and to the approved detour route, Liquidated Damages as specified in the "Failure to Open Traffic Lanes" special provision shall be assessed to the Contract except the value applied shall be \$10,000 /day beyond the completion time listed above.

Eastbound I-290 Mainline Lanes

Pre-stage:

Eastbound I-290 from west of Racine Avenue to Morgan Street may be reduced from 4 lanes to 2 lanes for one period of a 53-hour weekend closure beginning not earlier than 10:00 PM on a Friday extending to no later than 5:00 AM on a Monday. See "EB-I-290 PRE-STAGE – EB I-290 LANE CLOSURE" plan sheets for more information.

The extended closure is to construct the North half of the drainage connections to the existing main drain structures.

Stage 1B:

Eastbound I-290 from west of Racine Avenue to Morgan Street may be reduced from 3 lanes to 2 lanes for one period of a 53-hour weekend closure beginning no earlier than 10:00 PM on a Friday extending to no later than 5:00 AM on a Monday. See "EB-I-290 STAGE 1B – EB I-290 LANE CLOSURE" plan sheets for more information.

The extended closure is to construct the South half of the drainage connections to the existing main drain structures along with temporary drainage as show in the erosion control plans.

Stage 2:

Eastbound I-290 to Congress Parkway may be reduced from 2 lanes to 1 lane for two periods of a 53-hour weekend closure beginning no earlier than 10:00 PM on a Friday extending to no later than 5:00 AM on a Monday. See "EB-I-290 STAGE 2 – EB I-290 LANE CLOSURE" plan sheets for more information.

The extended closure is to construct the Mainline EB I-290 lane 2 pavement along with the temporary drainage as show in the erosion control plans

Liquidated Damages as specified in the "Failure to Open Traffic Lanes" special provision shall be assessed to the Contract for every 15 minutes beyond the completion time listed above.

These closures shall be coordinated with the contracts noted in the "Contractor Cooperation Special Provision".

Traffic is to be diverted onto an approved posted detour. Costs of all traffic control associated with the road closure and detour shall be included in the cost of the Traffic Control and Protection (Expressway) pay item. The Contractor shall furnish and install large (48" X 48") "DETOUR with arrow" signs as directed by the Engineer for all extended interstate 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 (EXPRESSWAY) (6 static signs maximum per closure).

The Contractor shall request and gain approval from the Illinois Department of Transportation's Expressway Traffic Operations Engineer at www.idotlcs.com seven (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.

A Maintenance of Traffic Plan shall be submitted to and approved by the District One Expressway Traffic Control Supervisor 14 days in advance of any full expressway closures. The Maintenance of Traffic Plan shall include, but not be limited to: lane and ramp closures, existing geometrics, equipment and material locations, material delivery schedule, detailed work schedule, communication plan and risk assessment.

The cost of this work will not be paid for separately but shall be considered included in the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS).

Non-Permitted Weekends

Extended interstate ramp and mainline closures lasting less than ten (10) days will not be allowed during the holiday periods stated in Article 107.09 and amended by PUBLIC CONVENIENCE AND SAFETY (D-1) and the weekends containing the additional following events or holidays:

Taste of Chicago
Chicago Air and Water Show
Chicago Marathon
Chicago Jazz Festival
Chicago Blues Festival
Chicago St. Patrick's Day Parade
Gospel Fest
Chicago Bears Home Games
Lollapalooza
Pride Parade
United Center Events
Chicago Cubs Home Games
Other events as dictated by the Engineer, local agencies or the City of Chicago

If not otherwise stated herein, all requirements and restrictions governing extended mainline closures shall follow the Special Provision for KEEPING THE EXPRESSWAY OPEN TO TRAFFIC.

LOCAL ROAD CLOSURES

To facilitate the construction of various substructure and superstructure items, the use of local streets for construction staging must be approved by the City of Chicago and the Department in advance of the proposed closure or partial closure.

Congress Parkway

Congress Parkway from the Harrison Street Parking Structure east of Racine Avenue to Morgan Street may be closed for a period of forty-five (45) consecutive calendar days. See "CONGRESS PARKWAY STAGE 1B" plan sheets for additional details. See UIC non-permitted closure dates below.

The extended closure is to provide access to perform tasks including but not limited to the construction of Retaining Walls 9 and 11, the construction of the parapet wall on top of existing Retaining Wall 13, water service line relocation and pavement reconstruction adjacent to the retaining walls.

If Congress Parkway has not been opened to traffic by the end time of the closure period described above and approved by the Department, including the removal of all advance signage directing traffic away from Congress Parkway and to the approved detour route, Liquidated Damages as specified in the "Failure to Open Traffic Lanes" special provision shall be assessed to the Contract except the value applied shall be \$2,000 /day beyond the completion time listed above.

UIC Parking Lot 9

The UIC Parking Lot 9 existing entrance/exit from Morgan Street may be closed for a period of thirty (30) consecutive calendar days beginning no earlier than the end of UIC Spring Commencement and ending prior to the UIC Move In Day. See UIC non-permitted closure dates below.

The extended closure is to provide access to perform tasks including but not limited to the construction of the parapet wall on top of existing Retaining Wall 10 and pavement reconstruction adjacent to the retaining wall from the east edge of the bridge abutment to the gated median. See "CONGRESS PARKWAY STAGE 1A" plan sheets for more information.

The first row of parking stalls adjacent to the retaining wall in UIC Parking Lot 9 may be closed beginning no earlier than the end of UIC Spring Commencement and ending prior to the UIC Move In Day. See UIC non-permitted closure dates below.

The extended closure is to provide access to perform tasks including but not limited to the construction of the parapet wall on top of existing Retaining Wall 10 and pavement reconstruction adjacent to the retaining wall from the gated median to Peoria Street. See "CONGRESS PARKWAY STAGE 1B" plan sheets for more information.

If UIC Parking Lot 9 existing entrance/exit has not be opened by the end time of the closure period described above and approved by the Department, including the removal of all advance signage directing traffic away from UIC Parking Lot 9, Liquidated Damages as specified in the "Failure to Open Traffic Lanes" special provision shall be assessed to the Contract except the value applied shall be \$2,000 /day beyond the completion time listed above.

UIC Non-Permitted Closure Dates

Extended road closures for Congress Parkway and Parking Lots 9 and 11 will not be allowed during the following events:

UIC Spring Commencement – May 8-13, 2018, May 7-12, 2019
UIC Move Out Day – May 12, 2018, May 11, 2019
UIC Move In Day – August 15, 2018, August 14, 2019
UIC Spark in the Park Event – August 30, 2018, August 29, 2019
UIC Chancellor Event – October 28, 2017

Dates are subject to change. Contractor shall verify exact dates with UIC.

ROAD CONSTRUCTION REPORTING AND SIGNING FOR VEHICLE WIDTH RESTRICTIONS

Introduction.

The intent of this policy is to provide uniform width restriction signing and reporting in order to reduce the chances of oversized vehicles, particularly those operating under blanket permits, from becoming entrapped in construction zones.

Construction/Maintenance Projects Requiring Over Size and Over Weight Restrictions.

Closures of any roadway, Rail Road crossing, Interstate or Freeway Ramps

All road construction that restricts the actual measured opening to less than 17' 6".

Any construction zone with characteristics that have the potential of creating delays and/or potentially hazardous conditions such as roadways with a high traffic volume or unnecessary merging situations. Any other condition that the Engineer deems necessary to ensure safety should be listed.

Measuring with Restrictions.

In order to ensure state-wide uniformity, the opening shall be measured as follows:

Two fixed structures – Measurement shall be made between the narrowest points of the fixed structures. Fixed structures may include but are not limited to bridge railing, concrete barrier, cable rail, or guard rail.

Fixed structure and non-fixed devices or equipment – Measurement shall be made between the two narrowest points of the fixed structure and non-fixed devices when such non-fixed devices cannot easily be moved to accommodate the overwidth load. Such devices or equipment may include snoopers, barricades/cones/drums placed to keep traffic away from open holes in the pavement, arrow boards, dynamic message signs, etc.

Construction near a fixed structure – Construction activities near a fixed structure may result in a reportable width restriction where there is insufficient room for an overwidth load to safely move onto the structure

Reporting.

In order to provide timely information to truckers, all road construction or maintenance activities which result in measured openings for traffic of less than 17' 6" or which involve the closure of any roadway, railroad grade crossing or freeway ramp are to be reported to the Central Bureau of Operations at least 21 days in advance of the date of the restriction start date which may be different from the start date of the project itself. The reporting is to be on form OPER 2410. Note on the form if the restrictions will only be in effect during the time period of ½ hour before sunrise to ½ after sunset Monday through Friday and ½ hour before sunrise to noon on Saturday, or if they will be in effect at all times.

When using form OPER 2410, the restriction location on interstate routes or other freeways should be identified with mileposts and/or a distance from an identifiable location, such as an intersection of two routes. If the restriction is located a structure, identify the feature crossed. The location of restrictions on conventional highways should be identified with a distance from an identifiable locations, such as an intersection of two routes and the From Mile/To Mile fields left blank. If construction is located at a structure, identify the feature crossed. If there are multiple structures with different width restriction dimensions, each structure and restriction must be listed separately. This can be accomplished on the same form.

If the construction and/or width restriction start/stop dates change after being submitted, a revised OPER 2410 must be submitted.

The width restriction dimension to be listed on form OPER 2410 and used on the width restriction signing should be the actual measured opening less 18". For example if the actual measured opening is 16' 3", the restriction dimension is to be reported and signed at 14' 9".

A greater deduction than 18" may be taken if, in the opinion of the Engineer, it is warranted due to unusual geometrics or other operational considerations. The dimension listed on form OPER 2410 and used on the signing should reflect the greater deduction.

After completion, the form is to be e-mailed to the IDOT ROAD INFO mailbox.

Emergencies or any unusual construction restrictions or closures should be reported immediately.

During Normal Business Hours: Call (217) 782-8551. Submittal of OPER 2410 by e-mail to IDOT ROAD INFO is still required.

After Normal Business Hours/ Weekends/ Holidays: Call the Communications Center (Station 1) at (217) 782-2937. After calling Station 1, submit OPER 2410 by e-mail to IDOT ROAD INFO and fax a copy to the Communications Center at (217) 782-1927.

Signing.

Signing shall be provided whenever the actual measured restriction is less than 17' 6". W12-I102 signs should be placed prior to the beginning of the traffic control where the width restriction occurs. Advance signing (W12-I103) shall also be placed where the roadway intersects with the previous state route and with any major local routes where overwidth vehicles are likely to enter the highway. The advance signing must be visible to approaching traffic sufficiently in advance of the intersection to enable overwidth trucks to change direction. This may require the use of more than one advance sign at the intersection. The dimensions shown on the signing shall be the actual measured opening less 18" as noted previously.

TEMPORARY INFORMATION SIGNING

Effective: November 13, 1996

Revised: January 2, 2007

Description.

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

Materials.

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

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

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

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

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

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

GENERAL CONSTRUCTION REQUIREMENTS

Installation.

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

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

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

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

Method of Measurement.

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

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

Basis Of Payment.

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

SPEED DISPLAY TRAILER (D1)

Effective: April 1, 2015

Revised: January 1, 2017

Revise the third paragraph of Article 701.11 of the Standard Specifications to read:

“When not being utilized to inform and direct traffic, sign trailers, speed display trailers, arrow boards, and portable changeable message boards shall be treated as nonoperating equipment.”

Add the following to Article 701.15 of the Standard Specifications:

“(m) Speed Display Trailer. A speed display trailer is used to enhance safety of the traveling public and workers in work zones by alerting drivers of their speed, thus deterring them from driving above the posted work zone speed limit.”

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

Add the following to Article 701.20 of the Standard Specifications:

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

Add the following to Article 1106.02 of the Standard Specifications:

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

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

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

The speed indicator display shall be equipped with a violation alert that flashes the displayed detected speed when the posted limit is exceeded. The speed indicator shall have a maximum speed cutoff. On roadway facilities with a normal posted speed limit greater than or equal to 45 mph, the detected speeds of vehicles traveling more than 25mph over the work zone speed limit shall not be displayed. On facilities with normal posted speed limit of less than 45 mph, the detected speeds of vehicles traveling more than 15 mph over the work zone speed limit shall not be displayed. On any roadway facility if detected speeds are less than 25 mph, speed shall not be displayed. The display shall include automatic dimming for nighttime operation.

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

TRAFFIC CONTROL SURVEILLANCE (EXPRESSWAYS)

Effective: October 25, 1995

Revised: January 21, 2015

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

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

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

Method of Measurement.

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

Basis of Payment.

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

NOISE COMPLIANCE

Description. This work shall be according to Article 107.35 of the Standard Specifications, with the following additions:

All Work requiring lane closures and lane restrictions under KEEPING THE EXPRESSWAY OPEN TO TRAFFIC special provision shall follow the requirements described herein. Unless specifically approved in writing by the Engineer, no work that could be considered a noise nuisance, including but not limited to demolition activities, shall be performed during the period of 10 p.m. to 7 a.m.

When the Contractor requests to modify or deviate from the requirements of Article 107.35, the Contractor shall identify the intended construction activities, utilize noise mitigation techniques and identify the anticipated duration that noise levels will be elevated. Vehicle noise, including horns, back up warning signals and other abrupt noises shall be minimized

The Engineer may elect to shut down any nuisance activity that was not previously approved or does not meet the Contractor obligations identified in the approval request.

Basis of Payment. This work will not be paid for separately. All obligations described herein are included in associated pay items. No extension of the completion date, waiver of penalties or claims shall arise from any Contractor activity shut down enacted due to deficiencies described herein.

SIGN SHOP DRAWING SUBMITTAL

Effective: January 22, 2013

Revised: July 1, 2015

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

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

OVERHEAD SIGN STRUCTURE – BRIDGE MOUNTED

Effective: July 1, 2015

Revised: December 27, 2016

Revise Article 733.10(b) of the Standard Specifications to Read:

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

GENERAL ELECTRICAL REQUIREMENTS

Effective: January 1, 2017

This special provision replaces Articles 801.01 – 801.07, 801.09 – 801-16 of the Standard Specifications.

Definition. Codes, standards, and industry specifications cited for electrical work shall be by definition the latest adopted version thereof, unless indicated otherwise.

Materials by definition shall include electrical equipment, fittings, devices, motors, appliances, fixtures, apparatus, all hardware and appurtenances, and the like, used as part of, or in connection with, electrical installation.

Standards of Installation. Materials shall be installed according to the manufacturer’s recommendations, the NEC, OSHA, the NESC, and AASHTO’s Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

All like materials shall be from the same manufacturer. Listed and labeled materials shall be used whenever possible. The listing shall be according to UL or an approved equivalent.

Safety and Protection. Safety and protection requirements shall be as follows.

Safety. Electrical systems shall not be left in an exposed or otherwise hazardous condition. All electrical boxes, cabinets, pole handholes, etc. which contain wiring, either energized or non-energized, shall be closed or shall have covers in place and be locked when possible, during nonworking hours.

Protection. Electrical raceway or duct openings shall be capped or otherwise sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

Equipment Grounding Conductor. All electrical systems, materials, and appurtenances shall be grounded. Good ground continuity throughout the electrical system shall be assured, even though every detail of the requirements is not specified or shown. Electrical circuits shall have a continuous insulated equipment grounding conductor. When metallic conduit is used, it shall be bonded to the equipment grounding conductor, but shall not be used as the equipment grounding conductor.

Detector loop lead-in circuits, circuits under 50 volts, and runs of fiber optic cable will not require an equipment grounding conductor.

Where connections are made to painted surfaces, the paint shall be scraped to fully expose metal at the connection point. After the connection is completed, the paint system shall be repaired to the satisfaction of the Engineer.

Bonding of all boxes and other metallic enclosures throughout the wiring system to the equipment grounding conductor shall be made using a splice and pigtail connection. Mechanical connectors shall have a serrated washer at the contact surface.

All connections to structural steel or fencing shall be made with exothermic welds. Care shall be taken not to weaken load carrying members. Where connections are made to epoxy coated reinforcing steel, the epoxy coating shall be sufficiently removed to facilitate a mechanical connection. The epoxy coating shall be repaired to the satisfaction of the Engineer. Where connections are made to insulated conductors, the connection shall be wrapped with at least four layers of electrical tape extended 6 in. (150 mm) onto the conductor insulation.

Submittals. At the preconstruction meeting, the Contractor shall submit a written listing of manufacturers for all major electrical and mechanical items. The list of manufacturers shall be binding, except by written request from the Contractor and approval by the Engineer. The request shall include acceptable reasons and documentation for the change.

Major items shall include, but not limited to the following:

Type of Work (discipline)	Item
All Electrical Work	Electric Service Metering Emergency Standby System Transformers Cable Unit Duct Splices Conduit Surge Suppression System
Lighting	Tower Pole Luminaire Foundation Breakaway Device Controllers Control Cabinet and Peripherals
ITS	Controller Cabinet and Peripherals CCTV Cameras Camera Structures Ethernet Switches Detectors Detector Loop Fiber Optic Cable

Within 30 calendar days after contract execution, the Contractor shall submit, for approval, one copy each of the manufacturer's product data (for standard products and components) and detailed shop drawings (for fabricated items). Submittals for the materials for each individual pay item shall be complete in every respect. Submittals which include multiple pay items shall have all submittal material for each item or group of items covered by a particular specification, grouped together and the applicable pay item identified. Various submittals shall, when taken together, form a complete coordinated package. A partial submittal will be returned without review unless prior written permission is obtained from the Engineer.

The submittal shall be properly identified by route, section, county, and contract number.

The Contractor shall have reviewed the submittal material and affixed his/her stamp of approval, with date and signature, for each individual item. In case of subcontractor submittal, both the subcontractor and the Contractor shall review, sign, and stamp their approval on the submittal.

Illegible print, incompleteness, inaccuracy, or lack of coordination will be grounds for rejection.

Items from multiple disciplines shall not be combined on a single submittal and transmittal. Items for lighting, signals, surveillance and CCTV must be in separate submittals since they may be reviewed by various personnel in various locations.

The Engineer will review the submittals for conformance with the design concept of the project according to Article 105.04 and the following. The Engineer will stamp the drawings indicating their status as "Approved", "Approved as Noted", "Disapproved", or "Information Only". Since the Engineer's review is for conformance with the design concept only, it shall be the Contractor's responsibility to coordinate the various items into a working system as specified. The Contractor shall not be relieved from responsibility for errors or omissions in the shop, working, or layout drawings by the Engineer's approval thereof. The Contractor shall still be in full compliance with contract and specification requirements.

All submitted items reviewed and marked "Disapproved" or "Approved as Noted" shall be resubmitted by the Contractor in their entirety, unless otherwise indicated within the submittal comments.

Work shall not begin until the Engineer has approved the submittal. Material installed prior to approval by the Engineer, will be subject to removal and replacement at no additional cost to the Department.

Unless otherwise approved by the Engineer, all of the above items shall be submitted to the Engineer at the same time. Each item shall be properly identified by route, section, and contract number.

Electronic Submittals. The Contractor.....

Certifications. When certifications are specified and are available prior to material manufacture, the certification shall be included in the submittal information. When specified and only available after manufacture, the submittal shall include a statement of intent to furnish certification. All certificates shall be complete with all appropriate test dates and data.

Authorized Project Delay. See Article 801.08

Maintenance transfer and Preconstruction Inspection:

General. Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall request a maintenance transfer and preconstruction site inspection, to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of any lighting and/or traffic control systems which may be affected by the work. The request for the maintenance transfer and preconstruction inspection shall be made no less than **fourteen (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 lighting and/or traffic control systems which may be affected by the work

Marking of Existing Cable Systems. The party responsible for maintenance of any existing lighting and/or traffic control systems at the project site will, at the Contractor's request, mark and/or stake, once per location, all underground cable routes owned or maintained by the State. A project may involve multiple "locations" where separated electrical systems are involved (i.e. different controllers). The markings shall be taken to have a horizontal tolerance of at least 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 his work, as specified elsewhere herein. Note that the contractor shall be entitled to only one request for location marking of existing systems and that multiple requests may only be honored at the contractor's expense. No locates will be made after maintenance is transferred, unless it is at the contractor's expense.

Condition of Existing Systems. The Contractor shall conduct an inventory of all existing electrical system equipment within the project limits, which may be affected by the work, making note of any parts which are found broken or missing, defective or malfunctioning. Megger and load readings shall be taken for all existing circuits which will remain in place or be modified. If a circuit is to be taken out in its entirety, then readings do not have to be taken. The inventory and test data shall be reviewed with and approved by the Engineer and a record of the inventory shall be submitted to the Engineer for the record. Without such a record, all systems transferred to the Contractor for maintenance during construction shall be returned at the end of construction in complete, fully operating condition."

Maintenance and Responsibility During Construction.

Lighting Operation and Maintenance Responsibility. The scope of work shall include the assumption of responsibility for the continuing operation and maintenance of the existing, proposed, temporary, sign and navigation lighting, or other lighting systems and all appurtenances affected by the work as specified elsewhere herein. Maintenance of lighting systems is specified elsewhere and will be paid for separately

The proposed lighting system must be operational prior to opening the roadway to traffic unless temporary lighting exists which is designed and installed to properly illuminate the roadway.

Energy and Demand Charges. The payment of basic energy and demand charges by the electric utility for existing lighting which remains in service will continue as a responsibility of the Owner, unless otherwise indicated. Unless otherwise indicated or required by the Engineer duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously at the Owner's expense and lighting systems shall not be kept in operation during long daytime periods at the Owner's expense. Upon written authorization from the Engineer to place a proposed new lighting system in service, whether the system has passed final acceptance or not, (such as to allow temporary lighting to be removed), the Owner will accept responsibility for energy and demand charges for such lighting, effective the date of authorization. All other energy and demand payments to the utility shall be the responsibility of the Contractor until final acceptance.

Damage to Electrical Systems. Should damage occur to any existing electrical systems through the Contractor's operations, the Engineer will designate the repairs as emergency or non-emergency in nature.

Emergency repairs shall be made by the Contractor, or as determined by the Engineer, the Department, or its agent. Non-emergency repairs shall be performed by the Contractor within six working days following discovery or notification. All repairs shall be performed in an expeditious manner to assure all electrical systems are operational as soon as possible. The repairs shall be performed at no additional cost to the Department.

Lighting. An outage will be considered an emergency when three or more lights on a circuit or three successive lights are not operational. Knocked down materials, which result in a danger to the motoring public, will be considered an emergency repair.

Temporary aerial multi-conductor cable, with grounded messenger cable, will be permitted if it does not interfere with traffic or other operations, and if the Engineer determines it does not require unacceptable modification to existing installations.

Marking Proposed Locations for Highway Lighting System. The Contractor shall mark or stake the proposed locations of all poles, cabinets, junction boxes, pull boxes, handholes, cable routes, pavement crossings, and other items pertinent to the work. A proposed location inspection by the Engineer shall be requested prior to any excavation, construction, or installation work after all proposed installation locations are marked. Any work installed without location approval is subject to corrective action at no additional cost to the Department.

Inspection of electrical work. Inspection of electrical work shall be according to Article 105.12 and the following.

Before any splice, tap, or electrical connection is covered in handholes, junction boxes, light poles, or other enclosures, the Contractor shall notify and make available such wiring for the Engineer's inspection.

Testing. Before final inspection, the electrical work shall be tested. Tests may be made progressively as parts of the work are completed, or may be made when the work is complete. Tests shall be made in the presence of the Engineer. Items which fail to test satisfactorily shall be repaired or replaced. Tests shall include checks of control operation, system voltages, cable insulation, and ground resistance and continuity.

The forms for recording test readings will be available from the Engineer in electronic format. The Contractor shall provide the Engineer with a written report of all test data including the following:

- Voltage Tests
- Amperage Tests
- Insulation Resistance Tests
- Continuity tests
- Detector Loop Tests

Lighting systems. The following tests shall be made.

- (1) Voltage Measurements. Voltages in the cabinet from phase to phase and phase to neutral, at no load and at full load, shall be measured and recorded. Voltage readings at the last termination of each circuit shall be measured and recorded.
- (2) Insulation Resistance. Insulation resistance to ground of each circuit at the cabinet, with all loads connected, shall be measured and recorded.

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

On tests of cable runs which include cables which were existing in service prior to this contract, the resistance readings shall be the same or better than the readings recorded at the maintenance transfer at the beginning of the contract. Measurements shall be taken with a megohm meter approved by the Engineer.

- (3) Loads. The current of each circuit, phase main, and neutral shall be measured and recorded. The Engineer may direct reasonable circuit rearrangement. The current readings shall be within ten percent of the connected load based on material ratings.
- (4) Ground Continuity. Resistance of the system ground as taken from the farthest extension of each circuit run from the controller (i.e. check of equipment ground continuity for each circuit) shall be measured and recorded. Readings shall not exceed 2.0 ohms, regardless of the length of the circuit.
- (5) Resistance of Grounding Electrodes. Resistance to ground of all grounding electrodes shall be measured and recorded. Measurements shall be made with a ground tester during dry soil conditions as approved by the Engineer. Resistance to ground shall not exceed 10 ohms.

ITS. The following test shall be made in addition to the lighting system test above.

Detector Loops. Before and after permanently securing the loop in the pavement, the resistance, inductance, resistance to ground, and quality factor for each loop and lead-in circuit shall be tested. The loop and lead-in circuit shall have an inductance between 20 and 2500 microhenries. The resistance to ground shall be a minimum of 50 megohms under any conditions of weather or moisture. The quality factor (Q) shall be 5 or greater.

Fiber Optic Systems. Fiber optic testing shall be performed as required in the fiber optic cable special provision and the fiber optic splice special provision.

All test results shall be furnished to the Engineer seven working days before the date the inspection is scheduled.

Contract Guarantee. The Contractor shall provide a written guarantee for all electrical work provided under the contract for a period of six months after the date of acceptance with the following warranties and guarantees.

- (a) The manufacturer's standard written warranty for each piece of electrical material or apparatus furnished under the contract. The warranty for light emitting diode (LED) modules, including the maintained minimum luminance, shall cover a minimum of 60 months from the date of delivery.
- (b) The Contractor's written guarantee that, for a period of six months after the date of final acceptance of the work, all necessary repairs to or replacement of said warranted material or apparatus for reasons not proven to have been caused by negligence on the part of the user or acts of a third party shall be made by the Contractor at no additional cost to the Department.
- (c) The Contractor's written guarantee for satisfactory operation of all electrical systems furnished and constructed under the contract for a period of six months after final acceptance of the work.

The warranty for an uninterruptable power supply (UPS) shall cover a minimum of two years from date the equipment is placed in operation; however, the batteries of the UPS shall be warranted for full replacement for a minimum of five years.

Record Drawings. Alterations and additions to the electrical installation made during the execution of the work shall be neatly and plainly marked in red by the Contractor on the full-size set of record drawings kept at the Engineer's field office for the project. These drawings shall be updated on a daily basis and shall be available for inspection by the Engineer during the course of the work. The record drawings shall include the following:

- Cover Sheet
- Summary of Quantities, electrical items only
- Legends, Schedules and Notes
- Plan Sheet
- Pertinent Details
- Single Line Diagram
- Other useful information useful to locate and maintain the systems.

Any modifications to the details shall be indicated. Final quantities used shall be indicated on the Summary of Quantities. Foundation depths used shall also be listed.

As part of the record drawings, the Contractor shall inventory all materials, new or existing, on the project and record information on inventory sheets provided by the Engineer.

The inventory shall include:

- Location of Equipment, including rack, chassis, slot as applicable.
- Designation of Equipment
- Equipment manufacturer
- Equipment model number
- Equipment Version Number
- Equipment Configuration
 - Addressing, IP or other
 - Settings, hardware or programmed
- Equipment Serial Number

The following electronic inventory forms are available from the Engineer:

- Lighting Controller Inventory
- Lighting Inventory
- Light Tower Inspection Checklist
- ITS Location Inventory

The information shall be entered in the forms; handwritten entries will not be acceptable; except for signatures. Electronic file shall also be included in the documentation.

When the work is complete, and seven days before the request for a final inspection, the set of contract drawings, stamped "**RECORD DRAWINGS**", shall be submitted to the Engineer for review and approval and shall be stamped with the date and the signature of the Contractor's supervising Engineer or electrician. The record drawings shall be submitted in PDF format on CDROM as well as hardcopy's for review and approval.

In addition to the record drawings, PDF copies of the final catalog cuts which have been Approved and Approved as Noted with applicable follow-up shall be submitted along with the record drawings. The PDF files shall clearly indicate either by filename or PDF table of contents the respective pay item number. Specific part or model numbers of items which have been selected shall be clearly visible. Hard copies of the catalog are not required with this submittal.

The Contractor shall provide two sets of electronically produced drawings in a moisture proof pouch to be kept on the inside door of the controller cabinet or other location approved by the Engineer. These drawings shall show the final as-built circuit orientation(s) of the project in the form of a single line diagram with all luminaires numbered and clearly identified for each circuit.

Final documentation shall be submitted as a complete submittal package, i.e. record drawings, test results, inventory, etc. shall be submitted at the same time. Partial piecemeal submittals will be rejected without review. A total of five hardcopies and CDROMs of the final documentation shall be submitted.

GPS Documentation. In addition to the specified record drawings, the Contactor shall record GPS coordinates of the following electrical components being installed, modified or being affected in other ways by this contract:

- All light poles and light towers.
- Handholes and vaults.
- 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.
- All fiber optic slack locations shall be identified with quantity of slack cable included. When sequential cable markings are available, those markings shall be documented as cable marking into enclosure and marking out of enclosure.

Datum to be used shall be North American 1983.

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

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

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

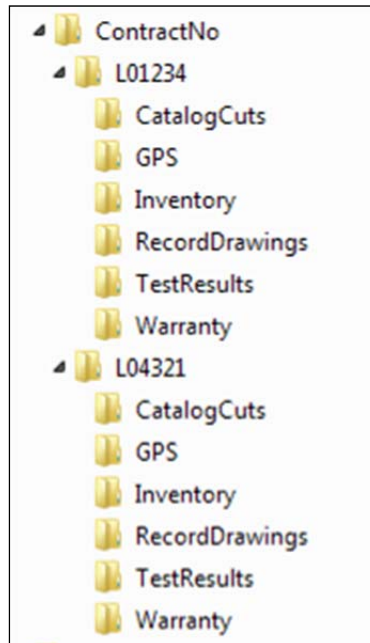
Prior to the collection of data, the contractor shall provide a sample data collection of at least six data points of known locations to be reviewed and verified by the Engineer to be accurate within 20 feet. Upon verification, data collection can begin. Data collection can be made as construction progresses, or can be collected after all items are installed. If the data is unacceptable the contractor shall make corrections to the data collection equipment and or process and submit the data for review and approval as specified. **Data collection prior to the submittal and review of the sample data of existing data points will be unacceptable and rejected.**

Accuracy. Data collected is to be mapping grade. A handheld mapping grade GPS device shall be used for the data collection. The receiver shall support differential correction and data shall have minimum 5 meter accuracy after post processing.

GPS receivers integrated into cellular communication devices, recreational and automotive GPS devices are not acceptable.

The GPS shall be the product of an established major GPS manufacturer having been in the business for a minimum of 6 years.”

The documents on the CD shall be organized by the Electrical Maintenance Contract Management System (EMCMS) location designation. If multiple EMCMS locations are within the contract, separate folders shall be utilized for each location as follows:



Extraneous information not pertaining to the specific EMCMS location shall not be included in that particular folder and sub-folder.

The inspection will not be made until after the delivery of acceptable record drawings, specified certifications, and the required guarantees.

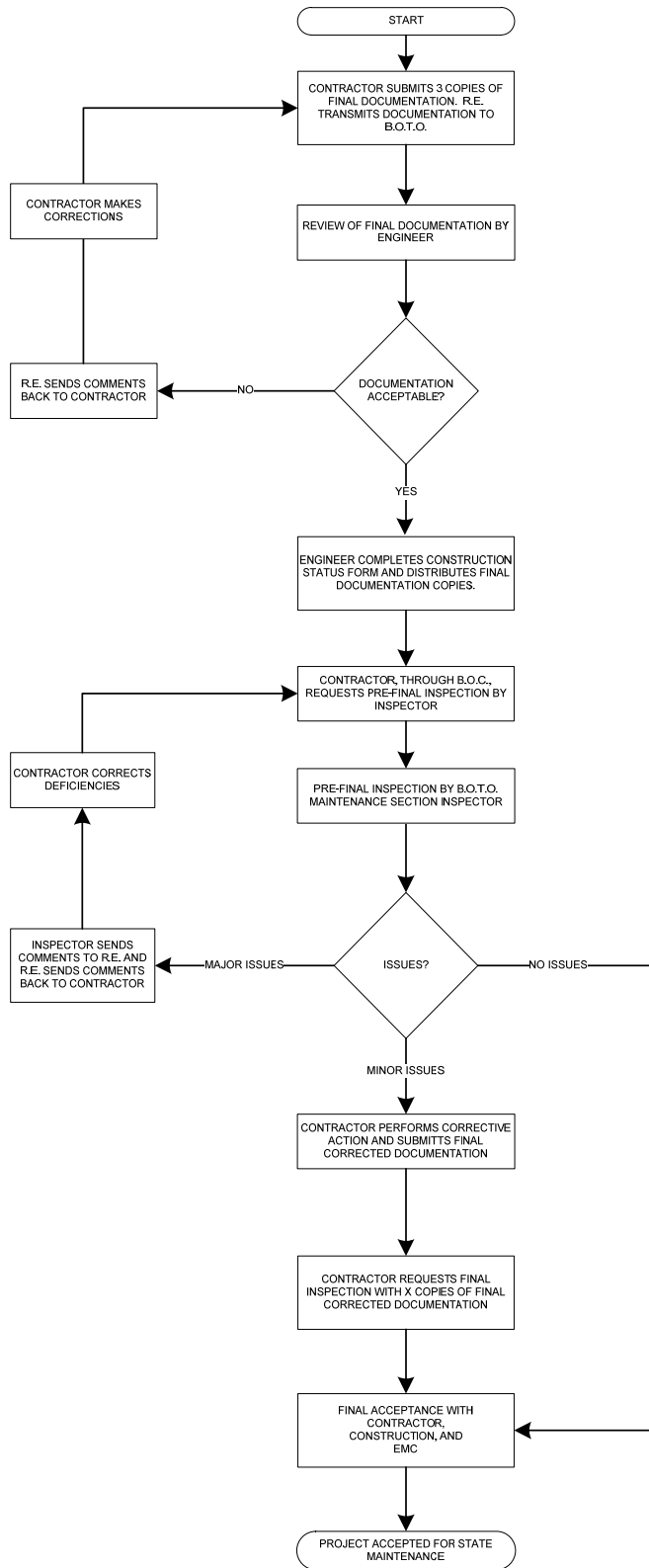
The Final Acceptance Documentation Checklist shall be completed and is contained elsewhere herein.

All CD's shall be labeled as illustrated in the CD Label Template contained herein.

Acceptance. Acceptance of electrical work will be given at the time when the Department assumes the responsibility to protect and maintain the work according to Article 107.30 or at the time of final inspection.

When the electrical work is complete, tested, and fully operational, the Contractor shall schedule an inspection for acceptance with the Engineer no less than seven working days prior to the desired inspection date. The Contractor shall furnish the necessary labor and equipment to make the inspection.

A written record of the test readings taken by the Contractor according to Article 801.13 shall be furnished to the Engineer seven working days before the date the inspection is scheduled. Inspection will not be made until after the delivery of acceptable record drawings, specified certifications, and the required guarantees.



Final Acceptance Documentation Checklist

LOCATION	
Route	Common Name
Limits	Section
Contract #	County
Controller Designation(s)	EMC Database Location Number(s)

ITEM	Contractor (Verify)	Resident Engineer (Verify)
Record Drawings -Four hardcopies (11" x 17") -Scanned to two CD-ROMs	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Field Inspection Tests -Voltage -Amperage -Cable Insulation Resistance -Continuity -Controller Ground Rod Resistance (Four Hardcopies & scanned to two CD's)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
GPS Coordinates -Excel file (Check Special Provisions, Excel file scanned to two CD's)	<input type="checkbox"/>	<input type="checkbox"/>
Job Warranty Letter (Four Hardcopies & scanned to two CD's)	<input type="checkbox"/>	<input type="checkbox"/>
Catalog Cut Submittals -Approved & Approved as Noted (Scanned to two CD's)	<input type="checkbox"/>	<input type="checkbox"/>
Lighting Inventory Form (Four Hardcopies & scanned to two CD's)	<input type="checkbox"/>	<input type="checkbox"/>
Lighting Controller Inventory Form (Four Hardcopies & scanned to two CD's)	<input type="checkbox"/>	<input type="checkbox"/>
Light Tower Inspection Form (If applicable, Four Hardcopies & scanned to two CD's)	<input type="checkbox"/>	<input type="checkbox"/>

Four Hardcopies & scanned to two CD's shall be submitted for all items above. The CD ROM 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 11 x 17 size. Include the original “red-ink” copy. The red-ink markup should be neatly drawn. Record drawings copies should be legible. Blurred copies will not be acceptable. 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.

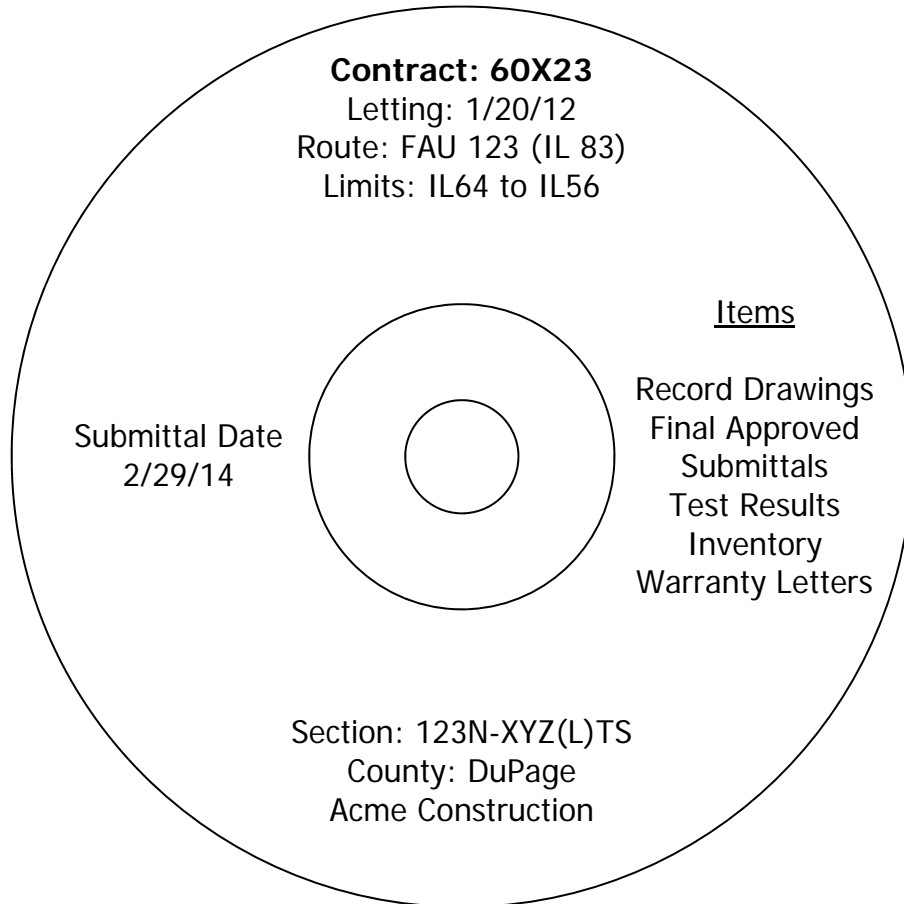
Lighting Inventory Form – Inventory form should include only proposed light poles, proposed light towers, proposed combination (traffic/light pole) lighting and proposed underpass luminaires.

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 SYSTEM

Effective: March 1, 2017

Replace Article 801.11 and 801.12 of the Standard Specifications with the following:

Effective the date the Contractor's activities (electrical or otherwise) at the job site begin, the Contractor shall be responsible for the proper operation and maintenance of all existing and proposed lighting systems which are part of, or which may be affected by the work until final acceptance or as otherwise determined by the Engineer.

The Contractor shall be responsible for the proper operation and maintenance of the following existing and proposed lighting systems under this contract:

- Existing IDOT Lighting Controller 'G'; Circuits E, F, G, H, M, N, O, and P.
- Existing IDOT Lighting Controller 'Z'; Circuits A, B, M and N.

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 fourteen (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. The contract drawings indicate the general extent of any existing lighting, but whether indicated or not, it remains the Contractor's responsibility to ascertain the extent of effort required for compliance with these specifications and failure to do so will not be justification for extra payment or reduced responsibilities.

Extent of Maintenance.

Partial Maintenance. Unless otherwise indicated, if the number of circuits affected by the contract is equal to or less than 40% of the total number of circuits in a given controller and the controller is not part of the contract work, the Contractor needs only to maintain the affected circuits 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 a given controller, or if the controller is modified in any way under the contract work, the Contractor shall maintain the entire controller and all associated circuits 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 contractor operations, is beyond repair and cannot be re-set, the contractor shall replace the equipment in kind with payment made for such equipment under Article 109.04. If the equipment damaged by any construction operations, not normal vehicular traffic, is beyond repair and cannot be re-set, the contractor shall replace the equipment in kind and the cost of the equipment shall be included in the cost of this pay item and shall not be paid for separately.

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 operations, vandalism, or other means. The potential cost of replacing or repairing any malfunctioning, damaged, or vandalized equipment shall be included in the bid price of this item and will not be paid for separately.

Lighting System Maintenance Operations

The Contractor's responsibility shall include all applicable responsibilities of the Electrical Maintenance Contract, State of Illinois, Department of Transportation, Division of Highways, District One. These responsibilities shall include the maintenance of lighting units (including sign lighting), cable runs and lighting controls. In the case of a pole knockdown or sign light damage, the Contractor shall promptly clear the lighting unit and circuit discontinuity and restore the system to service. The equipment shall then be re-set by the contractor within the time limits specified herein.

If the 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, 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. Maintenance of lighting systems shall be paid for at the contract unit price per calendar month for **MAINTENANCE OF LIGHTING SYSTEM.**

LUMINAIRE

Effective: January 1, 2012

Add the following to first paragraph of Article 1067(c) of the Standard Specifications:

“The reflector shall not be altered by paint or other opaque coatings which would cover or coat the reflecting surface. Control of the light distribution by any method other than the reflecting material and the aforementioned clear protective coating that will alter the reflective properties of the reflecting surface is unacceptable”

Add the following to Article 1067.01(f) of the Standard Specifications:

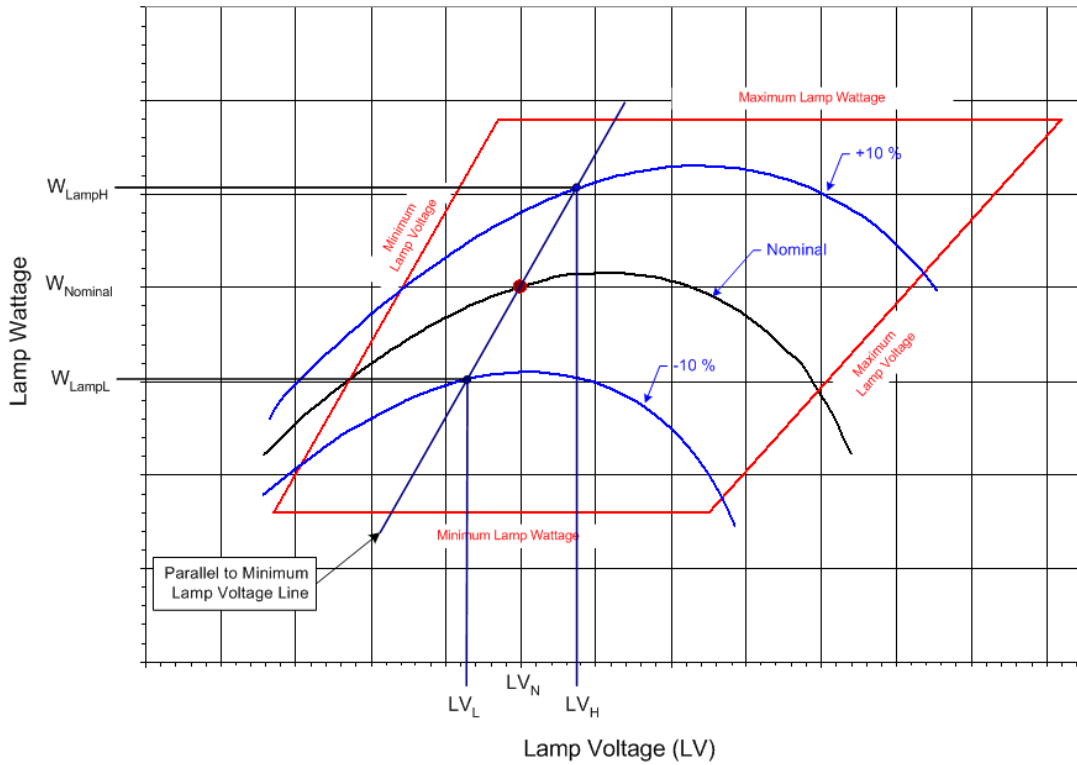
“The ballast shall be a High Pressure Sodium, high power factor, constant wattage auto-regulator, lead type (CWA) for operation on a nominal 240 volt system.”

Revise Article 1067.01(f)(1) of the Standard Specifications to read:

“The high pressure sodium, auto-regulator, lead type (CWA) ballast shall be designed to ANSI Standards and shall be designed and rated for operation on a nominal 240 volt system. The ballast shall provide positive lamp ignition at the input voltage of 216 volts. It shall operate the lamp over a range of input voltages from 216 to 264 volts without damage to the ballast. It shall provide lamp operation within lamp specifications for rated lamp life at input design voltage range. Operating characteristics shall produce output regulation not exceeding the following values:

Nominal Ballast Wattage	Maximum Ballast Regulation
750	25%
400	26%
310	26%
250	26%
150	24%
70	18%

For this measure, regulation shall be defined as the ratio of the lamp watt difference between the upper and lower operating curves to the nominal lamp watts; with the lamp watt difference taken within the ANSI trapezoid at the nominal lamp operating voltage point parallel to the minimum lamp volt line:



$$\text{Ballast Regulation} = \frac{W_{LampH} - W_{LampL}}{W_{LampN}} \times 100$$

where:

W_{LampH} = lamp watts at +10% line voltage when Lamp voltage = LV_H

W_{LampL} = lamp watts at - 10% line voltage when lamp voltage = LV_L

W_{lampN} = lamp watts at nominal lamp operating voltage = LV_N

Wattage	Nominal Lamp Voltage, LV_N	LV_L	LV_H
750	120v	115v	125v
400	100v	95v	105v
310	100v	95v	105v
250	100v	95v	105v
150	55v	50v	60v
70	52v	47v	57v

Ballast losses, based on cold bench tests, shall not exceed the following values:

Nominal Ballast Wattage	Maximum Ballast Losses
750	15%
400	20%
310	21%
250	24%
150	26%
70	34%

Ballast losses shall be calculated based on input watts and lamp watts at nominal system voltage as indicated in the following equation:

$$\text{Ballast Losses} = \frac{W_{Line} - W_{Lamp}}{W_{Lamp}} \times 100$$

where:

W_{line} = line watts at nominal system voltage

W_{lamp} = lamp watts at nominal system voltage

Ballast output to lamp. At nominal system voltage and nominal lamp voltage, the ballast shall deliver lamp wattage with the variation specified in the following table.

Nominal Ballast Wattage	Output to lamp variation
750	± 7.5%
400	± 7.5%
310	± 7.5%
250	± 7.5%
150	± 7.5%
70	± 7.5%

Example: For a 400w luminaire, the ballast shall deliver 400 watts ±7.5% at a lamp voltage of 100v for the nominal system voltage of 240v which is the range of 370w to 430w.

Ballast output over lamp life. Over the life of the lamp the ballast shall produce average output wattage of the nominal lamp rating as specified in the following table. Lamp wattage readings shall be taken at 5-volt increments throughout the ballast trapezoid. Reading shall begin at the lamp voltage (L_v) specified in the table and continue at 5 volt increments until the right side of the trapezoid is reached. The lamp wattage values shall then be averaged and shall be within the specified value of the nominal ballast rating. Submittal documents shall include a tabulation of the lamp wattage vs. lamp voltage readings.

Nominal Ballast Wattage	LV Readings begin at	Maximum Wattage Variation
750	110v	± 7.5%
400	90v	± 7.5%
310	90v	± 7.5%
250	90v	± 7.5%
150	50v	± 7.5%
70	45v	± 7.5%

Example: *For a 400w luminaire, the averaged lamp wattage reading shall not exceed the range of ±7.5% which is 370w to 430w*

Add the following to Article 1067.01(h) of the Standard Specifications:

“Independent Testing. Independent testing of luminaires shall be required whenever the pay item quantity of luminaires of a given pay item, as indicated on the plans, is 50 or more. For each luminaire type to be so tested, one luminaire plus one luminaire for each 50 luminaires shall be tested. Example: *A plan pay item quantity of 75 luminaires for a specific pay item would dictate that 2 be tested; 135 luminaires would dictate that three be tested.*” If the luminaire performance table is missing from the contract documents, the luminaire(s) shall be tested and the test results shall be evaluated against the manufacturer’s data as provided in the approved material submittal. The test luminaire(s) results shall be equal to or better than the published data. If the test results indicated performance not meeting the published data, the test luminaire will be designated as failed and corrective action as described herein shall be performed.

The Contractor shall be responsible for all costs associated with the specified testing, including but not limited to shipping, travel and lodging costs as well as the costs of the tests themselves, all as part of the bid unit price for this item. Travel, lodging and other associated costs for travel by the Engineer shall be direct-billed to or shall be pre-paid by the Contractor, requiring no direct reimbursement to the Engineer or the independent witness, as applicable”

The Contractor shall select one of the following options for the required testing with the Engineer's approval:

- a. Engineer Factory Selection for Independent Lab: The Contractor may select this option if the luminaire manufacturing facility is within the state of Illinois. The Contractor shall propose an independent test laboratory for approval by the Engineer. The selected luminaires shall be marked by the Engineer and shipped to the independent laboratory for tests.
- b. Engineer Witness of Independent Lab Test: The Contractor may select this option if the independent testing laboratory is within the state of Illinois. The Engineer shall select, from the project luminaires at the manufacturer's facility or at the Contractor's storage facility, luminaires for testing by the independent laboratory.
- c. Independent Witness of Manufacturer Testing: The independent witness shall select from the project luminaires at the manufacturers facility or at the Contractor's storage facility, the luminaires for testing. The Contractor shall propose a qualified independent agent, familiar with the luminaire requirements and test procedures, for approval by the Engineer, to witness the required tests as performed by the luminaire manufacturer.

The independent witness shall as a minimum meet the following requirements:

- ▶ Have been involved with roadway lighting design for at least 15 years.
- ▶ Not have been the employee of a luminaire or ballast manufacturer within the last 5 years.
- ▶ Not associated in any way (plan preparation, construction or supply) with the particular project being tested.
- ▶ Be a member of IESNA in good standing.
- ▶ Provide a list of professional references.

This list is not an all-inclusive list and the Engineer will make the final determination as to the acceptability of the proposed independent witness.

- d. Engineer Factory Selection and Witness of Manufacturer Testing: The Contractor may select this option if the luminaire manufacturing facility is within the state of Illinois. At the Manufacturer's facility, the Engineer shall select the luminaires to be tested and shall be present during the testing process. The Contractor shall schedule travel by the Engineer to and from the Manufacturer's laboratory to witness the performance of the required tests.

Should any of the tested luminaires fail to satisfy the specifications and perform according to approved submittal information, the luminaire shall be unacceptable and be replaced by alternate equipment meeting the specifications with the submittal and testing process repeated in their entirety; or corrections made to achieve required performance. In the case of corrections, the Contractor shall advise the Engineer of corrections made and shall request a repeat of the specified testing and, if the corrections are deemed reasonable by the Engineer, the testing process shall be repeated. The number of luminaires to be tested shall be the same quantity as originally tested; i.e. if three luminaires were tested originally, one, two or three failed, another three must be tested after corrective action is taken.

Revise Article 1067.06(a)(1) of the Standard Specifications to read:

"The lamps shall be of the clear type and shall have a color of 1900° to 2200° Kelvin."

Add the following table(s) to Article 1067 of the Standard Specifications:

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE #1
 2 LANE ROADWAY SECTION**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	22 (ft)
	Number of Lanes	2
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	47.5 (ft)
	Mast Arm Length	12 (ft)
	Pole Set-Back From Edge of Pavement	10 (ft)
LUMINAIRE DATA	Lamp Type	HPS
	Lamp Lumens	50,000
	I.E.S. Vertical Distribution	Medium
	I.E.S. Control Of Distribution	Cutoff
	I.E.S. Lateral Distribution	Type 3
	Total Light Loss Factor	0.70
LAYOUT DATA	Spacing	160 (ft)
	Configuration	Single Sided
	Luminaire Overhang over edge of pavement	2 (ft)

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

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

LUMINANCE	Average Luminance, L_{AVE}	1.2 Cd/m ²
	Uniformity Ratio, L_{AVE}/L_{MIN}	1.5:1 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	2:1 (Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3:1 (Max)

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE #2
 5 LANE ROADWAY SECTION**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	<u>60 (ft)</u>
	Number of Lanes	<u>5</u>
	I.E.S. Surface Classification	<u>R3</u>
	Q-Zero Value	<u>.07</u>
LIGHT POLE DATA	Mounting Height	<u>47.5 (ft)</u>
	Mast Arm Length	<u>12 (ft)</u>
	Pole Set-Back From Edge of Pavement	<u>10 (ft)</u>
LUMINAIRE DATA	Lamp Type	<u>HPS</u>
	Lamp Lumens	<u>50,000</u>
	I.E.S. Vertical Distribution	<u>Medium</u>
	I.E.S. Control Of Distribution	<u>Cutoff</u>
	I.E.S. Lateral Distribution	<u>Type 3</u>
	Total Light Loss Factor	<u>0.70</u>
LAYOUT DATA	Spacing	<u>250 (ft)</u>
	Configuration	<u>Opposite</u>
	Luminaire Overhang over edge of pavement	<u>2 (ft)</u>

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

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

LUMINANCE	Average Luminance, L_{AVE}	<u>1.35 Cd/m²</u>
	Uniformity Ratio, L_{AVE}/L_{MIN}	<u>2.5:1 (Max)</u>
	Uniformity Ratio, L_{MAX}/L_{MIN}	<u>5:1 (Max)</u>
	Veiling Luminance Ratio, L_V/L_{AVE}	<u>0.3:1 (Max)</u>

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE #3
 6 LANE ROADWAY SECTION**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	<u>72 (ft)</u>
	Number of Lanes	<u>2</u>
	I.E.S. Surface Classification	<u>R3</u>
	Q-Zero Value	<u>.07</u>
LIGHT POLE DATA	Mounting Height	<u>47.5 (ft)</u>
	Mast Arm Length	<u>12 (ft)</u>
	Pole Set-Back From Edge of Pavement	<u>10 (ft)</u>
LUMINAIRE DATA	Lamp Type	<u>HPS</u>
	Lamp Lumens	<u>50,000</u>
	I.E.S. Vertical Distribution	<u>Medium</u>
	I.E.S. Control Of Distribution	<u>Cutoff</u>
	I.E.S. Lateral Distribution	<u>Type 3</u>
	Total Light Loss Factor	<u>0.70</u>
LAYOUT DATA	Spacing	<u>255 (ft)</u>
	Configuration	<u>Opposite</u>
	Luminaire Overhang over edge of pavement	<u>2 (ft)</u>

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

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

LUMINANCE	Average Luminance, L_{AVE}	<u>1.0 Cd/m²</u>
	Uniformity Ratio, L_{AVE}/L_{MIN}	<u>2.4:1 (Max)</u>
	Uniformity Ratio, L_{MAX}/L_{MIN}	<u>5:1 (Max)</u>
	Veiling Luminance Ratio, L_V/L_{AVE}	<u>0.3:1 (Max)</u>

LUMINAIRE, LED

Effective: January 1, 2017

Description.

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

General.

The luminaire including the housing, driver and optical assembly shall be assembled in the U.S.A. The luminaire shall be assembled by and manufactured by the same manufacturer. The luminaire shall be in compliance with ANSI C136.37. LED light source(s) and driver(s) shall be RoHS compliant.

Submittal Requirements.

The Contractor shall submit, for approval, an electronic version of all associated luminaire IES files, AGI32 files and the TM-21 or TM-28 calculator spreadsheet with inputs and reports associated with the project luminaires. The Contractor shall also provide (as a minimum) an electronic (PDF) version of each of the following manufacturer's product data for each type of luminaire:

1. Descriptive literature and catalogue cuts for luminaire, LED driver, and surge protection device.
2. LED drive current, total luminaire input wattage and total luminaire current at the system operating voltage or voltage range and ambient temperature of 25 C.
3. LED efficacy per luminaire expressed in lumens per watt (lpw).
4. Initial delivered lumens at the specified color temperature, drive current, and ambient temperature.
5. Computer photometric calculation reports as specified and in the luminaire performance table.
6. TM-15 BUG rating report.
7. Isofootcandle chart with max candela point and half candela trace indicated.

8. Documentation of manufacturers experience and verification that luminaires were assembled in the U.S.A. as specified.
9. Supporting documentation of compliance with ANSI standards as well as UL listing as specified.
10. Supporting documentation of laboratory accreditations and certifications for specified testing as indicated.
11. Thermal testing documents as specified.
12. IESNA LM-79, LM-80 (or LM-84) and TM-21 (or TM-28) reports as specified.
13. Salt fog test reports and certification as specified.
14. Vibration Characteristics Test Reports and certification as specified.
15. Ingress Protection Test Reports as specified.
16. Written warranty.

A sample luminaire shall be provided upon request of the Engineer. The sample shall be as proposed for the contract and shall be delivered to the District Headquarters.

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 33 years' experience manufacturing HID roadway luminaires and shall have a minimum of seven (7) years' experience manufacturing LED roadway luminaires. The manufacturer shall have a minimum of 25,000 total LED roadway luminaires installed on a minimum of 100 separate installations, all within the U.S.A.

Housing.

Material. The luminaire shall be a single device not requiring on-site assembly for installation. The power supply for the luminaire shall be integral to the unit.

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

Unless otherwise indicated in the plans, the luminaire color shall be grey.

The luminaire shall slip-fit on a mounting arm with a 2" diameter tenon (2.375" outer diameter), and shall have a barrier to limit the amount of insertion. The slip fitter clamp shall utilize four (4) bolts to clamp to the tenon arm. The luminaire shall be provided with a leveling surface and shall be capable of being tilted ± 5 degrees from the axis of attachment in 2.5 degree increments and rotated to any degree with respect to the supporting arm.

The housing shall be designed to prevent the accumulation of water, ice, dirt and debris and to ensure maximum heat dissipation.

The effective projected area of the luminaire shall not exceed 1.6 sq. ft.

The total weight of the luminaire(s) and accessories shall not exceed 75 pounds.

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

The luminaire shall include a fully prewired, 7-pin twist lock ANSI C136.41-compliant receptacle. Unused pins shall be connected as directed by the Manufacturer and as approved by the Engineer. A shorting cap shall be provided with the luminaire.

Vibration Characteristics. All luminaires shall be vibration tested and pass ANSI C136.31 requirements. Luminaires shall be rated for "3G" peak acceleration. Vibration testing shall be run using the same luminaire in all three axes.

Labels and Decals. All luminaires shall have labels in accordance with ANSI C136.15 for an external label, and ANSI C136.22 for an internal label.

The luminaire shall be Listed for wet locations by a U.S. Occupational Safety Health administration (OSHA) Nationally Recognized Testing Laboratory (NRTL) and shall be in compliance with UL 8750 and UL 1598. It shall be identified as such by the NRTL tag/sticker on the inside of the luminaire.

Hardware. All fasteners shall be stainless steel. Captive screws are required on any components that require maintenance after installation.

Internal Luminaire Electrical Connections. Quick connect/disconnect plugs shall be supplied between the discrete electrical components within the luminaire such as the driver, surge protection device and optical assembly for easy removal. The keyed quick connect/disconnect plugs shall be operable without the use of tools while wearing insulated gloves.

Provisions for any future house-side external or internal shielding should be indicated along with means of attachment.

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

Wiring. Wiring within the electrical enclosure shall be rated at 600v, 105°C or higher.

Driver.

The driver shall be integral to the luminaire.

The driver shall tolerate indefinite open and short circuit output conditions without damage.

Ingress Protection. The driver Ingress Protection (IP) rating as defined in the ANSI/IEC 60529 standard shall have an IP66 rating.

Input Voltage. The driver shall be suitable for operation over a range of 120 to 277 volts or 347 to 480 volts as required by the system operating voltage.

Operating Temperature. The driver shall have an operating ambient temperature range of -40°C to 70°C.

Driver Life. The driver shall provide a life time of 100,000 hours at 25° C ambient.

Safety/UL. The driver shall be UL Listed under standard UL 1012.

Power Factor. Drivers shall maintain a power factor of 0.9 or higher and total harmonic distortion of less than 20%.

Driver efficiency. Efficiency of the driver is defined by the ratio of output power and input power. The driver shall deliver a maximum efficiency of >90% at maximum load and an efficiency of >85% for the driver operating at 50% power.

Electrical Interference. The driver shall meet the Electromagnetic Compatibility (EMC) requirements per FCC Title 47 Code of Federal Regulations (CFR) Part 15 Class A.

Thermal Fold Back. The driver shall reduce the current to the LED module if the driver is overheating due to abnormal conditions.

Dimming. The driver shall have dimming capability. The driver shall accept a dimming control signal that is compliant with the 0-10V protocol in accordance with ANSI C136.37.

Leakage current. The driver shall comply with safety standards in accordance with IEC 61347-1.

The Surge Protection Device shall be UL 1449 labeled as Type 4 and be an integral part of the luminaire. The SPD shall be compliant with ANSI C136.2-2014 (Draft).

Thermal performance

Thermal Testing shall be provided as defined by ANSI/UL 1598. The luminaire shall start and operate in the ambient temperature range specified in the driver section. The maximum rated case temperature of the driver, LEDs, and other internal components shall not be exceeded when the luminaire is operated in the ambient temperature range specified.

Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation. Testing shall be submitted (whenever is available) to show the maximum rated case temperature of the driver, LEDs, and other internal components are not exceeded when the luminaire is operated with the heat sink filled with debris.

LED Optical Assembly

The LED optical assembly shall be a scalable array consisting of discrete LED panels or modules. Each panel or module shall have a minimum IP rating of 66.

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

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

The luminaire may or may not have a glass lens over the LED modules. If a glass lens is used, it must be a flat lens. Material other than glass will not be acceptable. 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) National Voluntary Laboratory Accreditation Program (NVLAP) for the IESNA LM-79 test procedure.

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

Lumen maintenance shall be measured for the LEDs according to LM-80 or for the luminaires according to LM-84. The LM-80 report shall be based on a minimum of 6,000 hours, yet 10,000 hour reports shall be provided for luminaires where those tests have been completed.

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.

Lumen Maintenance Projection.

The luminaire shall have long term lumen maintenance documented according to IESNA TM-21 or IESNA TM-28. Ambient temperature shall be 25⁰ C.

The submitted calculations shall incorporate the light loss factors as indicated the respective performance tables.

Photometric Calculations.

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

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

All photometry must be **photopic**. Scotopic or mesopic factors will not be allowed.

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 ROADWAY LIGHTING**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	72 (ft)
	Number of Lanes	6
	Median Width	N/A
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	47.5 (ft)
	Mast Arm Length	6 (ft)
	Pole Set-Back From Edge Of Pavement	4 (ft)
LUMINAIRE DATA	Lumens	36,001 – 50,000
	BUG Rating	B3 – U0 – G4 (Max)
	I.E.S. Vertical Distribution	Medium
	I.E.S. Lateral Distribution	Type 2 or 3
	Total Light Loss Factor	0.70
LAYOUT DATA	Spacing	165 (ft)
	Configuration	Opposite
	Luminaire Overhang over EOP	2 (ft)

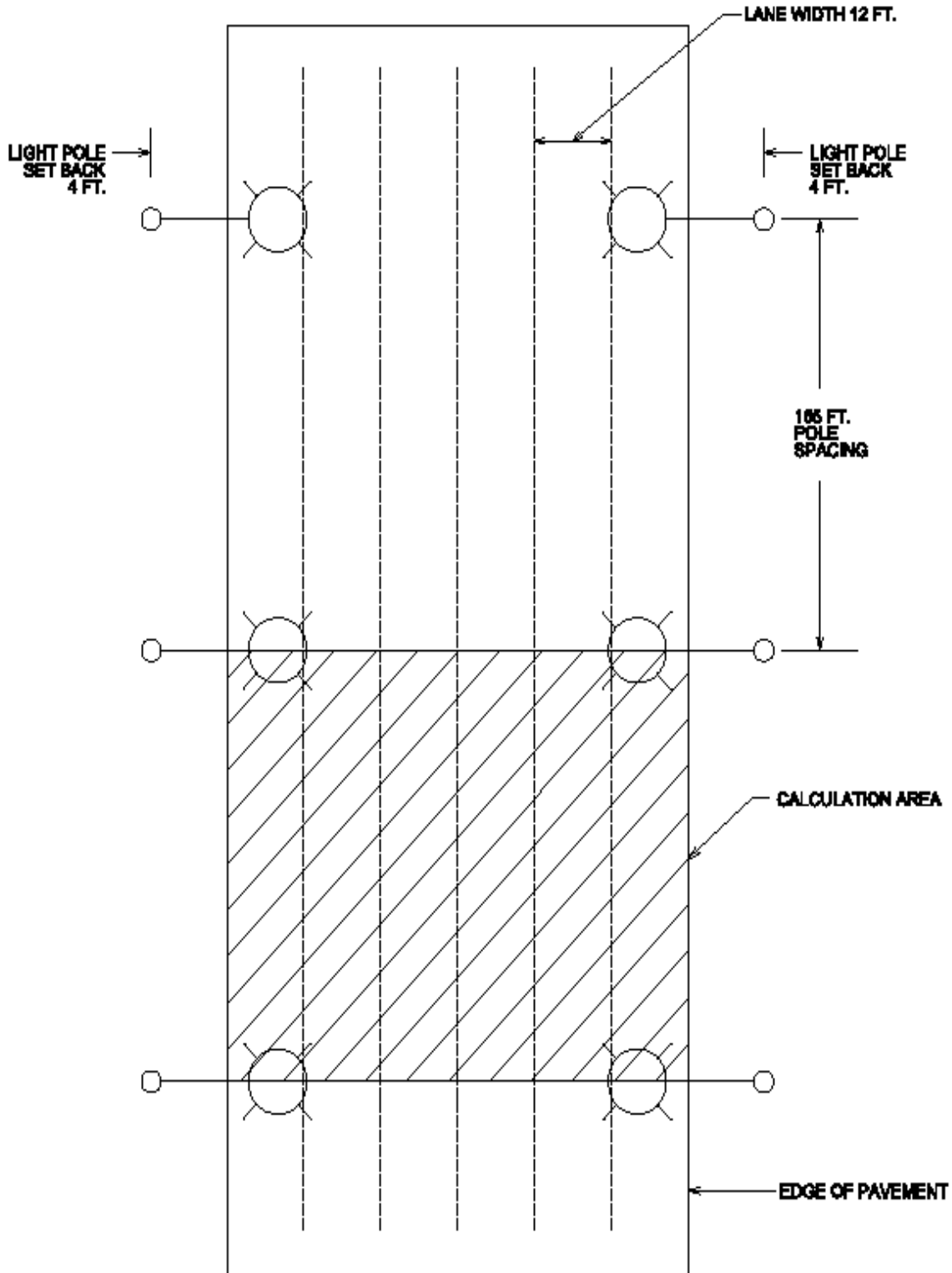
NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

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

ROADWAY LUMINANCE	Average Luminance, L_{AVE}	1.45 Cd/m ² (Max)
		.95 Cd/m ² (Min)
	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}	0.3:1 (Max)

LIGHT POLE LAYOUT 6 LANE OPPOSITE



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
1-29	0 (unless otherwise noted)
30-80	2
81-130	3
131-180	4
181-230	5
231-280	6
281-330	7

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

The Electrical Engineer shall select from all the project luminaires at the Contractor's or distributor's storage facility, within District 1, the luminaires for testing. In all cases, the selection of luminaires shall be a random selection from the entire completed lot of luminaires required for the contract. Selections from partial lots will not be allowed. An additional luminaire shall also be selected for physical inspection by the Engineer at the District Headquarters. This luminaire will be 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.

Luminaires shall be tested at a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory approved for each of the required tests. All costs associated with luminaire testing shall be included in the bid price of the luminaire.

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

The testing performed shall include photometric and electrical testing.

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

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

Two copies of the summary report and the test results (including CDROM) shall be certified by the test laboratory and shall be sent by certified mail directly to the Engineer.

To: District Engineer
Attn: Bureau Chief of Traffic Operations
Illinois Department of transportation
201 West center Ct.
Schaumburg, IL 60196

The package shall state "luminaire test reports" and the contract number clearly.

A copy of this material shall be sent to the Contractor and the Resident Engineer at the same time.

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

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

In the case of corrections, the Contractor shall advise the Engineer of the proposed corrections and shall request a repeat of the specified testing and, if the corrections are deemed reasonable by the Engineer, the testing process shall be repeated in its entirety.

The number of luminaires to be tested shall be the same quantity as originally tested as required in the above table.

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

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

Installation.

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

Luminaires which are pole mounted shall be mounted on site such that poles and arms are not left unloaded. Pole mounted luminaires shall be leveled/adjusted after poles are set and vertically aligned before being energized. When mounted on a tenon, care shall be exercised to assure maximum insertion of the mounting tenon. Each luminaire shall be checked to assure compatibility with the project power system. When the night-time check of the lighting system by the Engineer indicates that any luminaires are mis-aligned, the mis-aligned luminaires shall be corrected at no additional cost.

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

Pole wiring shall be provided with the luminaire. Pole wire shall run from handhole to luminaire. Pole wire shall be sized No. 10, rated 600 V, RHW/USE-2, and have copper conductors, stranded in conformance with ASTM B 8. Pole wire shall be insulated with cross-linked polyethylene (XLP) insulation. Wire shall be trained within the pole or sign structure so as to avoid abrasion or damage to the insulation.

Pole wire shall be extended through the pole, pole grommet, luminaire ring, and any associated arm and tenon. The pole wire shall be terminated in a manner that avoids sharp kinks, pinching, pressure on the insulation, or any other arrangement prone to damaging insulation value and producing poor megger test results. Wires shall be trained away from heat sources within the luminaire. Wires shall be terminated so all strands are extended to the full depth of the terminal lug with the insulation removed far enough so it abuts against the shoulder of the lug, but is not compressed as the lug is tightened.

Included with the pole wiring shall be fusing located in the handhole. Fusing shall be according to Article 1065.01 with the exception that fuses shall be 6 ampere.

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

Horizontal mount luminaires shall be installed in a level, horizontal plane, with adjustments as needed to insure the optics are set perpendicular to the traveled roadway.

When the pole is bridge mounted, a minimum size stainless steel 1/4-20NC set screw shall be provided to secure the luminaire to the mast arm tenon. A hole shall be drilled and tapped through the tenon and luminaire mounting bracket and then fitted with the screw.

Warranty.

The entire luminaire and all of its component parts shall be covered by a 10 year warranty. Failure is when one or more of the following occur:

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

The warranty period shall begin on the date of project final acceptance. A copy of the acceptance letter shall be sent to the luminaire manufacturer and luminaire manufacturer's representative by the Contractor upon final acceptance.

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

Method of Measurement.

LED Luminaire classification shall be as follows:

Type	Min Lumens	Max Lumens
A	3,000	12,000
B	12,001	22,000
C	22,001	36,000
D	36,001	50,000

Where delivered lumens is defined as the initial delivered lumens at the specified color temperature.

Note: Luminaires above the stated maximums for the specified type will not be accepted

Basis of Payment.

This work will be paid for at the contract unit price per each for **LUMINAIRE, LED, HORIZONTAL MOUNT**, of the **TYPE** indicated.

LUMINAIRE SAFETY CABLE ASSEMBLY

Effective: January 1, 2012

Description: This item shall consist of providing a luminaire safety cable assembly as specified herein and as indicated in the plans.

Materials. Materials shall be according to the following:

Wire Rope. Cables (wire rope) shall be manufactured from Type 304 or Type 316 stainless steel having a maximum carbon content of 0.08 % and shall be a stranded assembly. Cables shall be 3.18 mm (0.125") diameter, 7x19 Class strand core and shall have no strand joints or strand splices.

Cables shall be manufactured and listed for compliance with Federal Specification RR-W-410 and Mil-DTL-83420.

Cable terminals shall be stainless steel compatible with the cable and as recommended by the cable manufacturer. Terminations and clips shall be the same stainless steel grade as the wire rope they are connected to.

U-Bolts. U-Bolts and associated nuts, lock washers, and mounting plates shall be manufactured from Type 304 or Type 316 stainless steel.

CONSTRUCTION REQUIREMENTS

General. The safety cable assembly shall be installed as indicated in the plan details. One end of the cable assembly shall have a loop fabricated from a stainless steel compression sleeve. The other end of the cable assembly shall be connected with stainless steel wire rope clips as indicated. Slack shall be kept to a minimum to prevent the luminaire from creeping off the end of the mast arm. Unless otherwise indicated in the plans, the luminaire safety cable shall only be used in conjunction with luminaires which are directly above the traveled pavement.

Basis of Payment: This work shall be paid for at the contract price each for LUMINAIRE SAFETY CABLE ASSEMBLY, which shall be payment for the work as described herein and as indicated in the plans.

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 Listed (UL 6). The PVC coating must have been investigated by UL as providing the primary corrosion protection for the rigid metal conduit. Ferrous fittings for general service locations shall be UL Listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to plastic coating shall be UL listed.

b. The PVC coating shall have the following characteristics:

Hardness:	85+ Shore A Durometer
Dielectric Strength:	400V/mil @ 60 Hz
Aging:	1,000 Hours Atlas Weatherometer
Temperature	The PVC compound shall conform at 0° F. to Federal Specifications PL-406b, Method 2051, Amendment 1 of 25 September 1952 (ASTM D 746)
Elongation:	200%

c. The exterior and interior galvanized conduit surface shall be chemically treated to enhance PVC coating adhesion and shall also be coated with a primer before the PVC coating to ensure a bond between the zinc substrate and the PVC coating. The bond strength created shall be greater than the tensile strength of the plastic coating.

d. The nominal thickness of the PVC coating shall be 1 mm (40 mils). The PVC exterior and urethane interior coatings applied to the conduit shall afford sufficient flexibility to permit field bending without cracking or flaking at temperatures above -1°C (30°F).

e. An interior urethane coating shall be uniformly and consistently applied to the interior of all conduit and fittings. This internal coating shall be a nominal 2 mil thickness. The interior coating shall be applied in a manner so there are no runs, drips, or pinholes at any point. The coating shall not peel, flake, or chip off after a cut is made in the conduit or a scratch is made in the coating.

f. Conduit bodies shall have a tongue-in-groove gasket for maximum sealing capability. The design shall incorporate a positive placement feature to assure proper installation. Certified test results confirming seal performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours shall be submitted for review when requested by the Engineer.

g. The PVC conduit shall pass the following tests:

Exterior PVC Bond test RN1:

Two parallel cuts 13 mm (1/2 inch) apart and 40 mm (1 1/2 inches) in length shall be made with a sharp knife along the longitudinal axis. A third cut shall be made perpendicular to and crossing the longitudinal cuts at one end. The knife shall then be worked under the PVC coating for 13 mm (1/2 inch) to free the coating from the metal.

Using pliers, the freed PVC tab shall be pulled with a force applied vertically and away from the conduit. The PVC tab shall tear rather than cause any additional PVC coating to separate from the substrate.

Boil Test:

Acceptable conduit coating bonds (exterior and interior) shall be confirmed if there is no disbondment after a minimum average of 200 hours in boiling water or exposure to steam vapor at one atmosphere. Certified test results from a national recognized independent testing laboratory shall be submitted for review and approval. The RN1 Bond Test and the Standard Method for Measuring Adhesion by Tape Test shall be utilized.

Exterior Adhesion. In accordance with ASTM D870, a 6" length of conduit test specimen shall be placed in boiling water. The specimen shall be periodically removed, cooled to ambient temperature and immediately tested according to the bond test (RN1). When the PVC coating separates from the substrate, the boil time to failure in hours shall be recorded.

Interior Adhesion. In accordance with ASTM D3359, a 6" conduit test specimen shall be cut in half longitudinally and placed in boiling water or directly above boiling water with the urethane surface facing down. The specimen shall be periodically removed, cooled to ambient temperature and tested in accordance with the Standard Method of Adhesion by Tape Test (ASTM D3359). When the coating disbonds, the time to failure in hours shall be recorded.

Heat/Humidity Test:

Acceptable conduit coating bonds shall be confirmed by a minimum average of 30 days in the Heat and Humidity Test. The RN1 Bond Test and the Standard Method for Measuring Adhesion by Tape Test shall be utilized.

Exterior Adhesion. In accordance with ASTM D1151, D1735, D2247 and D4585, conduit specimens shall be placed in a heat and humidity environment where the temperature is maintained at 150°F (66°C) and 95% relative humidity. The specimens shall be periodically removed and a bond test (RN1) performed. When the PVC coating separates from the substrate, the exposure time to failure in days shall be recorded.

Interior Adhesion. In accordance with ASTM D3359, conduit specimens shall be placed in a heat and humidity environment where the temperature is maintained at 150°F (66°C) and 95% relative humidity. When the coating disbonds, the time to failure in hours shall be recorded.

Add the following to Article 1088.01(a)(4) of the Standard Specifications:

“All liquid tight flexible metal conduit fittings shall have an insulated throat to prevent abrasion of the conductors and shall have a captive sealing O-ring gasket. The fittings shall be Listed under UL 514B. The insulated throat shall be rated up to 105° C.”

Revise the second paragraph of Article 811.04 of the Standard Specifications to read:

“Expansion fittings and LFNC will not be measured for payment.”

Revise Article 811.05 of the Standard Specifications to read:

“**811.05 Basis of Payment.** This work will be paid for at the contract unit price per meter (foot) for **CONDUIT ATTACHED TO STRUCTURE**, of the diameter specified, **RIGID GALVANIZED STEEL** or **CONDUIT ATTACHED TO STRUCTURE**, of the diameter specified, **RIGID GALVANIZED STEEL, PVC COATED.**”

UNDERGROUND RACEWAYS

Effective: March 1, 2015

Revise Article 810.04 of the Standard Specifications to read:

“Installation. All underground conduits shall have a minimum depth of 30-inches (700 mm) below the finished grade.”

Add the following to Article 810.04 of the Standard Specifications:

“All metal conduit installed underground shall be Rigid Steel Conduit unless otherwise indicated on the plans.”

Add the following to Article 810.04 of the Standard Specifications:

“All raceways which extend outside of a structure or duct bank but are not terminated in a cabinet, junction box, pull box, handhole, post, pole, or pedestal shall extend a minimum of 300 mm (12”) or the length shown on the plans beyond the structure or duct bank. The end of this extension shall be capped and sealed with a cap designed for the conduit to be capped.

The ends of rigid metal conduit to be capped shall be threaded, the threads protected with full galvanizing, and capped with a threaded galvanized steel cap.

The ends of rigid nonmetallic conduit and coilable nonmetallic conduit shall be capped with a rigid PVC cap of not less than 3 mm (0.125”) thick. The cap shall be sealed to the conduit using a room-temperature-vulcanizing (RTV) sealant compatible with the material of both the cap and the conduit. A washer or similar metal ring shall be glued to the inside center of the cap with epoxy, and the pull cord shall be tied to this ring.”

Add the following to Article 810.04(c) of the Standard Specifications:

“Coilable non-metallic conduit shall be machine straightened to remove the longitudinal curvature caused by coiling the conduit onto reels prior to installing in trench, encasing in concrete or embedding in structure. The straightening shall not deform the cross-section of the conduit such that any two measured outside diameters, each from any location and at any orientation around the longitudinal axis along the conduit differ by more than 6 mm (0.25”).” The longitudinal axis of the straightened conduit shall not deviate by more than 20 mm per meter (0.25” per foot” from a straight line. The HDPE and straightening mechanism manufacturer operating temperatures shall be followed.

UNIT DUCT

Effective: January 1, 2012

Revise the first paragraph of Article 810.04 to read:

“The unit duct shall be installed at a minimum depth of 30-inches (760 mm) unless otherwise directed by the Engineer.”

Revise Article 1088.01(c) to read:

“(c) Coilable Nonmetallic Conduit.

General:

The duct shall be a plastic duct which is intended for underground use and which can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance. The duct shall be a plastic duct which is intended for underground use and can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance.

The duct shall be made of high density polyethylene which shall meet the requirements of ASTM D 2447, for schedule 40. The duct shall be composed of black high density polyethylene meeting the requirements of ASTM D 3350, Class C, Grade P33. The wall thickness shall be in accordance with Table 2 for ASTM D 2447.

The duct shall be UL Listed per 651-B for continuous length HDPE coiled conduit. The duct shall also comply with NEC Article 354.100 and 354.120.

Submittal information shall demonstrate compliance with the details of these requirements.

Dimensions:

Duct dimensions shall conform to the standards listed in ASTM D2447. Submittal information shall demonstrate compliance with these requirements.

Nominal Size		Nominal I.D.		Nominal O.D.		Minimum Wall	
mm	in	mm	in	mm	in	mm	in
31.75	1.25	35.05	1.380	42.16	1.660	3.556 +0.51	0.140 +0.020
38.1	1.50	40.89	1.610	48.26	1.900	3.683 +0.51	0.145 +0.020

Nominal Size		Pulled Tensile	
mm	in	N	lbs
31.75	1.25	3322	747
38.1	1.50	3972	893

Marking:

As specified in NEMA Standard Publication No. TC-7, the duct shall be clearly and durably marked at least every 3.05 meters (10 feet) with the material designation (HDPE for high density polyethylene), nominal size of the duct and the name and/or trademark of the manufacturer.

Performance Tests:

Polyethylene Duct testing procedures and test results shall meet the requirements of UL 651. Certified copies of the test report shall be submitted to the Engineer prior to the installation of the duct. Duct crush test results shall meet or exceed the following requirements:

Duct Diameter		Min. force required to deform sample 50%	
mm	in	N	lbs
35	1.25	4937	1110
41	1.5	4559	1025

WIRE AND CABLE

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.”

JUNCTION BOX EMBEDDED IN STRUCTURE

Effective: January 1, 2012

Description. This work shall consist of furnishing and installing an embedded Composite Concrete Junction Box in concrete.

Materials. The box and cover shall be constructed of a polymer concrete and reinforced with a heavy-weave fiberglass cloth. The material shall have the following properties:

Mechanical Property	Value	Physical Property	Value
Compressive strength	9,000 – 15,000 psi	Density	85-150 lbs/ft ²
flexural strength	3,000 – 6,000 psi	Barcol Hardness	45
Impact Energy	30 – 72 ft.-lbs	Water Absorption	Less Than 1%
tensile strength	800 – 1,100 psi		

The resulting enclosure shall have a Tier 8 Load Rating in accordance with ANSI/SCTE 77 2002. The material shall have light gray color to match the surrounding concrete. The cover shall be made of the same material. The junction box and cover shall be arranged to fit flush with the structure surface. The cover shall be gasketed and attached with a minimum of four stainless steel hex-head bolts factory coated with anti-seize compound. The enclosure shall be UL Listed.

Installation. The embedded junction box shall be set flush with the adjoining surface and shall be properly supported during concrete placement. The junction box shall not be installed in areas where

Field cut conduit openings shall be uniform and smooth. All burrs and rough edges shall be filed smooth to the satisfaction of the Engineer prior to the installation of conduit(s) into the junction box. Field cut conduit openings shall be fitted with the appropriate conduit fittings and accessories. Conduit fittings and accessories shall be provided according to Article 1088.01 and as shown on the plans.

Conduit openings may be factory cut and pre-assembled with conduit fittings. Conduit fittings and accessories shall be manufactured from polyvinyl chloride complying with ASTM D 1784 and shall comply with all the applicable requirements of NEMA Publication No. TC2, U.L. Standard 651 for EPC-40-PVC and NEC Article 347.

Slight deviations to a larger size than the specified sizes may be allowed to conform to a standard manufacturer's production size with the approval of the Engineer.

Basis of Payment. This work will be paid for at the contract unit price each for JUNCTION BOX, EMBEDDED IN STRUCTURE, of the type and size when specified. The Contractor may, with the approval of the Engineer, use box sizes larger than indicated, at no additional cost to the Department.

LIGHT TOWER

Effective: July 1, 2015

Description. This work shall consist of furnishing and delivering a light tower complete with lowering device, and all appurtenances required for a complete operating unit.

Definitions.

Light Tower: The complete light tower shaft and lowering device as one integral working system.

Shaft: The light tower shaft.

Lowering Device: The components involved with the mounting, operation, and raising and lowering of the luminaire ring, luminaires.

Tower Height: The height of the tower shall be measured from the bottom of the base plate to the center-line of the luminaire tenon arm. This dimension is also referred to as Mounting Height.

Materials. Materials shall be as specified elsewhere herein.

Submittals and Certifications. Shop drawings, product data and certifications shall be submitted. The submitted information shall be complete and shall include information relative to all specified requirements suitable for verification of compliance.

THE SUBMITTALS SHALL BE ARRANGED AND CROSS-REFERENCED TO THE SPECIAL PROVISIONS. FAILURE TO CROSS-REFERENCE THE SUBMITTAL INFORMATION WITH THE SPECIAL PROVISIONS WILL RESULT IN THE SUBMITTAL BEING RETURNED WITHOUT REVIEW.

The submittal information shall be dated, current, project specific, identified as to the project, and shall also include the following calculations and certifications:

- Shaft design calculations, including Registered Engineer Certification.
- Lowering device seating force calculations.
- Certification of intent to provide domestic steel in accordance with Article 106.01 of the Standard Specifications.
- Welding details and procedures.
- Letter of intent to provide specified weld inspection reports.
- Confirmation of coordination between anchor rod supplier and tower manufacturer for adequacy of anchor rod assembly.
- Manufacturer's recommended installation procedures.
- Letter of intent to provide manufacturer's representative during installation and to provide specified installation certification.

All certifications shall be notarized. A PDF format copy of the submittal shall be provided with all submittals, including resubmittals, on CDROM. Light tower submittals will require a longer review time than other items as and such the review period referenced in Article 105.04 shall be 60 days.

Light Tower

General. Light towers (high mast poles) shall consist of any poles 24 m (80 ft) or more in length.

Each light tower shall be complete with internal, integral motorized lowering mechanism, luminaire ring, pole top hood, internal electric power cables, luminaire counter-weight (when applicable), and all appurtenances required for a complete operating unit.

The design shall be based upon AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" current at the time the project is advertised with the following exception; the Illinois Department of Transportation waives the requirements of Chapter 5, Section 5.14.6.2 – Reinforced Holes and Cutouts for high mast lighting towers.

The calculated loading shall incorporate a total combined luminaire weight of 720 lbs and a total projected area of 7.3 m² (24 ft²) plus 10 sq ft (0.93 sq m) for the hood. A 90 mph (145 km/hr) wind velocity and a minimum design life of 50 years shall be applied using Fatigue Category 1.

Light towers shall be designed and constructed so no structural member or other component is applied in excess of the manufacturer's recommended rating (when applicable) or the published rating, whichever is lower.

The light towers shall be of a height and luminaire capacity as indicated and shall be of the non-latching ring support design. A latching-type ring support will not be acceptable.

The tower shall be provided as a single coordinated assembly, with one entity responsible as manufacturer of the whole. One entity must be the manufacturer of the lowering device or the tower shaft, or both, shall warrant the entire coordinated assembly.

Deflection. The design of the tower shaft shall achieve a maximum, fully loaded deflection at the top of the pole, which is not greater than the following percentage of the tower height:

Light Tower Maximum Deflection		
Tower Height		Maximum Deflection as % of Tower Height
Meters	Feet	
49	160	13.70
46	150	10.04
43	140	7.80
40	130	6.02
36	120	10.75
33	110	7.80
30	100	5.30
27	90	4.50
24	80	3.50

Shaft. The tower shaft shall be a low deflection tapered shaft having polysided, circular, or elliptical cross sections. The shaft cross section at the top shall be not less than 190 mm (7.5 in.) in length across the major axis. The shaft cross section at the bottom shall not be greater than that which is compatible with the base plate bolt circle specified, and shall not be less than 600 mm (24 in.) in length across the minor axis for new installations.

All tower shaft components, including, but not limited to the shaft sections, tower sections, base plates, handhole door, handhole reinforcing, rain gutter, and base plate shall be fabricated from high strength, low alloy steel with minimum yield strength of 345,000 kPa (50,000 psi) according to AASHTO M 223 (ASTM A 572 GR 50).

Each tower shaft shall be constructed of not more than the following welded or slip fitted sections:

Maximum Light Tower Sections		
Tower Height		Maximum Number of Sections
Meters	Feet	
49	160	4
46	150	4
43	140	4
40	130	4
36	120	3
33	110	3
30	100	3
27	90	3
24	80	2

Sections which are slip fitted shall have slip joints with a minimum overlap of 1.5 times the diameter of the bottom of the upper section at the slip joint. Towers having slip joint construction shall be pre-fitted and match marked at the factory and shall be shipped disassembled for assembly at the job site. Slip joints shall be marked with a scribe to allow verification that 1.5 times diameter insertion is provided. A copper bonding jumper, included with the tower, shall bond slip fit pole sections together with a flat copper mesh and UL Listed ground lugs. The bonding jumper shall not interfere with the operation of the luminaire ring.

Handhole. Each tower shaft shall be constructed with a handhole/access door for access to power connections and lowering mechanism equipment. The handhole shall be large enough to make the following items visible from an extended operating position and accessible for maintenance: cable drum, transition plate, and the drive train oil level indicator. The handhole shall be sized and arranged to permit removal of the lowering mechanism without excessive dismantling of the equipment. The handhole may be a reinforced opening in the pole shaft as detailed on the plans or may be a part of a flared shaft base assembly as approved by the Engineer. The flared base shall not be considered a separate section of the tower shaft. Minimum opening dimension for the handhole shall be 300 mm x 900 mm (12 in. x 36 in.) and it shall have a lockable door. The handhole shall be located so as to not interfere with the operation of the door clamps, and it shall be positioned on the tower shaft to align on center with one of the anchor bolt (rod) positions and at a minimum height, as detailed on the plans, to facilitate access to mounting nuts with tools required for installation.

The handholes in the pole shafts shall have rounded corners and shall be reinforced to maintain the original strength of the tower shaft. Flared base assemblies shall maintain the strength of the shaft and have no nonround protrusions.

Handhole Door. The handhole shall have a door with a full-height stainless steel piano hinge, or with not less than two stainless steel hinges. A bolt through a door and frame eyelet shall not constitute an acceptable hinge. Hinges shall be heavy duty, suitable for the weight of the handhole door. The handhole door shall not be warped in any direction. The door hinge shall be attached with stainless steel nuts and bolts.

Handhole door gasket. The door/opening shall be gasketed in a manner which will prevent the entry of water into the tower and the door shall have a tight compressive seal employing a tubular gasket to assure compressibility. The gasket shall be a one piece design and shall be jointed by chemical fusion at the bottom of the opening.

Handhole door clamps. The door shall be held closed with a 12 gauge captive adjustable, spring loaded, stainless steel clamp assembly. The clamps shall have a depth stop feature to insure uniform sealing pressure at all clamp points. A minimum of four clamps shall be used around the non-hinged sides of the door assembly. The door clamp locations and handhole shall be coordinated with the tower so that the clamps can operate over their full range of movement without any interference from other tower components including anchor bolts which may protrude up to 6" above the top surface of the base plate. The door clamps shall be attached with stainless steel nuts and bolts.

Padlock provision. A stainless steel padlock hasp and staple shall be provided for locking the door. Door hardware shall be stainless steel. The door shall be equipped with an integral door stop/hold-open mechanism.

Rain Shield. A rain shield shall be placed above the handhole to direct water away from the handhole. The shield shall be fabricated of the same material as the pole shaft, shall have rounded corners, and shall be permanently welded to the shaft. The rain shield cannot interfere with operation of the handhole door or door clamps. Details of the configuration and welding shall be submitted for the Engineer's approval.

Cable Hook. A cable hook/cradle, readily accessible from the front of the tower, shall be provided to hang the control operator cable assembly when not in use. The hook or cradle shall be made from steel rod no less than 1/2-inch in diameter and shall be painted as the pole is. This hook or cradle shall be large enough to hold 25 ft. (7.5m) of power cable and positioned for practical in-field use. The hook shall not have sharp edges or protrusions that could damage the cable, and it shall not interfere with the operation of the lowering mechanism.

Ground Lug. Each tower shaft shall have a handhole accessible ground lug welded to the shaft for connection of ground conductors. The lug shall be UL Listed and accessible with the lowering device installed.

Interior Bolt Exposure. Bolts attaching the various components to the tower, handhole, and handhole door shall be properly sized and coordinated with the matching nuts so that no more than 0.25" of thread is exposed past the nut when properly tightened.

Base Plate. The base plate shall be factory predrilled (slotted) for the number and configuration of anchor rods as provided in the following table:

Base Plate Configuration				
Tower Height		Min, number anchor rods	Rod Circle	
Meters	Feet		mm	inches
49	160	8	965	38
46	150	8	965	38
43	140	8	914	36
40	130	8	914	36
36	120	8	914	36
33	110	8	762	30
30	100	8	762	30
27	90	8	762	30
24	80	6	762	30

The base plate shall have a round (disk) shape of the specified outer diameter or as otherwise approved by the Engineer. The minimum thickness of the base plate shall be 50 mm (2.0 in.). The base plate shall be circumferentially welded to the tower shaft and, as noted above, the plate shall be oriented such that one anchor rod is aligned with the vertical center line of the handhole.

Welding - Manufacturer Welding Requirements.

Circumferential welds. Circumferential welds, including top flange welds, shall be full penetration welds.

Longitudinal welds. Longitudinal welds shall have a minimum of 60 percent penetration, except the longitudinal welds on both the male and female shaft sections shall be full penetration welds within a distance of two diameters of overlap joints.

Minimum preheats for welds shall be 40° C (100° F) for fillets, 65° C (150° F) for seams, and 110° C (225° F) for circumferential welds.

Weld procedure specifications for seams and circumferential welds must be qualified according to Section 4, Part B of AWS D1.1. Charpy V-Notch (CVN) impact specimens shall be tested according to Table III-1 (note 2) of Appendix III for minimum values of 34 J (25 ft lb) at 4° C (40° F). Fillet weld procedures shall be tested according to Table 4.4 of AWS D1.1.

The welds shall be smooth and thoroughly cleaned of flux and spatter and be according to the AWS.

All full penetration welds shall be inspected for soundness by the ultrasonic method and all partial penetration welds shall be inspected by the magnetic particle method. Welding inspection reports shall be submitted to the Engineer for approval. The welding symbols and complete information regarding location, type, size, welding sequence, and WPSs shall be shown on all shop drawings. The Contractor shall submit the manufacturer's welding procedures, including inspection procedures, to the Engineer for approval.

Independent Welding Inspection. In addition to manufacturer's own welding inspection, the Contractor shall have welding inspected by an independent Certified Welding Inspector (CWI). The selected inspector shall be approved by the Engineer before any inspecting is performed. The NDE inspector(s) shall be independent nondestructive testing inspector(s), certified as level II in RT, UT, and/or MT as applicable. The methods for testing full penetration and partial penetration welds by the independent welding inspector(s) shall be the same as specified above in section 7.1

The independent welding inspector shall send the test results directly to the Engineers, as follows: Illinois Department of Transportation, Attn: Engineer of Structural Services, 2300 S. Dirksen Parkway, Bureau of Bridges & Structures, Springfield, Illinois 62764 and to: Illinois Department of Transportation, District 1, Attn: Electrical Design Section Chief, Bureau of Traffic Operations, 201 West Center Court, Schaumburg, Illinois 60196. All welds must pass inspection. Any deficient welds must be brought to the attention of the Engineer and corrective measures must be outlined.

Light Tower Finish. The light tower shall be hot-dip galvanized including the handhole, handhole door, base plate, mounting plate and all other elements welded to the shaft according to AASHTO M 111. Stainless steel components shall remain the natural stainless steel finish.

Head Frame. Each tower shall be equipped with a head frame assembly to support and guide the luminaire ring assembly.

The head frame and luminaire ring shall have a positive mating/alignment interface at which the seating force is applied at each support cable. The interface shall be designed to operate with not less than 1.3 kN (300 lbs.) of total seating force distributed among the interface points. Manufacturer calculations shall be submitted to confirm this requirement. The stop used at the top of the tower shall not deform with the full force applied.

All head frame members and components, including support arms, shall be fabricated of steel of the same type as specified for the tower shafts or stainless steel of appropriate strength. The head frame shall have a head plate, a support, and 2 pulleys for each support cable. All openings in the head frame assembly shall be machined smooth and free from any burrs and sharp edges which could damage the support cables and power cable.

The head frame shall have a power cable pulley placed between and roughly equidistant from 2 support arms, with a pulley diameter around the groove of not less than 350 mm (14 inches).

The power cable shall pass through the head frame assembly utilizing a four-way roller guide assembly sized to accommodate the outside diameter of the power cable.

Pulleys shall be constructed to allow associated cables to ride freely within pulley grooves and cable guides shall be incorporated to prevent cables from riding out of pulleys.

Pulleys, attachment hardware, latches, hinges and the like shall be stainless steel. Pulleys shall be made of Unified Numbering System type 300 stainless steel and have permanently lubricated sealed bearings except the power cable pulleys may be cast aluminum or high-strength nylon.

The head frame assembly shall be equipped with a metal hood. The hood shall protect the operating head frame components from damage or deterioration from weather but shall permit pole ventilation while preventing the entry of birds. The hood shall have a strong secure mechanical means to open/raise the hood for the future maintenance of the head frame such as a spin screw mount, and shall have a double-secured latching system to assure closure. The Design shall be such as to minimize the risk that the hood will be displaced from gusts of wind. The head frame assembly shall be match-marked to its tower shaft and shall be attached to the shaft by stainless steel hardware.

Luminaire Ring. Each tower shall be provided with a luminaire ring suitable for twelve (12) luminaires of the type, and orientation specified. The ring shall mate/align with the head frame and shall be coordinated relative to seating force.

The ring shall be designed for lowering to a position with the center line of luminaire arms 1.4 m (54 inches) or less above the top of the tower base plate. The exact fully-lowered position shall be adjustable in the field. Wiring shall be fully enclosed in a metal raceway.

The ring shall be equipped with spring loaded bumpers, spring loaded rollers, spring-loaded outriggers or other shock-absorbing mechanism to guide the ring during the raising/lowering operations. The guide mechanism shall be spring loaded and shall be designed to minimize shock to the luminaire during raising and lowering. These devices shall be attached in a secure manner. The mechanism does not have to maintain constant contact with the tower shaft.

Arms for the attachment of luminaires shall be standard 50 mm (2-inch) diameter tenon arms. The arms shall be attached to the ring in a secure manner either by welding or by means of stainless steel bolts, nuts, lock washers and hardware such that a permanent rigid attachment is achieved. Arms shall be approximately 325 mm (13 inches) in length, coordinated with luminaire size and configuration and shall be arranged so that the overall diameter of the ring, including the luminaire, does not exceed 3.4 m (11 ft.). A "T" arm configuration shall be used as indicated in the plans and described elsewhere herein. Tenon arm ends shall be threaded to accept a PVC pipe cap. All tenon arms shall be capped. The tenon arms shall be level when the ring is in the raised position.

The ring raceway shall be arranged with screened weep holes of not less than 1/2-inch diameter at no less than 90 degree intervals around the ring.

The ring shall be equipped with an enclosed wire raceway and a stainless steel NEMA 4X terminal box for wiring of the luminaires and CCTV camera.

Junction Box. The box shall be made of Type 304 stainless steel, not less than 2.03 mm (14 gauge), with all seams continuously welded with stainless steel weld wire and ground smooth. Exterior surfaces shall have a smooth polished finish. The box shall be UL 50 "Junction and Pull Box", "Junction Box", or "Pull Box".

A grounding lug shall be provided for the connection of the equipment grounding conductors as required by NEC Article 250-114.

The box shall have an overlapping stainless steel cover and shall be secured to the box with a continuous stainless steel hinge and a minimum of 4 captive stainless steel clamps utilizing captive stainless steel hex-head bolts or deep slotted stainless steel screws.

The box shall be suitable for surface mounting, complete with external stainless steel mounting lugs or brackets welded to the enclosure.

The box cover shall have a continuous formed, seamless, urethane, oil-resistant gasket. The gasket shall be extruded directly onto the junction box cover. The gasket shall adhere to the cover without the use of adhesives. A neoprene strip gasket, or urethane strip gasket cut out of a larger sheet and glued to the junction box will not be acceptable.

The box shall be arranged and connected to the top of the ring from the top of the box in a manner that precludes moisture draining from the ring into the box. All fittings penetrating the box shall be watertight hubs with an integral O-ring. The hubs shall be watertight and corrosion resistant NEMA 4X and have an insulated polycarbonate throat. The insulated throat shall be rated up to 105° C. The hubs shall be UL Listed and comply with UL Standard 514B.

The box shall be equipped with a hinged door and a latch or with captive stainless steel closure hardware acceptable to the Engineer and an external special fixed-mount plug with a retained cap as specified elsewhere herein to accept a test power connection when the ring is in the lowered position.

The box shall, on the side, have the main tower cable entry and the entry for the luminaire wires; it shall also contain a terminal strip with identified terminals for connection of the main power cord, luminaires, and the test power receptacle. The terminal strip shall have terminals sized to accommodate the cables to be connected and shall have luminaire connection terminals to accommodate the usage of all luminaire positions.

The ring shall facilitate ease of wiring to the arms by the use of removable gasketed covers, physical arrangement, or other means acceptable to the Engineer. Arms shall be factory or field wired according to NEC Article 410-31 using No. 10 wire having ethylene propylene rubber (EPR) insulation or bonded composite EPR insulation with a chlorosulfanated polyethylene jacket, rated 600 V not less than 90° C (194 ° F.), RHH-RHW, U.L. listed with solid color coding.

Luminaire wire		
Insulation Type	Average EPR Insulation Thickness	Average Jacket Thickness
Single Material EPR	1.1 mm (45 mils)	n/a
Bonded Composite Insulation Thickness	0.8 mm (30 mils)	0.4 mm (15 mils)

Wiring shall be color coded (black, red, white, and green, as applicable) with coloring via outer material color or by painting with a process approved by the Engineer. Wire rating information shall be visible in a contrasting color. Wires shall be installed to all luminaire arms. Luminaire wires shall extend 600 mm (24 inches) longer than their respective tenon arm and shall be trained back into the arm which shall then be closed with a protective cap for shipment of the jobsite. All wires shall be capped and crimped with sealant and heat-shrink insulating sleeves (wire nuts, tape, crimps, etc. will not be acceptable.). Wiring shall alternate circuits to the luminaire arms so that adjacent arms are not on the same circuit. All ring wires shall be tagged with wire markers at both ends. The tenon arms shall also be tagged corresponding to the wiring contained within.

The luminaire ring shall be factory checked and marked for proper positioning and luminaire orientation. Catalog cuts and shop drawings shall indicate the orientation of the luminaire ring, handhole, and bolt circle in relation to each other on a single drawing.

The ring shall be complete with a counterweight for each unmatched luminaire to maintain ring balance. Counterweights shall be coordinated with the luminaires to be installed.

All luminaire rings shall be arranged to accommodate the complete indicated compliment of luminaires, regardless of the number actually to be installed, to facilitate luminaire positioning and orientation. For rings of 6 positions or less, each position shall have a tenon arm. For rings of more than 6 luminaire positions, the arrangement shall be accomplished by a "T" type of tenon arm to produce two luminaire mounting positions from a single extension arm, or by other means approved by the Engineer.

Lowering and Support Mechanism. The support shall be of the non-latching design.

The mechanism shall operate to raise the luminaire ring to its fully raised position and to lower the ring to a position with the centerline of the luminaire tenon arms 1.4 m (54 inches) or less above the top of the tower base plate. The exact fully-lowered position shall be adjustable in the field.

The lowering and support mechanism shall include, but not be limited to the support cables, power cable, pulleys, winch, gear reducer, mechanical clutch, electric motor, control and all accessories and appurtenances for a coordinated operating system.

The lowering and support scheme shall be of the 2-cable or 3-cable type as specified.

Three-cable mechanisms shall incorporate 3 support cables joined via an appropriate proven transition design to a single hoist cable wound around a single hoist winch. The transition design shall be such to prevent twisting of the support cables, to assure smooth winding of the cables on the winch and to prevent binding on the inside of the tower shaft.

Two-cable mechanisms shall incorporate 2 support/hoist cables wound around a dual winch assembly. The design shall be such to prevent twisting of the cables and to assure smooth winding of the cables on their respective winches and to prevent binding on the inside of the tower shaft.

The hoisting system shall be securely mounted and the lower assembly, i.e. motor, winch, mechanical clutch, gear reducer, etc., shall be designed to allow ease in removal of the equipment via the tower handhole without dismantling the system. Individual components shall be accessible and removable without the removal of other components. Mounting plates and other mounting templates and provisions shall have standardized dimensions to facilitate removal and interchangeability from unit to unit. Mounting hardware shall have an abundant strength safety factor and shall be positioned for even distribution of load.

The lowering device shall tightly position the luminaire mounting ring against the head assembly frame by applying a holding force evenly distributed among the seating/interfacepoints. The total force required by the system must not be less than 1.3 kN (300 lbs.) greater than the weight of the luminaire mounting ring with all luminaire positions occupied by luminaires. There shall be a positive indication at the handhole that the required force has been applied, visible from the extended operating position away from the handhole and not under the ring. Submittal information shall include load and seating force calculations to demonstrate compliance with specified requirements.

The mechanism shall be equipped with a multi-point safety chain and hook assembly to maintain the tension on the support system, allowing the motorized winch assembly to be disengaged. Chain and all hardware shall be stainless steel.

The system shall be designed so that unbroken power cable, suspension and/or hoist cable can be replaced from ground level.

Support and Hoist Cables. Cables (wire rope) shall be manufactured from Type 302 stainless steel having a carbon content of 0.09 to 0.15 and shall be a stranded assembly coated with a friction-limiting non-corrosive lubricant.

Cables shall be 7x19 wire strand and have no strand joints or strand splices.

Cables shall be manufactured and listed for compliance with military specification MIL-W-83420B, Type 1, Composition B.

Cable terminals shall be stainless steel compatible with the cable and as recommended by the cable manufacturer. The terminals, swaging, etc. shall meet the requirements of military specification MIL-T-781 and shall be so listed. Care shall be exercised to assure a match of connector sizes to the wire rope size(s), and, to the extent possible, connectors shall have visible size markings.

For 3-cable systems, the support cables shall each be not less than 5 mm (3/16 inch) in diameter and the hoist cable shall not be less than 8 mm (5/16 inch) in diameter.

For 2-cable systems, the support/hoist cables shall each be not less than 6 mm (1/4 inch) in diameter.

As part of the tower shop drawings and product data submitted for approval, support and hoist cable information shall be provided. Submittals without such information will be incomplete and will be rejected. The information shall include, but not limited to:

- Catalog information to confirm sizing, stranding and other specified requirements.
- Evidence of listing as military specification cable as specified.
- Certification of compliance with all specification requirements made by the cable manufacturer.

Documentation of arrangement to provide a sample of the support cable to an independent laboratory as selected by the Engineer for testing to the military specifications listed herein, with results to be sent directly to the Engineer, all included incidental to this item. Copies of recent test reports made on identical cable indicating compliance with military specification requirements shall be submitted. The test reports shall include as a minimum, the following:

- Breaking Strength test.
- Endurance test.
- Stretch test.
- Test load.
- Chemical Composition.

Winch.

Drum. The winch/gear reducer assembly shall have a drum suitable for the hoist of support/hoist cables, arranged to provide smooth winding of the cable and to prevent slippage. The drum shall be stainless steel or cast/ductile iron and shall have a diameter not less than 18 times the diameter of its respective cable (wire rope). The winch drum shall be designed with cable guides for a smooth cable take-up of level lays and to prevent the cable from riding over the drum flange. The drum shall have the end of the cable attached by means of a swaged connection and one full layer of cable shall be wound on the drum even when the ring is in the fully lowered position. The drum flange axle shall be supported at both ends.

Gear Reducer. Each assembly shall incorporate a gear reducer having a reduction ratio which will prevent free fall of the luminaire ring upon failure or disengagement of the drive unit and which will produce a travel rate of 3 m (10 ft.) to 4.6 m (15 ft.) per minute under normal operation.

The unit shall have a worm gear which is totally enclosed in a lubricating reservoir. The lubricant shall have a viscosity range suitable for proper operation in ambient temperatures from -40° C to 49° C (-40° F. to 120° F.)

The worm shall be manufactured of case hardened ground alloy steel or cast iron.

The gear shall be of bronze alloy or of a proven alternate material and design acceptable to the Engineer with and the gear shall be keyed to the output shaft. The output shaft shall be high quality medium carbon steel ground to close tolerances. The worm and output shaft shall be mounted on anti-friction bearings. All shaft extensions shall be equipped with a lip-type synthetic element and oil seals.

The unit shall have provisions to verify oil levels in all gear boxes, and oil level indication shall be visible from the handhole when the unit is installed.

Clutch. The mechanism shall incorporate a mechanical clutch, installed between the winch/gear reducer and the cable winch assembly. The clutch shall be of mechanical type, in a sealed cast metal housing. The clutch torque shall be factory calibrated and coordinated with the electric motor. The clutch shall act to limit the seating force of the raised ring to a pre-established value. The clutch shall be suitable for the application and torque limitation and shall not deteriorate with use.

Motor. The electric motor shall be matched to the load and torque characteristics required for a fully loaded luminaire ring and shall not be less than 746 watts (1 horsepower).

The motor shall be capable of producing torque in excess of the clutch maximum torque rating. The motor shall be totally enclosed fan cooled (TEFC), shall be reversible to operate the lowering mechanism in both directions, and shall be suitable for operation on the power supply characteristics shown on the drawings. Submittal information shall include complete motor data, including, but not limited to:

- Manufacturer
- Nameplate Rated Watts (Horsepower)
- Rated Voltage
- Full Load RPM
- Full Load Current
- Locked Rotor Current
- NEMA Design Letter
- Insulation Class
- Torque Data
- Dimensional Data

Lowering Device Control. The lowering device control shall consist of motor short circuit and motor running overcurrent protection and motor control complete with all appurtenances and interconnecting wiring. The control may incorporate a reversing motor starter or a suitably-rated reversing control station.

The lowering device control may be provided in a separate NEMA 4X stainless steel enclosure or in the enclosure with the tower main Electrical breaker, provided the remote control station is a separate remote device.

The lowering device motor shall have a motor disconnecting means circuit and running overload protection according to N.E.C. requirements. The motor disconnect and short circuit protection shall be achieved by a molded case thermal magnetic bolt-on circuit breaker rated at 600 volts, of an ampere rating suitable for the motor and having a UL-listed interrupting rating of not less than 14,000 rms symmetrical amperes at 480 volts and 10,000 rms symmetrical amperes at 240 volts.

Running overcurrent protection shall be according to N.E.C. requirements. Motor overload protection shall be achieved by an appropriate dual element fuse in a spring-loaded screw-in type small-dimension fuse holder mounted within the enclosure in a suitable box or other arrangement approved by the Engineer.

The motor starter, if incorporated, shall not be smaller than NEMA size 1, shall be rated 600 volts and shall be full voltage, reversing type, with arc-extinguishing characteristics and renewable silver-to-silver contacts. A reversing control switch, if incorporated, shall be rated well in excess of the duty required and in no case less than 2,240 watts (3 horsepower) at 230 volts single phase. The control shall be momentary contact, raise-stop-lower with a neutral stop condition, requiring positive action by the person operating the device to keep the motor energized. The control shall have auxiliary contacts as indicated and as required for the control.

The enclosure shall have an exterior position-indicating trip-free operating handle for the motor circuit breaker. The enclosure(s) shall have exterior nameplates to read "LOWERING DEVICE CONTROL" and "MOTOR CIRCUIT BREAKER" as well as an interior nameplate "MOTOR OVERLOAD FUSE" which shall also be inscribed with the applicable fuse type and ratings. Nameplates shall be engraved, 2-color, attached with screws.

The line side power to the lowering device control shall be obtained via a plug extended connection to the power distribution cord/receptacle.

The control shall be complete with a cable-connected remote control station. The control station shall incorporate heavy duty control devices in a non-metallic impact-resistant NEMA 4X enclosure. The control shall be "dead man" type with "RAISE" and "LOWER" controls, requiring the operator to hold the respective control depressed in position for movement of the ring in either direction and with release of the control to stop the mechanism. The cord shall incorporate a No.12 ground wire and the number of conductors required for a control, with control conductors not less than No. 14. The cord shall be weatherproof with watertight connections at either end and it shall be long enough to allow the operator to stand 7.5 m (25 ft.) away from the lowered luminaire ring. Provisions for storage of the control station and cord such as a suitable hanger cradle, shall be provided in a manner easily accessible at the handhole and in a location which precludes interference with the internal components of the lowering mechanism.

Cables extended from the enclosure shall be passed through a watertight sealing bushing and the cable shall be supported and arranged to preclude interference with the lowering mechanism. Wiring shall be in compliance with NEC requirements. Motor wires shall not be less than No. 12 and motor wiring shall be extended in UL-listed extra-flexible, weatherproof cord or other cord approved by the Engineer with suitable fittings, bushings and supports. All equipment shall be grounded and bonded via an appropriately sized equipment ground wire.

Electric Power Distribution. Electric power for motorized operation of the lowering mechanism and for the power supply to the lighting shall be taken from the lighting circuitry feeding the tower. The distribution shall provide termination of the supply feeder, extension to a tower main breaker and distribution to lighting and the lowering device. The power cable extension from the branch circuit feeding the light tower shall be a sealed with a multi-leg heat shrink break out boot.

The tower shall be equipped with a main circuit breaker. The circuit breaker shall be molded case, 2-pole, 40-ampere thermal magnetic, bolt-on type having a UL-listed interrupting rating of not less than 14,000 rms symmetrical amperes at 480 volts. The breaker shall indicate "ON", "OFF" and "TRIPPED" conditions and the handle shall be trip-free.

The main breaker shall be housed in NEMA 4X stainless steel enclosure with an external, position-indicating operating handle with padlock provisions. The enclosure shall have a 2-color engraved nameplate to read "MAIN BREAKER", attached with screws. The box shall have openings and suitable bushings for cable extensions.

The main breaker shall be arranged for line-side connection to incoming feeder conductors entering the base of the tower via an extension of multi-conductor cable. The load side of the main breaker shall be connected to a cord and receptacle which shall be arranged for connection to the luminaire ring main power, the lowered luminaire ring test power or the lowering device control.

Each connection to the main breaker shall be made with the specified electric power cable, extended from the enclosure through a watertight sealing/support bushing. The cables shall be arranged and secured to preclude any interference with the lowering device operation.

Electric Power Cable. The electric power cable shall consist of a 4-conductor jacketed extra flexible cable, (2 phase conductors, neutral conductor and a ground conductor) Type W industrial grade portable power cable, as listed in NEC Table 400-4. The cable shall meet ICEA S-68-516, WC-3 and shall be approved by the Pennsylvania Bureau of Mines.

Each conductor shall be stranded assembly of 133 flexible annealed copper wires according to ASTM B 33. Each of the 4 conductors shall be sized No. 6. Each conductor shall be individually insulated with ethylene propylene rubber insulation, all in compliance with ICEA S-68-516. Insulation shall be rated not less than 600/2000 volts, 90° C (194° F.) and insulation thickness shall not be less than 1.5 mm (60 mils).

Each individual conductor's insulation shall be color coded; one black, one red, one white and one green.

The individual conductors shall be assembled in a cable, with non-hydroscopic reinforced rubber fillers to maintain a smooth round outer surface, with a jacket applied overall. The jacket shall be a heavy duty jacket manufactured according to ASTM D 752 and shall be imprinted with the manufacturer, conductor size number of conductors, type of cable, voltage rating, and Pennsylvania Bureau of Mines designation P-XXX-MSHA.

Ground Continuity. A flexible copper braid connector equivalent to a #2 AWG copper cable shall be attached with studs and exothermic welds at tower shaft sections or the shafts shall be electrically joined by other means approved by the Engineer. Towers shall include all materials to achieve this bond.

Power Receptacles and Plugs. Power receptacles and plugs shall be circuit-breaking devices which shall mate with each other. The plugs and receptacles shall be 4-wire 4-pole, 600 volt, 60 ampere weatherproof devices according to UL Standard 498 and International Electrical Commission Standard 309. The devices shall be listed by the manufacturer as suitable for make and break operation at rated current.

Components and insert assemblies shall be interchangeable to accept either pin or socket inserts to allow either plug or receptacle to be configured in an energized or de-energized condition, i.e. reverse-contact configurations shall be available. Locations of reverse-contact devices shall be as indicated.

Each plug or receptacle connection to a power cord shall be complete with a suitable non-metallic sealing connector body with a wire mesh strain relief. Other plugs and receptacles shall be complete with suitable sealing angle-adaptor panel of box mounting bodies, as applicable and shall be complete with back-boxes if so dictated by the power distribution configuration.

Each plug and each receptacle shall be complete with a retained flap-type or retained screw-on cover.

Plugs and receptacles shall be water-tight, dust-tight, and chemical resistant and be suitable for use when exposed to the weather and shall be applicable for safe use in harsh, wet weather conditions. The Engineer shall be the judge of applicability.

Shipment and Installation. The light tower, luminaire ring, etc., and hardware shall be packaged during shipment to protect all surfaces from being scratched, marred, chipped, or damaged in any way. Prior to installation, the tower and all its components will be inspected by the Engineer and any parts found to be damaged or defective shall be replaced. Any minor damage to a completely painted light tower surface shall be touched up in a professional manner as approved by the paint manufacturer.

The tower shall be set plumb on the foundation and fastened to the anchor rods with double nuts and washers. Flat washers shall be installed below and above the base plate of the pole. Locknuts with nylon or steel inserts shall be installed on top of the top nut. The nuts shall be tightened in compliance with torque specifications recommended by the manufacturer of the lighting unit.

The space between the finished top of the foundation and the bottom of the base plate of the pole shall be enclosed with an expanded metal screen made of stainless steel. The size of the mesh of the screen shall be 1/4 in. (6 mm) or less and #18 gauge (1.22 mm) thick, or heavier as approved by the Engineer. The screen shall be held in place with a stainless steel band installed around the tower base plate. The band shall be held tight by a ratchet-type device. Grouting shall not be used to enclose the above described space.

The light tower shall be straight and centered on its longitudinal axis, under no-wind conditions, so, when examined with a transit from any direction, the deviation from the normal shall not exceed 1/8 in. in 3 ft (3 mm in 1 m) within any 5 ft (1.5 m) of height, with total deviation not to exceed 3 in. (75 mm) from the vertical axis through the center of the pole base.

When the luminaire position and orientation has been confirmed and approved by the Engineer, the luminaire shall be anchored with a minimum size 1/4-20NC stainless steel set screw installed through tapped holes in the tenon and mounting bracket of the luminaire. Counterweights on unused tenons shall be mounted in a similar manner.

Inspection. Each tower shall be inspected. The Contractor must show that the tower can be raised and lowered in the presence of the Engineer.

Method of Measurement. Each light tower which is delivered and installed shall be counted as a unit for payment.

Basis of Payment. This work will be paid for at the contract unit price each for LIGHT TOWER of the mounting height, luminaire mounting positions specified.

LUMINAIRE, HIGH MAST, LED

Effective: January 1, 2017

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

General: The luminaire including the housing, driver and optical assembly shall be assembled in the U.S.A. The luminaire shall be assembled by and manufactured by the same manufacturer. The luminaire shall be in compliance with ANSI C136.37. LED light source(s) and driver(s) shall be RoHS compliant.

The luminaire shall be designed and manufactured for high mast tower use. It shall be designed to withstand constant 80 mph (130 km/hr) wind speeds and 104 mph (167 km/hr) gusts and the physical stresses associated with such duty including shocks and vibrations.

Submittal Requirements: The Contractor shall submit, for approval, an electronic version of all associated luminaire IES files, AGI32 files and the TM-21 or TM-28 calculator spreadsheet with inputs and reports associated with the project luminaires. The Contractor shall also provide (as a minimum) an electronic (PDF) version of each of the following manufacturer's product data for each type of luminaire:

1. Descriptive literature and catalogue cuts for luminaire, LED driver, and surge protection device.
2. LED drive current, total luminaire input wattage and total luminaire current at the system operating voltage or voltage range and ambient temperature of 25 C.
3. LED efficacy per luminaire expressed in lumens per watt (lpw).
4. Initial delivered lumens at the specified color temperature, drive current, and ambient temperature.
5. Computer photometric calculation reports as specified and in the luminaire performance table.
6. TM-15 BUG rating report.
7. Isofootcandle chart with max candela point and half candela trace indicated.
8. Documentation of manufacturers experience and verification that luminaires were assembled in the U.S.A. as specified.

9. Supporting documentation of compliance with ANSI standards as well as UL listing as specified.
10. Supporting documentation of laboratory accreditations and certifications for specified testing as indicated.
11. Thermal testing documents as specified.
12. IESNA LM-79, LM-80 (or LM-84) and TM-21 (or TM-28) reports as specified.
13. Salt fog test reports and certification as specified.
14. Vibration Characteristics Test Reports and certification as specified.
15. Ingress Protection Test Reports as specified.
16. Written warranty.
17. A sample luminaire shall be provided upon request of the Engineer. The sample shall be as proposed for the contract.

Manufacturer Experience. The luminaire shall be designed to be incorporated into a lighting system with an expected 20 year lifetime. The luminaire manufacturer shall have a minimum of 35 years' experience manufacturing HID roadway luminaires and shall have a minimum of seven (7) years' experience manufacturing LED roadway luminaires. The manufacturer shall have a minimum of 25,000 total LED roadway luminaires installed on a minimum of 100 separate installations, all within the U.S.A.

Housing.

Material. The luminaire shall be a single device not requiring on-site assembly for installation. The power supply for the luminaire shall be integral to the unit. The housing shall be 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.

The luminaire shall be optically sealed, mechanically strong and easy to maintain.

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.

The housing shall be designed to prevent the accumulation of water, ice, dirt and debris and to ensure maximum heat dissipation.

The total weight of the luminaire(s) and accessories shall not exceed 75 pounds.

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

Vibration Characteristics. All luminaires shall be vibration tested and pass ANSI C136.31 requirements. Luminaires shall be rated for "3G" peak acceleration. Vibration testing shall be run using the same luminaire in all three axes.

Labels and Decals. All luminaires shall have labels in accordance with ANSI C136.15 for an external label, and ANSI C136.22 for an internal label.

The luminaire shall be Listed for wet locations by a U.S. Occupational Safety Health administration (OSHA) Nationally Recognized Testing Laboratory (NRTL) and shall be in compliance with UL 8750 and UL 1598. It shall be identified as such by the NRTL tag/sticker on the inside of the luminaire.

Hardware. All hardware shall be stainless steel. Captive screws are required on any components that require maintenance after installation.

Internal Luminaire Electrical Connections. Quick connect/disconnect plugs shall be supplied between the discrete electrical components within the luminaire such as the driver, surge protection device and optical assembly for easy removal. The quick connect/disconnect plugs shall be operable without the use of tools while wearing insulated gloves.

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.

Mounting.

The luminaire shall slip-fit on a 2 to 2 3/8 in. (50 to 60 mm) O.D. pipe arm and shall have a barrier to limit the amount of insertion. The mounting shall be fully coordinated with the luminaire mounting method indicated in plans.

Driver.

The driver shall be integral to the luminaire. Integral driver components shall be mounted in the rear of the luminaire on the inside of a removable door or on a removable mounting pad. Driver wiring shall be connected by means of plugs. Upon unplugging the driver wiring the entire driver assembly shall remove for maintenance. The removable door or pad shall be secure when fastened in place and all individual components shall be secured upon the removable element. Each component shall be readily removable from the removable door or pad for replacement.

The plugs shall be keyed and shall be operable without the use of special tools by insulated, gloved hands

The driver shall be installed in a manner to keep it mechanically separated from the LED array heat sink.

The driver shall tolerate indefinite open and short circuit output conditions without damage.

Ingress Protection. The driver Ingress Protection (IP) rating as defined in the ANSI/IEC 60529 standard shall have an IP66 rating.

Input Voltage. The driver shall be suitable for operation over a range of 120 to 277 volts or 347 to 480 volts as required by the system operating voltage.

Operating Temperature. The driver shall have an operating ambient temperature range of -40°C to 70°C.

Driver Life. The driver shall provide a life time of 100,000 hours at 25° C ambient.

Safety/UL. The driver shall be UL Listed under standard UL 1012.

Power Factor. Drivers shall maintain a power factor of 0.9 or higher and total harmonic distortion of less than 20%.

Driver efficiency. Efficiency of the driver is defined by the ratio of output power and input power. The driver shall deliver a maximum efficiency of >90% at maximum load and an efficiency of >85% for the driver operating at 50% power.

Electrical Interference. The driver shall meet the Electromagnetic Compatibility (EMC) requirements per FCC Title 47 Code of Federal Regulations (CFR) Part 15 Class A.

Thermal Fold Back. The driver shall reduce the current to the LED module if the driver is overheating due to abnormal conditions.

Dimming. The driver shall have dimming capability. The driver shall accept a dimming control signal that is compliant with the 0-10V protocol.

Leakage current. The driver shall comply with safety standards in accordance with IEC 61347-1.

The Surge Protection Device shall be UL 1449 labeled as Type 4 and be an integral part of the luminaire. The SPD shall be compliant with ANSI C136.2-2014 (Draft).

Thermal performance

Thermal Testing shall be provided as defined by ANSI/UL 1598. The luminaire shall start and operate in the ambient temperature range specified in the driver section. The maximum rated case temperature of the driver, LEDs, and other internal components shall not be exceeded when the luminaire is operated in the ambient temperature range specified.

Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation. Testing shall be submitted (whenever is available) to show the maximum rated case temperature of the driver, LEDs, and other internal components are not exceeded when the luminaire is operated with the heat sink filled with debris.

LED Optical Assembly

The LED optical assembly shall be a scalable array consisting of discrete LED panels or modules. Each panel or module shall have a minimum IP rating of 66.

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

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

The luminaire must have a clear glass lens over the LED modules. The lens shall be made of tempered crystal clear borosilicate glass. Material other than glass will not be acceptable.

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

The optical assembly shall be capable of being rotated 360 degrees around its vertical axis. The luminaire shall be equipped with identifying markings to indicate the mounted orientation. Luminaire installation shall include engraved banding of the mounting arms to designate proper orientation.

Photometric Performance

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

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

Lumen maintenance shall be measured for the LEDs according to LM-80 or for the luminaires according to LM-84. The LM-80 report shall be based on a minimum of 6,000 hours, yet 10,000 hour reports shall be provided for luminaires where those tests have been completed.

The luminaire shall have a BUG upward rating of U0 and a Glare rating of G4 or less.

Lumen Maintenance Projection.

The luminaire shall have long term lumen maintenance documented according to IESNA TM-21 or IESNA TM-28. Ambient temperature shall be 25⁰ C.

The submitted calculations shall incorporate the light loss factors as indicated the respective performance tables.

Photometric Calculations.

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

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

All photometry must be **photopic**. Scotopic or mesopic factors will not be allowed.

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 HIGH MAST LIGHTING**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	60 (ft)
	Number of Lanes	5
	Median Width	10 (ft)
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	130 (ft)
	Mast Arm Length	3 (ft)
	Pole Set-Back From Edge Of Pavement	40 (ft)
LUMINAIRE DATA	Lumens	36,001 – 50,000
	BUG Rating	B5 – U0 – G5 (Max)
	I.E.S. Vertical Distribution	Medium
	I.E.S. Lateral Distribution	Varies (Types 3, 4 or 5)
	Total Light Loss Factor	0.70
LAYOUT DATA	Spacing	400 (ft)
	Configuration	Opposite
	Luminaire Overhang over EOP	-40 (ft)

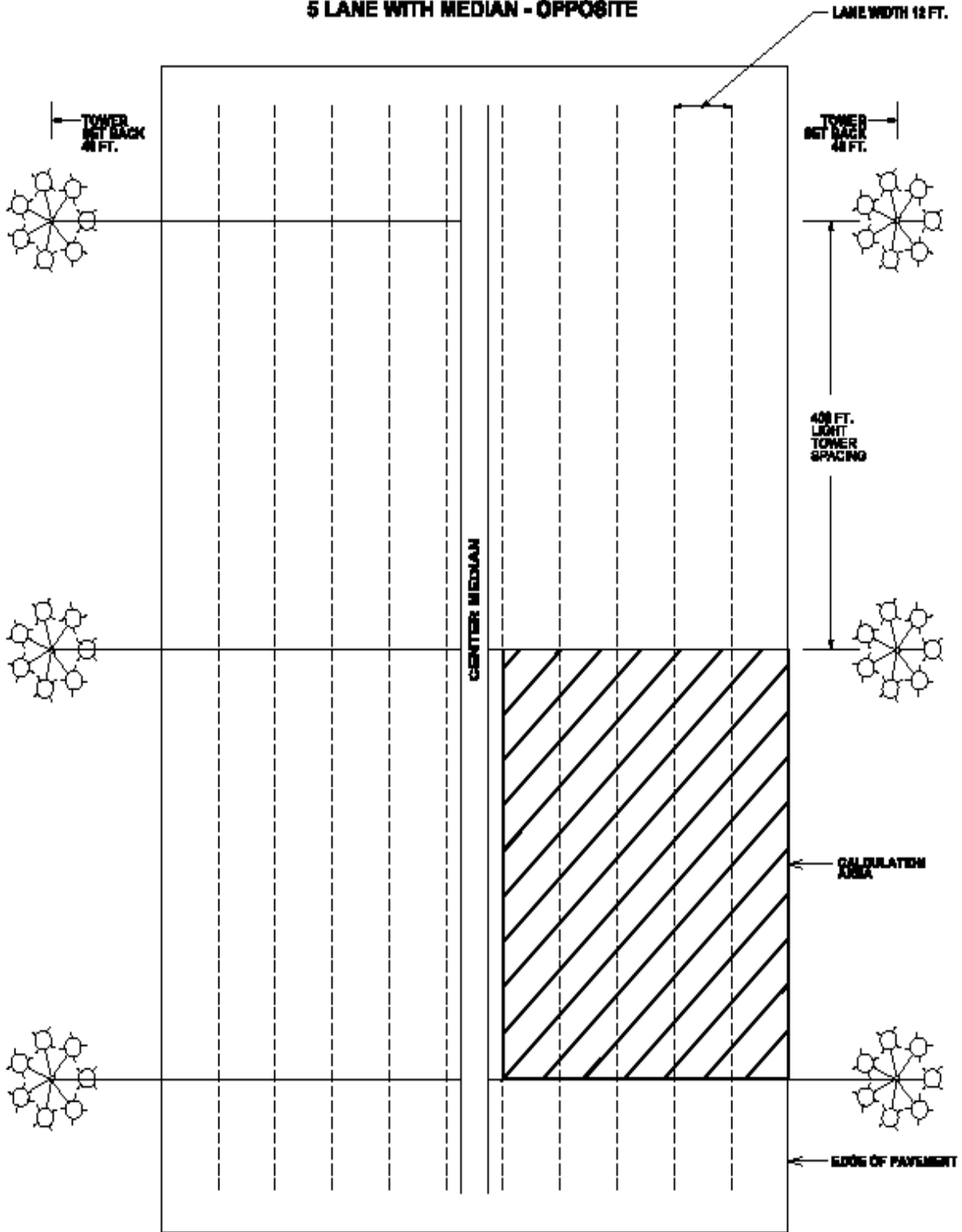
NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

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

ROADWAY LUMINANCE	Average Luminance, L_{AVE}	1.0 Cd/m ² (Max)
		0.8 Cd/m ² (Min)
	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}	0.3:1 (Max)

**HIGH MAST TOWER LAYOUT
5 LANE WITH MEDIAN - OPPOSITE**



Independent Testing

When a contract has 11 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
1-10	0 (unless otherwise noted)
11-30	2
31-50	3
51-70	4
71-90	5
91-110	6
111-130	7

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

The Electrical Engineer shall select from all the project luminaires at the Contractor's or distributor's storage facility, within District 1, the luminaires for testing. In all cases, the selection of luminaires shall be a random selection from the entire completed lot of luminaires required for the contract. Selections from partial lots will not be allowed. An additional luminaire shall also be selected for physical inspection by the Engineer at the District Headquarters. This luminaire will be 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.

Luminaires shall be tested at a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory approved for each of the required tests. All costs associated with luminaire testing shall be included in the bid price of the luminaire.

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

The testing performed shall include photometric and electrical testing.

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

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

Two copies of the summary report and the test results (including CDROM) shall be certified by the test laboratory and shall be sent by certified mail directly to the Engineer.

To: District Engineer
Attn: Bureau Chief of Traffic Operations
Illinois Department of transportation
201 West center Ct.
Schaumburg, IL 60196

The package shall state "luminaire test reports" and the contract number clearly.

A copy of this material shall be sent to the Contractor and the Resident Engineer at the same time.

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

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

In the case of corrections, the Contractor shall advise the Engineer of the proposed corrections and shall request a repeat of the specified testing and, if the corrections are deemed reasonable by the Engineer, the testing process shall be repeated in its entirety.

The number of luminaires to be tested shall be the same quantity as originally tested as required in the above table.

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

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

Installation.

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

Luminaires shall be leveled/adjusted before being energized. Each luminaire shall be checked to assure compatibility with the project power system. When the night-time check of the lighting system by the Engineer indicates that any luminaires are mis-aligned, the mis-aligned luminaires shall be corrected at no additional cost.

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

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

Horizontal mount luminaires shall be installed in a level, horizontal plane.

The Engineer reserves the right to select the final light distribution pattern, luminaire aiming angle and change it as deemed necessary to produce the proper pavement luminance.

Luminaires having asymmetrical photometric distributions shall be carefully oriented with respect to the roadway as indicated on the plans and as directed by the Engineer. The Contractor shall confirm all luminaire orientations with the Engineer prior to installation.

For horizontal mounts having rotating optical assemblies, after the orientation of each mast arm tenon is inspected and approved by the Engineer, the position shall be permanently marked in a manner acceptable to the Engineer. The luminaire shall then be leveled to the plane of the luminaire ring.

When the luminaire position and orientation has been confirmed and approved by the Engineer, the luminaire shall be anchored with a minimum size 1/4-20NC stainless steel bolt installed through tapped holes in the tenon and mounting bracket of the luminaire. The bolt shall not penetrate into the tenon more than 1/4 in. (6 mm). Counterweights on un-used tenons shall be mounted in a similar manner. Pre-installed wire on the tower ring shall have the ends of each wire capped at the tenon with butt type crimp-connectors for un-used tenons. The wires shall then be re-inserted into the tenon end and the tenon end shall be capped.

Warranty.

The entire luminaire and all of its component parts shall be covered by a 10 year warranty. Failure is when one or more of the following occur:

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

The warranty period shall begin on the date of project final acceptance. A copy of the acceptance letter shall be sent to the luminaire manufacturer and luminaire manufacturer's representative by the Contractor upon final acceptance.

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

Method of Measurement.

LED Luminaire classification shall be as follows:

Type	Min Lumens	Max Lumens
D	36,001	50,000
E	50,001	60,000
F	60,001	70,000

Where delivered lumens is defined as the initial delivered lumens at the specified color temperature. Luminaires above the stated maximums for the specified type will not be accepted

Basis of Payment: This work will be paid for at the contract unit price per each for **LUMINAIRE, HIGHMAST, LED**, of the **TYPE** indicated.

INTERCEPT EXISTING CONDUIT

Description. This item consists of intercepting an existing conduit or raceway for the purpose of installing a new light tower foundation and making a connection to a new conduit.

General Requirements. Work under this item shall be performed in accordance with Sections 800, 810 and 1088 of the Standard Specifications.

Construction Requirements.

The Contractor shall pull back the existing lighting cables and carefully cut the conduit or raceway so that the cut conduit ends can be installed in the foundation conduit sleeves into the light tower. This item shall include all work necessary to bring the conduit and cables into the foundation. All new conduit required to intercept the existing conduit and make the necessary connections to install the conduit run into the light tower will not be paid for separately and shall be included in this item. The Contractor shall furnish and install all materials for a complete installation.

Method of Measurement. This work will be measured on a per each basis each for conduit end cut.

Basis of Payment. This work will be paid for at the contract unit price per each for INTERCEPT EXISTING CONDUIT, which will be payment in full for the material and work described herein. No additional payment will be allowed for excavation, backfilling, and restoration of a parkway.

TEMPORARY WOOD POLE. 50 FT., CLASS 4

TEMPORARY WOOD POLE, 50 FT., CLASS 4, 15 FT. MAST ARM

Description. This item shall consist of furnishing and installing a temporary wood pole and mast arm, as specified herein and all hardware and accessories required for the intended temporary use of the pole.

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

Item	Article/Section
(a) Light Pole Identification.....	1069.06
(b) Wood Pole.....	1069.04
(c) Mast Arm.....	1069.03(a)

CONSTRUCTION REQUIREMENTS

Installation. Installation shall be as described in Article 830.03(c). The Contractor shall provide all hardware to install the pole and mast arm as specified herein and indicated on the plans.

Wood poles may be used poles as approved by the Engineer as described in Article 830.04. The wood pole and mast arm, as applicable, shall remain the property of the Contractor and shall be removed when directed by the Engineer.

The void caused by the removal of the wood pole shall be backfilled according to Article 819.04.

Method Of Measurement. Wood poles shall be counted as, each installed.

Basis Of Payment. This item shall be paid at the contract unit price each for TEMPORARY WOOD POLE, of the mounting height, class, mast arm quantity and length indicated.

REMOVE TEMPORARY WOOD POLE

Description. This item consists of removing existing temporary wood poles, aerial cable, and all associated apparatus and connections. This removal shall also include removal of all wiring and connections back to the associated lighting controller, junction box, or adjacent lighting unit to remain not affected by construction. All equipment and material removed as part of this item shall become property of the Contractor and shall be removed from the site.

Pole holes shall be backfilled according to Article 841.02

Method of Measurement. Units measured for payment will be counted on a per-pole basis, regardless of pole material, pole dimensions and installation depth.

Basis of Payment. This work will be paid for at the Contract unit price each for REMOVE TEMPORARY WOOD POLE.

DRILL EXISTING JUNCTION BOX

Description. This item consists of drilling a hole in an existing surface mounted junction box for the installation of a new conduit(s) and drilling a hole in an existing embedded junction box and barrier wall and furnishing and installing new conduit as shown in the plans.

General Requirements. General requirements must be in accordance with Section 801 of the Standard Specifications.

Installation. The size of the hole must be as close as possible to the size of the conduit. Conduit openings must be fitted with the appropriate conduit fittings, nuts and accessories. The type and orientation of the conduit must be as shown on the Plans.

Materials. All materials shall be in accordance to the requirements of section 813 of the Standard Specification.

Installation for embedded junction box. Core drill through the existing barrier wall to reach the junction box. Use a knockout punch to make a hole into the side wall of the junction box. Use the punch size recommended by the manufacturer for the conduit being installed. Do not disturb any existing cables within the junction box.

Run a galvanized steel close nipple through the hole, using a sealing lock nut on either side of the junction box wall.

Connect the nipple to the conduit using metal conduit and fittings as required. Match the size of the conduit. At right angle connections, install mogul LB conduit bodies to facilitate the installation of cable.

Fill in any voids within the barrier wall around the conduit and seal the conduit entry point into the wall to prevent the collection of moisture.

Installation for surface mounted junction boxes. Field cut openings in the junction box shall be uniform and smooth. All burrs and rough edges shall be filed smooth prior to the installation of the conduit(s) into the junction box.

Cleaning the existing junction box (if required) will be included in this item.

Method of Measurement. Each hole that is drilled for a conduit (drilling the hole, furnishing and installing the conduit(s) and fitting(s)) including all necessary labor and material for a complete installation as indicated will be counted as a unit for payment.

Basis of Payment. This work will be paid for at the contract unit price each for DRILL EXISTING JUNCTION BOX, which will be payment in full for performing the work complete as described herein and as directed by the Engineer.

REMOVE EXISTING CABLE

Description. This work will consist of disconnecting and removing of existing cable from a conduit or raceway. Existing cables shall be disposed of or coiled in an existing junction box and protected for re-use as specified herein, as shown on the plans and as directed by the Engineer.

No removal work shall be permitted without approval from the Engineer. All cables removed and disposed of as part of this item shall become property of the Contractor and shall be removed from the site, unless otherwise directed.

Cables to be Disposed. Cables must be pulled out of an existing conduit, removed completely and disposed.

Cables to be Re-Installed. Cables to be reinstalled must be carefully pulled out of an existing conduit, protected from damage and coiled in an existing junction box, handhole or manhole for re-use as shown on the plans.

Method of Measurement. The removed cable will be measured for payment in feet in place, regardless of cable type and size. Measurement will be made in a straight line between changes of direction and to the centers of poles, handholes, junction boxes and manholes. Slack cable and vertical cable will not be measured for payment. Multi-conductor cables within a single outer jacket shall be measured the same as single conductor cables.

Basis of Payment. This work shall be paid for at the contract unit price for REMOVE EXISTING CABLE as specified. The price will be payment in full for completely removing the existing cable from a conduit and disposing of the cable or protecting the cable for reuse. If two or more cables in a conduit are to be removed, each cable will be measured for payment separately.

The reinstallation of existing cables in existing or new conduits is not included in this item and shall be paid for under a separate pay item.

The removal of existing cables within existing conduits to be removed is not included in this item and shall be paid for under a separate pay item.

ROD AND CLEAN EXISTING CONDUIT

Description. This work will consist of inserting a duct rod or electrical fish rod or tape of sufficient length and rigidity into an electrical conduit opening in one electrical manhole, handhole, or junction box and pushing the said rod through the conduit to emerge at the next or subsequent manhole, handhole or junction box in the conduit system at the location shown on the plans. The duct rod may be inserted and removed by any standard construction method which causes no damage to the conduit system. The size of the conduit may vary from two inch (2") to four inch (4"), but there will be no differentiation in cost for the size of the conduit.

Prior to removal, of the duct rod, a duct cleaning attachment such as a properly sized wire brush or cleaning mandrel must be attached to the duct rod, which by removal of the duct rod will be pulled through the conduit to remove sand, grit, or other light obstructions from the duct to provide a clean, clear passage for the installation of cable. Whenever the installation of cables is not performed as an adjunct to or immediately following the cleaning of the duct, a light weight pulling line such as a 1/8" polyethylene line or conduit measuring tape must be placed and will remain in the conduit to facilitate future work. When great difficulty of either inserting the duct rod or removal of the cleaning mandrel is encountered, the duct may require further cleaning by use of a compressed air gun, or a low pressure water hose. In the case of a broken duct line, the conduit must be excavated and repaired. The existence and location of breaks in the duct line may be determined by rodding, but the excavation and repair work required will not be a part of this pay item.

Method of Measurement. This work will be measured per lineal foot for each conduit cleaned. Measurements will be made from point to point horizontally. No vertical rises will count in the measurement.

Basis of Payment. This work will be paid for at the contract unit price per lineal foot for ROD AND CLEAN EXISTING CONDUIT for the installation of new electric cables. Such price will include the furnishing of all necessary tools, equipment, and polyethylene line as required to prepare a conduit for the installation of cable. When the number of cables to be installed requires the use of more than one conduit in the same run, each additional conduit required will be rodded and cleaned as a separate unit and paid for at the contract unit price.

REPLACE EXISTING DECAL WITH NEW LUMINAIRE NUMBERING DECAL

Description. This work will consist of replacing an existing luminaire numbering decal for an existing light pole, tower or luminaire as specified herein, as shown on the plans and as directed by the Engineer.

This item shall include the removal of the existing decal and all mounting brackets, hardware and appurtenances required for a complete installation of the new decal.

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

Item	Article/Section
(a) Pole/Unit Identification.....	1069.06

Installation Requirements. Installation of the new number decal shall be done according to Article 1069.06 of the Standard Specifications and as describe herein.

The existing decal shall be removed completely from the lighting unit and disposed of properly. The area where the existing decal was removed shall be thoroughly cleaned to remove all existing glue or adhesive residue prior to installing the new decal.

Method of Measurement. Each decal that is replaced on an existing light pole, tower or luminaire as indicated will be counted as a unit for payment.

Basis of Payment. This work shall be paid for at the contract unit price each for REPLACE EXISTING DECAL WITH NEW LUMINAIRE NUMBERING DECAL, which will be payment in full for performing the work described herein.

REMOVE CONDUIT ATTACHED TO STRUCTURE

Description. This item consists of removing and disposing existing conduit attached to structure complete with all support equipment, hardware and appurtenances associated with the existing conduit for a complete removal as shown on the plans, as describe herein and as directed by the Engineer.

This item shall also include the removal of all wiring and connections associated with the removed conduit.

The removed conduit and associated appurtenances shall be disposed of properly offsite.

The contractor shall cut off the anchoring devices a minimum of 1 inch below the surface of the concrete and fill the voids with Portland cement concrete mortar, making a smooth finish to the concrete surface. If required, the patched area shall be painted to match the existing structure surface color.

No removal work shall be permitted without approval from the Engineer.

The contractor shall provide a steel, screw/bar type, weatherproof knockout seal in the existing junction box to cover the hole/void caused by the removal of the conduit. The seal shall be designed to protect the existing wires inside the junction box.

Method of Measurement. Removal of existing conduit attached to structure will be measured for payment in feet in place, regardless of conduit type and size.

The removed conduit will be measured for payment in a straight line between changes of direction and to the centers of poles, handholes, junction boxes and manholes. Vertical conduit will not be measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per foot for REMOVE CONDUIT ATTACHED TO STRUCTURE, which will be payment in full for the material and work described herein.

REMOVAL OF LIGHT TOWER, NO SALVAGE

Description. The work shall consist of removal and disposal of existing high mast light towers as described herein, as shown on the plans and as directed by the Engineer.

The removal of the light tower foundation is not included in this item and will be paid for separately.

General. General requirements must be in accordance with Article 842.02 of the Standard Specifications.

Removal of the light towers must be in accordance with Article 842.03 of the Standard Specifications. The light towers, luminaires and all associated hardware and appurtenances shall become the property of the Contractor and shall be disposed of according to Article 202.03.

Method of Measurement. Each light tower which is removed and disposed of as indicated will be counted for as a unit for payment.

Basis of Payment. Removal of light towers will be paid for at the contract unit price per each for REMOVAL OF LIGHT TOWER, NO SALVAGE.

REMOVAL OF TOWER FOUNDATION

Description. This item consists of removing and disposing of an existing high mast light tower foundation and backfilling the excavated areas as specified herein, as shown on the Plans and as directed by the Engineer.

General Requirements. General requirements must be in accordance with Section 801 of the Standard Specifications, except as herein modified.

Removal. Removal must be in accordance with Article 842.04 of the Standard Specifications.

Method of Measurement. Each foundation that is removed and disposed of properly as indicated will be counted as a unit for payment.

Basis of Payment. This work will be paid for at the Contract unit price each for REMOVAL OF TOWER FOUNDATION, which shall be payment in full for the work described herein.

REMOVE AERIAL CABLE

Description. This item consists of removing existing aerial cables completely from the lighting units and bridge structures including all associated apparatus, anchors, mounting hardware and connections as shown on the plans and as directed by the Engineer.

All equipment and material removed as part of this item shall become property of the Contractor and shall be removed from the site.

Method of Measurement. Removal of existing aerial cable will be measured for payment at the contract unit price per foot, regardless of the quantity and size of the aerial cables.

Basis of Payment. This work will be paid for at the Contract unit price per foot for REMOVE AERIAL CABLE.

LIGHT POLE FOUNDATION, INTEGRAL WITH BARRIER WALL

Description. This item shall consist of providing a light pole foundation integral to a single face barrier for a wall mounted light pole as detailed in the plans and specified herein. This pay item shall also include constructing the concrete barrier and its base.

The work shall include all Portland cement concrete, formwork, concrete finishing, reinforcement bars, anchor bolts, rebar cage, all hardware and appurtenances required for a complete installation.

Execution. Construction of the light pole foundation shall be in accordance with Section 836 of the Standard Specifications. Construction of the concrete barrier shall be in accordance with Section 637 of the Standard Specifications.

Refer to the structural plan sheets for typical details of the barrier wall, reinforcement bars, drilled shaft, rebar cage and anchor rods. The top portion of the foundation shall be integrated with the barrier wall. The top portion of the wall shall be nominally 36 inches wide and 32 inches high as detailed in the structural plan sheets. The length of wall included shall be 10 feet.

The Engineer shall inspect the foundation form work and verify location of anchor rods and conduit sleeves prior to the placement of concrete. The Contractor shall be responsible for coordinating the Engineer's inspection and obtaining his approval.

Method of Measurement. Concrete foundations will be measured for payment in feet in place. The length measured will be limited to that shown on the plans or authorized by the Engineer. Any offsets in the foundation will be measured along the vertical and horizontal centerlines of the foundation without overlap.

Relocation of a foundation due to an obstruction and any shaft excavation to that point will not be measured for payment.

Excavation in rock will be measured for payment according to Article 502.12.

Basis of Payment. This work will be paid for at the contract unit price per each for LIGHT POLE FOUNDATION, INTEGRAL WITH BARRIER WALL, which shall be payment in full for the work described herein.

RELOCATE EXISTING JUNCTION BOX

Description. This item consists of removing and relocating an existing junction box attached to structure with all support equipment, hardware and appurtenances as shown on the plans, as describe herein, as directed by the Engineer and as required for a complete installation.

Removal. The contractor shall cut off the anchoring devices a minimum of 1 inch below the surface of the concrete and fill the voids with Portland cement concrete mortar, making a smooth finish to the concrete surface. If required, the patched area shall be painted to match the existing structure surface color.

No removal work shall be permitted without approval from the Engineer.

The contractor shall provide a steel, screw/bar type, weatherproof knockout seal in the existing junction box to cover the hole/void caused by the removal of the conduit. The seal shall be designed to protect the existing wires inside the junction box.

Installation. The junction box shall be installed accordance with Article 813.03 of the Standard Specifications.

Method of Measurement. Removal and reinstallation of an existing junction box attached to structure will be measured on a per each basis, regardless of junction box type and size.

Basis of Payment. This work will be paid for at the contract unit price per each for RELOCATE EXISTING JUNCTION BOX, which will be payment in full for complete installation.

TRAFFIC SURVEILLANCE. – GENERAL (TSC T 400#02)

Effective: June 1, 1994

Revised: July 21, 2011

The following supplements applicable sections of Section 800 of the Standard Specifications for Road and Bridge Construction.

The intent of this Special Provision is to prescribe the materials and construction methods commonly used in traffic surveillance installations. All material furnished shall be new. The locations and the details of all installations shall be as indicated on the Plans or as directed by the Engineer.

When the road is open to traffic, except as otherwise provided, the Contractor may request a turn on and inspection of all complete traffic surveillance installations system. This request must be made to the Engineer a minimum of seven (7) working days prior to the time of the requested inspection. Upon demonstration that all surveillance is operational and all work is completed in accordance with the contract and to the satisfaction of the Bureau of Traffic Operations Electrical Engineer, The Bureau of Traffic Operations Electrical Engineer will then allow all of the surveillance to be placed in continuous operation. The Agency that is responsible for the maintenance of the traffic surveillance installations will assume the maintenance upon successful completion of this inspection.

Projects which call for the storage and re-use of existing traffic surveillance equipment shall have a 30 day test period prior to project acceptance.

Definition.

Whenever in these Special Provisions the following terms are used, the intent and meaning shall be interpreted as follows:

Induction Loop - A continuous non-spliced wire, three turns, permanently placed and sealed in sawcuts in the roadway and adjacent area, used in conjunction with an induction loop detector sensor unit.

State Highway Communications Center - The main communication control facility of the Illinois Department of Transportation with present offices at 201 W. Center Court, Schaumburg, Illinois 60196-1096.

Prosecution of Surveillance. The work shall be as indicated on the Plans and as required by the Specifications. Unless otherwise indicated, the Contractor shall furnish and install all required materials and equipment, including all associated appurtenances, to produce a complete and operational installation. The appurtenances shall be as indicated, and the costs shall be included in the unit prices bid for the pay items of this contract. The work shall be done in a workmanlike manner.

Connections to Existing. Where new work connects to existing installations, the Contractor shall do all necessary cutting, fitting and foundation drilling to the existing installation and shall remove all existing work, as required, to make satisfactory connections, with the work to be performed under these Provisions, so as to leave the entire work in a finished and workmanlike manner, as approved by the Bureau of Traffic Operations Electrical Engineer. No raceways shall be allowed to enter cabinet through the sides or back walls.

Some contracted work which does not call for a complete rebuilding of a surveillance location but the replacement of detector loops and lead-in cable only in conjunction with work such as pavement overlay, cut and grind, curb and gutter replacement and other similar type work where existing appurtenances have been in place for several years. This at times has created pre-existing conditions (such as blocked/broken lead-in conduits, buried handholes) which the contractor may have to repair/replace to make the location fully functioning. The Contractor will be compensated for such work utilizing contract items after a complete inspection by the Bureau of Traffic Operations Electrical Engineer, Resident Engineer and Electrical Maintenance Contractor's Rep. with a full review on a case by case basis. Upon completing such work the Contractor shall notify the R.E. to contact the Bureau of Traffic Operations Electrical Engineer for checks and test to insure the location is on-line and working correctly.

The Contractor shall furnish all labor and material to the furtherance of this end, whether or not distinctly shown on the plans, in any of the "Standard Specifications" or in the Special Provisions.

Note that the Contractor shall be entitled to only one request for location marking of existing systems by the Electrical Maintenance Contractor and that multiple requests may only be honored at the Contractor's expense.

Standard Guarantee. Manufacturers' warranties or guarantees on all electrical and mechanical equipment consistent with those provided as customary trade practice shall be obtained and transferred to the State.

In-Service Warranties or Guarantees. The Contractor shall provide warranties or guarantees that will provide for satisfactory in-service operation of the mechanical and electrical equipment and related components. These warranties or guarantees shall cover a period of two (2) years following project acceptance. The cost of these warranties and guarantees shall be considered incidental to the Contract.

Equipment Documents. The Contractor shall furnish five (5) diagrams of the internal and external connection of the equipment in each Bureau of Traffic Operations Electrical cabinet. Contractor shall also furnish the Operating and maintenance instructions for all equipment supplied. One copy of the wiring diagrams for each cabinet shall be retained in each field cabinet. A wiring diagram shall be contained in a plastic pouch that shall be permanently mounted to the door of each cabinet. Contractor shall permanently mark the cabinet for each termination and each terminal connection as to loop, tone, closure, phone, and lane function of each termination in the cabinet and provide a completed cable log and location as-built diagram at each location.

Terminal Blocks. Terminal blocks provided in field cabinets shall be the heavy duty barrier type. The terminal block shall be a minimum of 2 inches (50.8 mm) wide and 1-3/16 inch (30.16 mm) deep. Center to center of the terminal screws or studs shall be a minimum of 21/32 inch (16.67 mm) with barriers in between. Terminal blocks shall be rated at 45 amps 600 volts breakdown RMS line to line 11,000 V. and breakdown RMS line to ground 13,800 V. A marking strip shall be provided with each terminal block.

Existing Equipment. All existing equipment, replaced by new equipment shall remain the property of the State and shall be delivered to the Electrical Maintenance Contractor. The cost of removing and delivering the replaced equipment shall be paid for under separate pay item for Cabinet Housing Equipment - Removal.

Telecommunication Cable. When installing the telecommunication cable, the Contractor shall extend his installation and connections of the cable to the next adjacent Surveillance installations or junction box, beyond the limits of his contract section. He shall be responsible for insuring that the cable is continuous and connected from one contract section to the other.

The Contractor shall comply with the agreement between the State of Illinois and IBT/Ameritech as to connections, locations, and terminations of the phone lines (Telephone Company, Engineering, General Service Engineering Division, Outside Plant Engineering Notes 14-36A., March 1971, Administrative Aids and Procedures).

Existing Surveillance Equipment and Appurtenances. Before starting work, the Contractor, in the presence of the Resident Engineer, Bureau of Traffic Operations Electrical Engineer and the State Electrical Maintenance Contractor's rep., shall inspect the existing equipment to be delivered or maintained by the Contractor and shall take an inventory of all defective, broken, and/or missing parts. Those parts found broken, defective, and/or missing shall be repaired or replaced by the State Electrical Maintenance contractor and shall be recorded as such. The Contractor shall be required to maintain all tone transmitters, tone receivers, tone power supplies, tone mounting frames, harnesses, controller and wiring. The Contractor shall be required to maintain all metering and surveillance cabinets, foundation, concrete handhole, vehicle detection equipment, all interconnecting cables and all Surveillance appurtenances including signal heads. Contractor shall number each cabinet as indicated on the plans, with reflective decals as those used on lighting pole standard.

Should damage occur to any surveillance items during the Contractor's contract period, the Contractor shall repair or replace all damaged equipment at his own expense. The Bureau of Traffic Operations Electrical Engineer shall determine what equipment shall be reusable and what shall be replaced. Replaced equipment shall be of equal or better quality and type.

The Contractor, prior to the commencement of his work, shall notify the Bureau of Traffic Operations Electrical Engineer for a pre-construction inspection. If construction begins prior to this meeting, the Contractor assumes maintenance responsibilities of the locations within his contract limits and shall make any repairs or replace any damaged equipment pre-existing or damaged as a result of his own negligence at his own expense. This also relieves the Electrical Maintenance Contractor of providing one free locate of the surveillance installations within the contract limits.

As-Built Plans. Upon completion of the work, the Contractor shall furnish one (1) copy of "as-built" drawings on CD compatible with Micro Station V8-2004 Edition software at the Bureau of Traffic Operations Electrical Design Section and four (4) full size sets of "as-built" plans to the Resident Engineer. The plans shall include definite locations and length of all cables, duct, conduit pushes, induction loop, lead-in, foundations, handhole and P-duct. The cost of the "as-built" plans shall be incidental to the contract. The Engineer will not authorize final inspection of any installations until the said plans are in his possession.

Protection of The Work. Electrical work, equipment and appurtenances shall be protected from damage during construction until final acceptance. Electrical raceway or duct openings, shall be capped or sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

Standards of Installation. Electrical work shall be installed in a neat and workmanlike manner in accordance with the best practices of the trade. Unless otherwise indicated, materials and equipment shall be installed in accordance with the manufacturer's recommendations.

Except as specified elsewhere herein, materials and equipment shall be in conformance with the requirements of Section 800 & 1088 of the Standard Specifications for Road and Bridge Construction.

In addition to the requirements of the Standard Specifications relating to control of materials, the Contractor shall comply with the following requirements.

The Contractor shall supply samples of all wire, cable, and equipment and shall make up and supply samples of each type of cable splice proposed for use in the work for the Engineer's approval.

Before equipment and/or material including cabinet, telemetry, and detectors are delivered to the job site, the Contractor shall obtain and forward to the Engineer a certified, notarized statement from the manufacturer, containing the catalog numbers of the equipment and/or material, guaranteeing that the equipment and/or material, after manufacture, comply in all respects with the requirements of the Specifications and these Special Provisions. Re-manufactured or modified equipment other than by the original manufacturer shall not be allowed. Original manufacturer shall certify that he made modification to the equipment.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which the subject materials and equipment are paid, and no additional materials and equipment are paid, and no additional compensation will be allowed. Materials and equipment not complying with the above requirements that have been installed on the job will be done at the Contractor's own risk and may be subject to removal and disposal at the Contractor's expense.

Procurement. Materials and equipment shall be the products of established manufacturers, shall be new, and suitable for the service required. The Contractor is obligated to conduct his own search into the timely availability of the specified equipment and to ensure that all materials and equipment are in strict conformance with the contract documents. Materials or equipment items which are similar or identical shall be the product of the same manufacturer. The cost of submittals, certifications, any required samples and similar costs shall not be paid for extra but shall be included into the pay item bid price for the respective material or work.

Exceptions, Deviations and Substitutions. Exceptions to and deviations from the requirements of the Contract Documents shall not be allowed without approval by Engineer and Bureau of Traffic Operations Electrical Engineer. It is the Contractor's responsibility to note any deviations from contract requirements at the time of submittal and to make any requests for deviations in writing to the Engineer. In general, substitutions will not be acceptable. Requests for substitutions must demonstrate that the proposed substitution is superior to the material or equipment required by the Contract Documents. No substitutions shall be permitted without the approval of the Engineer, and Bureau of Traffic Operations Electrical Engineer.

Submittals. Within 30 days after contract award, the Contractor shall submit, for approval, complete manufacturer's product data (for standard products and components) and detailed shop drawings (for fabricated equipment). All of the submittal information shall be assembled by the Contractor and submitted to the Engineer at one time. All equipment samples shall be submitted at this time. Partial and sporadic submittals may be returned without review. The Contractor may request, in writing, permission to make a partial submittal. The Engineer will evaluate the circumstances of the request and may accept to review such a partial submittal. However, no additional compensation or extension of time shall be allowed for extra costs or delays incurred due to partial or late submittals.

Testing. Before final acceptance, the electrical equipment, material, induction loops and work provided under this contract shall be tested. Tests will not be made progressively, as parts of the work are completed they shall be all made at one time. Items which fail to test satisfactorily shall be repaired or replaced. Bureau of Traffic Operations Electrical Engineer will witness all testing.

Installation/Inspection Procedures. After all control boxes and equipment to be installed has been physically inspected and approved by Bureau of Traffic Operations Electrical Engineer, the equipment supplier shall then deliver all equipment to the job site. The Contractor shall then install/safeguard all the equipment which has been delivered prior to requesting an inspection. No unapproved equipment shall be on the job site or installed as part of the job. This does not relieve the Contractor from replacement/repairs of equipment found to be damaged or in non-compliance of these provisions.

Certain items such as conduit, wire, duct, anchor bolts, and junction boxes will be inspected and may be tested by the Department's Bureau of Materials and these items shall not be delivered to the job site without inspection approval. Items such as cabinets shall be inspected by the Engineer at the contractor's or manufacturer's shop and these items shall not be delivered to the job site without Bureau of Traffic Operations Electrical Engineer inspection approval. It shall be the Contractor's responsibility to arrange inspection activities with the Engineer thirty (30) days prior to installation. 30 days prior to installation of the tone equipment being supplied and, prior to request for a turn-on, the Bureau of Traffic Operations Electrical Engineer will be contacted for the correct frequencies, controller addresses and "DB" setting for each location to be installed. When the work is complete, all equipment fully operational, the Contractor shall schedule a turn-on inspection with the Engineer. Acceptance will be made as a total system, not as parts. The Contractor shall request the inspection no less than seven (7) working days prior to the desired inspection date.

No inspection shall be made until the delivery of acceptable "as built" drawings, specified certifications, and the required guarantees.

It will be the responsibility of the installing contractor to provide a qualified technician representing the tone equipment supplier to be at the turn-on inspection of each location to provide the technical expertise to bring each location on line.

The Contractor shall furnish the necessary manpower and equipment to make the Inspection. The Engineer may designate the type of equipment required for the inspection tests.

A written record of the loop analyzer readings shall be submitted to the Bureau of Traffic Operations Electrical Engineer prior to the final inspection.

Any part or parts of the installation that are missing, broken, defective, or not functioning properly during the inspection shall be noted and shall be adjusted, repaired, or replaced as directed by the Engineer and another inspection shall be made at another date. Only upon satisfaction of all points shall the installation be acceptable.

After the subject inspections are completed the Bureau of Traffic Operations Electrical Engineer will provide the contractor with a complete punch list of items necessary to be completed prior to final inspection and acceptance for maintenance.

The Contractor shall furnish a written guarantee for all materials, equipment and work performed under the contract for a period of not less than two (2) years from the date of final acceptance.

OPERATION OF EXISTING TRAFFIC SURVEILLANCE/SPEED/COUNT STATIONS (TSC T400#03)

Effective: June 1, 1994

Revised: November 12, 2008

Existing traffic surveillance installations and/or any electrical facilities at certain locations included in this Section may be altered or reconstructed totally or partially as part of the work on this Section. The Contractor is hereby advised that all traffic surveillance equipment, presently installed at these locations, is the property of the State of Illinois, Department of Transportation, Division of Highways or Springfield Bureau of Traffic.

The Contractor is further advised that the existing traffic surveillance, or the existing speed/data installations, must remain in operation during all construction stages except for the most essential down time. Any shutdown of the installation, for a period to exceed four (4) hours must have the prior approval of the Engineer. Such approval will generally only be granted during the period extending from 10:00 a.m. to 2:00 p.m. on weekdays. Any other traffic shutdown, either for periods in excess of one (1) hour or outside of the 10:00 a.m. to 2:00 p.m. weekday period must have prior approval of the Engineer.

The Contractor, prior to the commencement of his work, shall notify the State's Electrical Maintenance Contractor and the Bureau of Traffic Operations of his intent to perform this work. Failure to notify either the Bureau/EMC when starting work will cause maintenance to be transferred to the Contractor without pre-inspection and will require the Contractor to complete all repairs without compensation. This also relieves the EMC from providing a locate without compensation. Upon request from the Contractor, the State Electrical Maintenance Contractor will locate any buried conduit or other electrical facility which may interfere with the Contractor's operations without charge to him. This shall in no way relieve the Contractor of his responsibility to repair and/or replace electrical facilities damaged by his operations.

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.

Any known or suspected damage to the electrical facility shall be reported immediately to the Engineer. The Contractor will be held fully responsible for the repair and/or replacement of any part of the existing installation, whether permanent or temporary, if, in sole opinion of the Engineer, such damage was caused by the negligence of the Contractor, his agents, or employees. The State, at its own discretion, may call upon the State's Electrical Maintenance Contractor or the concerned bureau to make any such repairs and/or replacements at the total expense of the Contractor for this Section.

GROUNDING OF ITS SUBSYSTEMS (TSC T 420#8)

Effective: March 12, 2009

The grounding of ITS subsystems shall meet the requirements of Section 806 of the Standard Specifications. In addition, amend Article 806.03 of the Standard Specifications to include:

General. All ITS subsystems (ramp metering system, dynamic message sign system, system detector stations, etc.), associated equipment, and appurtenances shall be properly grounded in strict conformance with the NEC and as shown on the Plans.

Testing shall be according to Section 801. 13(a)(5) of the Standard Specifications:

The grounded conductor (neutral conductor) shall be white color-coded. This conductor shall be bonded to the equipment-grounding conductor only at the Electric Service installation. All power cables shall include one neutral conductor of the same size as the phase (hot) conductors.

The equipment-grounding conductor shall be green color-coded. The following is in addition to Section 801.04 of the Standard Specifications.

Equipment grounding conductors shall be XLP insulated No. 6, unless otherwise noted on the Plans, and bonded to the grounded conductor (neutral conductor) only at the Electric Service Installation. The equipment-grounding conductor is paid for separately and shall be continuous. The Earth shall not be used as the equipment-grounding conductor.

Equipment grounding connectors shall be bonded, using a listed grounding conductor, to all ramp meters, DMS, and detector cabinets, handholes, and other metallic enclosures throughout the ITS subsystems, except where noted herein. A listed electrical joint compound shall be applied to all conductor terminations, connector threads, and contact points.

All metallic and non-metallic raceways containing ITS circuit runs shall have a continuous equipment grounding conductor, except raceways containing only detector loop lead-in circuits, circuits under 50 volts and/or fiber optic cable will not be required to include an equipment grounding conductor.

The grounding electrode conductor shall be similar to the equipment grounding conductor in color-coding (green) and size. The grounding electrode conductor is used to connect the ground rod to the equipment grounding conductor and is bonded to ground rods via exothermic welding, listed pressure connectors, listed clamps or other approved listed means.

Basis of Payment. Payment shall be included in the various items associated with ITS.

HANDHOLE (TSC T428#1)

Effective: June 1, 1994

Revised: May 19, 2009

Description. This item shall consist of constructing a handhole, a heavy-duty handhole, or a double handhole, cast in place, complete with frame and cover and in accordance with the following requirements and conforming in all respects to the lines, grades, and dimensions shown on the plans or as directed by the Engineer. All handholes shall be installed in accordance with the Standard Specifications Sec. 814.

Materials. All handholes shall be constructed of Class SI concrete meeting the requirements of the Standard Specifications for Road and Bridge Construction Section 1020.

Construction Details. Handhole of the type specified shall be constructed in accordance with the details shown on the plans and conform to the following requirements:

Concrete: Concrete construction shall be done in accordance with the provisions of Concrete for Structures and Incidental Construction contained in the Standard Specifications for Road and Bridge Construction Sec. 503.

Placing Castings: Castings shall be set accurately to the finished elevation so that no subsequent adjustment will be necessary. Castings shall be set flush with a sidewalk or pavement surface. When installed in an earth shoulder away from the pavement edge, the top surface of the casting shall be 1 in. (25.4mm) above the finished surface of the ground.

Backfilling: Any backfilling necessary under a pavement, shoulder, sidewalk or within 2 ft. (60 cm) of the pavement edge shall be made with sand or stone screenings.

Forming: Forms will be required for the inside face of the handhole wall, and across all trenches leading into the handholes excavation. The ends of conduits leading into the handhole shall fit into a conduit bell which shall fit tightly against the inside form and the concrete shall be carefully placed around it so as to prevent leakage.

French Drain: A french drain conforming to the dimensions shown on the plans shall be constructed in the bottom of the handhole excavation.

Steel Hooks: Each handhole shall be provided with four galvanized steel hooks of appropriate size, one on each wall of the handhole.

Frame and Cover: The outside of the cover shall contain a recessed ring Type "G" for lifting and a legend "IDOT TSC" cast-in.

Cleaning: The handhole shall be thoroughly cleaned of any accumulation of silt, debris, or foreign matter of any kind, and shall be free from such accumulations at the time of final inspection.

Basis of Payment. This work will be paid for at the contract unit price each for HANDHOLE or HEAVY DUTY HANDHOLE, or CONCRETE HEAVY DUTY HANDHOLE (SPECIAL), as the case may be, for all necessary excavating, backfilling, disposal of surplus material and form work, frame and cover, and furnishing all materials.

CONCRETE FOUNDATION (TSC T 427#01)

Effective: June 1, 1994

Revised: Sept. 15, 2010

Description. This item shall consist of constructing a concrete foundation for the installation of a traffic signal, cabinet, and cabinet with pedestal, anchor bolt, and ground rod in accordance with the following requirements and conforming in all respects to the lines, grades and dimensions shown on the plans or as directed by the Engineer and in applicable portions of Section 878 of the Standard Specifications and the Bureau of Design and Environment Concrete Foundation Detail #878001-08.

Materials. The materials shall conform to the specifications of Class SI concrete and concrete Reinforcement Bars in the Standard Specifications for Road and Bridge Construction. The conduit and fittings within the limits of the foundation shall conform to the same requirements as that specified for the conduit outside these limits.

Anchor bolts shall meet the requirements of Section 505 of the Standard Specifications and the material shall conform to the requirements of Article 1006.09 of the Standard Specifications for Road and Bridge Construction. A ground rod shall be installed in each foundation and shall conform to Section 806. Unless otherwise indicated in plans, ground rods shall be one piece copper-clad steel rods 3/4" x 10' (2cm x 3 m).

Construction Details. Concrete foundations shall be Type A or Type D and location as specified on the plans. The top of the foundation shall be finished level. Shimming will not be permitted. All edges along the top of the foundation shall be given a 1 inch (25mm) bevel. A form extending a minimum of 9 inches (225mm) below the top surface of the foundation is required. The form shall be set level and means shall be provided for holding same rigidly in place while the concrete is being deposited. Whenever the excavation is irregular, a form shall be used to provide the proper dimension of the entire foundation below the ground surface. Where a concrete foundation is contiguous to a sidewalk, preformed joint filler of 1/2 inch (12mm) thickness shall be placed between the foundation and the sidewalk.

All conduit in the foundation shall be installed rigidly in place before concrete is deposited in the form. Insulated bushings shall be provided at the ends of conduit. Anchor bolts shall be set in place before the concrete is deposited by means of a template constructed to space the anchor bolts in accordance with the pattern of the bolt holes in the base. After installation of cables, all conduit openings in foundations shall be sealed with an approved mastic. The required number and size of galvanized steel conduits shall be installed in every concrete foundation as shown on the plans. An excess of galvanized steel conduits shall be installed in every concrete foundation. These excess stubs shall be 2 inches (50 mm) in diameter. Placement and quantity shall be determined by the Engineer, and the ends of the stubs shall be capped.

Incidental to the cost of each control box foundation, the Contractor shall construct a 5" (125 mm) P.C.C. sidewalk of a rectangular area 3 ft (1 mm.) by 4 ft (1.2 meter.) immediately adjacent to the cabinet door, with the 4' (1.2 meter) dimension of the rectangle parallel to the cabinet door when closed. This paragraph shall be applicable at all cabinet foundation locations included in this Section. The only situations where this paragraph shall no apply are as follows: When the foundation is immediately adjacent to or within a paved sidewalk or shoulder area and no further surfacing is require. The Engineer shall be the sole judge as to the applicability of this paragraph in all questions arising therefrom.

Basis of Payment. This work will be paid for at the contract unit price per meter/foot for CONCRETE FOUNDATION of the type specified, which price shall be payment in full for all necessary excavating, backfilling, disposal of surplus material and formwork and furnishing all materials, anchor bolts, stubs and ground rod within the limits of the foundation.

FIBER OPTIC CABLE, SINGLE MODE

Effective: March 15, 2013

Description. The Contractor shall furnish and install loose-tube, single-mode, fiber optic cable of the number of fibers specified as shown in the plans and as directed by the Engineer.

Other ancillary components, required to complete the fiber optic cable plant, including but not limited to, moisture and water sealants, cable caps, fan-out kits, etc., shall be included in the cost of fiber optic cable and will not be paid for separately.

Materials. The single-mode, fiber optic cable shall incorporate a loose, buffer-tube design. The cable shall be an accepted product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1999 for a single sheathed, non-armored cable, and shall be new, unused and of current design and manufacture.

Fibers. The cables shall use dispersion unshifted fibers. The optical and physical characteristics of the un-cabled fibers shall include:

The single-mode fiber shall meet EIA/TIA-492CAAA, "Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers," and ITU recommendation G.652.D, "Characteristics of a single-mode optical fiber cable."

Physical Construction			
Requirement		Units	Value
Cladding Diameter		(μm)	125.0 \pm 0.7
Core-to-Cladding Concentricity		(μm)	\leq 0.5
Cladding Non-Circularity			\leq 0.7 %
Mode Field Diameter	1310 nm	(μm)	9.2 \pm 0.4
	1550 nm		10.4 \pm 0.5
Coating Diameter		(μm)	245 \pm 5
Colored Fiber Nominal Diameter		(μm)	253 - 259
Fiber Curl radius of curvature		(m)	> 4.0 m

Optical Characteristics			
Requirement		Units	Value
Cabled Fiber Attenuation	1310 nm	(dB/km)	\leq 0.4
	1550 nm		\leq 0.3
Point discontinuity	1310 nm	(dB)	\leq 0.1
	1550 nm		\leq 0.1
Macrobend Attenuation	Turns	Mandrel OD	
	1	32 \pm 2 mm	< 0.05 at 1550 nm
	100	50 \pm 2 mm	< 0.05 at 1310 nm
	100	50 \pm 2 mm	< 0.10 at 1550 nm
	100	60 \pm 2 mm	< 0.05 at 1550 nm
	100	60 \pm 2 mm	< 0.05 at 1625 nm
Cable Cutoff Wavelength (λ_{cef})		(nm)	< 1260
Zero Dispersion Wavelength (λ_0)		(nm)	1302 \leq λ_0 \leq 1322
Zero Dispersion Slope (S_0)		(ps/(nm ² •km))	\leq 0.089
Total Dispersion	1550 nm	(ps/(nm•km))	\leq 3.5
	1285-1330 nm		\leq 17.5
	1625 nm		\leq 21.5
Cabled Polarization Mode Dispersion		(ps/km ²)	\leq 0.2
IEEE 802.3 GbE - 1300 nm Laser Distance		(m)	up to 5000
Water Peak Attenuation: 1383 \pm 3 nm		(dB/km)	\leq 0.4

Cable Construction. The number of fibers in each cable shall be as specified on the plans.

Optical fibers shall be placed inside a loose buffer tube. The nominal outer diameter of the buffer tube shall be 3.0 mm. Each buffer tube shall contain up to 12 fibers. The fibers shall not adhere to the inside of the buffer tube.

Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." The fibers shall be colored with ultraviolet (UV) curable inks.

Buffer tubes containing fibers shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." Buffer tube colored stripes shall be inlaid in the tube by means of co-extrusion when required. The nominal stripe width shall be 1 mm.

For cables containing more than 12 buffer tubes, standard colors are used for tubes 1 through 12 and stripes are used to denote tubes 13 through 24. The color sequence applies to tubes containing fibers only, and shall begin with the first tube. If fillers are required, they shall be placed in the inner layer of the cable. The tube color sequence shall start from the inside layer and progress outward.

In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and shall not be subject to fading or smearing onto each other. Colors shall not cause fibers to stick together.

The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrinkback requirements of 7 CFR 1755.900.

Fillers may be included in the cable core to lend symmetry to the cable cross-section where needed. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer. Fillers shall be nominally 2.5 mm or 3.0 mm in outer diameter.

The central member shall consist of a dielectric, glass reinforced plastic (GRP) rod (optional steel central member). The purpose of the central member is to provide tensile strength and prevent buckling. The central member shall be overcoated with a thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.

Each buffer tube shall contain a water-swellaable yarn for water-blocking protection. The water-swellaable yarn shall be non-nutritive to fungus, electrically non-conductive, and homogeneous. It shall also be free from dirt or foreign matter. This yarn will preclude the need for other water-blocking material; the buffer-tube shall be gel-free. The optical fibers shall not require cleaning before placement into a splice tray or fan-out kit.

Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process.

Water swellaable yarn(s) shall be applied longitudinally along the central member during stranding.

Two polyester yarn binders shall be applied contrahelically with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking, and dielectric with low shrinkage.

For single layer cables, a water swellaable tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The water swellaable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

For dual layer cables, a second (outer) layer of buffer tubes shall be stranded over the original core to form a two layer core. A water swellaable tape shall be applied longitudinally over both the inner and outer layer. The water swellaable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

The cables shall contain one ripcord under the sheath for easy sheath removal.

Tensile strength shall be provided by the central member, and additional dielectric yarns as required.

The dielectric yarns shall be helically stranded evenly around the cable core.

The cables shall be sheathed with medium density polyethylene (MDPE). The minimum nominal jacket thickness shall be 1.4 mm. Jacketing material shall be applied directly over the tensile strength members (as required) and water swellaable tape. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The MDPE jacket material shall be as defined by ASTM D1248, Type II, Class C, Category 4 and Grades J4, E7 and E8.

The jacket or sheath shall be free of holes, splits, and blisters.

The cable jacket shall contain no metal elements and shall be of a consistent thickness.

Cable jackets shall be marked with the manufacturer's name, month and year of manufacture, sequential meter or foot markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code (NESC), fiber count, and fiber type. The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white, with the exception that cable jackets containing one or more co-extruded white stripes, which shall be printed in light blue. The height of the marking shall be approximately 2.5 mm.

The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

The shipping, storage, and operating temperature range of the cable shall be -40°C to +70°C. The installation temperature range of the cable shall be -30°C to +70°C.

General Cable Performance Specifications. The fiber optic cable manufacturer shall provide documentation and certify that the fiber optic cable complies with the following EIA-455-xxx Fiber Optic Test Procedures (FOTP):

When tested in accordance with FOTP-3, "*Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components,*" the change in attenuation at extreme operational temperatures (-40°C and +70°C) shall not exceed 0.15 dB/km at 1550 nm for single-mode fiber and 0.3 dB/km at 1300 nm for multimode fiber.

When tested in accordance with FOTP-82, "*Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable,*" a one meter length of unaged cable shall withstand a one meter static head or equivalent continuous pressure of water for one hour without leakage through the open cable end.

When tested in accordance with FOTP-81, "*Compound Flow (Drip) Test for Filled Fiber Optic Cable,*" the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 70°C.

When tested in accordance with FOTP-41, "*Compressive Loading Resistance of Fiber Optic Cables*," the cable shall withstand a minimum compressive load of 220 N/cm (125 lbf/in) applied uniformly over the length of the sample. The 220 N/cm (125 lbf/in) load shall be applied at a rate of 2.5 mm (0.1 in) per minute. The load shall be maintained for a period of 1 minute. The load shall then be decreased to 110 N/cm (63 lbf/in). Alternatively, it is acceptable to remove the 220 N/cm (125 lbf/in) load entirely and apply the 110 N/cm (63 lbf/in) load within five minutes at a rate of 2.5 mm (0.1 in) per minute. The 110 N/cm (63 lbf/in) load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 110 N/cm (63 lbf/in) load. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fibers and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-104, "*Fiber Optic Cable Cyclic Flexing Test*," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-25, "*Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies*," except that the number of cycles shall be two at three locations along a one meter cable length and the impact energy shall be at least 4.4 Nm (in accordance with ICEA S-87-640)", the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-33, "*Fiber Optic Cable Tensile Loading and Bending Test*," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a rated tensile load of 2670N (601 lbf) and residual load of 30% of the rated installation load. The axial fiber strain shall be $\leq 60\%$ of the fiber proof level after completion of 60 minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be $\leq 20\%$ of the fiber proof level after completion of 10 minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-85, "*Fiber Optic Cable Twist Test*," a length of cable no greater than 2 meters shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-37, "*Low or High Temperature Bend Test for Fiber Optic Cable*," the cable shall withstand four full turns around a mandrel of ≤ 20 times the cable diameter after conditioning for four hours at test temperatures of -30°C and $+60^{\circ}\text{C}$. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears, or other openings. The change in attenuation shall not exceed 0.30 dB at 1550 nm for single mode fiber and 0.50 dB at 1300 nm for multimode fiber.

Quality Assurance Provision. All cabled optical fibers > 1000 meters in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel. The cable manufacturer shall be TL 9000 registered.

Packaging. Top and bottom ends of the cable shall be available for testing. Both ends of the cable shall be sealed to prevent the ingress of moisture. Each reel shall have a weather resistant reel tag attached identifying the reel and cable. The reel tag shall include the following information:

- Cable Number
- Gross Weight
- Shipped Cable Length in Meters
- Job Order Number
- Product Number
- Customer Order Number
- Date Cable was Tested
- Manufacturer Order Number
- Cable Length Markings
 - a: Top (inside end of cable)
 - b: Bottom (outside end of cable)

The reel (one flange) marking shall include:

- Manufacturer
- Country of origin
- An arrow indicating proper direction of roll when handling
- Fork lift-handling illustration
- Handling Warnings.

Each cable shall be accompanied by a cable data sheet. The cable data sheet shall include the following information:

- Manufacturer Cable Number
- Manufacturer Product Number
- Manufacturer Factory Order Number
- Customer Name
- Customer Cable Number
- Customer Purchase Order Number
- Mark for Information
- Ordered Length
- Maximum Billable Length
- Actual Shipped Length
- Measured Attenuation of Each Fiber

The cable shall be capable of withstanding a minimum-bending radius of 20 times its outer diameter during installation and 10 times its outer diameter during operation without changing the characteristics of the optical fibers.

The cable shall meet all of specified requirements under the following conditions:

- Shipping/storage temperature: -58° F to +158° F (-50° C to +70° C)
- Installation temperature: -22° F to +158° F (-30° C to +70° C)
- Operating temperature: -40° F to +158° F (-40° C to +70° C)
- Relative humidity from 0% to 95%, non-condensing

Optical Patch Cords and Pigtails. The optical patch cords and pigtails shall comply with the following:

- The optical patch cords shall consist of a section of single fiber, jacketed cable equipped with optical connectors at both ends.
- The factory installed connector furnished as part of the optical patch cords and pigtails shall meet or exceed the requirements for approved connectors specified herein.
- The fiber portion of each patch cord and pigtail shall be a single, jacketed fiber with optical properties identical to the optical cable furnished under this contract.
- The twelve fiber single-mode fiber optic cable shall be installed as a pigtail with factory installed ST compatible connectors.
- The patch cords shall comply with Telcordia GR-326-CORE

Connectors. The optical connectors shall comply with the following:

- All connectors shall be factory installed ST compatible connectors. Field installed connectors shall not be allowed.
- Maximum attenuation 0.4dB, typical 0.2dB.
- No more than 0.2dB increase in attenuation after 1000 insertions.
- Attenuation of all connectors will be checked and recorded at the time of installation with an insertion test minimum 5 times checked with an OTDR.
- All fibers shall be connectorized at each end.
- All fibers shall terminate at a fiber patch panel
- Unused fibers will be protected with a plastic cap to eliminate dust and moisture.
- Termination shall be facilitated by splicing factory OEM pigtails on the end of the bare fiber utilizing the fusion splicing method. Pigtails shall be one meter in length.

CONSTRUCTION REQUIREMENTS

Experience Requirements. Personnel involved in the installation, splicing and testing of the fiber optic cables shall meet the following requirements:

- A minimum of three (3) years experience in the installation of fiber optic cables, including fusion splicing, terminating and testing single mode fibers.
- Install two systems where fiber optic cables are outdoors in conduit and where the systems have been in continuous satisfactory operation for at least two years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the installed fiber optic systems.
- One fiber optic cable system (which may be one of the two in the preceding paragraph), which the Contractor can arrange for demonstration to the Department representatives and the Engineer.

Installers shall be familiar with the cable manufacturer's recommended procedures for installing the cable. This shall include knowledge of splicing procedures for the fusion splicer being used on this project and knowledge of all hardware such as breakout (furcation) kits and splice closures. The Contractor shall submit documented procedures to the Engineer for approval and to be used by Construction inspectors.

Personnel involved in testing shall have been trained by the manufacturer of the fiber optic cable test equipment to be used, in fiber optic cable testing procedures. Proof of this training shall be submitted to the Engineer for approval. In addition, the Contractor shall submit documentation of the testing procedures and a copy of the test equipment operation manual for approval by the Engineer.

Installation in Raceways. Prior to installation, the Contractor shall provide a cable-pulling plan. The plan shall include the following information:

- Identify where each cable will enter the underground system and the direction each pull.
- Identify locations where the cable is pulled out of a handhole, coiled in a figure eight, and pulled back into the hand hole.
- The plan shall address the physical protection of the cable during installation and during periods of downtime.
- Identify the location of slack storage locations
- Identify the locations of splices.
- Identify distances between fiber access points and crossings.

The cable-pulling plan shall be provided to the Engineer for approval a minimum of 15 working days prior to the start of installation. The Engineer's approval shall be for the operation on the freeway and does not include an endorsement of the proposed procedures. The Contractor is responsible for the technical adequacy of the proposed procedures.

During cable pulling operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and pulling operations. Unless specified otherwise by the fiber optic cable manufacturer, the outside bend radius of the cable during installation shall be no less than 20 times the outside diameter of the fiber optic cable. Entry guide chutes shall be used to guide the cable into the handhole conduit ports. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation-bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the cable manufacturers specifically approve the array.

If figure-eight techniques are used during cable installation, the cable shall be handled manually and stored on the ground. The cable shall be placed on tarps to prevent damage from gravel, rocks, or other abrasive surfaces. Tarps should also be used in muddy conditions to keep the cable clean. Enough area to accommodate the cable length to be stored and sufficient personnel to maintain the required minimum-bending diameter as well as avoid kinking or otherwise damaging the cable shall be provided. If the cable has been figure-eighted in preparation for a forward feed, the figure-eight must be flipped over to access the outside cable end. Provide sufficient personnel to avoid kinking the cable as the figure-eight is flipped over. When removing the cable from the figure-eight, use care to avoid kinking the cable and violating the minimum-bending diameter.

Power assisted or figure-eight eliminator equipment, which is used to eliminate manual figure-eight procedures, shall not be used unless specifically allowed by the cable manufacturer in writing.

The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. A dynamometer or in-line tensiometer shall be used to monitor tension in the pull-line near the winch. This device must be visible to the winch operator or used to control the winch. The pulling system shall have an audible alarm that sounds whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the engineer as well as included in the record drawing package.

The use of a breakaway link (swivel) may be used to ensure that the maximum tension of the cable is not exceeded. Breakaway links react to tension at the pulling eye and shall not be used in lieu of tension measuring devices. All pulling equipment and hardware which will contact the cable during installation must maintain the cable's minimum bend radius. Equipment including sheaves, capstans, bending shoes, and quadrant blocks shall be designed for use with fiber optic cable.

The cable shall be pulled into the conduit as a single component, absorbing the pulling force in all tension elements. The central strength member and Aramid yarn shall be attached directly to the pulling eye during cable pulling. "Basket grip" type attachments, which only attach to the cable's outer jacket, shall not be permitted. A breakaway swivel, rated at 95% of the cable manufacturer's approved maximum tensile loading, shall be used on all pulls. When simultaneously pulling fiber optic cable with other cables, separate grooved rollers shall be used for each cable.

To minimize the exposure of the backbone cable and to facilitate the longer lengths of fiber optic cable, the Contractor shall use a "blown cable" (pneumatically assisted) technique to place the fiber optic cable. A Compressed air cooler shall be used when ambient air temperatures reaches 90°F or more.

Where cable is to be pulled through existing conduit which contains existing cables, optical or other, the existing cables shall be removed and reinstalled with the fiber optic cable as indicated on the plans. The removal of the cable(s) shall be paid for separately. Reinstallation of the existing cables, if indicated on the plans, along with the fiber optic cable shall be included in this item for payment.

Tracer Wire. A tracer wire shall be installed with all fiber optic cable runs. One tracer wire shall be installed along with the fiber optic cable in each raceway. If a raceway has more than one fiber optic cable, only one tracer wire per raceway is required. If there are parallel raceways, a tracer wire is required in each raceway that contains a fiber optic cable. Tracer wire shall be installed in raceway segments which are metallic to provide a continuous tracer wire system.

The tracer wire shall be a direct burial rated, number 12 AWG (minimum) solid (.0808" diameter), steel core soft drawn high strength tracer wire. The wire shall have a minimum 380 pound average tensile break strength. The wire shall have a 30 mil high density yellow polyethylene (HDPE) jacket complying with ASTM-D-1248, and a 30 volt rating.

Connection devices used shall be as approved by the tracer wire manufacturer, except wire nuts of any type are not acceptable and shall not be used.

The cost of the tracer wire shall be included in the cost of the fiber optic cable and not paid for separately.

Aerial Fiber Optic Cable. Aerial fiber optic cable assemblies shall be of a self-supporting figure-8 design. The fiber optic cable shall be as described herein and shall be waterblocked utilizing water-swappable materials. The cable assembly shall be designed and manufactured to facilitate midspan access.

The submittal information must include a copy of the standard installation instructions for the proposed cable. Installed cable sag shall not exceed 1% of the span distance. The submittal information must also include catalog cuts for all hardware to be utilized in the installation.

Construction Documentation Requirements.

Installation Practices for Outdoor Fiber Optic Cable Systems

The Contractor shall examine the proposed cable plant design. At least one month prior to starting installation of the fiber optic cable plant, the Contractor shall prepare and submit to the Engineer for review and approval, ten (10) copies of the Contractor's "Installation Practices for Outdoor Fiber Optic Cable Systems" manual. This manual shall address the Contractor's proposed practices covering all aspects of the fiber optic cable plant. This submittal shall include all proposed procedures, list of installation equipment, and splicing and test equipment. Test and quality control procedures shall be detailed as well as procedures for corrective action.

Operation and Maintenance Documentation. After the fiber optic cable plant has been installed, ten (10) complete sets of Operation and Maintenance Documentation shall be provided. The documentation shall, as a minimum, include the following:

- Complete and accurate as-built diagrams showing the entire fiber optic cable plant including locations of all splices.
- Final copies of all approved test procedures
- Complete performance data of the cable plant showing the losses at each splice location and each terminal connector.
- Complete parts list including names of vendors.

Testing Requirements. The Contractor shall submit detailed test procedures for approval by the Engineer. All fibers (terminated and un-terminated) shall be tested bi-directionally at both 1310 nm and 1550 nm with both an Optical Time Domain Reflectometer (OTDR) and a power meter with an optical source. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

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

The Contractor shall provide the date, time and location of any tests required by this specification to the Engineer at least 5 working (7 calendar) days before performing the test. Included with the notification shall be a record drawing of the installed fiber optic cable system. The drawings shall indicate actual installed routing of the cable, the locations of splices, and locations of cable slack with slack quantities identified.

Upon completion of the cable installation, splicing, and termination, the Contractor shall test all fibers for continuity, events above 0.1 dB, and total attenuation of the cable. The test procedure shall be as follows:

A Certified Technician utilizing an Optical Time Domain Reflectometer (OTDR) and Optical Source/Power Meter shall conduct the installation test. The test equipment used shall have been calibrated within the last two years. Documentation shall be provided. The Technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.

A fiber ring or fiber box shall be used to connect the OTDR to the fiber optic cable under test at both the launch and receive ends. The tests shall be conducted at 1310 and 1550 nm for all fibers.

All testing shall be witnessed by the IDOT Engineer and a copy of the test results (CD ROM or USB Drive) shall be submitted on the same day of the test. Hardcopies shall be submitted as described herein with copies on CD ROM.

At the completion of the test, the Contractor shall provide copies of the documentation of the test results to the Project Engineer. The test documentation shall be submitted as two bound copies and three CD ROM copies, and shall include the following:

Cable & Fiber Identification:

- Cable ID
- Cable Location - beginning and end point
- Fiber ID, including tube and fiber color
- Wavelength
- Pulse width (OTDR)
- Refractory index (OTDR)
- Operator Name
- Date & Time
- Setup Parameters
- Range (OTDR)
- Scale (OTDR)
- Setup Option chosen to pass OTDR "dead zone"

Test Results shall include:

- OTDR Test results
- Total Fiber Trace
- Splice Loss/Gain
- Events > 0.10 dB
- Measured Length (Cable Marking)
- Total Length (OTDR)
- Optical Source/Power Meter Total Attenuation (dB/km)

Sample Power Meter Tabulation:

Power Meter Measurements (dB)									
Location		Fiber No.	Cable Length (km)	A to B		B to A		Bidirectional Average	
A	B			1310 nm	1550 nm	1310 nm	1550 nm	1310 nm	1550 nm
		1							
		2							
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 manufacturer’s software to read the test files, OTDR and power, shall be provided to the Department. These results shall also be provided in tabular form, see sample below:

Sample OTDR Summary				
Cable Designation:	<i>TCF-IK-03</i>	OTDR Location:	<i>Pump Sta. 67</i>	Date: <i>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:

The test results shall show that the dB/km loss does not exceed +3% of the factory test or 1% of the cable's published production loss. However, no event shall exceed 0.10 dB. If any event is detected above 0.10 dB, the Contractor shall replace or repair the fiber including that event point.

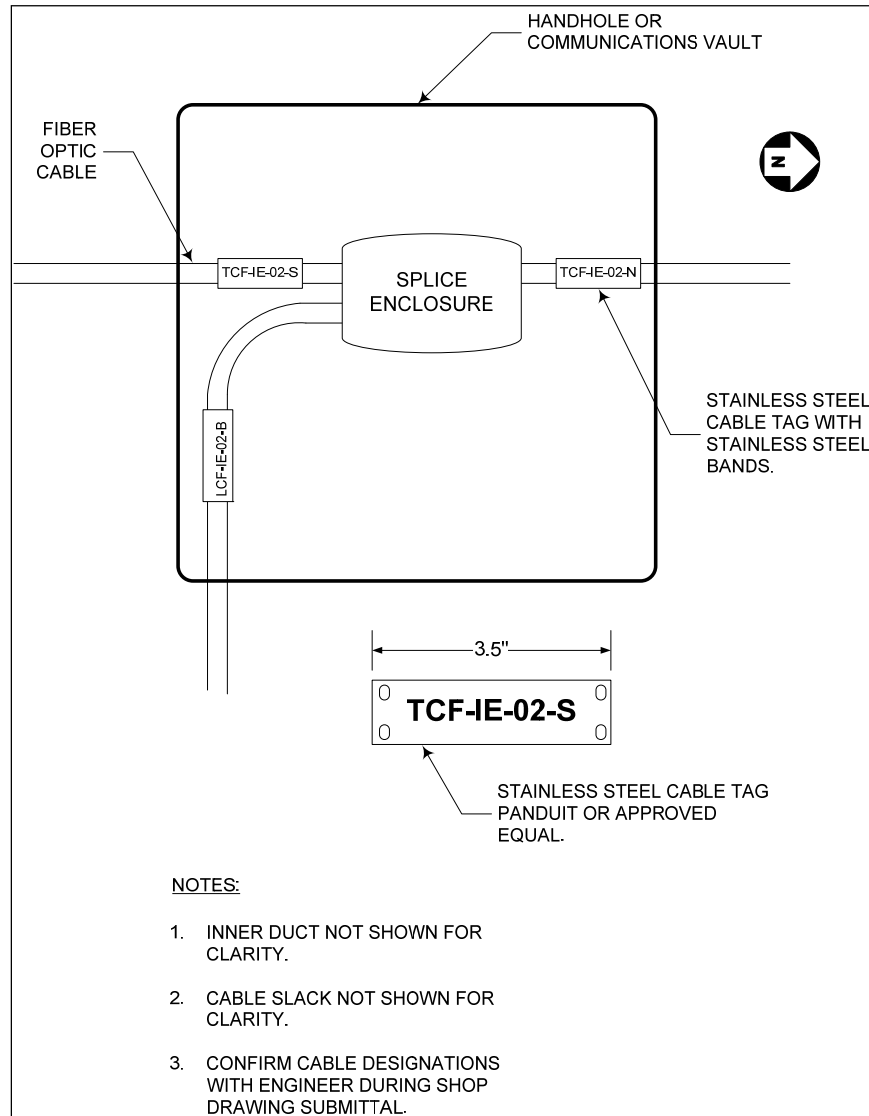
The total loss of the cable (dB), less events, shall not exceed the manufacturer's production specifications as follows: 0.5 dB/km at both 1310 and 1550 nm.

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

Splicing Requirements. Splices shall be made at locations shown on the Plans. Any other splices shall be permitted only with the approval of the Engineer. Splices will be paid for separately. All splice locations must be identified in the Record Drawings. **Cable runs which dead-end at a handhole, communications vault, interconnect cabinet, or any other type of enclosure, shall be dead ended in a splice enclosure.**

Slack Storage of Fiber Optic Cables. Included as a part of this item, slack fiber shall be supplied as necessary to allow splicing the fiber optic cables in a controlled environment, such as a splicing van or tent. After splicing has been completed, the slack fiber shall be stored underground in handholes or in the raised base adapters of ground mounted cabinets in accordance with the fiber optic cable manufacturer's guidelines. Fiber optic cable slack shall be 100 feet for each cable at each splice location, above or below ground. Fiber optic cable slack shall be 50 feet for each cable at access points, above or below ground, where splicing is not involved. If the innerduct is cut, the ends of the innerduct should extend beyond the first vertical rack so they can be secured at that point. This slack shall be measured for payment.

Fiber optic cable shall be tagged inside handholes with yellow tape containing the text: "CAUTION - FIBER OPTIC CABLE." In addition, permanent tags, as approved by the engineer, shall be attached to all cable in a hand hole or other break-out environment. These tags shall be stainless steel, nominally 0.75" by 1.72", and permanently embossed. These tags shall be attached with stainless steel straps, and shall identify the cable number, the number of fibers, and the specific fiber count. Tags and straps shall be Panduit or approved equal. See figure below:



Label the destination of each trunk cable onto the cable in each handhole, vault or cable termination panel.

Method of Measurement. Fiber optic cable will be measured for payment in feet in place installed and tested. Fiber optic cable will be measured horizontally and vertically between the changes in direction, including slack cable. The entire lengths of cables installed in buildings will be measured for payment

Basis of Payment. This work will be paid for at the contract unit price per foot for FIBER OPTIC CABLE of the type, size, and number of fibers specified. Payment shall not be made until the cable is installed, spliced and tested in compliance with these special provisions.

MAINTAINING ITS DURING CONSTRUCTION

Description. Intelligent Transportation Systems (ITS) references IDOT traffic surveillance infrastructure. These elements include, but are not limited to, the following: induction loops, ramp meters, closed circuit television cameras, dynamic message signs, highway advisory radios, Radar Vehicle Sensing Devices (RVSDs), copper and fiber optic communication cables, power cables, cabinets, and communication equipment.

General Requirements. Effective the date the Contractor's activities (ITS or otherwise) begin at the job site, the Contractor shall be responsible for the proper operation and maintenance of ITS elements that are part of, or that may be affected by, the work until final acceptance by the Engineer or as otherwise determined by the Engineer.

Before performing any excavation, removal, or installation work (ITS or otherwise) at the site, the Contractor shall initiate a request for a maintenance transfer and preconstruction inspection to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of any ITS systems that may be affected by the work. This includes co-ordination with adjacent projects that may have an effect on the ITS infrastructure. The request for the maintenance preconstruction inspection shall be made no less than seven (7) calendar days prior to the desired inspection date.

Existing ITS elements, 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 and location of the ITS components and systems to be maintained and installed.

Existing ITS components shall be defined as any ITS component or device in service at the time of the commencement of construction activities. The contract drawings indicate the general extent of any existing ITS elements, 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.

Maintaining ITS During Construction - It is the Contractor's responsibility to maintain vehicle detection, which includes speed and volume data, in all lanes within the construction limits for this project, on all roadway segments and ramps that will be open to traffic. Where the existing detection cannot be maintained, the Contractor shall provide a temporary detection system, approved by IDOT, at no additional cost to the contract. The Contractor's responsibility shall include protection or removal and storage of any ITS/Communication cabinets and protecting in place any cables, conduits and ITS devices in or adjacent to the work zone. This work may also include the abandonment of the existing device and communication pathway and the installation of a temporary device such as a RVSD with a wireless communication. It is the Contractor's responsibility to maintain closed circuit television cameras including associated fiber optic communications and power.

The Contractor is responsible for the disconnection, rerouting, and reconnection of all fiber and copper communication cables currently located in existing conduits as indicated in the plans. The disconnection and reconnection must be made at an existing splice point or communication cabinet where a connection is made, or as otherwise indicated in the plans. The existing communication and infrastructure must be properly maintained for the duration of construction activities and the Contractor must coordinate the disconnection and reconnection activities with the Engineer.

All work required to maintain, relocate or provide temporary ITS infrastructure as depicted in the plans or otherwise necessary and as provided for in this special provision shall be paid for under the Maintaining ITS During Construction pay item. No component items germane to this work shall be paid for separately.

Once construction activities are complete, all temporary equipment installed will become the property of the Department and shall remain in place, except where a proposed location has been identified in the plans. All final locations and installations of ITS devices, communication cabinets, junction boxes, conduit, fiber optic, copper cable, wireless equipment and associated infrastructure shall be protected, secured and have the Engineer's approval. Proper documentation, to include latitude and longitude for all equipment locations and communication pathway must be turned over to the Department. The proposed plan for this work must be presented to the Engineer for approval prior to the commencement of the work.

Method of Measurement. The contractor shall demonstrate to the satisfaction of the Engineer that the ITS components, devices and infrastructure have been properly installed, protected and maintained and that the appropriate data is being transmitted to the Traffic Management Center prior to submitting a pay request. In order for final payment to be released the contractor must demonstrate that the equipment is working as intended following inspection by the Engineer. Failure to do so will be grounds for denying the pay request.

Basis of Payment. Maintaining ITS During Construction and Rerouting ITS Communication shall be paid for at the contract unit price per calendar month (Cal Mo) for MAINTAINING ITS DURING CONSTRUCTION, which shall include all work as described herein.

REMOVE EXISTING TRAFFIC SURVEILLANCE EQUIPMENT

Description. This work shall consist of the removal and disposal of existing traffic surveillance equipment and their foundations.

General Requirements. No removal work will be permitted without approval from the Engineer. Removal shall start as soon as the temporary ITS or permanent ITS, as applicable, is placed in approved operation. An inspection and approval by the Engineer will take place before any associate proposed permanent or temporary ITS is approved for operation.

Removal of Traffic Surveillance Equipment: Any damage resulting from the removal and/or transportation of the Traffic Surveillance Equipment and associated hardware, shall be repaired or replaced in kind. The Engineer will be the sole judge to determine the extent of damage and the suitability of repair and/or replacement.

Abandoned underground Traffic Surveillance cables shall be removed with conduit to a depth of 1 ft (300 mm) below ground level and the hole shall be backfilled.

Conduit hangers, straps, and supports shall be removed from bridge steel as directed by the Engineer. Where the conduit system is removed from parapet walls and other concrete surfaces, the Contractor shall cut off the anchor device 1 in. (25 mm) below the surface of the concrete, and fill all voids with portland cement concrete mortar, making a smooth finish to the concrete surface.

Unprotected bridge steel which is exposed by the removal of the conduit system shall be touched up using a paint and procedure approved by the Engineer.

(a) Removal of Traffic Surveillance Equipment, No Salvage. When indicated, Traffic Surveillance Equipment and all associated hardware and appurtenances shall become the property of the Contractor and shall be disposed of according to Article 202.03.

(b) Removal of Traffic Surveillance Equipment, Salvage. When indicated, Traffic Surveillance Equipment, and all associated hardware and appurtenances shall remain the property of the Department and shall be delivered to a Department facility within the District and unloaded and stacked there, as directed by the Engineer. Wood blocking, banding, or other appurtenant items required for proper stacking and protection shall be included.

Traffic Surveillance Equipment shall be removed, boxed in new containers, approved by the Engineer, and delivered to a Department facility, as designated by the Engineer. The contractor is responsible for paying for the shipping of Traffic Surveillance Equipment included in this special provision and will not be paid separately for shipping costs.

Removal of Traffic Surveillance Equipment Foundation: Concrete foundations shall be removed to at least 2 ft (600 mm) below grade, with removed material disposed of according to Article 202.03. The removal shall extend deeper where required to facilitate roadway construction at no additional cost to the Department. Underground conduits and cables shall be separated from the foundation at 2.5 ft (750 mm) below grade and shall be abandoned or re-used as indicated.

The void caused by the removal of the foundations shall be backfilled according to Article 841.02.

Removal of Existing Electric Service: The removal of the existing electric service, as noted in the plans, shall include the complete removal the cables, disconnect switch, and meter. The existing conduit shall remain for re-use.

Basis of Payment. Remove Existing Traffic Surveillance Equipment shall be paid for at the contract LUMP SUM (L SUM) price.

ELECTRIC CABLE NO. 19 - 6 PAIR (TSC T421#2)

Effective: June 1, 1994

Revised: April 8, 2016

DESCRIPTION

This item shall consist of furnishing and installing telephone cable intended for direct burial in P-duct or G.S. conduit. The number of conductors shall be twisted into pairs stranded into a cable core and enclosed in two polyethylene jackets, with a copper shield between the inner and outer jackets. All

No. 19 electric cable shall conform with these specifications and the current addition of the Rural Electrification Specification for fully color-coded, polyethylene or crystalline propylene/ethylene copolymer-insulated, double polyethylene copolymer-insulated, double polyethylene-jacketed telephone cables for direct burial PE 39. The No. 19 cables shall be installed in complete spans.

MATERIAL AND TESTING

No. 19 electric cable shall meet the requirement set forth in the REA Specification **PE 39**.

CONSTRUCTION

CONDUCTORS: Each conductor shall be a solid round wire of commercially pure annealed copper. Conductors shall meet the requirements of ASTM Designation B-3, latest issue, except that the requirements for dimensions and permissible variations are waived.

CONDUCTOR INSULATION: Each conductor shall be insulated with colored insulating grade high density polyethylene or crystalline propylene/ethylene copolymer. The manufacturer shall have the option of using either of the above materials.

IDENTIFICATION OF PAIRS: The polyethylene or propylene copolymer compounds used for conductor insulation shall be colored so as to identify (1) the "tip" and "ring" conductor of each pair, and (2) each pair in the completed cable.

STANDARDS OF COLOR: The colors of insulated conductors supplied in accordance with this specification shall fall within the limits of standards of color as defined by the Munsell Color Notations specified in paragraph 4.031.

TWISTING OF PAIRS: The insulated conductors shall be twisted into pairs.

In order to provide sufficiently high crosstalk losses at voice and carrier frequencies, the pair twists shall be designed to enable the cable to meet the pair-to-pair capacitance unbalance requirements and the crosstalk requirements.

CORE COVERING: The core shall consist of an inner jacket of polyethylene applied over the completed core, a metal shield, and an outer jacket of polyethylene.

SHIELD: A gopher-resistant corrugated shield of FULLY ANNEALED COPPER shall be applied longitudinally over the inner jacket. The shield shall completely cover the inner jacket and shall be so constructed that the completed cable shall meet the bending requirements given in paragraph 9 of Rural Electrification Specification PE-39. The shield shall provide 100% electrical shielding plus resistance to gopher attack or other severe service conditions.

MUTUAL CAPACITANCE: The average mutual capacitance of all pairs in any reel shall be in accordance with the following table:

Number of Cable Pairs	Average Mutual Capacitance	
	mf/mile	(mf/km)
3	0.083 plus or minus 0.010	(0.052 plus or minus 0.006)
6, 12	0.083 plus or minus 0.007	(0.052 plus or minus 0.004)
18 or more	0.083 plus or minus 0.004	(0.052 plus or minus 0.002)

Mutual capacitance is the effective capacitance between the two wires of a pair.

CAPACITANCE UNBALANCE: (Pair to Pair): Pair-to-pair capacitance unbalances as measured on the completed cable at a frequency of 1000 plus or minus 100 Hz shall not exceed the following values:

Number of Cable Pairs	Pair-to-Pair Capacitance Unbalance (Max)	
	mmf/kft	(mmf/km)
	<u>Max. Individual</u>	
Less than 12	100	(181.1)

CAPACITANCE UNBALANCE - (Crosstalk Loss): The r.m.s. output-to-output far-end crosstalk loss as measured on the completed cable at a frequency of 150 kHz shall be not less than 73 db per 1,000 feet (67.8 db per kilometer) for cable sizes of 6 pairs and larger. The r.m.s. calculation shall be based on the combined total of all adjacent and alternate pair combinations within the same layer and center to first layer pair combinations.

CAPACITANCE UNBALANCE - (Pair to Shield): Pair-to-shield direct capacitance unbalances as measured on the completed cable at a frequency of 1000 plus or minus 100 Hz shall not exceed the following values:

<u>Cable Pairs</u>	<u>Pair-to-Shield Unbalance (Max)</u> <u>mmf/kf (mmf/km)</u> <u>Max. Individual</u>
Less than 12	250 (820)

CONDUCTOR RESISTANCE: The d.c. resistance of any conductor as measured on the completed cable shall not exceed the following values when measured at or corrected to 20° C.

<u>AWG</u>	<u>Maximum Resistance</u> <u>ohms/kf (ohms/km)</u>
19	8.7 (28.5)

BASIS OF PAYMENT

This work will be paid for at the contract price per lineal foot (meter) for ELECTRIC CABLE IN CONDUIT, COMMUNICATIONS, NO. 19 of the number of pairs specified, for furnishing all materials, making all electrical connection and installing the cable in place.

TELECOMMUNICATION CABLE (TSC T421#04)

Effective: June 1, 1994

Revised: July 13, 2016

Description. It is the intent of this specification that a continuous communication cable be installed on the Expressway and be connected to the Traffic Systems Center. All surveillance installations along the Expressway will be connected to this cable which shall be connected to the Traffic Systems Center building at approximately East Avenue and the Eisenhower Expressway. This item shall consist of furnishing and installing 100 pair No. 19 gauge wire, telephone type cable, with all necessary connection blocks, binding posts, connections and all necessary miscellaneous hardware. The 100 pair No. 19 cable shall conform with these specifications and the current edition of The Rural Electrification Specification (REA) PE-39.

Material & Construction. The #19 telecommunication cable shall meet the requirements set forth in the R.E.A. Specification PE-39. Shielding shall be gopher-resistant, corrugated, fully annealed solid copper. Shielding between cables shall be bonded together by a #10 AWG copper wire and stainless steel clamps.

Installation Details. The telecommunication cable shall be installed in the median barrier wall where a 4 inch(100mm) P.V.C. duct shall be provided for its installation. The Contractor shall insure that the telecommunication duct is continuous, free of debris and not connected to the electrical lighting cable duct.

"Junction boxes" or cross connect terminals shall be installed in or at the median barrier wall at every Surveillance installation, as shown on the plans, and every 1500 ft. (457m). The cable shall be continuous between runs. No splices will be allowed in the cable. Should it not be possible to run the cable continuous between Surveillance installation, the interconnection of the cable will be allowed in the "junction box" with U1B connectors or equal. These "splices" shall be held to a minimum and maximum cable lengths shall be used to reduce the number of connections. The cables shall be terminated in a Surveillance installation cabinet as shown on the plan. The cables shall be connected on a type 66 connector block which shall be mounted in the cabinet. The Surveillance installation shall be connected to the appropriate cable pair on the 66 blocks with a 6C-No. 19 cable. Two (2) type 66 connecting blocks shall be required per 50 pair cable installation; four (4) type 66 connecting blocks shall be required per 100 pair cable installation.

The type 66 quick connect terminal blocks shall be furnished with tin lead plated clips manufactured to Western Electric Specification #669A. There shall be eight spring clips, which are electrically and mechanically common to each other, to a row and 50 rows of spring clips. The type 66 connecting block shall be 8 x 50, 13-5/16" x 3-3/8" x 1-1/8" (338.1mm x 85.7mm x 28.6mm) . The block shall be molded of self extinguishing material and shall have molded in fanning strips on each side which shall be marked every five rows. The top of the block shall be lettered by rows (A-B-C etc.) and the retaining plate shall be numbered every other row and lettered on the top to correspond to the face of the block. The Contractor shall insure that none of the spring clip rows are shorted together or shorted to the junction box or cabinet. The Contractor shall supply the type 66 block with high impact PVC, transparent snap on protective covers. The Contractor shall spray the spring clips with a protective coating after all wires are terminated. A punch down impact tool will be required to make the connection to the type 66 block. The punch down impact tool shall be equal to or exceed the Harris Dracon Delux Automatic Impact Tool D814 for type 66 blocks only.

When installing the telecommunication cable, the Contractor shall extend his installation and connection of the cable to the next adjacent surveillance installation or "junction box" beyond the limits of his contract section. He shall be responsible for insuring that the cable is continuous and connected from one contract section to the other.

Permanently mark each binder group for the appropriate color with standard vinyl electrical tape.

Testing. 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 7 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.

Basis of Payment. This work shall be paid for at the contract price per lineal foot (meter) for ELECTRIC CABLE NO. 19, 100 PAIR, which price shall be payment in full for furnishing all materials, making all electrical connections and installing the cable complete in place.

Connecting blocks, terminal blocks, wiring, mounting brackets U1B/U1Y Connectors, and miscellaneous hardware will not be paid for separately, but shall be considered as incidental to the cost of this item.

CLOSED CIRCUIT DOME VIDEO CAMERA, HIGH DEFINITION

Effective: May 1, 2015

Description. This item shall consist of furnishing and installing an integrated High Definition Closed-Circuit Television (CCTV) Dome Camera Assembly as described herein and as indicated in the Plans.

Materials.

General:

The HD (High Definition) CCTV Dome Color Camera shall be a rugged, non-pressurized, outdoor surveillance domed camera system. The HD CCTV Dome Camera shall be designed to perform over a wide range of environmental and lighting conditions and automatically switches from color daytime to monochrome nighttime operation. The high definition camera shall be either a Bosch Autodome IP series 7000 HD, or a Pelco Spectra 1080P HD Series in compliance with the requirement herein.

Camera shall use a standard Web browser interface for remote administration and configuration of camera parameters. The browser interface shall provide PTZ control including preset and pattern and on-screen display (OSD) for access to camera programming

All equipment and materials used shall be standard components that are regularly manufactured and utilized in the manufacturer's system.

The manufacturer shall be ISO 14001 Certified. The manufacturer's quality system shall be in compliance with the I.S./ISO 9001/EN 29001, QUALITY SYSTEM. The manufacturer shall provide a three year (3) warranty. The manufacturer shall pay inbound and outbound shipping charges during the warranty period for products returned as warranty claims. The manufacturer shall also provide an advance exchange program for warranty claims.

The warranty period shall begin on the date of final acceptance of the video distribution system. This warranty shall include repair or replacement of all failed components via a factory authorized repair facility. All items sent to the repair facility for repair shall be returned within two weeks of the date of receipt at the facility. The repair facility location shall be in the United States. Any extended warranty coverage required to comply with the specified warranty period shall be provided as a part of this pay item at no additional cost to the State.

Physical construction:

The CCTV Dome Camera shall be provided in a NEMA 4X or IP66 certified, rugged, weather-resistant package. The CCTV Dome Camera shall also comply with the following requirements:

Environmental	Requirement
IP Rating	IP 66
Weight (max.)	10 lbs
Overall Dimensions	10" dia. x 14"
Humidity	0 to 100%
Operating temperature	-40°C to 50°C
Mount	1 ½" NPT

The CCTV dome camera shall be equipped with a fan and heater controlled by a thermostat. The heater shall prevent internal fogging of the lower dome throughout the operating temperature range of the camera.

An optional rugged clear dome bubble shall be available from the CCTV camera manufacturer. The rugged dome shall be made from 3mm thick polycarbonate, designed to meet stringent strength standards without compromising optical clarity. The dome, by itself, shall withstand a 100 foot-pound impact. This energy is equivalent to that of a 10 lb sledgehammer being dropped from a height of 10 feet. The dome, when installed in the CCTV camera, shall exceed the UL 1598 horizontal impact standard for lighting fixtures, by a factor of 10. The submittal needs to indicate compliance with this requirement.

Power:

The CCTV Dome Camera shall be designed to operate from a 120v power source. The appropriate power supply, if required for the CCTV Dome Camera to operate, shall be included as a part of this item. The power requirements for the camera shall comply with the following:

Item	Requirement	
Port	RJ-45 for 100Base-TX; Auto MDI/MDI-X;	
Cabling Type	Cat5 cable or better for 100Base-TX	
Input Voltage	18 to 32 VAC; 24 VAC nominal; 22 to 27 VDC; 24 VDC nominal	
Input Power		
	24 VAC nominal	25 VA nominal (without heater and blower); 75 VA nominal (with heater and blower)
	24 VDC nominal	0.7 A nominal (without heater and blower); 3 A nominal (with heater and blower)
	PoE	IEEE802.3af (without heater and blower)

Camera

The camera shall provide a minimum of two simultaneous video streams with a 2.1 megapixel (MPx) 1920 x 1080 resolution, auto iris with 30X optical, and 12X digital zoom. The CCTV Dome Camera shall incorporate

Item	Requirement
Sensor Type	1/2.8-inch Type Exmor CMOS sensor
Optical Zoom	30X
Digital Zoom	12X
Maximum Resolution	1920 x 1080
Lens	f/1.6 - f/4.7, (4.3 mm - 129.0 mm optical)
Horizontal Angle of View	59° (wide) - 2° (tele)
Aspect Ratio	16:9
Light Sensitivity	Sensitivity in lux for 90% reflectance, f/1.6 (wide angle), 28 dB gain at 30 IRE (30% of signal level) with Sensitivity Boost OFF; 4X improvement to sensitivity with Sensitivity Boost ON
Color (33 ms)	0.65 lux
Color (250 ms)	0.07 lux
Mono (33 ms)	0.20 lux
Mono (250 ms)	0.015 lux
Day/Night Capabilities	Yes
IR Cut Filter	Yes
IR Trace	Curves 850 nm and 950 nm
Wide Dynamic Range	80dB
Iris Control	Auto iris with manual override
Backlight Compensation	Auto / Manual
Automatic Gain Control	Auto / Manual
Active Noise Filtering	Auto / Manual
Electronic Image	30X

Stabilization (EIS)	
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Video.

Item	Requirement
Video Encoding	H.264 in High, Main, or Base profiles and MJPEG
Video Streams	Up to 2 simultaneous streams, the second stream is variable based on the setup of the primary stream
Frame Rate	Up to 30, 25, 15, 12.5, 10, 8.333, 7.5, 6, 5.3, 2.5, 2, 1 (depending upon coding, resolution, and stream configuration)
Minimum Available Resolutions	1920 x 1080 1280 x 720 720 x 480
Supported Protocols	TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, IPv6, SNMP v2c/v3, QoS, HTTP, HTTPS, LDAP (client), SSH, SSL, SMTP, FTP, and 802.1x (EAP)
Security Access	Password protected
Software Interface	Web browser view and setup

PTZ Mechanical.

Item	Requirement
Pan Movement	360° continuous pan rotation
Pan Speed	Variable between 400 per second continuous pan to 5.0° per second
Vertical Tilt	Unobstructed tilt of +1° to -90°
Manual Control Speed	Pan speed of 0.1° to 80° per second; tilt operation shall range from 0.5° to 40° per second.
Automatic Preset Speed	Pan speed of 280° and a tilt speed of 160° per second
Presets	255 positions
Tours	2 tours
Preset Accuracy	± 0.2°
Proportional Pan/Tilt Speed	Speed decreases in proportion to the increasing depth of zoom
Motor	Continuous duty and variable speed, operating at 18 to 32 VAC, 24 VAC nominal
Window Blanking	16 blanked windows
Auto Flip	Rotates dome 180° at bottom of tilt travel
Power Consumption	Nominal 45 VA (without heater and blower running) Nominal 75 VA (with heater and blower running)

The camera shall provide a freeze frame feature that freezes a camera image as a preprogrammed preset is called+, providing a live view once positioned. Selections for on/off shall be available through the embedded Web browser.

The camera shall provide image stabilization to compensate for vibration introduced into the camera.

The camera shall support IPv6 configurations in conjunction with IPv4.

Still Picture Capture. The camera shall be capable of capturing a still image in JPEG format and automatically transferring this image to an FTP site. The resolution of the image shall be 1920 x 1080 pixels. The frequency of captures shall be user settable and shall as a minimum range from 1 picture every 30 seconds to 1 picture every five minutes.

Blank, Future Use.

Testing. The Contractor shall test each CCTV Dome Camera Assembly in the presence of the Engineer after the camera is installed. This test may be done locally at the camera support structure.

Product Support. The manufacturer shall provide technical support via email, fax and toll-free telephone. The above forms of support shall be provided Monday through Friday, 8:00am to 8:00pm EST.

Installation. The Contractor shall install the CCTV camera in accordance with manufacturer's instructions. The camera firmware shall be the latest stable release available at the time of installation.

Documentation. In addition to the initial submittal(s) prior to procurement, the Contractor shall provide installation and operation manuals, documentation of exact equipment model and serial numbers, software/firmware version numbers, in hardcopy and PDF formats on CDROM.

Measurement. Closed-Circuit Television (CCTV) Dome Cameras shall be counted as each upon successful completion of the testing described herein for payment.

Basis of Payment. This item will be paid for at the contract unit price each for CLOSED CIRCUIT DOME TELEVISION CAMERA, HD, which shall be payment in full for all material and work as specified herein.

CLOSED CIRCUIT TELEVISION (CCTV) EQUIPMENT – FIBER OPTIC

Description. This item shall consist of furnishing and installing equipment for the control and distribution of CCTV video from the CCTV camera to and at a Video Collection Point (VCP). Transmission for the video and control signals shall be by fiber optic cable as specified elsewhere herein and as indicated in the plans.

Construction Requirements

General:

The Contractor shall prepare and submit a shop drawing detailing the complete closed-circuit television cabinet equipment installation. The shop drawings shall identify the installation and specifications of all components to be supplied, for approval of the Engineer. Particular emphasis shall be given to the cabling and the interconnection of all of the components.

The Contractor shall demonstrate a pre-installation assembly using the proposed components. This demonstration shall take place at the D1 Headquarters in Schaumburg. These conformance tests shall be completed prior to the delivery of any completed assemblies to the project site. Any deviations from these specifications that are identified during this testing shall be corrected prior to shipment of the assembly to the project site.

Appropriate connectors shall be furnished and installed to interface the in-cabinet components to the integrated dome camera assembly. The Contractor shall mount the in-cabinet components in the equipment cabinet and connect them to the appropriate power, communication, and video feed cables.

Testing:

The Contractor shall test each installed CCTV Cabinet Equipment. The test shall be conducted from the field cabinet utilizing the standard communication protocol and a laptop computer. The Contractor shall verify that the camera can be fully exercised and moved through the entire limits of Pan, Tilt, Zoom, Focus and Iris adjustments, using both the manual control and presets.

The Contractor shall repeat the test at the communications shelter associated with the CCTV camera. This test confirms the distribution portion of the video circuit, that is, the portion of the circuit from the CCTV camera to the network switch.

The Contractor shall maintain a log of all testing and the corresponding results. A representative of the Contractor and a representative of the Engineer shall sign the log as witnessing the results. Records of all tests shall be submitted to the Engineer prior to accepting the installation.

Documentation:

One copy of all operations and maintenance manuals for each CCTV component shall be delivered for each assembly installed. In addition, full documentation for all software and associated protocols shall be supplied to the Department on a CD-ROM. The Department reserves the right to provide this documentation to other parties who may be Contracted with in order to provide overall integration or maintenance of this item.

Warranty:

The Contractor shall warranty all materials and workmanship including labor for a period of two years after the completion and acceptance of the installation, unless other warranty requirements prevail. The warranty period shall begin when the Contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. This warranty shall include repair and/or replacement of all failed components via a factory authorized depot repair service. All items sent to the depot for repair shall be returned within two weeks of the date of receipt at the facility. The depot location shall be in the United States. Repairs shall not require more than two weeks from date of receipt and the provider of the warranty shall be responsible for all return shipping costs.

The depot maintainer designated for each component shall be authorized by the original manufacturer to supply this service. A warranty certificate shall be supplied for each component from the designated depot repair site indicating the start and end dates of the warranty. The certificate shall be supplied at the conclusion of the system acceptance test and shall be for a minimum of two years after that point. The certificate shall name the Department as the recipient of the service. The Department shall have the right to transfer this service to other private parties who may be contracted to perform overall maintenance of the facility.

Materials.

Equipment Installation. The installation and mounting of the CCTV equipment shall be fully coordinated with the enclosure or co-location.

Co-location of CCTV equipment. The CCTV equipment maybe co-located within a traffic signal controller, or other equipment as indicated.

The equipment shall be securely mounted on a mounting back panel or on a corrosion resistant DIN rail system.

Closed Circuit Television Camera Power Supply. The power supply, as required, as specified elsewhere herein and as indicated in the plans, shall be placed in the cabinet. The power supply is included in the CLOSED CIRCUIT DOME TELEVISION CAMERA, HD pay item.

Ethernet Managed Switch. The Ethernet Managed Switch as specified elsewhere herein and as indicated in the plans, shall be placed in the cabinet.

Network (IP-Video) Surge Protection Device (SPD). The Network (IP-Video) SPD shall be modular in design to support multiple installation options e.g. Stand-alone or DIN rail mounting configuration. SPD shall be a single port unit to support industrial 1000/100/10-Base-T Ethernet and POE applications. SPD shall support shielded RJ45 connectors and comply with UL497B listed. SPD shall comply with the following standards: TIA/EIA-568-B.2-1, IEEE 802.3ab, IEEE 803.3af, and IEEE 803.3at.

Fiber Optic Cable Termination. The Contractor shall include all necessary wires and cables necessary to interconnect the components of the CCTV cabinet. The Contractor shall provide a factory terminated patch block with a 12 fiber pigtail of sufficient length to connect to the lateral splice handhole without the use of any intermediate splices. The patch block shall be a Fiber Connections, Gator Patch II or approved equal.

Method Of Measurement. CCTV equipment shall be counted, each CCTV unit installed.

Basis Of Payment. This item shall be paid at the contract unit each for CLOSED CIRCUIT TELEVISION CAMERA EQUIPMENT.

CCTV EQUIPMENT CABINET, STRUCTURE MOUNTING

Description. The Contractor shall provide a closed-circuit television cabinet on a 50' or 100' structure as shown in the plans and specified herein.

Materials.

General. The Contractor shall furnish the following items as specified.

CCTV Cabinet. The CCTV Cabinet shall be a Hoffman Enclosures Model A20H1610SS6LP, Electromate Enclosures Model E-20H1610SSLP, or approved equal. The cabinet shall be NEMA 4X compliant.

The nominal dimensions of the cabinet shall be 20 inches high by 16 inches wide by 10 inches deep.

The cabinet shall be fabricated of 14 gauge Type 304 or Type 316L stainless steel. All seams shall be continuously welded and ground smooth with no holes or knockouts. The cabinet shall be fabricated with a rolled lip around three sides of the door and on all sides of the enclosure openings to exclude liquids and contaminants. A stainless steel door clamp assembly shall assure a watertight seal. A seamless gasket shall be included to assure a watertight and dust-tight seal.

The cabinet shall have provisions for padlocking in the closed position. The lock shall be Corbin #2 and two keys shall be supplied to the Department with each lock. The keys shall be removable in the locked position only.

A data pocket of high impact thermoplastic material shall be provided. The nominal dimensions of this pocket shall be 12 inches by 12 inches.

Collar studs shall be provided for mounting the stainless steel backboard panel.

The cabinet shall be unpainted. Cover, sides, top, and bottom shall have a smooth brushed finish.

The cabinet shall mount on the structure, using the fabricated bolt pattern.

CONSTRUCTION REQUIREMENTS

General. The Contractor shall prepare and submit a shop drawing detailing the complete closed-circuit television cabinet installation. The shop drawings shall identify the installation and specifications of all components to be supplied, for approval of the Engineer.

The Contractor shall install the CCTV cabinet as indicated in the Plans. The Contractor shall verify the mounting criteria and dimensions based upon the structure or pole being provided. Any adjustments in the dimensions for the mounting brackets shall be approved by the Engineer.

Basis of Payment. This work shall be paid for at the contract unit price each for CLOSED CIRCUIT TELEVISION CABINET as specified.

ATMS SYSTEM INTEGRATION

Description. This item includes integrating all loop detector installations shown on the plans into the IDOT Advanced Traffic Management System (ATMS). Data from the loop detector stations will be collected and integrated via the existing iNET interface to the ATMS. This item includes all software, programming, miscellaneous devices, cabinets, racks, and cables necessary to provide the successful integration of the existing stations in the project to the existing expressway traffic monitoring system.

Work as necessary will be performed at the:

Illinois Department of Transportation
Bureau of Traffic Operations/Electrical Field Office
445 W. Harrison Street
Oak Park, Illinois 60304

Integration. The Contractor shall subcontract with the development and maintenance contractor for the ATMS to perform all ATMS software and hardware modifications. Contact information is:

Parsons
Project Manager
650 E Algonquin Rd, Suite 104
Schaumburg, IL 60173

Phone: (847) 925-0120

The ATMS system shall be upgraded and expanded to add all loop detector stations shown on the plans. The integration must be made to make this expansion a seamless transition, and function in an identical manner as the existing expressway surveillance. Work under this item includes but is not limited to the following:

- Integrate data from the additional loop detector stations thru the existing iNET interface at the existing rate of once every 20 seconds.
- Create new Vehicle Detection Station (VDS) display, data table, description and control panel display, and travel time tables.
- Modify the existing graphic user interface, report generators, data bases, broadcast feeds (both subscriber and internal), data tables for the dynamic message sign control,
- Display on the Traffic Systems Center ATMS maps, and all user interfaces the new loop detector stations data (as applicable) including Volume, Occupancy, Speed, Vehicle Classification (length), and operational status.
- Create new segments and groupings used to display travel time and congestion data to the Dynamic Message Signs.
- Update the Lake Michigan Interstate Gateway Alliance (LMIGA) data feeds for presentation of the additional data to the web page and user interfaces.
- Develop an integration acceptance test plan and conduct said test to verify that all loop detector stations have been properly integrated according to the requirements. This acceptance plan shall conclude with a 30 day burn-in period. During the burn-in period, the subcontractor shall identify and resolve any problems identified with the integration.

Method of Measurement. The ATMS System integration shall be measured as lump sum.

Basis of Payment. This item shall be paid for at the contract lump sum price for ATMS SYSTEM INTEGRATION, which price shall be payment in full for the work described for a complete seamless integration of the new loop detector stations into the existing IDOT ATMS System. Acceptance shall be granted after integration and after passing an acceptance test proposed by the Subcontractor, and agreed upon by the Engineer.

BUDGETARY ALLOWANCE FOR CCTV INTEGRATION

Description. This item is to establish a budget account to allocate funds for the payment of the video integration. A budgetary allowance has been established since the final cost is unknown. This allowance will not be used to repair damage caused by the Contractor's operations. Damage caused by the Contractor's operations shall be repaired at no additional cost to the Contract.

The allowance under this Special Provision includes the coordination with camera equipment provided under this contract, adjacent contract(s), and coordination with existing CCTV equipment as indicated, including adjustments of or supplements to the equipment as may be required

Video Control software. The existing control software is ICX's 360 Cameleon Enterprise camera control. Included in this item, the Contactor shall provide 10 Enterprise software license units. The Contractor shall configure the cameras within the video control software. This work shall be coordinated with the Electrical Maintenance Contractor.

Provisioning of IP routing and switching equipment. The Contractor shall fully integrate all the equipment to be installed with the existing video distribution system as a part of this item and this coordination will require technical services of the existing system integrator, AT&T, a Cisco Systems Integrator (Contact: Jim Patterson, AT&T, 217.801.2329) and coordination with the State District 1 Electrical Maintenance Contractor. This work shall be included in the item and will not be paid for separately.

This item shall be bid at a price of \$10,000.00

Basis of Payment. This item shall be paid for at the contract lump sum price or fraction thereof for BUDGETARY ALLOWANCE FOR CCTV INTEGRATION, which shall include all work as described herein.

tone equipment

Effective: October 27, 2016

General.

- (a) Telemetry equipment shall be furnished and installed in the Traffic Systems Center Office and along expressway at locations designated in these Special Provisions and Plans, and in strict accordance with these specifications.
- (b) Communication link from field located cabinets to the Traffic Systems Center Office will be via 3002 Channel, C1 conditioning, Type 7 FDDC telephone pairs leased by the Traffic Systems Center, or telecommunication cable in barrier wall.
- (c) All tone transmitters and tone receivers shall be three frequency frequency-shift; that is equipment which the center frequency is normally on at all times and is electrically shifted +30 Hz to a higher frequency (mark) or -30 Hz to a lower frequency (space). Other frequency shifts from +10 to +300 shall be user selectable.
- (d) All transmitters, receivers, and power supplies shall be of the modular plug-in type construction. The circuitry of each unit shall be protected by a U-shaped metal chassis, cadmium-plated, with iridite finish.
- (e) All tone equipment shall be physically interchangeable with existing Traffic Systems Center tone equipment, that is furnished tone equipment shall be directly compatible with and replaceable by existing tone equipment with no modification to any hardware.
- (f) All transmitters, receivers, and power supplies shall be solid state. All transistors shall be silicon, excepting the power transistors in power supplies. All transmitters and receivers I.C.s shall be plug in.
- (g) All transmitters and receivers shall be programmable frequency-shift key units. These units shall have a universal card which is field programmable for any channel frequency or shift. The frequencies available shall be in the range of 120 Hz to 3800 Hz in increments of 5 Hz. The shifts available shall be 10, 25, 30, 35, 42.5, 60, 70, 75, 120, 150, 240 and 300 Hz. A new center frequency or shift shall be field programmed by simply changing setting of the program switch.

- (h) All transmitters and receivers shall be capable of being operated at any frequency program switches. The center frequency shall be clearly visible through or on the front of each transmitter and receiver. Such indication shall always correspond to the frequency of the elements currently operating in each module. Contractor shall supply 500 complete sets of pre-printed tags for labeling the units indicating the center frequency.
- (i) Transmitters and receivers shall work into a communication link with standard impedance of 600 ohms.
- (j) Transmitters and receivers shall be individually fused.

Materials.

(a) General

- (1) Receivers, transmitters and power supplies shall be capable of operation in field cabinets which provide protection against direct contact with the elements with no special provisions for environment control.
- (2) All field located tone equipment shall be mounted in the surveillance cabinets as designated elsewhere in these specifications.
- (3) All field located tone equipment shall be capable of operation on a temperature range of -22 degrees F to 140 degrees F (-30° to +60° C) and shall have P.C. boards coated for protection against humidity in the range of 0% to 96%.
- (4) All field tone equipment shall be capable of being tipped, while in operation, from the vertical to the horizontal position and back again, without having adverse effect on the continuous operation of the transmitter, receiver or power supply

(b) Power Supply

- (1) The power supply shall operate on input voltage of 117 VAC allowing for 10% variation in line voltage.
- (2) The power supply shall provide a regulated 12 VDC output at 1.7 amps.
- (3) Each tone equipment mounting frame field located or office located, shall have its own regulated power supply, capable of operating at least ten tone modules in any combination of transmitters and receivers.
- (4) The front panel of the power supply shall have an on/off switch and a Red LED that indicates the status of the output DC voltage.

- (5) The power supply shall contain a switch and L.E.D. on the front panel to permit the monitoring of the supply voltage with the existing Traffic Systems Center tone test meter.
 - (6) The power supply shall be fused.
 - (7) The power supply shall have a DC voltage control.
- (c) Transmitter
- (1) The tone transmitter shall operate on an input of a regulated 12 VDC.
 - (2) The tone frequencies shall be programmable in the audio frequency range between 120 and 3800 hertz.
 - (3) The transmission quality shall be such that there may be as many as 20 channels of tone transmitters operating over one telephone pair with perfect discrimination by the associated tone receivers. The frequency of one tone transmitter shall have no adverse effect on the operation of the frequency of any other transmitter connected to the same telephone pair.
 - (4) Output level of tone transmitters shall be adjustable over a range of -40 to +13 dBm.
 - (5) Transmitter harmonic output shall be at least 42 dB down from the fundamental for each harmonic component.
 - (6) Each unit furnished shall have an external jumper wire on the barrier type terminal block to provide a two frequency space-hold operation.
 - (7) The transmitter shall be capable of holding any of its assigned frequencies (mark, space) continuously without degradation in life of performance.
 - (8) Each transmitter shall be capable of test operation of at least 30 pulses per second.
 - (9) No transmitter plugs shall be required for tone output. A toggle switch thru the faceplate shall put the transmitter "on line" and "off line".
 - (10) The transmitter shall have L.E.D. indicators for Mark-Red, Space-Yellow and Carrier-Green visible through the face panel.
 - (11) Test points through front face plate shall be provided to test for DC voltage levels.

(d) Receiver

- (1) The requirements as to the programmable channel frequency range, channel spacing, holding of shifted frequency, and operating voltage shall be the same as those for 3 Frequency Transmitter.
- (2) Input sensitivity of tone receiver shall be adjustable down to -45 dBm. The dynamic range shall be 25 dB.
- (3) Adjacent channel attenuation shall be at least 35 dB.
- (4) Each receiver shall be capable of test operation of at least 30 pulses per second.
- (5) Each receiver shall have one single pole, double throw, mark relay output and one single pole, double throw space output relay.
- (6) Each receiver shall also have a carrier detector circuit with one single pole, double throw relay output.
- (7) All output relay contacts shall be capable of handling a minimum of 30 VA continuously. Any substitution shall be subject to written approval of the Engineer.
- (8) Receiver shall have L.E.D. indicators for Mark-Red, Space-Yellow and Carrier-Green, visible through the face panel.
- (9) Receiver shall operate in a space hold, 2 state operation.
- (10) An attenuation plug shall be provided to set sensitivity level of receiver.
- (11) Each receiver shall come with 2 spare relays as outlined in Sec. (d) (5) of this material specification.
- (12) Test points through front face plate shall be provided to test for DC voltage levels.

(e) Mounting Frame

- (1) Under this item, for a unit price each, the Contractor shall furnish and install an Iniven 1X 11-1 mounting rack or equivalent in strict accordance with the requirements specified herein.
- (2) Each tone equipment mounting frame field located or office located, shall have with power supply added, 11 slots capable of operating at least ten tone modules in any combination of transmitters and receivers.
- (3) Each mounting frame shall provide a separate barrier type terminal block with screw-type terminal for each transmitter, receiver, and power supply.
- (4) Each mounting frame shall be constructed of steel with zinc bonderizing and hard baked finish of gold metallic epoxy paint.
- (5) Where the mounting frame is not completely filled with tone modules, the unused modules spaces shall be provided with the barrier type terminal blocks, within each mounting frame, shall be wired to the 12 VDC power supply.
- (6) Each mounting frame for the field equipment shall be of a size that shall hold the power supply, all transmitters and all receivers required at each field cabinet as specified elsewhere in these Special Provisions.
- (7) In all field cabinet locations where mounting frames are specified the mounting frames shall be bolted to the rear wall of the cabinet by means of a swing bracket as per field mounting frame with cradle assembly drawing #TY-1TSC 400#6.
- (8) The bracket cradle shall have three (3) position stops: horizontal, 45 degree and vertical.
- (9) The bracket cradles shall be constructed of ¼" (6.35mm) steel, cadmium plated with an irridite finish, as shown on plan for cradle assembly drawing #TY-1TSC 400#7.

Basis of Payment.

Power Supply

This item shall be paid for at the contract unit price each for TONE EQUIPMENT - POWER SUPPLY, installed, operating, and completely in place.

Terminal boards, wiring, and miscellaneous hardware will not be paid for separately, but shall be considered as incidental to the cost of this item.

Transmitter

This item will be paid for at the contract unit price each for TONE EQUIPMENT - 3 FREQUENCY TRANSMITTER PROGRAMMABLE, installed, operating and completely in place.

Terminal boards, wiring, and miscellaneous hardware will not be paid for separately, but shall be considered as incidental to the cost of this item.

Receiver

This item will be paid for at the contract unit price each for TONE EQUIPMENT - 3 FREQUENCY RECEIVER PROGRAMMABLE, installed, operating, and completely in place.

Terminal boards, wiring, optical-isolator, relays, cable assemblies and miscellaneous hardware will not be paid for separately, but shall be considered as this item.

Mounting Frame

This work shall be paid at the contract unit price each for TONE EQUIPMENT – MOUNTING FRAME, which shall be payment in full for all work as described herein and as directed by the Engineer.

PREFORMED INDUCTION LOOP EMBEDDED IN NEW CONCRETE PAVEMENT (TSC T418#2)

Effective: Feb. 11, 1997

Revised: January 1, 2017

Description. This item shall consist of furnishing, installing and testing a Pre-formed Induction Loop, of the dimensions shown in the Plans or of the dimensions from Table 1, at the locations shown. The Pre-Formed Induction Loop shall be installed in accordance with all details shown in the Plans and applicable portions of Section Art.886 of the Standard Specifications for Road and Bridge Construction. All cable installation, lead-ins and testing necessary to complete the installation shall conform with the following requirements.

Materials. The wire used for the Induction loop shall be #14-XLPE-600V, encased in a **3/8" (9.5mm), maximum inner diameter, highly abrasion-resistant Polyurethane alloy cover with a minimum impact pressure of 9000 psi (62,050 kPa). The maximum outer diameter of the cover shall be 5/8" (16 mm). Lead-ins shall be 4C # 18, Twisted Shielded.**

Preformed detector loops shall be factory assembled. The loop assembly shall be one continuous piece. No joints or splices shall be allowed in the loop wire, except where necessary to connect homeruns or interconnects to loops. This will provide maximum wire protection and loop system strength. Tee connections shall be high tensile strength/high temperature Polyurethane. The tee shall be of proper size to attach directly to the loop minimizing glue joints. The tee shall have the same flexible properties as the loop, to insure that the whole assembly can conform to pavement movement and shifting without cracking or breaking.

The number of turns in the loop shall be application specific. No wire splices will be allowed in the preformed loop assembly.

The loops shall be filled and sealed with a flexible rubber self-sealing emulsion to insure complete moisture blockage and to prevent false calls due to movement of the wire within the conduit..

Loops and wire shall be custom marked as necessary for the job. The loops shall be individually marked as to the direction of the wire turns.

The Pre-Formed Loop shall pass the Specifications in the Pre-formed Inductive Loop (P-ILD) Handbook V.2.4.

The synthetic yarn reinforced Pre-Formed Loop outside jacket shall be stamped with the size, rating, clockwise or counter-clockwise, loop dimension, # of turns, and wire type every 6 feet, or as directed by the Engineer.

The Pre-formed loops shall have a minimum 15 year Manufacturer guarantee.

Installation Details. The Pre-Formed Induction Loops shall be installed in new concrete pavement at the location shown on the plans or as directed by the Engineer. The loops shall be installed at such a time that the loop can be secured to the reinforcement bars to prevent movement during concrete pour. The induction loop shall have a minimum of 2 inches (50mm) of concrete cover at all points.

The Pre-Formed Loop shall be fed through a 2 in (50mm) galvanized steel conduit to a Heavy Duty Handhole (See TY-1TSC-418#10 and TY-1TS-418#19). The hose shall extend a minimum of 6 feet (1.8 meters) into the HDHH.

For loops in bridge decks, the Loop shall extend a minimum of 6 feet (1.8 meters) beyond the forms for the bridge deck pour. Extra care shall be taken when the forms are stripped to insure that no damage is done to the loop. A nominal 10" X 8" X 4" (254mm X 203.2mm X 101.6mm) stainless steel junction box, minimum, shall be used to house the splice for the induction loop. This stainless steel junction box shall be attached where the Loop passes out of the bridge deck. The stainless steel junction box shall not be considered incidental but shall be paid for separately as 10" X 8" X 4" (254mm X 203.2mm X 101.6mm) stainless steel junction box attached to structure. A minimum of 2 feet of Loop wire and lead-in shall be coiled in the SS Junction Box to permit the splice to be removed, worked on, and replaced.

Where there are continuous count stations in the new concrete pavement, the loops from inside lane to outside lane shall be wrapped and alternate clockwise, counter-clockwise, etc...as per Loop Table #2 shown below:

Mainline Loop Table # 2

<u>Lane 1</u>	<u>Lane 2</u>	<u>Lane 3</u>	<u>Lane 4</u>
Clockwise	Counter-clockwise	Clockwise	Counter-clockwise

The Pre-Formed Induction loops shall follow this method to reduce crosstalk between adjacent loops.

Induction loops on exit and entrance ramps shall be square or rectangular with edges perpendicular or parallel to traffic flow. All mainline loops shall be round loops, 6 feet (1.8 meters) in diameter. Induction loops shall be centered on all ramps and in traffic lanes unless designated otherwise on the plans or by the Engineer. Traffic lanes shall be referred to by number and loop wire shall be color-coded and labeled accordingly. Lane one shall be the lane adjacent to the median, or that lane on the extreme left in the direction of the traffic flow; subsequent lanes are to be coded sequentially towards the outside shoulder. A chart which shows the coding for each installation shall be included in each cabinet.

Each induction loop shall have its own lead-in to the cabinet. The lead-in is paid separately as **Electrical Cable in Conduit 4/C # 18, Twisted Shielded (see Special Provision)**

Induction loops shall not be connected in series with other loops. This wire shall be free from kinks or any insulation abrasions. The loop lead-in shall be barrel sleeved, crimped, soldered and protected by heat shrinkable epoxy filled tubing to the loop #14 wire. The soldered connection shall be made with a soldering iron or soldering gun. No other method will be acceptable, i.e. the use of a torch to solder will not be acceptable. The heat shrink tube shall be shrunk with a heat gun. Any other method will not be acceptable, i.e. the use of a torch will not be acceptable. No burrs shall be left on the wire when done soldering. Cold solder joints will not be acceptable. Refer to TSC typical(s) **TY-1TSC-418 #2 & #3** for proper loop to loop lead-in splice detail.

Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be brought into a cabinet or handhole at the time the induction loop is placed in the pavement. Loops located over 1000 feet (300 m) from cabinet shall require five (5) turns of No. 14 wire.

Loop lead-ins placed in handholes shall be coiled, taped and hung from the side of the handhole to protect against water damage. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged in each handhole through which it passes. The loop lead-in shall be color coded and tagged at the core hole, in each junction box it passes through, and at the termination point in the cabinet.

Pre-Formed loops on ramps shall use the following table, or as directed by the Engineer.

RAMP LOOP TABLE #1

W (M)	S (M)
13 ft (4.0m)	9 ft (2.8m)
14 ft (4.3m)	10 ft (3.1m)
15 ft (4.6m)	11 ft (3.4m)
16 ft (4.9m)	12 ft (3.7m)
17 ft (5.2m)	13 ft (4.0m)
18 ft (5.5m)	14ft (4.3m)
19 ft (5.8m)	15ft (4.6m)
20 ft (6.1m)	16 ft (4.9m)
21 ft (6.4m)	17 ft (5.2m)
22 ft (6.7m)	18 ft (5.5m)
23 ft (7.0m)	19 ft (5.8m)
24 ft (7.3m)	20 ft (6.1m)
25 ft (7.6m)	21 ft (6.4m)

The new concrete pavement slab in which the loop is installed shall be stamped near the right shoulder to indicate an induction loop.

Traffic Systems Center Loop Splicing Requirement Color Code.

<u>MAINLINE LOOPS</u>				<u>METERING LOOPS</u>	
Lane 1	Blue	Lane 4	Violet	Queue	Green
Lane 2	Brown	Exit	Black	Demand	Yellow
Lane 3	Orange	Entrance	White	Passage	Red

When 2 or 3 loops are installed on an exit or entrance ramp the loop color code shall conform to the mainline loop color code and shall be marked as entrance or exit ramp loops.

In addition to color codes each loop shall be identified with a written label attached to the loop wire, or lead-in wire. The tags shall be **Panduit #MP250W175-C or equivalent.** All wires and cables shall be identified in each handhole or cabinet the cable passes through, or terminates in. The labels shall be attached to the cable by use of two cable ties.

Prosecution of Surveillance Work. Should damage occur to any Traffic Systems Center cabinets, housing telemetry equipment and/or vehicle detection equipment, the Contractor shall install and replace all damaged equipment at his own expense. The Traffic Systems Center staff shall determine what equipment shall be reusable and what shall be replaced. Replaced equipment shall be of equal or better quality and type.

Connections to Existing Installations. Where new work connects to existing installations, the Contractor shall do all necessary cutting, fitting and foundation drilling to the existing installation and shall remove all existing work, as required, to make satisfactory connections, with the work to be performed under these Provisions, so as to leave the entire work in a finished and workmanlike manner, as approved by the Engineer. No raceways shall be allowed to enter cabinet through the sides or back walls.

Protection of Work. Electrical work, equipment and appurtenances shall be protected from damage during construction until final acceptance. Electrical raceway or duct openings shall be capped or sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

Standards of Installation. Electrical work shall be installed in a neat and workmanlike manner in accordance with the best practices of the trade. Unless otherwise indicated, materials and equipment shall be new and installed in accordance with the manufacturer's recommendations.

Except as specified elsewhere herein, materials and equipment shall be in conformance with the requirements of Section 106 of the Standard Specifications.

Testing. Before final acceptance, the induction loops shall be tested. Tests will not be made progressively, as parts of the work are completed. They shall be all made at one time. Items which fail to test satisfactorily shall be repaired or replaced.

An electronic test instrument capable of measuring large values of electrical resistance, **such as major megger**, shall be used to measure the resistance of the induction loop and its lead-in. The resistance of the loop and its lead-in shall be a minimum of 100 megohms above ground under any conditions of weather or moisture. The resistance tests and all electronic tests shall be performed in the presence of the Engineer any number of times specified by the Engineer. The loop and loop lead-in shall have an inductance between 100 microhenries and 700 microhenries. The continuity test of the loop and loop lead-in shall not have a resistance greater than two (2) ohms. The Contractor shall do all testing in the presence of the Engineer and all readings will be recorded by the Engineer. Testing shall be done with an approved loop tester.

Final Acceptance. When the work is complete, tested and fully operational, the Contractor shall schedule a Final Acceptance Inspection with the Engineer. Final acceptance will be made as a total system, not as parts.

The Contractor shall furnish the necessary manpower and equipment to make the Final Acceptance Inspection. The Engineer will designate the type of equipment required for the inspection tests.

Method of Measurement. The Pre-formed Induction Loop measurement shall be the length of rubber reinforced hose in the pavement which contain loop wire. The actual length of wire used in the rubber reinforced hose shall not be considered in any measurement.

Basis of Payment. This item will be paid at the contract unit price per linear foot (meter) as PREFORMED INDUCTION LOOP. Lead-in cable will be paid at the contract unit price per lineal foot (meter) as 4-CONDUCTOR NO.18 TWISTED SHIELDED. The price will be payment in full for furnishing and installing all materials listed complete and operating in place.

CABINET HOUSING EQUIPMENT, MOUNTING AND SIZE AS SPECIFIED

(TSC T637#2)

Effective: June 1, 1994

Revised: March 21, 2013

DESCRIPTION

This item shall consist of furnishing and installing cabinets of the type and size specified in place including anchor bolts, bases, pedestals, posts, fans, cable harnesses, ground rods, terminal boards, shelves, mounting hardware, and all miscellaneous items at locations as directed by the Engineer.

MATERIALS

Cabinets shall be of fabricated aluminum supplied in sizes with minimum inside dimensions as listed below.

<u>TYPE</u>	<u>HEIGHT</u>	<u>WIDTH</u>	<u>DEPTH</u>	<u>THICKNESS</u>	<u>OPENING</u>
E.S.P. 1	22-1/2"	14-1/4"	9-3/4"	3/16"	18" x 11"
E.S.P. 2	36"	20"	15"	3/16"	28" x 17-1/2"
E.S.P. 3	49-1/2"	30"	17"	3/16"	38" x 27-11/2"
E.S.P. 4	55"	44"	26"	3/16"	2-1/2" x 41-1/2"
E.S.P. 1	571.5mm	362mm	248mm	4.7mm	457mm x 279mm
E.S.P. 2	914.4mm	508mm	381mm	4.7mm	711mm x 444.5mm
E.S.P. 3	1257.3mm	762mm	432mm	4.7mm	965mm x 698.5mm
E.S.P. 4	1397mm	1117.6mm	660.4mm	4.7mm	1079.5mm x 1054.1mm

Cabinets shall be watertight. Doors shall be gasketed to provide a waterproof seal. Bases shall be caulked to obtain a moisture-proof bond. All cabinet types shall have a minimum of two (2) shelves for setting detectors and other equipment on, and Type 2 Corbin brass locks or equal.

E.S.P. Type 3 and Type 4 cabinets shall be fitted with a thermostatically controlled fan. It shall be mounted at the top of the cabinet for a forced air fan system that has a screened air exhaust opening under roof overhang and no opening in top of cabinetry. The fan shall be capable of operating at 130C.F.M. (3.68m³/min) at .160" (4.1mm) of water static pressure.

Where the E.S.P. Type 3 cabinet is used to house equipment controlling ramp metering signals, the E.S.P. Type 3 cabinet shall have a signal load relay installed. The signal load relay shall consist of two components, a base which is mounted on the E.S.P. Type 3 cabinet wall and a locking screw. The coil of this relay shall be connected to the mark output of the signal change tone receiver. The one set contacts of the load relay shall be used to change the ramp signals and one set of contacts shall be used to key the mark input to the signal change transmitter. This relay shall be incidental to the cost of the cabinet when used.

Materials shall conform to controller cabinets as listed in the Standard Specifications 1074.03 except that the door shall not have any outside designation nor shall the cabinet door be equipped with a police door or louvers. Post top mounted cabinets, shall have a 1/4" (6.4mm) bottom of cabinet welded.

Each Induction loop shall have lightning protection. The Contractor shall furnish and install stud-mounted lightning protection devices. The device shall have three-terminals, two of which are connected across the loop input of the detector for differential mode protection and the third terminal grounded to protect against common mode damage. Differential mode surge shall be clamped by the semi-conductor array instantly and common mode surge shall be handled by three element gas discharge tube which fires at 400VDC and thereafter clamps the two loop leads to 30 volts in respect to ground. The device shall be installed in close proximity to the loop input. Extension of the factory leads of the device shall not be allowed.

Each Cabinet shall have a Corbin # 2 lock.

INSTALLATION DETAILS

Installation shall conform to applicable portions of Section 863 of the Standard Specifications.

Cabinets, cabinet posts, and cabinet pedestals shall be primed and painted in accordance with TSC Specification T712#1. The final coat color shall be specified by the T.S.C. at the time of the pre-construction meeting. Interior of all cabinets shall be painted high gloss white.

CMS/DMS Type 4 cabinets shall be serviced by 117 volts AC power with a 60 amp circuit breaker minimum.

All cabinets shall be serviced by 117 volts AC power and a telecommunication system. Each cabinet shall be equipped with a 10 ampere circuit breaker, ground rod, 115 VAC RFI filtering surge protector (ACD-340 surrestor), 130 volt, 70 joules, 10 amp varistor, lightning protection for each loop (SRA-6LC surrestor), data line protection for each leg of the four (4) wire telecommunication system (SRA 64C surrestor), a pull chain porcelain base light fixture with a 3 prong 110 volt outlet. The porcelain fixture shall be mounted on metal plate, that shall be mounted on the cabinet ceiling. No holes shall be drilled thru the cabinet exterior for internal equipment mounting.

Each wire entering a cabinet shall be trained in a workmanlike manner and lugged at each terminal strip or switch. If more than one wire has a common terminal on a terminal strip, the adjacent strip shall be used and an appropriate jumpered connection shall be made.

All cables and wiring entering a cabinet shall be dressed, harnessed, tied, laced, and clamped to produce a workmanlike wiring installation.

All cables (loop wires, power, phone) shall be labeled with a panduit type cable tag. The tag will identify the type of cable and the cable destination.

A copper grounding bus shall be mounted on the rear wall of the cabinets.

Each cabinet shall contain a wiring diagram of the installation in addition to the diagrams which are to be submitted to the Engineer.

Prior to the wiring of the cabinet, the contractor shall submit box print for approval before cabinet wiring shall begin.

The Contractor shall furnish three (3) diagrams of the internal and external connections of the equipment in each Traffic Systems Center cabinet. He shall also furnish the operating and maintenance instructions for all equipment supplied. One copy of the wiring diagrams for each cabinet shall be retained in each field cabinet. Wiring diagram shall be contained in a plastic pouch that shall be permanently mounted to the door of each cabinet. Contractor shall permanently mark the cabinet for each termination and each terminal connection as to loop, tone, closure, phone, and lane function of each termination in the cabinet.

Incidental to the cost of each cabinet, the Contractor shall construct 5" (127mm) P.C.C. sidewalk of a rectangular area 3' x 4' (1 meter by 1.2m) immediately adjacent to the cabinet foundation on the same side of the foundation as the cabinet door, with the 4' (1.2m) dimension of the rectangle parallel to the cabinet door when closed. If the width of the required cabinet foundation is greater than the 3 feet (1 meter) width of the standard concrete foundation. Type D, the 4' (1.2m) dimension of the sidewalk area shall be increased to equal the width of the foundation plus 1ft (30 cm), the area to extend 6" (15cm) beyond each side of the foundation. This paragraph shall be applicable at all cabinet locations included in this Section. The only situations where this paragraph shall not apply are as follows: When the foundation is immediately adjacent to or within a paved sidewalk or shoulder area and no further surfacing is required. The Engineer shall be the sole judge as to the applicability of this paragraph in all questions arising therefrom.

No raceways shall be allowed to enter cabinet through the sides, top or back walls.

Anchor bolts shall be installed for pedestal and base mounted cabinets. These shall be considered as incidental to the cost of the cabinets.

Cable harnesses, terminal boards, and mounting hardware shall be installed as needed. These items shall be considered as incidental to the cost of the contract.

Terminal blocks provided in field cabinets shall be the heavy duty barrier type. The terminal block shall be a minimum of 2" (50.8mm) wide and 1-3/16" (30.2mm) deep. Center to center of the terminal screws or studs shall be a minimum of 21/32" (16 mm) with barriers in-between. Terminal blocks shall be rated at 45 amps 600 volts breakdown RMS line to line 11,000 V. and breakdown RMS line to ground 13,800 V. A marking strip shall be provided with each terminal block.

METHOD OF MEASUREMENT

Cabinets will be accepted as concrete foundation mounted, pole mounted, pedestal mounted, or attached to structure. Each cabinet installed complete and in place will be counted as a single unit.

BASIS OF PAYMENT

This work will be paid for at the contract price each for **CABINET HOUSING EQUIPMENT**, mounting and size specified, installed complete and in place.

DIGITAL LOOP DETECTOR SENSOR UNIT (TSC T638#1)

Effective: June 1, 1994

Revised: May 19, 2009

1.0

Scope. This item shall consist of furnishing digital four or two channel loop detector sensor units complete with associated enclosures, cable harness, quick disconnect plugs, and operation manuals in strict accordance with these specifications.

Functional Requirements. The sensor unit shall operate on a regulated 117 VAC. The sensor unit shall be of solid state design throughout. Each sensor unit shall include four or two complete loop detector channels in the space that is normally occupied by an INDUCTION LOOP DETECTOR SENSOR UNIT.

The loop connected to each of the four channels or two shall be sequentially scanned at a rate of not less than 148 times per second. Only one loop shall operate at a time in the system to eliminate cross-talk.

The digital loop sensor unit shall be automatically and instantaneously self-tuning requiring no burn-in or warm-up time. Then it shall also track environmental changes.

The digital loop sensor unit shall be self-tracking and fully automatic in its recovery from power failure.

The digital loop sensor unit shall be of sufficient sensitivity to detect the smallest licenseable motor vehicle, including motorbikes. The sensor unit shall detect a Honda CT-170 and hold the detection for minimum of four minutes.

The sensor unit shall be designed to operate in conjunction with three turns of a loop of wire embedded up to 3" (76.2mm) deep in a reinforced concrete roadway. The loop and lead-ins will measure at least 100 megohms above ground and have a minimum inductance of 50 microhenries and a continuity resistance of not more than 2 ohms. Digital sensor unit shall be capable of tuning to an inductance range of 0 to 2000 microhenries.

Vehicle detection shall be indicated by a single optically isolated solid state output per channel.

Output circuit shall be an optically coupled output. It shall be a 2N37. Polarity of interface between telemetry and sensor unit must be observed.

Any size or type of motor vehicle from motorcycle to a high bed tractor-trailer moving over the loop shall be detected and each vehicle shall produce only one output for the length of time the vehicle is over the loop.

Detection shall be positive for all vehicle speeds 0 to 129km (80 mi.) per hour.

The sensor unit shall be capable of reliable operations when placed up to 1000 ft. (304.8m) away from loops and connected with type No. 14 AWG, stranded copper wire. The loops will vary in size from 5 ft. x 6 ft (1.52m by 1.83m) up to 18 ft. x 6 ft. (5.49m by 1.83m). Loop system with 1000 ft (304.8m.) of lead-in shall perform with sensitivity to detect and hold the smallest motorbike.

Each detection channel shall have its own output incandescent indicator lamp and 16 position thumbwheel switch. The thumbwheel switch shall select the sensitivity and mode. The thumbwheel switch shall provide eight sensitivities, .0025% to .33% and 3 modes: off, pulse, and presence.

In the pulse mode each new vehicle shall produce an output pulse of 225 milliseconds duration. A vehicle remaining on a loop for more than two seconds shall be "tuned out" allowing operation of the loop to other vehicles.

In the presence mode output duration shall be equal to the percent of time the vehicle is present on the loop. Vehicle detection and hold times shall not be less than 30 minutes.

Electrical connections from the sensor unit to incoming and outgoing circuits shall be made by one MS type multiple positive connection plug and jack, or equivalent arrangement, to permit rapid replacement with similar existing units without disconnecting or reconnecting individual wires.

All the tuning adjustments shall be made with controls provided on the sensor unit without requiring movement of the sensor unit.

These controls shall be identified and it shall not be necessary to remove or change wires or contacts nor to use any tools other than a screw driver in tuning or making sensitivity adjustments.

A properly tuned sensor unit shall detect all high vehicles (truck) with chassis 4 feet (1.22m) above pavement surface with one contact closure and yet shall not detect vehicles passing in lanes adjacent to loop installation.

All transistors shall be silicon type. The main logic of the unit shall be a single MOS-LSI chip to simplify the electronics, increase reliability and improve maintainability.

The sensor unit shall be contained in a rigid high quality metal enclosure providing complete protection to all components and electrical connections.

During normal detection operation the state of the output indicator shall correspond exactly to the state of the optically coupled output.

A frequency switch shall be provided to raise or lower the loop oscillator frequency for the elimination of cross-talk between sensor unit, should it ever occur.

The digital sensor unit shall be provided with a circuit breaker.

Special circuitry shall be provided so that the sensor unit shall continue in proper operation even though the induction loop is shorted or leaking to ground.

Induction loops shall be coupled to a transformer to provide for rejection of induction loop lead-in cable noise and shall allow low inductance operation (0 to 50 microhenries).

A reset shall be provided to reset all channels.

There shall be a write-on pad mounted on sensor to identify traffic lane with channel indication.

Basis of Payment. This item will be paid for at the contract unit price each for DIGITAL LOOP DETECTOR SENSOR UNIT, channels specified, installed, operating and completely in place.

Terminal boards, cable harness wiring and miscellaneous will not be paid for separately, but shall be considered as incidental to the cost of the item.

JUNCTION BOX

Description. This work will consist of furnishing and installing a stainless steel, Type "J" junction box with cover embedded in concrete as described herein, as shown on the plans and as directed by the Engineer. When used in a median barrier or parapet wall with a sloped face, the front of the junction box shall be sloped to match the barrier wall as depicted in Standard Drawings TY-ITSC-663#3 and 400#30. The depth indicated in the dimensions shall be the bottom depth.

Construction Requirements. Furnishing and installing the junction box shall meet the requirements according to Section 813 of the Standard Specifications, unless modified in this special provision.

Materials. The junction box shall meet the requirements according to Section 1088.04 of the Standard Specifications, unless modified in this special provision.

The junction box shall be continuously welded and consist of 1/4" thick, Type 316 stainless steel with a stainless steel 1/4" Type 316 cover, neoprene gasket and a minimum of ten 3/8" X 3/4" 16 threads/inch flat-head stainless steel slotted screws.

Reference Traffic Surveillance Typical Drawings TY-1TSC-663 #2 through #13 drawings.

Installation. All junction boxes shall be water tight. Predrilled holes shall be provided for the applicable conduit size and location. Unless otherwise specified, conduits terminating at stainless steel boxes shall be terminated in conduit hubs.

The cover shall be recessed within an outside frame, having a water-tight gasket mounted flush with the surface of this frame. Recessed stainless steel slot head screws shall secure the cover.

Each box shall have a 4.625 inch diameter hole for installing a 4" diameter conduit on both sides of the box. For locations where conduits also exit through the bottom of the box, two additional 2.625 inch diameter holes shall be provided in the bottom of the box for installing the 2" diameter conduits. For locations where a junction box is to intercept an existing 4" surveillance conduit, a 4.625 inch diameter hole shall be provided on the appropriate side of the box.

Method of Measurement. Junction boxes shall be counted as, each installed.

Basis of Payment. This item shall be paid at the contract unit price each for JUNCTION BOX, TYPE J, of the type and dimensions indicated, which price shall be payment in full for all labor and materials necessary to complete the work as described above.

FIBER OPTIC CABLE INNERDUCT

Description. This item shall consist of furnishing, installing, splicing, connecting and demonstrating continuity of fiber optic cable innerduct of sizes specified herein and as shown on the contract drawings. The innerduct shall be High Density Polyethylene.

Materials.

General:

The duct shall be a spiral ribbed plastic duct which is intended for underground use and which can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance. The ribbed duct shall have internally designed longitudinal ribs for reduced pulling frictions and increased lubrication effectiveness

The duct shall be made of high density polyethylene which shall meet the requirements of ASTM D 3035. The innerduct material shall be composed of high density polyethylene meeting the requirements of PE334470E/C as defined in ASTM D3350.

Submittal information shall demonstrate compliance with the details of these requirements.

Dimensions:

Duct dimensions shall conform to the standards listed in ASTM D3035, SDR-11. Submittal information shall demonstrate compliance with these requirements.

Nominal Size (Diameter)	Inside Diameter (minimum)	Outside Diameter (Average)	Wall Thickness (Min.)	Bend Radius (minimum)	Pull Strength	Weight Average (lbs/100ft.)
1"	1.030"	1.315"	0.120"	14"	500	19
1.25"	1.313"	1.660"	0.151"	17"	750	31
1.5"	1.506"	1.900"	0.173"	19"	1000	40
2"	1.885"	2.375"	0.216"	24"	1600	60

Marking:

As specified in NEMA Standard Publication No. TC-7, the duct shall be clearly and durably marked at least every 10 feet with the material designation (HDPE for high density polyethylene), nominal size of the duct, and the name and/or trademark of the manufacturer.

Color:

Innerduct shall be colored as follows or as directed by the Engineer.

Usage Designation	Color
Fiber Optic Trunk Cable (Ducts containing cables of 96 fibers)	Orange
Fiber Optic Distribution Cable (Ducts containing cables of 12, 6 or 4 fibers and 96 fiber ducts designated as distribution fibers)	Blue

Installation.

Pulling Tension.

Pulling tension of the duct shall be monitored throughout the pull and pulling tension shall not exceed those listed in the table or the specific manufacturer maximum pulling tensions as indicated in the catalog cut submittals. Failure to monitor the pulling tension will result in non-payment of that particular duct span and the span may be reinstalled with new duct at no additional cost to the State. Lubricants used shall be compatible with the duct.

Junction boxes.

Where duct passes through junction and/or pull boxes, the duct shall remain continuous unless a break is specifically indicated in the plans or as directed by the Engineer.

Handholes and Communications Vaults.

Where duct passes through handholes or vaults, the duct shall be looped uncut within the handhole unless otherwise indicated on the Plans or directed by the Engineer.

Bends.

Minimum bending radius shall be in accordance with the above table or the manufacturer's recommended radius, whichever is larger. Bends shall be made so that the duct will not be damaged and the internal diameter of the duct will not be effectively reduced. The degrees of bend in one duct run shall not exceed 360° between termination points.

In Trench

Where duct is installed in trench, it shall be placed in the bottom of the trench after all loose stones have been removed and all protruding stones have been removed or covered with backfill material as directed by the Engineer.

Where duct is shown to be installed in trench, it shall be installed at a depth not less than 30 inches unless otherwise indicated or specifically directed by the Engineer.

The inner duct may be plowed into place. Unless otherwise indicated or specifically approved by the Engineer, plowing of inner duct shall lay the duct in place and shall not pull the duct through the length of the cut behind a bullet-nose mandrel or similar apparatus. In all cases, plowing operations shall be non-injurious to the duct.

In Raceway

Where duct is installed in raceways, lubricating compounds shall be used where necessary to assure smooth installation.

Encased in Concrete

Concrete shall be class SI complying with Section 720 of the Standard Specifications.

Steel Reinforcement Bars. Steel reinforcement bars shall comply with Section 706.10 of the Standard Specifications.

Underground concrete-encased conduit shall be supported on interlocking plastic spacers specifically designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common duct bank shall be not less than 2 inches. The interlocking spacers shall be used at a minimum interval of 8 ft.

Concrete cover overall shall not be less than 3 inches all around the encased run. Space below the conduit, and concrete fill shall be assured. Care shall be exercised during concrete placement to assure that there are no voids, so that spacers are undisturbed, and so that conduit joints stay secure and unbroken. Concrete shall be deflected during placement to minimize the possible damage to or movement of the conduits.

Conduit encased in concrete shall have steel reinforcing where installed below roadway or other paved vehicle areas (including shoulder) and the reinforcement shall extend not less than 5 feet additional from the edge of pavement unless otherwise indicated. Steel reinforcement shall not be less than No. 4 bars at corners and otherwise spaced on 12-inch centers, tied with No. 4 bars on 12-inch centers.

The Engineer shall examine all conduit joints for compliance with section 5 of this specification before concrete is poured.

Embedded

Conduit embedded in structure shall be supported on interlocking plastic spacers specifically designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common structure shall be not less than 2 inches. The interlocking spacers shall be used at a minimum interval of 8 ft.

Concrete cover overall shall not be less than 3 inches all around the embedded run. Space below the conduit, and concrete fill shall be assured. Care shall be exercised during concrete placement to assure that there are no voids, so that spacers are undisturbed, and so that conduit joints stay secure and unbroken. Concrete shall be deflected during placement to minimize the possible damage to or movement of the conduits.

The Engineer shall examine all conduit joints for compliance with section 5 of this specification before concrete is poured.

Joints

All HDPE duct to HDPE duct joints shall be made with an approved duct fusion splicing device.

HDPE coilable non-metallic conduit to non-HDPE coilable non-metallic conduit joints shall be either made with an approved mechanical connector or with a chemical compound. Both methods must be specifically designed for joining HDPE coilable non-metallic conduit. Minimum pullout force for the chemical compound shall be as listed in the following table.

Nominal Size		Pullout Force	
mm	in	N	Lbs
31.75	1.25	2400	540
38.1	1.50	2535	570
50.8	2.0	3335	750
63.5	2.5	4445	1,000
76.2	3.0	6225	1,400
101.6	4.0	8890	2,000

Measurement. The duct shall be measured for payment in linear feet in place as described herein. Measurements shall be made in straight lines between horizontal changes in direction between the centers of the terminating points (poles, cabinets, junction boxes). Vertical measurement of the duct shall be as follows:

For runs terminating at junction boxes and/or control cabinets, the vertical measurement shall be taken from the bottom of the trench, or horizontal raceway, to a point 18-inches beyond the center of the junction box or control cabinet.

For runs terminating at poles, the vertical measure shall be taken from the bottom of the trench, or horizontal raceway, to a point 18-inch beyond the center of the light pole handhole regardless of light pole mounting method

Innerduct installed in excess of the limits describes herein shall not be paid for.

Basis of Payment. This item will be paid for at the contract unit price per foot installed for INNERDUCT, of the size of duct as indicated, which shall be payment in full for all material and work as specified herein.

UNDERGROUND CONDUIT, PVC, 2" & 4" DIA., SCHEDULE 80

Description. This work will consist of furnishing and installing Schedule 80 PVC conduit, fittings and accessories as part of the raceway either laid in trench, bored and pulled in place.

Construction Requirements. Furnishing and installing the conduits shall meet the requirements according to Section 810 of the Standard Specifications.

Materials. Polyvinyl chloride (PVC) conduit must conform to the requirements of the National Electrical Manufacturers Association Standard, Publication Number TC2 for EPC-80. Conduit color will be determined by the Resident Engineer.

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 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 UNDERGROUND CONDUIT of the type and size as specified, which price will be payment in full for furnishing and installing the conduit and fittings complete.

DRILL EXISTING JUNCTION BOX ATTACHED TO STRUCTURE

Description. This work will consist of drilling a hole in an existing junction box attached to structure for the installation of a new conduit for the connection of communication and/or electrical service. The conduit required to make the connection from the existing or proposed handhole, heavy duty handhole or median wall junction box to the junction box attached structure shall be a separate pay item. This item must meet the requirements of Article 879 of the Standard Specifications. This work also includes the connection of this conduit and the proper sealing of this hole as to not allow the entry of water.

Construction. The size of the hole must be as close as possible to the size of the conduit to be installed. The conduit must be installed in the drilled hole with a bushing before the hole is caulked with a waterproof grout.

Method of Measurement. This work will be measured per each hole drilled.

Basis of Payment. This work will be paid for at the contract unit price each for DRILL EXISTING JUNCTION BOX ATTACHED TO STRUCTURE, which price will be payment in full for drilling the hole, grouting, and any additional work required to accomplish this task.

INDUCTION LOOP (TSC T418#1)

Effective: June 1, 1994

Revised: April 5, 2017

Description. This item shall consist of furnishing, installing and testing an induction loop, of the dimensions shown on the plans or of the dimension from Table 1, at the locations shown. The induction loop shall be installed in accordance with all details shown on the plans and applicable portions of Section.886 Standard Specifications for Road and Bridge Construction. All saw cutting, cable installation, joint sealing, lead-ins and testing necessary to complete the installation shall conform with the following requirements.

Materials. The cable used for induction loop shall be #14-19 strand XHHW XLP-600V, encased in orange tubing as manufactured by Kris-Tech Wire Company, Inc., IMSA 51-7, or comparable. All loop wire shall be UL listed. The jacket, constructed of high density polyethylene, shall be rated to 600 volts in accordance with UL 83 Section 36.

Lead-ins shall be according to ELECTRICAL CABLE IN CONDUIT, LEAD IN, NO. 18 4/C, TWISTED SHIELDED.

Joint sealer shall have sufficient strength and resiliency to withstand stresses set up by vibrations and differences in expansion and contraction due to temperature changes. The joint sealer shall have a minimum tensile strength of 100 P.I.E. when tested by ASTM Method D638-58T. Adhesion to clean dry, oil-free Portland Cement concrete shall be at least equal to the tensile strength of the concrete. The joint sealer, with qualities described above, shall be capable of curing in a maximum time of 30 minutes at all temperatures above 50 degrees F (10 degrees C). Curing shall be defined as the capability of withstanding normal traffic loads without degradation. A hard asphalt-based filling and insulating compound having a high softening point and a high pouring temperature shall be used if the outside installation temperature is below 50 degrees F (10 degrees C). The filling compound shall have a softening point of not less than 235 degrees F (110 degrees C) and a summer pouring temperature of 375 degrees F (190 degrees C); winter pouring temperature of 425 degrees F (220 degrees C). Sealant for Detector Loop(s): The sealer shall meet or exceed the characteristics provided by OZ GEDNEY DOZSeal 230 filling compound.

Installation Details. Slots in the pavement shall be cut with a concrete sawing machine in accordance with the applicable portions of Art. 420.05 of the Standard Specifications for Road and Bridge Construction. The slot must be clean, dry, and oil-free. Wire shall be inserted in the pavement slot with a blunt tool which will not damage the insulation. Loops shall not be dry cut. Loops should not be installed at an outside temperature below 50 degrees F (10 degrees C) unless directed by Engineer.

Plastic sleeving shall be used to insulate the wire where loop wire crosses cracks and joints in the pavement. The sleeving shall be properly sealed with electrical tape to prevent joint sealer from entering sleeves. Sleeving shall extend a minimum of 8 inch (20 cm) each side of joint.

Induction loops on exit and entrance ramps shall be square or rectangular with edges perpendicular or parallel to traffic flow. All mainline loops shall be round loops, 6 feet (1.8 m.) in diameter. Induction loops shall be centered on all ramps and in traffic lanes unless designated otherwise on the plans or by the Engineer. Traffic lanes shall be referred to by number and loop wire shall be color-coded and labeled accordingly. Lane one shall be the lane adjacent to the median, or that lane on the extreme left in the direction of the traffic flow; subsequent lanes are to be coded sequentially towards the outside shoulder. A chart which shows the coding for each installation shall be included in each cabinet. Core holes shall not be allowed at corner of loop. Saw cuts for all induction loops and lead-ins shall not be greater than 2.75 inches (7 cm) in depth.

All excess joint sealer shall be removed so that the level of the sealer in the saw cut is at the same level as the adjoining pavement.

All induction loops shall contain three (3) turns of No. 14 wire min. Each induction loop shall have its own Canoga 30003 or equal home run or lead-in to the cabinet when said induction loops is over 150 feet (45 m) from cabinet. Induction loops shall not be connected in series with other loops. This wire shall be free from kinks or any insulation abrasions. The loop lead-in shall be a Canoga 30003 cable. The loop lead-in shall be barrel sleeved, crimped, soldered and protected by heat shrinkable tubing to the loop #14 wire. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be brought into a cabinet or handhole at the time the induction loop is placed in the pavement. Loops located over 1000 feet (300m) from cabinet require four (4) turns of No. 14 wire.

Where lead in runs are less than 150 feet (45 meters), the loop wire shall be utilized as lead-in from the Core Hole to the Cabinet, w/o splices, being twisted 5 turns per foot (16 turns per meter). The additional loop wire will not be paid for separately, but shall be considered part of this Pay Item.

Where duct is collapsed or damaged, making it impossible to pull loop lead-in, the affected area will need to be replaced. This will be paid for by the pay items CONDUIT IN TRENCH, HIGH DENSITY POLYETHYLENE COILABLE 1-1/4" and TRENCH AND BACKFILL FOR ELECTRICAL WORK.

Loop lead-ins placed in handholes shall be coiled, taped and hung from the side of the handhole to protect against water damage. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged in each handhole thru which it passes. The loop lead-in shall be color coded and tagged at the core hole, in each junction box it passes thru, and at the termination point in the cabinet. Contractor shall core drill all mainline round loops 6 feet (183 meters) in diameter x .25 inch (6 mm) in width x 2.75 inches (7 cm) in depth.

Loop lead-ins shall not be allowed in saw cuts in shoulders. The Engineer shall be contacted regarding proposed changes in loop locations necessitated by badly deteriorated pavement. The Engineer may relocate such loops. Loop Wire and lead-ins shall not be installed in the curb and gutter section or through the edge of pavement. A hole shall be drilled at least 12 inches (30 cm) in from the edge of pavement through which the P-duct, loop wire and lead-in shall be installed. Saw cuts through shoulders to core hole shall not be allowed.

W (M)	S (M)
13 ft (4.0 m)	9 ft (2.8 m)
14 ft (4.3 m)	10 ft (3.1 m)
15 ft (4.6 m)	11 ft (3.4 m)
16 ft (4.9 m)	12 ft (3.7 m)
17 ft (5.2 m)	13ft (4.0 m)
18 ft (5.5 m)	14ft (4.3 m)
19 ft (5.8 m)	15 ft (4.6 m)
20 ft (6.1 m)	16 ft (4.9 m)
21 ft (6.4 m)	17 ft(5.2 m)
22 ft (6.7 m)	18 ft (5.5 m)
23 ft (7.0 m)	19 ft (5.8 m)
24 ft (7.3 m)	20 ft (6.1 m)
25 ft (7.6 m)	21 ft (6.4 m)

Should the induction loop and/or core hole for the induction loop and loop lead-in cable be paved over by other construction operations, it shall be the contractor's responsibility for locating and finding the induction loop and/or the core hole for the repair of a bad loop or lead-in or for the installation of a new loop or loop lead-in. The locating of the core hole and the induction loop shall be incidental to the cost of the induction loop lead-in installation.

No extra compensation shall be allowed for finding and locating induction loops and/or core hole.

The loop shall be spliced to the lead-in wire with a barrel sleeve crimped and soldered. Epoxy filled heat shrink tubing shall be used to protect the splice. The soldered connection shall be made with a soldering iron or soldering gun. No other method will be acceptable, i.e. the use of a torch to solder will not be acceptable. The heat shrink tube shall be shrunk with a heat gun. Any other method will not be acceptable, i.e. the use of a torch will not be acceptable. No burrs shall be left on the wire when done soldering. Cold solder joints will not be acceptable. Refer to T.S.C. typical(s) TY-1TSC-418 #2 & #3 for proper loop to loop lead-in splice detail.

Where there are continuous count stations or multiple lane exits or entrance ramps the loop in the left most lane shall be wrapped clockwise, the adjacent lane loop wrapped counter-clockwise, etc, alternating wrapping the loops every other lane.

Traffic Systems Center Loop Splicing Requirement Color Code.

MAINLINE LOOPS				METERING LOOPS	
Lane 1	Blue	Lane 4	Violet	Loop 1	Green
Lane 2	Brown	Exit	Black	Loop 2	Yellow
Lane 3	Orange	Entrance	White	Loop 3	Red

When 2 or 3 loops are installed on an exit or entrance ramp the loop color code shall conform to the mainline loop color code and shall be marked as entrance or exit ramp loops.

In addition to color codes each loop shall be identified with a written label attached to the loop wire, or lead-in wire. The tags shall be Panduit #MP250W175-C or equivalent. All wires and cables shall be identified in each handhole or cabinet that the cable passes through, or terminates in. The labels shall be attached to the cable by use of two cable ties.

Prosecution of Surveillance Work. The work shall consist of replacement and/or repairs caused by the pavement repair, removal and resurfacing to all induction loops, loop lead-in, poly-duct, steel conduits, all interconnecting cables and all Surveillance appurtenances. The Contractor shall make modifications to existing installations to render the location functional. The Contractor shall also furnish and install new induction loops, loop lead-ins, poly-duct, steel conduits, all interconnecting cables, and all Surveillance appurtenances.

Should damage occur to any Traffic Systems Center cabinets, housing telemetry equipment and/or vehicle detection equipment, the Contractor shall install and replace all damaged equipment at his own expense. The Traffic Systems Center staff shall determine what equipment shall be reusable and what shall be replaced. Replaced equipment shall be of equal or better quality and type.

Connections to Existing Installations. Where new work connects to existing installations, the Contractor shall do all necessary cutting, fitting and foundation drilling to the existing installation. The Contractor shall remove all existing equipment, as required to make satisfactory connections, so as to leave the entire work in a finished and workmanlike manner, as approved by the Engineer. No raceways shall be allowed to enter cabinet through the sides or backwalls.

Protection of Work. Electrical work, equipment and appurtenances shall be protected from damage during construction until final acceptance. Electrical raceway or duct openings, shall be capped or sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

Standards of Installation. Electrical work shall be installed in a neat and workmanlike manner in accordance with the best practices of the trade. Unless otherwise indicated, materials and equipment shall be new and installed in accordance with the manufacturer's recommendations.

Except as specified elsewhere herein, materials and equipment shall be in conformance with the requirements of Section 106 of the Standard Specifications.

Testing. Before final acceptance, the induction loops shall be tested. Tests will not be made progressively, as parts of the work are completed. They shall be all made at one time. Items which fail to test satisfactorily shall be repaired or replaced.

An electronic test instrument capable of measuring large values of electrical resistance, such as major megger, shall be used to measure the resistance of the induction loop and its lead-in. The resistance of the loop and its lead-in shall be a minimum of 100 meg ohms above ground under any conditions of weather or moisture. The resistance tests and all electronic tests shall be performed in the presence of the Engineer any number of times specified by the Engineer. The loop and loop lead-in shall have an inductance between 100 micro henries and 700 micro henries. The continuity test of the loop and loop lead-in shall not have a resistance greater than two (2) ohms. The Contractor shall do all testing in the presence of the Engineer and all readings will be recorded by the Engineer. Testing shall be done with an approved loop tester.

Final Acceptance Inspection. When the work is complete, tested and fully operational, the Contractor shall schedule a Final Acceptance Inspection with the Engineer. Final acceptance will be made as a total system, not as parts.

The Contractor shall furnish the necessary manpower and equipment to make the Final Acceptance Inspection. The Engineer will designate the type of equipment required for the inspection tests.

Method of Measurement. The induction loop measurement shall be the length of saw cut in the pavement which contains loop wire. The actual length of wire used in the saw cut shall not be considered in any measurement. The 1st 150 ft. of loop wire from core hole to cabinet will not be measured for Payment.

Basis of Payment. This item will be paid at the contract unit price per lineal foot (meter) as INDUCTION LOOP for furnishing and installing all materials listed complete and operating in place. If loop is less than 150 ft. from cabinet, loop wire shall be used as lead-in and will not be paid separately. If loop is greater than 150 ft. from cabinet, loop wire shall be spliced in handhole to an ELECTRIC CABLE IN CONDUIT, LEAD-IN NO. 18 4/C TWISTED SHIELDED (see ELECTRICAL CABLE IN CONDUIT, 4C NO. 18 SHIELDED LOOP DETECTOR WIRE SPECIAL PROVISION).

ELECTRICAL CABLE IN CONDUIT, 4C/NO. 18 SHIELDED LOOP LEAD-IN (TSC T421#14)

Effective: March 1, 2010

Revised: April 5, 2017

Description. This work shall consist of furnishing materials and labor for installation of shielded loop lead-in cables in conduit as specified herein and indicated by the Engineer, complete with all identification, terminating and testing.

Materials.

General:

Lead-in is the wire that extends from the core hole of the induction loop to the termination point.

The cable shall be an assembly of pairs of left hand lay twisted insulated conductors, with a core filled with a petroleum base flooding compound, overlapped conductive tape shield and a black high density polyethylene jacket overall. This cable shall meet the requirements of IEEE Standard 383.

The cable shall have an Aluminized Polyester Shield to protect against electromagnetic interference.

The cable interstices shall be filled with a water blocking compound. It shall prevent hosing, siphoning or capillary absorption of water.

The jacket of high density polyethylene shall be rated to 600 volts in accordance with UL 83 Section 36.

All cables shall be UL listed.

The cable shall be rated 90 degrees C dry and 75 degrees C wet and shall be suitable for installation in wet and dry locations, exposed to the weather, and shall be resistant to oils and chemicals.

It shall have an operating temperature range of -20C to +60C (minimum).

The UL listing mark, cable voltage, insulation type and ratings, as well as the cable size shall all be clearly printed on the cable in a color contrasting with the insulation color.

Conductors:

The lead-in cable shall be 4 conductors (2 pair) # 18 stranded (7X.0152") un-coated copper, twisted at least 4 turns per foot and rated to 600 Volts. 1 pair is used for the loop while the other pair is a spare. Under no circumstances shall the spare pair be used to connect a second loop.

Conductors shall meet the requirements of ASTM Designation B-8 as applicable.

The conductors shall be coded as follows: black-red-white-green.

Insulation:

Cable insulation shall incorporate polyvinyl chloride (PVC) or Polypropylene, with a clear nylon covering overall as specified and the insulation shall meet or exceed the requirements of ICEA S-61-402, NEMA Standard Publication No. WC-5, UL Standard 83, as applicable.

Installation. All cables shall be delivered to the site in full reels. Cable on the reels shall be protected from damage during shipment and handling by wood lagging or other means acceptable to the Engineer. Reels shall be tagged or otherwise identified to show the UL listing.

The loop lead-in shall be barrel sleeved, crimped, soldered and protected by heat shrinkable tubing to the loop #14 wire. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be brought into the cabinet or handhole at the time the induction loop is placed in the pavement. Loops located over 1000 feet from cabinet require four (4) turns of No. 14 wire.

Lead-in cable will be installed where the lead-in length from point of interception to the point of termination exceeds 150 feet.

Where lead-in runs are less than 150 feet, the loop wire will be utilized as lead-in to the point of termination w/o splices, being twisted 5 turns per foot. The additional loop wire will not be paid for separately but shall be included in the Induction Loop Pay Item.

Loop lead-ins placed in handholes shall be coiled, taped, and hung from the side of the handhole to protect against water damage. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged in each handhole through which it passes. The loop lead-in shall be color coded and tagged at the core hole, in each junction box it passes through and at the termination point in the cabinet.

TRAFFIC SYSTEMS CENTER LOOP SPLICING REQUIREMENT

<u>MAINLINE LOOPS</u>		<u>METERING LOOPS</u>			
Lane 1	Blue	Lane 4	Violet	Loop 1	Green
Lane 2	Brown	Exit	Black	Loop 2	Yellow
Lane 3	Orange	Entrance	White	Loop 3	Red

When 2 or 3 loops are installed on an exit or entrance ramp the loop color code shall conform to the mainline loop color code and shall be marked as entrance or exit ramp loops.

In addition to color codes each loop shall be identified with a written label attached to the loop wire, or lead-in wire. The tags shall be Panduit #MP250W175-C or equivalent. All wires and cables shall be identified in each handhole or cabinet the cable passes through, or terminates in. The labels shall be attached to the cable by use of two cable ties.

Testing. After installation, the cable shall be tested as approved by the Engineer. Cable failing to pass the test shall be replaced with new cable at no additional cost.

Method of Measurement. The cable shall be measured for payment in linear foot in place. Measurements shall be made in straight lines between changes in direction and to the centers of Equipment. All vertical cable and permissible cable slack shall be measured for payment. A total of six (6) feet of slack shall be allowed for the end of a run terminating at a panel and four (4) feet will similarly be allowed when terminating at a wall-mounted panel. Additional vertical distance for the height of conduit risers, etc., as applicable, will be measured for payment for equipment so mounted.

Basis of Payment. This work shall be paid at the Contract unit price per linear foot, furnished and installed for ELECTRICAL CABLE IN CONDUIT, LEAD IN, NO. 18 4/C, TWISTED SHIELDED

CCTV CAMERA STRUCTURE

Effective: January 1, 2013

Description. This work shall consist of furnishing a CCTV camera structure complete with camera lowering device (*50ft camera pole will not require lowering device*). The structure shall be a galvanized steel structure with a concrete foundation.

Definitions.

CCTV Camera Structure: The complete camera structure and lowering device as one integral working system.

Shaft: The camera structure shaft.

Lowering Device: The components involved with the mounting, operation, and raising and lowering of the CCTV camera. ***Lowering device is not required for the 50ft camera pole structure.***

Structure Height: The height of the structure shall be measured as indicated on the detail drawings

Materials. Materials shall be as specified elsewhere herein.

Deflection. The design of the structure shaft shall achieve a maximum, fully loaded deflection at the top of the structure, which is not greater than 1-inch

Submittals and Certifications. The structure shall be designed in accordance with 2001 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals with Appendix C wind pressure for a 90 mph wind zone with a 1.3 gust factor. The pole shall be designed for use with a single arm camera lowering device with a total effective area of 2 square feet and total weight of 95 lbs. The structure shall not exceed 1" deflection in a 30 mph (non-gust) wind.

The camera structure shall be designed and constructed so no structural member or other component is applied in excess of the manufacturer's recommended rating (when applicable) or the published rating, whichever is lower

Shop drawings, product data and certifications shall be submitted. The submitted information shall be complete and shall include information relative to all specified requirements suitable for verification of compliance.

THE SUBMITTALS SHALL BE ARRANGED AND CROSS-REFERENCED TO THE SPECIAL PROVISIONS AND STANDARD SPECIFICATIONS. FAILURE TO CROSS-REFERENCE THE SUBMITTAL INFORMATION WITH THE SPECIAL PROVISIONS WILL RESULT IN THE SUBMITTAL BEING RETURNED WITHOUT REVIEW.

The submittal information shall be dated, current, project specific, identified as to the project, and shall also include the following calculations and certifications as applicable to the material utilized:

- Shaft design calculations, including Registered Engineer Certification.
- Certification of intent to provide domestic steel in accordance with Article 106.01 of the Standard Specifications.
- Welding details and procedures.
- Letter of intent to provide specified weld inspection reports.
- Confirmation of coordination between anchor rod supplier and the structure manufacturer for adequacy of anchor rod assembly.
- Manufacturer's recommended installation procedures.
- Letter of intent to provide manufacturer's representative during installation and to provide specified installation certification.

All certifications shall be notarized.

Shaft. The pole shall be a maximum of three sections for field assembly. The pole shafts shall be a round cross section and meet the requirements of ASTM A595 grade A with a minimum yield strength of 55,000 psi. The bottom section shall have a minimum .3125 wall thickness and a minimum diameter of 23". The three shafts sections shall taper at a rate of .14" per foot and have an overall height of 80'. The pole base plate shall meet the requirements of ASTM A36 and be arranged to accommodate four (4) 1 1/2" x 54" x 6" anchor bolts on a 27" bolt circle. Anchor bolts shall conform to ASTM F1554 gr. 55

The pole assembly shall be equipped with a 6" x 27" reinforced hand hole opening with a 3 gauge cover and shall be attached with four (4) 1/4"-20 hex hd s.s. screws. The bottom of the hand hole shall be located up 14" from the bottom. The hand hole frame shall meet ASTM A529 grade 50 and shall be made from 3/4" x 3 1/2" bar. There shall be a 3/8" diameter rod for wire tie off located at the top of the opening and 1 3/4" from the front of the hand hole frame and also a 1/2" tapped hole located 1 3/4" from the front of the frame at the bottom of the opening as shown on the drawing.

Six (6) 1" i.d. eye rings for power and communication cables are required as shown on the drawing. Two (2) shall be located 38" up from the bottom, two (2) located 6" below the top of the bottom shaft and two (2) 6" below the top of the center shaft.

There shall be a 3 1/2" schedule 40 (4" od) pipe tenon 11 3/4" tall on a 3/8" thick plate welded to the top of the pole. The pipe tenon shall include a 1 3/4" x 5 1/4" slot and two (2) 5/8" holes as shown on the drawing to accommodate the Camera Lowering System arm assembly. A J-hook shall be included inside the top of the tenon assembly and shall include a removable cast aluminum pole top.

Camera Lowering Device

The 50ft camera pole shall not have a lowering device.

General.

The camera lowering system shall be designed to support and lower a standard closed circuit television camera, lens, housing, PTZ mechanism, cabling, connectors and other supporting field components without damage or causing degradation of camera operations. The camera lowering system device and the pole are interdependent; and thus, must be considered a single unit or system. The lowering system shall consist of a pole, suspension contact unit, divided support arm, and a pole adapter for attachment to a pole top tenon, pole top junction box, conduit mount adapter and camera connection box. The divided support arm and receiver brackets shall be designed to self-align the contact unit with the pole center line during installation and insure the contact unit cannot twist under high wind conditions. For maximum arm strength, round support arms are not acceptable. The camera-lowering device shall withstand wind forces of 100mph with a 30 percent gust factor using a 1.65 safety factor. The lowering device manufacturer, upon request, shall furnish independent laboratory testing documents certifying adherence to the stated wind force criteria utilizing, as a minimum effective projected area, the actual EPA or an EPA greater than that of the camera system to be attached. The camera-lowering device to be furnished shall be the product of manufacturers with a minimum of 3 years of experience in the successful manufacturing of camera lowering systems. The lowering device provider shall be able to identify a minimum of 3 previous projects where the purposed system has been installed successfully for over a one-year period of time each.

The lowering device manufacturer shall furnish a factory representative to assist the electrical contractor with the assembly and testing of the first lowering system onto the pole assembly. The manufacturer shall furnish the applicable DOT engineer documentation certifying that the electrical contractor has been instructed on the installation, operation and safety features of the lowering device. The contractor shall be responsible for providing applicable maintenance personnel "on site" operational instructions.

Suspension Contact Unit.

The suspension contact unit shall have a load capacity 200 lbs. with a 4 to 1 safety factor. There shall be a locking mechanism between the fixed and moveable components of the lowering device. The movable assembly shall have a minimum of 2 latches. This latching mechanism shall securely hold the device and its mounted equipment. The latching mechanism shall operate by alternately raising and lowering the assembly using the winch and lowering cable. When latched, all weight shall be removed from the lowering cable. The fixed unit shall have a heavy duty cast tracking guide and means to allow latching in the same position each time. The contact unit housing shall be weatherproof with a gasket provided to seal the interior from dust and moisture.

The prefabricated components of the lift unit support system shall be designed to preclude the lifting cable from contacting the power or video cabling. The lowering device manufacturer shall provide a conduit mount adapter for housing the lowering cable. This adapter shall have an interface to allow the connection of a contractor provided 1.25 inch PVC conduit and be located just below the cable stop block at the back of the lowering device. The Contractor shall supply internal conduit in the pole as directed by the Lowering Device provider. The only cable permitted to move within the pole or lowering device during lowering or raising shall be the stainless steel lowering cable. All other cables must remain stable and secure during lowering and raising operations.

The female and male socket contact halves of the connector block shall be made of Hypalon. The female brass socket contacts and the male high conductivity brass pin contacts shall be permanently molded into the polymer body.

The current carrying male contacts shall be 1/8 inches in diameter. There shall be two male contacts that are longer than the rest which will make first and break last providing optimum grounding performance. The number of contacts shall be a minimum of 14 and shall be fully coordinated with the camera specified elsewhere herein.

The current carrying female contacts shall be 1/8 inches I.D. All of the contacts shall be recessed 0.125" from the face of the connector. Cored holes in the socket measuring 0.25" in diameter and 0.125" deep molded into the connector body are centered on each contact on the face of the connector to create rain-tight seals when mated with the male connector.

The wire leads from both the male and female contacts shall be permanently and integrally molded in the Hypalon body. The current carrying and signal wires molded to the connector body shall be constructed of #18/1 AWG Hypalon jacketed wire.

The contacts shall be self-wiping with a shoulder at the base of each male contact so that it will recess into the female block, thereby giving a rain-tight seal when mated. The facility manufacturing the electrical contact connector must comply with Mil Spec Q-9858 and Mil Spec I-45208.

Lowering Tool.

The camera-lowering device shall be operated by use of a portable lowering tool. The tool shall consist of a lightweight metal frame and winch assembly with cable as described herein, a quick release cable connector, an adjustable safety clutch and a variable speed industrial duty electric drill motor. This tool shall be compatible with accessing the support cable through the hand hole of the pole. The lowering tool shall attach to the pole with one single bolt. The tool will support itself and the load assuring lowering operations and provide a means to prevent freewheeling when loaded. The lowering tool shall be delivered to the State upon project completion. The lowering tool shall have a reduction gear to reduce the manual effort required to operate the lifting handle to raise and lower a capacity load. The lowering tool shall be provided with an adapter for operating the lowering device by a portable drill using a clutch mechanism. The lowering tool shall be equipped with a positive breaking mechanism to secure the cable reel during raising and lowering operations and prevent freewheeling. The manufacturer shall provide a variable speed, heavy-duty reversible drill motor and a minimum of two complete lowering tools plus any additional tools required by plan notes. The lowering tool shall be made of durable and corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

Camera Junction Box

The camera junction box shall be of two piece clamshell design with one hinge side and one latch side to facilitate easy opening. The general shape of the box shall be cylindrical to minimize the EPA. The Camera Junction Box shall be cast aluminum with stabilizing weights on the outside of the box to increase room on the interior. The box shall be capable of having up to 40 pounds of stabilizing weights. The bottom of the Camera Junction Box shall be drilled and tapped with a 1-1/2" NPT thread to accept industry standard dome housings and be able to be modified to accept a wide variety of other camera mountings. The junction box shall be gasketed to prevent water intrusion. The bottom of the box shall incorporate a screened and vented hole to allow airflow and reduce internal condensation.

Materials

All pulleys for the camera lowering device and portable lowering tool shall have sealed, self lubricated bearings, oil tight bronze bearings, or sintered- oil impregnated, bronze bushings. The lowering cable shall be a minimum 1/8-inch diameter stainless steel aircraft cable with a minimum breaking strength of 1740 pounds with (7) strands of 19 wire each.

All electrical and video coaxial connections between the fixed and lowerable portion of the contact block shall be protected from exposure to the weather by a waterproof seal to prevent degradation of the electrical contacts. The electrical connections between the fixed and movable lowering device components shall be designed to conduct high frequency data bits and one (1) volt peak-to-peak video signals as well as the power requirements for operation of dome environmental controls.

The interface and locking components shall be made of stainless steel and or aluminum. All external components of the lowering device shall be made of corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

The Camera Manufacturer shall provide weights and /or counterweights as necessary to assure that the alignment of pins and connectors are proper for the camera support to be raised into position without binding. The lowering unit will have sufficient weight to disengage the camera and its control components in order that it can be lowered properly

Installation of the lowering device and camera shall be included as a part of this item and shall not be paid for separately.

Method Of Measurement. CCTV camera structures shall be counted, each with all appurtenances installed.

Basis Of Payment. This item shall be paid at the contract unit each for CLOSED CIRCUIT TELEVISION CAMERA STRUCTURE, GALVANIZED STEEL, of the mounting height specified.

INTERCEPT EXISTING CONDUIT

Description. This item consists of intercepting an existing conduit or raceway for the purpose of installing a new embedded junction box and/or or making a connection to a new conduit.

General Requirements. Work under this item shall be performed in accordance with Sections 800, 810 and 1088 of the Standard Specifications.

Construction Requirements.

The Contractor shall pull back the existing Fiber Optic cables, Telecommunication cables, or Electrical cables and carefully cut the conduit or raceway so that the cut conduit ends can be installed in a new embedded junction box or new conduit. This item shall include all work necessary to bring the conduit and cables into the new embedded junction box or new conduit. All new conduit required to intercept the existing conduit and make the necessary connections to install the conduit run into the new embedded junction box or new conduit will not be paid for separately and shall be included in this item. The Contractor shall furnish and install all materials for a complete installation.

Method of Measurement. This work will be measured on a per each basis each for conduit end cut.

Basis of Payment. This work will be paid for at the contract unit price per each for INTERCEPT EXISTING CONDUIT, which will be payment in full for the material and work described herein. No additional payment will be allowed for excavation, backfilling, and restoration of a parkway.

REMOVAL OF CABLE FROM CONDUIT

Description. This work shall consist of removal of existing Fiber Optic Cable, Communication Cable, Electrical Cable installed in conduit, underground, embedded, or attached to structure.

Method of Measurement. Removal of Fiber Optic cable, Communication cable, Electrical cable will be measured for payment in feet removed.

Basis of Payment. This work will be paid for at the contract unit price per foot for REMOVE ELECTRIC CABLE FROM CONDUIT as shown on the plans.

COPPER CABLE INTEGRATION – HALSTED SHELTER

Description. This work shall consist of the reassignment of data streams collected and transmitted at the Halsted Street Communications Shelter from existing copper communication cable to existing fiber optic cable.

General Requirements. The Contractor shall perform all wiring and terminations required to move and integrate the Dan Ryan copper phone circuits from the Eisenhower Cross Connect cabinet (designated McD 03) to the existing RFL IMUX 2000 T1 multiplexer located in the Halsted Communications Shelter.

As part of this pay item the Contractor shall supply RFL voice modules, VF-5C, to replenish furnished State Stock materials for the Halsted Communications Shelter and the Traffic Systems Center. There are a total of six (6) DS0 circuits being added to the existing T1 multiplexer. Refer to the Kennedy Core DS0 Circuit table below for the termination schedule.

The work required to move the Dan Ryan circuits from the McD 03 cabinet to the Halsted Communications Shelter shall be performed by the Contractor. The #19 copper cable re-routed from the median into the shelter shall be punched down on the existing Kennedy Core type 66 block using a type 66 block punch down impact tool. Refer to the Kennedy Core DS0 Circuit table below for the termination schedule. The IDOT Traffic Systems Center Engineer will program the VF-5C cards and provision the existing RFL IMUX 2000 T1 Multiplexer for the additional circuits at the Traffic Systems Center and Halsted Communications Shelter. IDOT Traffic Systems Center staff will make the necessary wiring changes/additions at the Traffic Systems Center relative to the change in delivery of the Dan Ryan data from Eisenhower Copper barrier wall cable to Kennedy Core IMUX 2000 T1 chassis.

Kennedy Core 50-Pair Assignments Table

<u>Unit Binder Color Code</u>	<u>25 PAIR BINDER GROUP "BLUE"</u>	<u>25 PAIR BINDER GROUP "ORANGE"</u>
BL-W BLUE-WHITE		Van Buren Transmit -12db Cabinets Z4, Z5, Z6, Z7
O-W ORANGE-WHITE		Van Buren Rec Cabinets Z4, Z5, Z6, Z7
G-W GREEN-WHITE		Adams Transmit -10.8db Cabinets Z8, Z11
BR-W BROWN-WHITE		Adams Rec -0db Cabinets Z8, Z11
S-W SLATE-WHITE		Monroe Transmit -12.0 db Cabinets Y15, Z14
BL-R BLUE-RED		Monroe Rec -0 db Cabinets Y15, Z14
O-R ORANGE-RED		Madison/Washington Transmit -12.8 db Cabinets Y18, Y19, Y22, Y23
G-R GREEN-RED		Madison/Washington Rec -3.0 db Cabinets Y18, Y19, Y22, Y23
BR-R BROWN-RED		Randolph/Lake Transmit -12.5 db

		Cabinets Y26, Y27, Y28, Y30
S-R SLATE-RED		Randolph/Lake Rec -3.0 db
		Cabinets Y26, Y27, Y28, Y30
BL-B BLUE-BLACK		Fly over Speed Trap Transmit cabinet Z1A
O-B ORANGE-BLACK		Fly over Speed Trap Rec cabinet Z1A
G-B GREEN-BLACK		Harrison, Polk, IB Taylor Ramp metering (T) D4, D1, Z2
BR-B BROWN-BLACK		Harrison, Polk, IB Taylor Ramp metering (R) D4, D1, Z2
S-B SLATE-BLACK		OB Taylor Roosevelt (T) C5, C8, C3, C6
BL-Y BLUE-YELLOW		OB Taylor Roosevelt (R) C5, C8, C3, C6
O-Y ORANGE-YELLOW		16, 22, Ford (T) A11, Z10, Z13, Z12, Z14
G-Y GREEN-YELLOW		16, 22, Ford (R) A11, Z10, Z13, Z12, Z14
BR-Y BROWN-YELLOW		S-R Interchange, Normal-26 & Princeton (T) X19, Y18, Y15, Y17, Y16
S-Y SLATE-YELLOW		S-R Interchange, Normal-26 & Princeton (R) X19, Y18, Y15, Y17, Y16
BL-V BLUE-VIOLET		29th St (T) X20, X22, X21, X24
O-V ORANGE-VIOLET		29th St (R) X20, X22, X21, X24
G-V GREEN-VIOLET		Racine, Halsted, Morgan (T) G3, G1, G5, G6, G4, Z3, Z1, Z5, Z4
BR-V BROWN-VIOLET		Racine, Halsted, Morgan (R) G3, G1, G5, G6, G4, Z3, Z1, Z5, Z4
S-V SLATE-VIOLET		

Method of Measurement. Integration work at the Halsted Communication Shelter shall be measured as lump sum.

Basis of Payment. This item shall be paid for at the contract lump sum price for COPPER CABLE INTEGRATION – HALSTED SHELTER, which price shall be payment in full for the work described for a complete seamless integration of the data streams from copper to fiber optic cable. Acceptance shall be granted after integration and after passing an acceptance test proposed by the Contractor, and agreed upon by the Engineer.

CONCRETE BARRIER REMOVAL

Description. This work shall be according to Section 440 of the Standard Specifications with the following additions:

In some locations where existing concrete barrier wall is identified to be removed, additional concrete elements are located immediately adjacent to the barrier. These additional wall elements are located within the CTA Right-of-Way. The additional wall elements are up to 3.5' tall and up to 1' thick. The removal of the additional wall elements shall be included in the cost of CONCRETE BARRIER REMOVAL

REMOVAL OF EXISTING STRUCTURES NO. 1

Description. This item shall consist of furnishing all labor, equipment and materials necessary for the removal and disposal of the existing Retaining Wall 10 (S.N. 016-Z029) along Interstate 290 according to the station limits shown on the Plans. The work shall be done in accordance with the applicable portions of Section 501 of the Standard Specifications, as described herein, as shown on the Plans, and as directed by the Engineer.

All structure elements of existing Retaining Wall 10 along I-290 between the station limits stated on the Plans including, but not limited to, steel railing, concrete stem, concrete footing, and piles (to a depth as noted on the Plans or directed by the Engineer) shall be included in Removal of Existing Structures.

Included in the Removal of Existing Structures shall be the removal of items and appurtenances located on, attached or adjacent to the wall including, but not limited to existing conduits and gas main riser shaft attached to the wall.

Prior to commencing work under this Item, the Contractor shall verify the location of all existing utilities in the area. Utilities identified during design are shown on the drawings. The final location of utilities is the responsibility of the Contractor and is included in this Item. The Contractor shall submit drawings and written documentation to the Engineer of such verification. All work under this Item shall be executed in such a manner so as not to disturb or damage the existing utilities.

The Contractor shall exercise care when removing the existing Retaining Wall 10 to ensure that all portions of the existing wall, water main, and AT&T duct to remain in place are not damaged. Any damage to the wall, water main, or utilities shall be repaired by the Contractor to the satisfaction of the Engineer, the Chicago Department of Water Management (CDWM), and AT&T at the Contractor's expense.

Included in the Removal of Existing Structures, the Contractor shall coordinate with the Engineer and the Illinois Department of Transportation on the removal of the existing lighting units and overhead sign structure attached to existing Retaining Wall 10. The removal of the existing lighting units shall be included in REMOVAL OF LIGHT UNIT, SALVAGE. The removal of the overhead sign structure shall be included in REMOVE OVERHEAD SIGN STRUCTURE - SPAN.

Included in the Removal of Existing Structures, the Contractor shall coordinate with the Engineer and People's Gas on the removal of the existing gas main riser shaft attached to existing Retaining Wall 10.

The work shall conform in every respect to all environmental, state and local regulations regarding construction requirements, the protection of adjacent properties, as well as dust and noise control.

All materials removed under this Item, unless specified otherwise in the Contract Specifications and the Plans, shall become the property of the Contractor and shall be disposed of by the Contractor off the site and in a lawful manner meeting all IDOT Policies and Procedures.

Traffic Operations. The traffic using Interstate I-290 must remain open to all lanes of traffic during demolition activities unless the Contractor has secured the necessary permits from the Illinois Department of Transportation to allow for temporary closure of lanes.

Method of Measurement. No separate measurement will be made for removal of existing structures. Excavation of earth necessary to perform the removal of existing structures is included and will not be measured for payment.

Basis of Payment. The work under this Item will be paid for at the Contract unit price each for REMOVAL OF EXISTING STRUCTURES NO. 1, as indicated on the Plans and as specified herein.

REMOVAL OF EXISTING STRUCTURES NO. 2

Description. This item shall consist of furnishing all labor, equipment and materials necessary for the removal and disposal of the existing Retaining Wall 13 (S.N. 016-Z046) along Interstate 290 according to the station limits shown on the Plans. The work shall be done in accordance with the applicable portions of Section 501 of the Standard Specifications, as described herein, as shown on the Plans, and as directed by the Engineer.

All structure elements of existing Retaining Wall 13 along I-290 between the station limits stated on the Plans including, but not limited to, steel railing, concrete stem, concrete footing, and piles (to a depth as noted on the Plans or directed by the Engineer) shall be included in Removal of Existing Structures.

Included in the Removal of Existing Structures shall be the removal of items and appurtenances located on, attached or adjacent to the wall including, but not limited to existing conduits and junction boxes attached to the wall.

Prior to commencing work under this Item, the Contractor shall verify the location of all existing utilities in the area. Utilities identified during design are shown on the drawings. The final location of utilities is the responsibility of the Contractor and is included in this Item. The Contractor shall submit drawings and written documentation to the Engineer of such verification. All work under this Item shall be executed in such a manner so as not to disturb or damage the existing utilities.

The Contractor shall exercise care when removing the existing Retaining Wall 13 to ensure that all portions of the existing wall to remain in place are not damaged. Any damage to the remaining portion of the wall shall be repaired by the Contractor to the satisfaction of the Engineer at the Contractor's expense.

The work shall conform in every respect to all environmental, state and local regulations regarding construction requirements, the protection of adjacent properties, as well as dust and noise control.

All materials removed under this Item, unless specified otherwise in the Contract Specifications and the Plans, shall become the property of the Contractor and shall be disposed of by the Contractor off the site and in a lawful manner meeting all IDOT Policies and Procedures.

Traffic Operations. The traffic using Interstate I-290 must remain open to all lanes of traffic during demolition activities unless the Contractor has secured the necessary permits from the Illinois Department of Transportation to allow for temporary closure of lanes.

Method of Measurement. No separate measurement will be made for removal of existing structures. Excavation of earth necessary to perform the removal of existing structures is included and will not be measured for payment.

Basis of Payment. The work under this Item will be paid for at the Contract unit price each for REMOVAL OF EXISTING STRUCTURES NO. 2, as indicated on the Plans and as specified herein.

TEMPORARY SOIL RETENTION SYSTEM

Description. This work shall consist of designing, furnishing, installing, and subsequent removal of the temporary soil retention system according to the dimensions and details shown on the Plans and in the approved design submittal. The work shall be according to Section 522.07, except as noted in the construction restrictions listed herein and on the drawings.

General. The design shall consider the restrictions on the installation of all components of the temporary soil retention system. These installation restrictions are listed in the next section of this special provision and in the "CONSTRUCTION VIBRATION MONITORING" special provision.

Construction. The Contractor shall verify locations of all underground utilities and soil retention systems left in place from previous contracts before installing any of the soil retention system components or commencing any excavation. Any disturbance or damage to existing structures, utilities or other property, caused by the Contractor's operation, shall be repaired or remediated by the Contractor as approved by the Engineer at no additional cost to the Department. Utility and existing structure information shown on the drawings was collected from information available at the time of the design. There is no guarantee of complete accuracy with the utility or structure locations or types.

The temporary soil retention system must be installed without the use of impact-type pile drivers. The location of the temporary soil retention system as shown on the drawings is in a highly sensitive populated area with the potential for damage to adjacent older structures. The proposed equipment and procedures used for installation of sheet piles or other underground support components must be submitted to the Engineer for approval prior to their use. It is anticipated that vibratory equipment may be utilized in performing the work, subject to requirements of other sections of this specification. Contractor shall also submit any documentation available regarding the operating noise levels and operating vibration characteristics of the equipment proposed, prior to approval of the Engineer.

The approval of the equipment and procedure by the Engineer does not guarantee the performance in the field of the equipment will be acceptable. If, in the judgment of the Engineer, the noise and/or vibration effects exceed those required by the local residents, then the Contractor must halt production and find a remedy suitable to the Engineer. Threshold values for vibration monitoring are included in the special provision "CONSTRUCTION VIBRATION MONITORING." The costs incurred finding suitable equipment and procedures shall be included in the cost of this item. No additional costs shall be paid for this effort.

At the bottom of the temporary soil retention systems the Contractor shall be required to install a sump pit or a sedimentation basin as per the Illinois Urban Manual Details included in the plans. All water runoff or groundwater shall be directed to either the sump pit or sedimentation basin before it enters the drainage systems along I-90/I-94 or I-290. If the Contractor uses a sump pit and is pumping the water out of the pit, a filter bag shall be required at the end of the pump discharge hose to ensure that sediment does not enter the storm sewer systems along I-90/I-94 or I-290. Dewatering and draining areas along the temporary soil retention systems shall not be paid for separately but shall be included in the cost of TEMPORARY SOIL RETENTION SYSTEM.

If an obstruction is encountered, the Contractor shall notify the Engineer and upon concurrence, the Contractor shall begin working to break up, push aside, or remove the obstruction. An obstruction shall be defined as any object (such as but not limited to, boulders, logs, old foundations etc.) where its presence was not obvious or specifically noted on the Plans prior to bidding, that cannot be driven or installed through or around, with normal driving or installation procedures, but requires additional excavation or other procedures to remove or miss the obstruction.

Method of Measurement. Any temporary soil retention system installed beyond dimensions shown on the Plans or the approved Contractor's design without the written permission of the Engineer, shall not be measured for payment but shall be done at the Contractor's own expense.

Basis of Payment. This work will be paid for at the contract unit price per square foot for TEMPORARY SOIL RETENTION SYSTEM.

Obstruction mitigation for other than the known obstructions stated on the Plans shall be paid for according to Article 109.04 of the Standard Specifications.

STORM SEWERS JACKED IN PLACE

Description. This work shall consist of furnishing and installing, by jacking, storm sewers of the required inside diameter at locations shown in the Plans.

Materials: The materials shall be in accordance with Section 552.02 of the IDOT Standard Specifications.

Submittals: The Contractor shall submit calculations, drawings and details for the design and construction of the pipes via jacking for review and approval, including but not limited to:

- 1) Sheeting, bracing, or shoring for the jacking and receiving pits,
- 2) Dewatering,
- 3) Thrust blocks for pipe jacking,
- 4) Casing or liner design if casing or liner is used and,
- 5) All other materials and equipment necessary for a complete installation

All submittals shall be signed and sealed and by an Illinois licensed Structural Engineer employed by the Contractor for Engineer review and approval. The submittals shall indicate loads, codes and specifications to confirm that the design conforms to the applicable codes and design requirements. The submittal must be approved prior to the commencement of this work.

The Engineer's review shall not relieve the Contractor of his responsibility for the design of the jacking system.

Construction Requirements: The Contractor shall evaluate the subsurface soil conditions from the soil boring logs prior to submitting means and methods for constructing the pipes via jacking. The resistance which the soil can provide to the jacking loads may be estimated from the allowable passive pressures. A minimum factor safety of 2 should be considered for this application. If enough resistance is not available, additional ground improvement measures may be required to provide additional lateral resistance to withstand the jacking loads.

The jacking/receiving pit sizes shall not exceed the maximum dimensions as shown in the Plans and shall meet Occupational Safety and Health Administration (OSHA) construction requirements. A stabilized work platform shall be constructed in the jacking/receiving pit based on the Contractor's methods and equipment to be used.

Storm sewers, of the type and size specified, shall be jacked in a continuous operation. The construction may be accomplished by jacking the storm sewer, or if the Contractor elects, a metal liner of sufficient strength and size first, then the storm sewer installed inside the liner. If the liner is used, it shall remain in place to support the embankment, and the voids between the liner and the sewer pipe shall be completely filled with sand or grout mixture as approved by the Engineer. The grout mixture shall be one part cement and two parts sand mixed with water. The diameter of the metal liner, if used, shall not exceed the outside diameter of the storm sewer by more than 6 in. (150 mm).

If continuous jacking operation cannot be maintained, the Contractor shall take the necessary precautions for not allowing the jacked pipe to freeze in place.

Any temporary retention system required to support jacking and receiving pit excavation shall be designed and constructed per Article 522.07 of the Standard Specifications. The Plans include schematic layouts of proposed temporary soil retention systems for information only. The Contractor shall evaluate the actual size of required jacking and receiving pits based on intended means and methods. The design calculations, site layout and shop drawings for the temporary soil retention system proposed by the Contractor shall be submitted according to Article 522.05 of the Standard Specifications. This approval will not relieve the Contractor of responsibility for the safety of the excavation and structural adequacy of adjacent properties. Approval shall be contingent upon acceptance by all involved utilities and/or CTA.

The Contractor shall design a temporary soil retention system such that at any location the maximum total lateral deflection at the top of the temporary soil retention system shall not exceed 0.25 inch. The Plans include soil boring log data within the vicinity of the project. If deemed necessary, the Contractor shall obtain additional geotechnical data at no additional cost to the contract.

All sheeting, bracing, shoring, jacking frame, guide rails, backstop, shields, sleeves, and other materials necessary for the complete installation of the storm sewer shall be of sufficient strength to support the loads that are to be imposed on them.

The types, sizes, and number of jacks, jacking pit, and other equipment used shall be such as to exert sufficient force to overcome the greatest resistance to be encountered, considering both weight of the pipe or liner and the friction on its exterior surface. Lubricants, if required, may be used to decrease the frictional resistance on the exterior surface of the pipe being jacked. Suitable lubricants may be applied directly to the surface or through 1/2 in. (13 mm) nipples through holes drilled in the cutting shield at the lead pipe.

Care shall be taken in arranging the jacking equipment and struts to ensure that thrust is applied parallel with the centerline of the pipe or liner or as approved by the Engineer. A jacking head or collar shall be used to apply pressure from the jack to the pipe or liner. Pressure applied with the metal of the jack in direct contact with concrete pipe will not be permitted.

A cutting edge at least 1/2 in. (13 mm) greater in diameter than the pipe or liner being jacked shall be provided for the leading pipe or liner. The upper half of the cutting edge shall project beyond the pipe or liner end to support the embankment. Excavation within the jacked pipe or liner shall be performed in such a manner as to not increase the excavated diameter larger than the pipe or liner being jacked. Excavation shall not be carried beyond the end of the cutting edge of the pipe or liner. Any holes provided in the lead pipe to attach the cutting edge shall be properly filled with plug and mastic as approved by the Engineer after completion of the jacking operation and removal of cutting edge.

As each succeeding pipe section is placed against the previously jacked pipe, a 1/2 in. (13 mm) manila rope or other suitable material shall be inserted throughout the entire groove of the joint and set in place with asphalt mastic. The opening on the inside of the pipe shall be mortared with a mixture composed of one part cement to three parts sand, by volume, based on dry materials, after the complete sewer has been jacked in place. Any other method of jointing must be approved by the Engineer prior to the start of construction.

The alignment and elevation of the forward end of the pipe shall be checked at regular intervals as work proceeds and appropriate measures immediately taken to correct any observed deviation. When the Contractor elects to jack a metal liner prior to installing the storm sewer, all earth and other foreign material shall be removed from inside the liner. The storm sewer sections shall be installed by jacking the sections through the liner.

Any change in elevation of the pavement and/or shoulders of 0.25 inches or greater due to jacking operations shall be corrected by the Contractor at his/her own expense. Correction can be made by grinding for increases in elevation or asphalt milling and overlay for decreases in elevation.

The Contractor will also be required to collect and dewater any accumulated groundwater seepage in the pits.

When executing this work, the Contractor must monitor adjacent buildings for vibration and displacement and follow the related requirements and restrictions as outlined in the CONSTRUCTION VIBRATION MONITORING Special Provision.

Based on the available soil borings, soft clays may be encountered at the base of the jacking/receiving pits. When soft clays are encountered, the Contractor shall remove the soft clay and replace it with a stabilized stone to provide a stable working platform for the equipment. Prior to placement of the stabilized stone, a geotextile fabric for ground stabilization shall be placed on the ground surface. The depth of the soft clay which is to be removed shall be measured in the field based on the method and equipment that is to be used.

For estimating purposes, it is assumed that 24 inches of soft clay will need to be removed and replaced with stabilized stone. The stabilizing stone shall consist of 3 inches of capping aggregate meeting the CA 06 or CA 10 gradation and 21 inches of crushed gravel, crushed stone, or crushed concrete. Where greater than 24 inches of stabilized stone is required, rounded gravel meeting the CS01 gradation may be used beginning at a depth of 24 inches below the top of the capping aggregate.

The soft clay shall be considered unsuitable material and be removed and disposed of according to Article 202.03 of the Standard Specifications.

The geotextile fabric shall meet the requirements of and be installed according to Section 210 of the Standard Specifications.

The stabilized stone shall meet the requirements of and be placed according to the AGGREGATE SUBGRADE IMPROVEMENT (D1) Special Provision.

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

Excavation in rock will be measured for payment according to Article 502.12 of the Standard Specifications.

Removal of the soft clay will be measured for payment according to Article 202.07 of the Standard Specifications.

The geotechnical fabric for ground stabilization shall be measured for payment according to Article 210.05 of the Standard Specifications.

The stabilized stone shall be measured for payment according to Article 311.08 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price per foot for STORM SEWERS JACKED IN PLACE, of the diameter specified. The unit price shall include all labor, materials, and equipment necessary to jack the storm sewers.

Excavation in rock will be paid for according to Article 502.13 of the Standard Specifications.

Removal of the soft clay will be paid for at the contract unit price per cubic yard for REMOVAL AND DISPOSAL OF UNSUITABLE MATERIAL.

The geotechnical fabric for ground stabilization will be paid for according to Article 210.06 of the Standard Specifications.

The top 24 inches of stabilized stone will be paid for at the contract unit price per square yard for AGGREGATE SUBGRADE IMPROVEMENT 24". Any additional stabilized stone required beyond 24 inches in depth will be paid for at the contract unit price per cubic yard for AGGREGATE SUBGRADE IMPROVEMENT.

ORNAMENTAL FENCE, WROUGHT IRON

Description. This work shall consist of furnishing and installing a new fence along Morgan Street just north of Harrison Street to match the existing fence at the locations shown in the Plans including all posts, accessories, appurtenances, fittings, fasteners, braces, footings, backfill, labor and equipment required to install the fence.

Construction Requirements. This work shall be done in accordance with the applicable portions of Section 664 of the Standard Specifications. Fence post installation in soil shall be done using concrete footings having a minimum depth of 36 inches or as directed by the Engineer.

Materials. All new fence materials and style shall match the existing fence to be removed in kind to the satisfaction of the Engineer. In general, this fence shall be a wrought iron fence and painted black. Any modifications or substitutions will not be allowed unless previously agreed to by the Engineer.

Method of Measurement. ORNAMENTAL FENCE, WROUGHT IRON shall be measured for payment in feet along the top of the fence from center to center of end post, including the length occupied by gates.

Basis of Payment. This work will be paid for at the contract unit price per foot for ORNAMENTAL FENCE, WROUGHT IRON, which price shall include all equipment, labor, and materials necessary to furnish and install the fence, including posts, accessories, appurtenances, fittings, fasteners, braces, footings, and backfill.

CTA FENCE

Description. This work shall consist of fabricating, furnishing and erecting Chain Link Fence attached to the back of concrete barrier walls in locations shown in the Plans or as directed by the Engineer. This work shall conform to the applicable portions of Sections 509, 584, and 664 of the Standard Specifications and as modified herein.

General Requirements. Prior to fabrication or ordering materials, the Contractor shall submit detailed shop drawings to the Engineer for approval as described in Article 505.03 of the Standard Specifications; including but not limited to materials, fittings, attachments, anchors and accessories required for complete assembly of the fence as shown in the Plans.

The shop drawings shall include a proposed layout of all fence elements and include detailed dimensions to account for the proposed installation, including adjustments around light pole bumpouts and other obstructions along the concrete barrier wall.

Materials. Materials shall meet the requirements of Section 1000 of the Standard Specifications.

Fabric: The fabric shall be woven in 2 inch mesh with 9 gauge wire, aluminum coated steel.

Coatings: The tension wire and fabric ties shall be vinyl or polyolefin coated. The posts, post tops, base and cap plates, railings, braces, track, stretcher bars, fittings and hardware shall either be vinyl, polyolefin or polyester powder coated. All vinyl or polyolefin coating shall be according to the same requirements as the coating of the fabric. All material shall be galvanized prior to vinyl, polyolefin or polyester powder coating according to ASTM F1043.

Posts, post tops, base and cap plates, railings, braces, stretcher bars, fittings and hardware shall be hot dip galvanized or galvanize coated after fabrication according to Articles 1006.27, 1006.28 and 1006.34 of the Standard Specifications and ASTM F1043.

Vent holes for galvanizing shall be placed in the posts and rails at locations that will not allow the accumulation of moisture in the members.

All fence elements are to be supplied as shown in the Plans and approved by the Engineer.

Installing Posts. The Contractor shall locate the post according to the spacing shown in the contract plans. The posts shall be anchored to the concrete barrier as shown in the Plans. Expansion bolts shall be approved by the Engineer prior to the start of installation.

Fabrication and Erection. Steel railings shall be fabricated, inspected, stored and erected in accordance with the provisions of Articles 509.01, 509.03 and Section 505. Openings between railing components and adjacent surfaces shall not exceed 2" unless otherwise noted on drawings or required by structural design regarding expansion movement.

Method of Measurement. CTA FENCE shall be measured in feet along the top of the fence, from center to center of end posts installed and accepted.

Basis of Payment. This work shall be paid for at the contract unit price per foot for CTA FENCE, which price shall be payment in full for all shop and fabrication drawings, materials, fabricating and installing the complete fence including the gate posts, base plates, fittings, chain link fabric, anchorage, hardware, grounding and other incidentals for the fence, as specified herein.

VIDEO TAPING OF MAIN DRAIN

Description. This work will consist of televising the main storm sewer systems before and after construction as shown on Plans.

Requirements. The Contractor must furnish a videotape of a televised inspection of the interior of all existing main drain storm sewers within the areas of construction under this contract. The limits of main drain recording shall extend between the access points identified on the Plans. Record the videotape under the supervision of the Engineer. Perform two sessions of videotaping of the sewer: 1) prior to the start of construction, and 2) at the completion of major construction and at a time agreed upon by the Engineer. The main drains were previously videotaped in previous contracts. The Contractor may elect to not videotape the section of main drain not required to be cleaned and accept the previous video as the video to establish existing condition.

The name, phone number, and contact person of the firm which will be performing the videotaping of the sewer must be provided by the Contractor at the pre-construction meeting.

After the completion of construction, the main drain shall be videotaped to document post-construction condition. After review by the Engineer, any damage uncovered during the post-construction video not previously shown in the pre-construction video shall have repair plans developed by the Contractor for review. After approval of repair plans, the Contractor shall complete all repairs within sixty (60) days. All costs incurred by the Contractor to make the required repairs are to be borne solely by the Contractor. The Contractor is required to then re-videotape the sewer to verify that the deficiencies noted on the post-construction videotape have been corrected to the satisfaction of the Engineer. All costs to re-videotape the sewer, regardless of the number of times required, will be borne solely by the Contractor.

Include location maps, legends and descriptions on all videotape submittals. 2 copies of each submittal are required.

Method of Measurement. This work will be measured for payment for sewer televising per foot for the videotaping of the sewer before construction and at the completion of construction.

Basis of Payment. This work will be paid for at the contract unit price per foot for the VIDEO TAPING OF MAIN DRAIN. The price shall include all costs for equipment and labor to perform videotaping and all traffic control necessary to enter or exit main drain structures.

TELEVISION INSPECTION OF SEWER

Description. This work will consist of televising the storm sewer and combined sewer systems before and after construction as specified in the contract drawings.

Requirements. The Contractor must furnish a videotape of a televised inspection of the interior of all existing storm and combined sewers which may be impacted during construction under this contract. Record the videotape under the supervision of the Engineer. Perform two sessions of videotaping of the sewer: 1) before construction and 2) prior to the placement of final wearing surface.

The name, phone number, and contact person of the firm which will be performing the videotaping of the sewer must be provided by the Contractor at the pre-construction meeting.

Clean all sewers prior to videotaping before construction. The final acceptance of the sewer shall be based on the sewer videotape. All deficiencies exposed on the videotape must be corrected by the Contractor within 30 calendar days of notification. All costs incurred by the Contractor to make the required repairs are to be borne solely by the Contractor. The Contractor is required to re-videotape the sewer to verify that the deficiencies noted on any previous videotape have been corrected to the satisfaction of the Chicago Department of Sewers. All costs to re-videotape the sewer, regardless of the number of times required, will be borne solely by the Contractor.

Every effort is to be made by the Contractor to correct all deficiencies prior to the placement of the final wearing surface. If, in the opinion of the Engineer, the Contractor has delayed in submitting the videotape, the placement of the final wearing surface may be suspended. No time extension will be granted due to this suspension and the Engineer will be sole judge as to any delays.

Include location maps, legends and descriptions on all videotape submittals. 2 copies of each submittal are required.

Method of Measurement. This work will be measured for payment in sewer televising per foot for the videotaping of the sewer before construction and prior to placement of the final wearing surface.

Basis of Payment. This work will be paid for at the contract unit price per foot for the TELEVISION INSPECTION OF SEWER.

The cleaning of sewers prior to videotaping before construction shall be paid for as STORM SEWERS TO BE CLEANED, of the diameter specified or COMBINED SEWERS TO BE CLEANED.

CLASS SI CONCRETE (MISCELLANEOUS)

Description. This work shall consist of providing equipment, materials and labor required to install a cast-in-place concrete fascia wall with concrete reveals at locations shown on the drawings and/or designated by the Engineer. It includes all reinforcing bars, stud shear connectors, timber lagging, waterproofing, preformed joint filler, and drainage-related elements required for the construction of the complete wall as shown on the drawings.

General. Contractor shall construct completely the fascia wall as shown on the drawings and in conformance with Standard Specifications. The Contractor shall construct the timber lagging and all connections to the drilled shaft (henceforth referred to as the lagging system). The Contractor shall submit calculations and details of the connections to the Engineer for approval. The calculations shall be prepared and sealed by an Illinois Licensed Structural Engineer. This task is included in CLASS SI CONCRETE (MISCELLANEOUS).

Construction Requirements. Construction requirements for elements of the fascia wall complete shall conform to the following:

- a) FalseworkSection 503.05
- b) Forms.....Section 503.06
- c) Placing and Consolidating.....Section 503.07
- d) Construction Joints.....Section 503.09
- e) Expansion JointsSection 503.10
- f) Drainage Openings.....Section 503.11
- g) Non-Metallic Water Seals.....Section 503.12
- h) Surface Finish.....Section 503.15
- i) CuringSection 503.17
- j) WaterproofingSection 503.18
- k) Protective Coat Application.....Section 503.19
- l) Stud Shear ConnectorsSection 505.08
- m) Timber StructuresSection 507
- n) Reinforcing BarsSection 508

Fascia Wall shall be constructed in accordance with the requirements of Section 503-Concrete Structures.

After installation of the drilled shafts and after excavation has exposed the shafts to plan dimensions, inspect the shafts for quality of concrete and suitability of surface for installation of dowel bars. Patch all honeycombed or voided areas in order to provide sound surface for installation of dowel bars and drainage materials. Concrete repair materials and installation methods shall be submitted for approval to the Engineer. This work is considered included in this pay item.

Where timber lagging is called for in the drawings and /or the approved design, the Contractor shall furnish lagging materials and all connections to drilled shafts as required. Remove loose soil from and between caissons. Install lagging from the top down as excavation proceeds. Minimize over-excavation and backfill voids created using dry loose sand. Nominal thickness of the lagging shall not be less than 3 inches. The Contractor shall be responsible for the performance of the lagging system until the facing is installed. Alternative equivalent systems may be submitted for approval by the Engineer.

Furnish and install reinforcing bars, dowel bars, and stud shear connectors. Furnish and install drainage structures as shown on the drawings. Alternative equivalent systems shall account for drainage.

Contractor shall provide calculations and drawings for the concrete fascia formwork support during installation and curing. The calculations shall be stamped by an Illinois Licensed Structural Engineer. The formwork support system shall be reinforced against bulging and shall maintain the plumb and line of the wall as described in the contract documents.

Place expansion and/or control joints as described on the drawings and Standard Specifications. Horizontal construction joints are not allowed.

Formwork shall become the property of the Contractor after use.

Materials. Materials shall be as designated in Section 503.02 except as modified herein.

Concrete shall conform to Section 1020, and shall conform to Class SI concrete mix.

Furnishing and installing dowels into drilled shafts that support or reinforce the wall as shown on drawings or is needed in lagging design is included in this pay item.

Stud shear connectors shall conform to Section 1006.32. Furnishing and installing stud shear connectors onto permanent casing is included in this pay item.

Preformed flexible foam expansion joint filler shall conform to Section 1051.09, and is included in this pay item.

Drainage related items as shown on the drawings are included in this pay item, including drainage board, geo-composite wall drains, water-stops, vapor barrier and other separator sheets. Wall drainage-related items shall conform to Standard Specification 1040. Installation of geo-composite wall drain materials shall conform to Standard Specifications section 591, except that the drains shall be fastened to the shafts with wall nails or other suitable method as directed by the Engineer.

Untreated timber lagging shall meet the requirements of Section 1007.03 and the inspection requirements of Section 1007.01. Timber fastenings shall meet the requirements of Section 1006.17. Minimum design strength of the structural timber shall be 1000 PSI.

Method of Measurement. The work included in CLASS SI CONCRETE (MISCELLANEOUS) shall be measured in place and the volume computed in cubic yards of fascia wall from base of wall to the top of the poured wall. The width of the wall varies from point of tangency to drilled shafts to maximum thickness between drilled shafts as shown on the drawings. Concrete reveals will not be measured, but shall be considered included in the pay item. Additional concrete required due to out of alignment of the drilled shafts shall not be included in the measurement.

Dowel bars, reinforcing bars, stud shear connectors, untreated timber lagging, preformed joint filler, drainage board, additional backfill for voids created during construction, geo-composite wall drains or any other appurtenances required for the completed wall will not be measured separately but shall be included in this pay item.

Untreated Timber Lagging shall not be measured or paid for separately but shall be included in this pay item.

Basis of Payment. The work will be paid for at the contract unit price per furnished and installed CUBIC YARD of concrete for CLASS SI CONCRETE (MISCELLANEOUS).

TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY)

Description. This work shall consist of furnishing, placing, and maintaining precast concrete barrier at locations specified in the Plans. This work shall be completed in accordance with the applicable portions of Section 704 of the Standard Specifications, the TEMPORARY CONCRETE BARRIER BDE special provision and as noted herein.

Installation. The precast concrete barrier shall be installed according to Section 704.04 of the Standard Specifications and the revisions noted in the BDE special provision. The precast concrete barrier shall not be removed at the end of the contract. After the Contract is closed, the Contractor shall leave the existing barrier in place and ownership and maintenance of barrier shall be transferred over to the Department.

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).

Temporary pavement marking on the lower slope of the temporary concrete barrier wall will be measured and paid for as TEMPORARY PAVEMENT MARKING, 6".

All prismatic barrier wall reflectors will be measured and paid for according to Section 782 of the Standard Specifications.

Method of Measurement. TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY) shall be measured for payment per foot. Anchor pins, except for the six anchor pins for the barrier unit at each end of an installation, will be measured for payment as each, per anchor pin installed.

Basis of Payment. This work shall be paid for at the contract unit price per foot for TEMPORARY CONCRETE BARRIER (TO REMAIN PERMANENTLY), which price shall include all labor, equipment, and materials necessary to furnish and place precast concrete barrier. Anchor pins, except for the six anchor pins for the barrier unit at each end of an installation, will be paid for at the contract unit price per each for PINNING TEMPORARY CONCRETE BARRIER.

STEEL RAILING REMOVAL

Description. This work shall consist of all material, labor and equipment required for the removal and disposal of existing steel railing attached to retaining wall. The work shall be done in accordance with the applicable portions of Section 501 of the Standard Specifications, as described herein, and as shown on the Plans.

General. The existing steel railing, including, but not limited to, posts and connecting hardware, shall be removed and disposed of by the Contractor as indicated on the Plans.

All materials removed under this Item shall become the property of the Contractor and shall be disposed of by the Contractor off the site and in a lawful manner meeting all IDOT Policies and Procedures.

Method of Measurement. The removal of steel railing shall be measured for payment in place in feet. The length measured will be the overall length along the top longitudinal rail element through all posts and gaps.

Basis of Payment. This work shall be paid for at the contract unit price per foot for STEEL RAILING REMOVAL.

CLEANING EXISTING SEWERS AND DRAINAGE STRUCTURES

Description. All existing storm sewers and combined sewers shall be considered as sewers insofar as the interpretation of this Special Provision is concerned. When specified for payment, the location of sewer to be cleaned will be shown on the plans.

All existing drainage structures which are to be adjusted or reconstructed shall be cleaned according to Article 602.15 of the Standard Specifications. This work will be paid for in accordance with Article 602.16 of the Standard Specifications.

All existing sewers which are specified to be cleaned on the plans will be cleaned according to Article 602.15 of the Standard Specifications.

Method of Measurement. This work will be measured for payment in feet for the length of sewer that is to be cleaned.

Basis of Payment. This work will be paid for at the contract unit price per foot for STORM SEWERS TO BE CLEANED, of the diameter specified, or at the contract unit price per foot for COMBINED SEWERS TO BE CLEANED.

SLOPE INCLINOMETER

Description. This work shall consist of furnishing, installing, and maintaining slope inclinometer casings to obtain measurements of lateral movements of foundation and retained soils during the construction of permanent retaining walls. The slope inclinometers shall be located as close to the front face of retaining wall as possible. Slope inclinometer casing shall be located according to the Plans or as approved by the Engineer.

Materials. The slope inclinometer casing is comprised of nominal 2.75-inch diameter PVC casing with a coupling system that produces strong, flush joints that won't pull apart, twist out of alignment, or break if subjected to bending. The casing joints shall be equipped with o-ring seals and shall not leak or break under the pressure of grout. The casing joints shall be able to withstand 1,200 pounds of tension, 20 foot-pounds of torque, and a bending moment of 120 foot-pounds, and a pressure of 160 pounds per square inch (psi).

The inside of the casing shall have spiral-free, machine broached grooves spaced at 90 degrees that are continuously aligned along the full length of the casing. The grooves shall be of sufficient depth, width, and consistency to provide repeatable positioning of the inclinometer probe used to measure lateral movement of the casing at various depths.

The casing shall be capped top and bottom. A lockable, protective cover shall be installed at the ground surface to protect the inclinometer casing. Locations with construction traffic shall be protected by at least three bumper posts.

Construction Requirements. The inclinometer borehole shall be drilled from the top of existing grade elevation to a minimum of 5 feet into the bedrock with a minimum nominal inside diameter of 4.0 inches. The inclinometer casing shall be installed in the borehole with the guide grooves aligned parallel and perpendicular to the excavation face. The casing sections shall be assembled at the borehole. Use pipe clamps to hold the casing at the borehole collar while adding the next section of casing. Do not pre-connect the entire length of casing and drop into the hole, as this can result in damage to the casing.

Casing will float in a water-filled borehole, so the casing shall be filled with water to install it down hole. When grout is pumped into the hole, however, the casing will again begin to float. Hold the casing in place by using a casing anchor or lowering a steel pipe to the bottom of the casing. Do not force or hold the casing collar down using the drill rig or other top-down method, or the casing is likely to be compressed and lose its straightness.

Grouting shall be performed using a mixer, grout pump, and a pipe or hose for delivering the grout. Grout shall not be mixed by hand, and the water pump on the drill rig shall not be used to deliver the grout. A properly mixed grout shall be free of lumps and thin enough to pump but thick enough to set in a reasonable length of time. If the grout is too watery, it will shrink excessively, leaving the upper portion of the borehole un-grouted.

Grout mixes are provided in the following tables for hard to medium stiff soils and for soft soils. Mix the cement with water first. Then mix in the bentonite. Adjust the amount of bentonite to produce a grout with the consistency of heavy cream. The mix for hard to medium stiff soils has a 28-day compressive strength of about 100 psi, similar to hard clay. The mix for soft soils has a 28-day compressive strength of about 4 psi, similar to very soft clay.

Bentonite-Cement Grout for Hard to Medium Stiff Soils		
Materials	Weight	Ratio by Weight
Portland Cement	94 lb (1 bag)	1
Bentonite	25 lb (as required)	0.3
Water	30 gallons	2.5

Bentonite-Cement Grout for Soft Soils		
Materials	Weight	Ratio by Weight
Portland Cement	94 lb (1 bag)	1
Bentonite	39 lb (as required)	0.4
Water	75 gallons	6.6

The grout can be installed by either pre-grouting the hole or using an external grout pipe. In pre-grouting, the grout is pumped into the hole first, the grout pipe retrieved, and then the inclinometer casing lowered into the hole. Keep the casing filled with water to counteract buoyancy and grout pressure. Lower a steel pipe to the bottom of the casing to counteract buoyancy, allow the grout to set, top off the borehole with grout, and install the protective cover. When using an external grout pipe, first lower the inclinometer casing to the specified depth, then lower the grout pipe to the bottom of the hole and pump in grout. Add water into the casing to match the grout level. Take measures to counteract buoyancy but do not force the inclinometer casing down from the top, let the grout set with inclinometer casing anchored from the bottom, and install the protective cover.

The protective cover shall have an approximate 2.5-foot stickup beyond the highest ground level during construction and be lockable. The top of the inclinometer casing must extend 1 to 2 inches above the protective cover when the cover is opened, so that a pulley system can be installed on the casing when taking measurements with the inclinometer probe.

Monitoring Requirements. The Contractor shall record all observations and measurements required to determine ground movements throughout the wall construction. Inclinator probe measurements are made by lowering the inclinometer probe to the bottom of the casing and then slowly raising the probe by recording measurements every two feet up the casing.

A baseline set of readings shall be taken at least seven days before the beginning of wall construction to be used as a reference to determine ground movements. The baseline set will be the average of three sets of readings. Each set of readings will consist of inclinometer probe measurements made in the direction of anticipated ground movement (0 degrees) and measurements made in the opposite direction (180 degrees).

Frequency: Measurements shall be taken at the beginning and end of each work day at a minimum. More frequent monitoring may be required by the Engineer as field conditions warrant.

Over time, if the measured displacements are small in magnitude, monitoring frequency can be reduced as established by the Engineer. If displacements become random in nature and/or large in magnitude, the frequency shall be increased as directed by the Engineer. The frequency of readings will be dictated by the phase of current construction but must be sufficient to detect serious movements so that corrective measures can be initiated immediately.

Displacement measurements shall be dated, recorded, and reported to the Engineer the same day the readings are taken.

The Contractor shall control the work in such a manner that cumulative movements do not exceed the design maximum movements as stated in this Specification. The maximum outward deflection of the wall shall be measured at the top of shaft or pile. The maximum downward deflection of adjacent structures shall be measured at the bottom of structure foundation closest to the retaining wall. If measured ground movements in slope inclinometers begin to accelerate between readings, work shall be suspended and the Engineer informed immediately.

<i>Retaining Wall</i>	<i>Maximum outward deflection of wall</i>	<i>Maximum downward deflection of adjacent structures</i>
Wall 9 (SN 016-1728)	1 inch	0.25 inch
Wall 11 (SN 016-1800)	1 inch	0.25 inch
Wall 12 (SN 016-1801)	2.5 inch	0.25 inch

After the wall has been completed, the monitoring shall continue weekly for at least 3 months. After all monitoring has been completed, and at the direction of the Engineer, the cap shall be removed and the casing shall be grouted to final ground surface prior to restoration.

Submittals: The Contractor must submit daily reports of all slope inclinometer readings to the Engineer.

Method of Measurement: The work under this item as described herein will not be measured separately and shall be paid for as each.

Basis of Payment: This work will be paid for at the contract unit price per each for SLOPE INCLINOMETER. The contract unit price shall include all materials, labor, and impacts due to possible restraints inherent in the use of these devices upon the rate of construction. No additional compensation will be made for any impact, inefficiency, or any costs incurred as a result of compliance with this requirement.

CONSTRUCTION VIBRATION MONITORING

Description. This work consists of monitoring buildings, structures, tunnels and other locations susceptible to movement. Additional monitoring of facilities may be required and will be determined by the Engineer during the work. Additional monitoring, as determined by the Engineer, is included in the cost of this item.

The Contractor shall monitor adjacent buildings for both vibration and displacement. The Contractor shall designate a minimum of two monitoring point locations for each of the structures located at the following addresses:

- 525 South Racine Avenue (UIC Pavilion)
- 1100 West Harrison Street (Harrison Street Parking Structure)
- 1040 West Harrison Street (Education, Theatre, Music and Social Work)
- 737 South Halsted Street (UIC Student Recreational Facility)
- 735 West Harrison Street (Cermak Pump Station)
- 1224 West Van Buren Street (Van Buren Lofts)
- 1250 West Van Buren Street (Vanguard Lofts)
- CDWM Water Main Riser Shaft (approximately Sta. 7303+23 along baseline Taylor St. Exit, offset 51' right)

The monitoring point locations shall be spaced as evenly as possible along the building edge at the interface between the retaining walls and the building properties. The monitoring points for vibration and displacement do not have to be at the same location. The Contractor shall coordinate with the Engineer and building owners to ensure the proposed monitoring locations are acceptable to the building and accessible to both the Contractor and the Engineer. Proposed locations of building vibration and displacement monitoring points are to be submitted to the Engineer for approval prior to construction.

CTA Track Monitoring: The Contractor will include monitoring of the eastbound and westbound CTA tracks below and adjacent to a portion of construction in the contract. The Contractor will monitor CTA tracks for vertical and horizontal movements. As a minimum, monitor daily from start of demolition through completion of new retaining wall and barrier wall installation, then weekly through project completion. Submit copies of reports to CTA for review. The reports shall identify monitoring instrumentation utilized, measurement data, stop work periods, corrective measures and other associated information. Maximum allowable horizontal and vertical movements are ¼ inch. If movements in excess of ¼ inch are detected, the Contractor will discontinue construction operations immediately and notify the CTA. CTA will evaluate the track condition and determine what restorative work is required. The Contractor will perform this restorative work at the Contractor's expense prior to continuing remaining contract work. If track repairs are required, the Contractor shall hire a Contractor experienced in CTA track work and approved by the CTA to perform the corrective repairs to the satisfaction of the CTA.

Vibration Monitoring: The Contractor shall employ the services of a seismic monitoring consultant as approved by the Engineer. Monitoring point locations and frequency of data collection shall be as determined by the Contractor's Consultant and are subject to the approval of the Engineer. All vibration monitoring devices (seismographs) shall be attached to the floor of the buildings they are monitoring. The limit of acceptable vibration (Limiting Value) at structure shall be 0.5 in/s (inches per second) peak particle velocity. The Contractor's consultant may propose a Threshold Value of vibration for Engineer's review. When the Threshold Value is reached, the Contractor must stop the work and meet with the Engineer to determine the best course of action to reduce the vibrations (or minimize further displacement). Once the Limiting Value is reached, the work is stopped and a more formal response plan is submitted for approval before work can proceed. All seismographs on the project shall be programmed to actuate an alarm when the Threshold Value is exceeded. The alarm notification protocol shall consist of immediate dialing of mobile telephone numbers of the Engineer and the Contractor. If the Limiting Value is exceeded, all vibration inducing work within 100 feet of the existing building shall be stopped. Work may resume at the direction of the Engineer with the Contractor continuing to closely monitor vibration in the area of the alarm. If the work is stopped because the Limiting Value is exceeded there will be no additional compensation nor any additional time extensions granted. Any change in construction methods to avoid exceeding Limiting Value will not be grounds for additional compensation.

Displacement Monitoring: The Contractor shall provide the exact horizontal and vertical location of the displacement monitoring points to the Engineer prior to the commencement of any construction activities. The data shall be presented in a tabular format and shall include horizontal positions (stations and offsets or Northing and Easting) as well as vertical elevation (Chicago City Datum) to a minimum of one hundredth of a foot (0.01').

Monitoring Frequency: During the beginning phase of each stage of demolition and construction, displacement monitoring shall be performed at the beginning and end of each work day at a minimum. These surveying intervals are the minimum required, and more frequent monitoring may be required by the Engineer as field conditions warrant.

If after a period of time resulting in movements that are small in magnitude, monitoring frequency can be reduced to a frequency as established by the Engineer. If resulting movements become random in nature and/or large in magnitude, the frequency shall be increased as directed by the Engineer. The frequency of readings will be dictated by the phase of current construction but must be sufficient to detect serious movements so that corrective measures can be initiated immediately.

Monitoring readings for displacement shall be dated, recorded, and reported to the Engineer the same day the readings are taken.

Vibration monitoring shall be a continuous and uninterrupted process. During demolition within 50 feet of a vibration monitoring point location, the Contractor shall report the results of the largest amplitude of vibration to the Engineer on the same day. At all other times the vibration report shall be submitted weekly.

Construction Requirements. Before the start of construction, the Contractor will complete a preconstruction inspection of the following addresses/locations:

- 525 South Racine Avenue (UIC Pavilion)
- 1100 West Harrison Street (Harrison Street Parking Structure)
- 1040 West Harrison Street (Education, Theatre, Music and Social Work)
- 737 South Halsted Street (UIC Student Recreational Facility)
- 735 West Harrison Street (Cermak Pump Station)
- 1224 West Van Buren Street (Van Buren Lofts)
- 1250 West Van Buren Street (Vanguard Lofts)
- CDWM Water Main Riser Shaft (approximately Sta. 7303+23 along baseline Taylor St. Exit, offset 51' right)

Before the start of construction, the Contractor will complete a preconstruction inspection of the existing buildings listed above. Readily visible conditions and distress such as unusual cracks in concrete or masonry, obvious signs of leakage, settlement, etc. will be photographically recorded and documented. The Contractor will also make a DVD survey to provide a more complete general record of conditions in those areas. The interior survey shall include the first floor and basement (if existing) within 30 feet of the exterior wall closest to the project site. The exterior survey will include the exterior wall closest to the project site and the two adjacent walls. The survey will be performed from grade without the use of magnification devices. At the conclusion of the pre-construction field work, a report shall be prepared by the Contractor presenting the observed existing conditions and shall include written, videotaped and photographic documentation. This record shall then be used by the Contractor as a basis for comparison to distresses that may occur after the survey. The locations of the displacement monitoring points shall be included in the Report.

The Contractor will use the preconstruction report to aid in the selection of the displacement monitoring points. The Contractor must devise means and methods of construction that will not exceed the specified vibration limits. The Contractor is advised that particularly careful demolition requirements will be required at the edges of the retaining wall where the property line is immediately adjacent to the area of construction.

Corrective Measures. If at any time resulting movements are serious in nature or cause damage to facilities or property, the Contractor shall stop work immediately and the necessary corrective measures shall be initiated as directed by the Engineer. Damage as a result of the work activity of the Contractor will be corrected by the Contractor as determined by the Engineer. No additional compensation will be due the Contractor for repairing these facilities. The Contractor will not be entitled to any claim of delay for stopping of working to make correct measures.

Submittals. The Contractor must submit a Vibration and Displacement Control Plan to the Engineer for Approval. The Plan must be approved prior to the commencement of work. The plan must include, but is not limited to the following:

- Locations of all monitoring points (Vibration and displacement).
- Procedure and outline for how the data will be provided to the Engineer.
- Type of seismograph to be used (Submit to Engineer for Approval).
- List of pneumatic equipment to be used during demolition operations.
- Contact information for the Seismic Monitoring consultant.
- Timetable that outlines the duration that each monitoring point will be maintained and checked.
- A "Response Plan" to detail how the Contractor will address any concerns with vibration or displacement.

Additional Submittals include:

- Daily reports of all displacement monitoring
- Weekly reports of all vibration monitoring

Method of Measurement. The work under this item as described herein will not be measured separately. It will be paid for as lump sum.

Basis of Payment. This work will be paid at the contract unit price per lump sum for CONSTRUCTION VIBRATION MONITORING which payment shall be full compensation for the work described herein and as directed by the Engineer.

CITY OF CHICAGO DEPARTMENT OF WATER MANAGEMENT ENGINEERING SERVICES

Description. This item shall consist of payment for work performed by the City of Chicago Department of Water Management (CDWM) related to engineering services in support of this contract. These services include operations related to the replacement of water service lines west of Racine Avenue and west of Morgan Street, testing and inspection during the installation of infrastructure adjacent to, below or above existing water main, leakage survey, field supervision, technical assistance, reviews and other required services.

General. It shall be the Contractor's responsibility to arrange and coordinate all required services by CDWM. All necessary field work, including valve operations, shall be scheduled with CDWM in advance of the time period required. All work to be performed by CDWM is subject to CDWM work schedules and availability. Acceptance of complete water main by CDWM is based upon CDWM review of installation, presence during testing and disinfection operations and other roles as desired by CDWM and required in these special provisions.

Construction Requirements. The Contractor shall make the following submittals and notifications for work included in this contract adjacent, below or above existing water facilities:

- Submit five (5) copies of the shop drawings for all designs and materials associated with the temporary water main supports to be used to complete work adjacent, below or above existing water mains. Shop drawings shall be sent to the Department of Water Management, Bureau of Engineering Services, Jardine Water Purification Plant, 1000 E. Ohio Street, Office 307, Chicago, Illinois 60611, attention to Bill Doyle.
- Notify Bill Doyle, at (312) 217-1636, two (2) weeks prior to the start of the work adjacent, below or above existing water main, so a resident engineer can be assigned to the project.
- Obtain a "B-Permit" prior to construction from the City of Chicago, Department of Buildings, Plumbing Permit and Plan Section, City Hall, 121 North LaSalle Street, Room 906, Chicago, Illinois, 60602.
- Submit as-built drawings within two (2) weeks of completion of the work. The as-built drawings shall reflect all final conditions of water mains exposed, modified or otherwise impacted by work under this contract. The as-built drawings should be submitted to the Department of Water Management, Bureau of Engineering Services, Jardine Water Purification Plant, 1000 E. Ohio Street, Room 306, Chicago, Illinois 60611, attention to Rolando Villalon.

Failure to comply with these requirements may result in additional expenses to the project to verify that all work conforms to the CDWM's standards.

In order to accommodate the proposed improvements, the CDWM will conduct a leakage survey on each of the following water mains located within the proximity of the proposed improvements before and after the proposed construction to ensure they are not damaged during the adjacent construction:

- 2 inch water service line crossing Eastbound I-290 west of Racine Avenue.
- 2 inch water service line crossing Eastbound I-290 west of Morgan Street.
- 12 inch water main along the north side of Congress Parkways between Racine Avenue and Morgan Street
- 36 inch water main crossing UIC parking lot and Eastbound I-290 just east of Morgan Street
- 16" water main crossing of Eastbound I-290 and adjacent Harrison Field in the vacated Green Street ROW
- 2 - 54" feeder mains from the Cermak Pump Station under Southbound I-90/94 and the ramp from Eastbound I-290 to Southbound I-90/94

If any damage occurs to these water facilities during the proposed improvements, the Contractor will be held responsible for the cost of repairing or replacing the water mains as necessary.

The Department's separation standards are as follows: The minimum vertical clearance (edge-to-edge) from all water mains is 18-inches. For feeder mains (water mains 16-inches and larger), the minimum horizontal clearance (edge-to-edge) is five (5) feet, and for grid mains (water mains less than 16-inches), the minimum horizontal clearance (edge-to-edge) is three (3) feet. For above ground facilities, the minimum horizontal clearance (edge-to-edge) is five (5) feet. In no case shall the installation of any proposed facility be closer than five (5) feet from a fire hydrant or fire hydrant lead. All curb installation adjacent to fire hydrants must be painted 'safety yellow' for 15 feet on each side of the fire hydrant except where the 15 foot dimension intersects a crosswalk, driveway or similar feature.

Method of Payment. The Contractor will make payments to CDWM based upon the following schedule agreed to with CDWM:

- 80% of initial estimate of costs required by CDWM. CDWM has identified to the Department that the total cost for this item is \$20,000.00.
- This payment shall be made to CDWM within ten (10) days of contract award using certified check, certified mail and receipt notification. The receipt is to be provided to the Engineer for records.
- The initial certified check in the amount of \$16,000, payable to the City of Chicago, must be sent or hand delivered to the Department of Buildings, Plumbing Permit and Plan Section, Room 906, City Hall, 121 North LaSalle Street, Chicago, Illinois 60602
- Remaining balance at the completion of services by CDWM as invoiced including back up information.
- The estimated cost of services is an assumption subject to the receipt of the actual final estimate from CDWM. The initial estimate of costs subject to the first payment to CDWM will be based upon the actual estimate from CDWM. The initial assumption identified above is for bidding purposes only. The amount necessary for the first payment may exceed the amount calculated above.

CDWM will invoice the final amount based upon current rates for labor (straight time), material, equipment, overhead charges and other costs incurred.

The Contractor will be reimbursed based upon the requirements identified in Section 109.05, including administrative costs. The Contractor shall secure invoices from CDWM for work performed by CDWM. These invoices shall be submitted as documentation to the Department prior to or with any Contractor payment request for the remaining balance at the completion of work related to CDWM facilities.

For bidding purposes, this item shall be estimated as \$20,600.00 which includes the estimated costs and fixed fee from CDWM with additional administrative costs per Section 109.05.

A certified check in the amount mentioned above, payable to the City of Chicago, must be hand delivered to the Department of Buildings, Plumbing Permit and Plan Section, Room 906, City Hall, 121 North LaSalle Street, Chicago, Illinois 60602.

Basis of Payment. This work will be paid for at the contract lump sum price for CITY OF CHICAGO DEPARTMENT OF WATER MANAGEMENT ENGINEERING SERVICES which shall be reimbursement in full, and with administrative costs as described in Section 109.05, for services provided by CDWM.

STAINLESS STEEL CABLE PLANT SUPPORT SYSTEM

Description. This work consists of furnishing and installing Stainless Steel wire rope assembly, fittings, anchors, hardware and accessories of the type specified at locations shown on the Plans or directed by the Engineer, and in accordance with the details shown in the Plans.

Materials.

Wire Rope: Cable: ASTM A492 Type 316 4mm Ø 4mm stainless steel 7x7 wire rope.

Length:

Provide optimum adjustment in both directions by calculating final tendon lengths with allowance for tensioning fittings with 2/3 open and with 1/3 of thread length engaged.

Measure tendon length from center of pin to center of pin, or center of eye to center of eye.

Anchor Points: Fittings, Anchors, Hardware, and Accessories: AISI 304, 316 or 316L stainless steel

1. Rope End Fittings, Terminals, and Tensioners: External Thread-Swaged
2. Support Components: Spacer Bar, Clamp Screw, Ground Plate
3. Anchors and Hardware: Washer, Hex Nut, Threaded Rod, Wall Anchor for Masonry
4. Accessories: Provide grommet, bushings, nuts, washers, turnbuckles, fittings and other components as required for system installation, Clamps and Plant Supports

Finish.

Clean and/or descale cables and fittings in accordance with ASTM A380.

Passivate in accord with ASTM B912, to provide the following finish: Exterior and Interior:
330 grain satin finish (equiv. to #4 satin finish).

General.

Performance Requirements: Provide Stainless Steel Cable Railing System and mounting hardware which have been manufactured and installed to meet or exceed manufacturer's and project performance criteria.

Submittals.

1. Product Data: Submit Manufacturer's product data sheet for specified products.
2. Shop Drawings: Show layout, sizes, dimensions, details, and installation of wire rope system components. Include Details of rope attachment, tensioning methods, hardware, and tensioning and mounting methodology.
3. Samples: Submit samples of rope and/or hardware
4. Quality Assurance/Control Submittals:
5. Test reports: Submit any test report demonstrating compliance with intended use and code requirements.
6. Certificates: Submit manufacturer's certificate that product meets or exceeds specified requirements
7. Closeout Submittals: Submit the Following:
 - (a) Warranty: Submit manufacturer's standard warranty documents
 - (b) Maintenance Data: Include manufacturer's standard cleaning and maintenance instructions to avoid detrimental actions to finishes and performance
8. Mock-Ups: Mock-Ups: Install at project site or appropriate location a job mock-up using acceptable products and manufacturer approved installation methods

Quality Assurance:

1. Installer Qualifications: Installer should be experienced in performing work of this section and should have specialized in installation of work similar to that required for this project.
2. Coordination: Coordinate with Noise Wall and MSE wall manufacturer,

Construction Requirements:

1. Stainless Steel Cables and Fittings shall be dimensioned and fabricated to specified size and labeled according to shop drawings and installer's specifications.
2. Preassemble items in shop to greatest extent practicable to minimize assembly at project site. Disassemble units only to extent necessary for shipping and handling limitations. Mark units for reassembly.
3. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.
4. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.
5. Specifier Note: Specify actions required to physically determine that conditions are acceptable to receive primary products of the section.
6. Site Verification of Conditions: Verify mounting condition of previously installed surfaces to ensure it is acceptable for product installation in accordance with manufacturer's instructions. Do not begin installation until backup surfaces are in satisfactory condition.
7. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.
8. Take field measurements after permanent end terminations are in place and prior to preparation of shop drawings and fabrication, to ensure fitting of work.
9. Install cable plant support system in accordance with manufacturer's instructions and the approved shop drawings.
10. Provide anchorage devices and fittings to secure to in-place construction; including threaded fittings for concrete inserts, toggle bolts and through-bolts. Install all rope assemblies plumb, level, square, and taut.
11. Anchor system to mounting surfaces as indicated on the drawings.
12. Separate dissimilar materials with bushings, grommets or washers to prevent electrolytic corrosion.
13. Use manufacturer's supplied mounting hardware.
14. Terminate and tension cable system in accordance with manufacturer's instructions.
15. Ensure ropes are clean, and without kinks or sags.
16. After final adjustment provide tamper resistant locktight materials on all fittings.
17. Remove temporary coverings and protection of adjacent work areas.
18. Clean installed products in accordance with manufacturer's instructions before owner's acceptance. Do not use chlorine-based or abrasive cleaners.
19. Remove from project site and legally dispose of construction debris associated with this work.
20. Protection: Protect installed product from damage during subsequent construction activities.
21. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.

Acceptable Stainless Steel Wire Rope Assembly to use Made in USA products:

1. Façade Greenery I-SYS by Décor Cable
2. Cable Trellis Systems by Ronstan
3. Green Wall Trellis System by Hayn Lines
4. Approved Equal

Method of Measurement. All work shown on plans will be included for payment. This includes all cables measured for payment, complete in place, per Linear Feet of Wire Rope installed, and Anchor Points installed in place measured per Each of Anchor Points.

Basis of Payment. This work will be paid for at the lump sum price for STAINLESS STEEL CABLE PLANT SUPPORT SYSTEM – per wall, which price includes furnishing and placing all material required, including all labor, equipment and incidentals necessary to complete the work as herein specified and on the Plans.

FOUNDATION CONSTRUCTION AT EXISTING OBSTRUCTIONS

Description. This work shall consist of providing all labor, materials, and equipment necessary to construct Drilled Shaft at locations where man-made obstructions are encountered. The drawings have identified locations where new foundations are anticipated to be in conflict with existing retaining wall footings and existing abandoned utilities. If additional locations are encountered, as determined in the field by the Engineer, they shall also be covered by this specification.

Furnishing, fabricating and installing of drilled shafts shall be completed and paid for as described in their respective pay items.

The work under this item is considered additional compensation for the resources required to install drilled shafts through the identified obstructions. The Engineer shall determine applicability of this specification in the field when an obstruction is encountered.

This Special Provision applies to manmade obstructions. Non-manmade obstructions are covered in Standard Specification section 516.14. Obstruction mitigation for non-manmade obstructions are paid for in accordance with Article 109.04 of the Standard Specifications.

Equipment. The Contractor shall be responsible to provide the equipment required to advance the drilled shafts through previously constructed structures, such as retaining walls, that are present. The Construction tolerances and requirements for the drilled foundations shall not be relieved due to the presence of an obstruction. The Contractor is cautioned that although a best effort was made to identify the locations of the existing structures, additional obstructions may be found during the construction.

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.

The equipment shall be capable of drilling a straight and true shaft as required by the specifications through existing reinforced concrete structures, grouted and bulk-headed tunnels and other man-made obstructions that are encountered in the drilling.

Construction Requirements. The Contractor is alerted to the following known obstructions:

- (a) Existing Concrete Retaining Wall. The existing Retaining Wall 9 (SN 016-Z028) is in conflict with the proposed drilled shaft concrete foundation construction of the overhead sign structure - 1SO16I290R029.8-000. The reinforced concrete footing is approximately 1'-0" to 1'-6" thick. The original compressive strength of concrete is estimated to be 1,200 psi and was constructed in 1955. Existing plans can be provided at the request of the Contractor, but the Contractor should expect some variances from design occurred during installation. No additional compensation shall be permitted for such variances from existing plans.
- (b) Existing Abandoned Utilities. An existing abandoned water main and gas main are in conflict with the proposed drilled shaft construction of the proposed Retaining Wall 12 (SN 016-1801). The gas main is a 20" diameter metallic pipe. The water main is a 12" diameter ductile iron pipe. Existing SUE information is provided in the Contract Plans, but the Contractor should expect some variances from the Plans. No additional compensation shall be permitted for such variances from the Plans.

The Contractor shall submit to the Engineer a proposed construction sequence for approval prior to the beginning of this work. It shall include the methods and equipment used in accomplishing the work.

If additional obstructions are encountered the Contractor shall submit to the Engineer a proposed construction sequence for approval prior to the beginning of this work.

Method of Measurement. The Contractor shall provide equipment, labor and materials as required to install drilled shafts at the locations shown on the drawings. Where man-made obstructions are encountered, as determined by the Engineer, the Contractor will be paid the unit price per each for each shaft affected by obstructions, in addition to the applicable pay items for Drilled Shaft as specified elsewhere.

Basis of Payment. The drilling of foundations through obstructions as described above will be paid for at the contract unit bid price per each applicable location for FOUNDATION CONSTRUCTION AT EXISTING OBSTRUCTIONS.

PLANTING SOIL MIX FURNISH AND PLACE

Work under this item shall be performed in accordance with Section 200 of the Standard Specifications for Road and Bridge Construction except as modified herein.

Description: This work shall consist of furnishing, transporting, testing, preparing, and placing planting soil including finish grading to the depth specified in areas as shown in the plans or as directed by the Engineer.

General Requirements: In general the planting soil shall be two (2) parts top soil and one (1) part coarse sand. The sand, in the amount required to produce an acceptable planting soil, shall be added and mixed during the pulverization process only. The sand shall be of an FA 2 gradation.

Soil Stockpiling: The Contractor shall obtain the total quantity of planting soil required for this project and stockpile this material at an acceptable offsite location a minimum of 30 days in advance of placement. The stockpile must be covered to avoid excessive moisture content and erosion. The Contractor shall have the material tested following the guidelines presented below under Soil Testing and, if approved, this stockpile shall be the sole source for planting soil to be delivered to site. The test results and a Request for Inspection form should be sent to the Engineer prior to delivering the material to site. This transmittal must also identify the location of the stockpile. If there are any changes in the source the Contractor shall notify the Engineer immediately. No additional time will be allowed for the completion of this project in order to substitute, test, and approve a new source of planting soil.

Delivery, Storage and Handling: Protect soil from absorbing excess water and from erosion at all times. Do not store materials unprotected from large rainfall events. Do not allow excess water to enter site prior. Remove weeds prior to inspection.

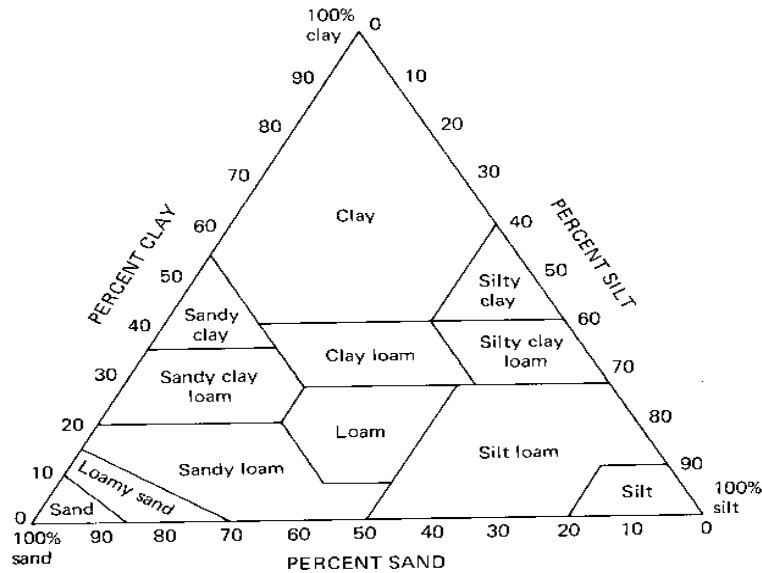
Soil Testing: No planting soil shall be delivered to the site until the Engineer has reviewed test results and has accepted the planting soil. The Contractor shall employ a soil testing agency acceptable to the Engineer, which uses test methods approved by the Association of Agricultural Chemists. Test frequency shall be as follows:

<u>Quantity of Soil Placed (c.y.)</u>	<u>Number of Tests</u>
1 - 200	1
200 – 1000	3
1000 <	$((\text{Quantity} - 1000) / 500) + 3$ round up to whole number

When more than one test is performed, the average of the test results will be used to determine acceptance.

The planting soil test report must obtain the following information:

	HIGH	LOW
1. Chemical Analysis:		
a. pH	7.0	6.5
2. Mechanical Analysis		
a. % clay	25%	0%
b. % silt	77%	45%
c. % sand	33%	25%
3. Additionally the following variables are required.		
d. cation exchange capacity (CEC)		
e. soluble salts		
f. organic matter		
g. phosphorous		
h. available potassium		
i. nutrients		
j. residual chemicals		
k. Recommendations to mitigate any issues from the results in items 3a through 3g.		



The mechanical analysis should show that the % sand, % silt, and the % clay must yield a silt loam soil. See the attached Textural Classes diagram above. To determine the class plot a line parallel to the % clay axis starting the line at the value of the % silt. Plot another line parallel to the % sand axis starting the line at the value of the % clay. The intersection of these lines should be in the silt loam or loam region, for the soil to be approved.

Preparation and Placement:

1. Perform or coordinate final adjustments of any utility structure.
2. Clean planting areas of all trash and debris before placement of soil mix. Remove and legally dispose of debris off site in accordance with Article 202.03. Repair to the satisfaction of the Engineer any portion of the geotechnical fabric or drainage layers prior to installation of planting soil mix.
3. Place, spread and rough grade specified planting soil to depths specified in all areas to be planted. Place planting soil mix in two level (2) lifts. The first lift shall contain 2/3 of the planter soil depth. After placing each lift, moisten the surface at a rate sufficient to hydraulically settle the soil, as determined by the Engineer. Allow water to thoroughly percolate through the soil before placing the next lift. Allow for settling, and place additional planting soil as necessary. Allow for placement and mixing of compost, as determined by the Engineer, but place enough soil mix to meet finish grades within ± 0.10 foot of design grades.
4. Rake smooth and finish grade all planted areas. The removal of excess material or the addition of planting soil may be required prior to landscaping. This shall be considered incidental to planting soil. Grading will be to a tolerance $\pm .10$ foot of design grades. Any grade disturbed by irrigation installation shall be restored to finish grade and raked smooth.
5. All debris, litter, tire tracks, dirt, and unintended materials shall be removed, swept or washed off of all landscape, hard surfaces, and pavement on a daily basis.

Planting Soil Acceptance:

The Engineer retains the right to visually inspect planting soil mix on site before placement. The Engineer may ask that material suspected of not meeting specification be removed from the site, until the material can be mechanically tested.

The final determination of the planter soil quality shall be based upon soil tests taken by the Engineer. The samples shall be taken at the time of planting soil installation. The samples will be tested by independent accredited agencies, for the Engineer. The test frequency shall be the same as listed above. When more than one test is required, the percentages of sand, silt and clay will be averaged. This averaged value will be used to determine the soil quality.

If the averaged test result for sand or silt content is outside the range specified by less than five (5%) percent, an adjusted unit price will be used in computing payment for the planting soil. The adjusted unit price will be a percentage of the contract unit price as given in the following schedule:

<u>Average Sand or Silt Deficiency</u>	<u>Percent of Contract Payment</u>
0 to 2	80
2.1 to 4	66
4.1 to 5	50

Clay content in excess of this specification by two (2%) percent or less: If the averaged result for clay is outside the range specified by less than two (2%) percent an adjusted unit price will be used in computing payment for the planting soil. The adjusted unit price will be sixty-six (66%) percent of the contract unit price.

The Contractor shall remove all planting soil and install material meeting this specification. The Contractor shall be responsible for all costs incurred to remove deficient material and install acceptable planting soil. The Contractor shall be responsible for any damage to plant material, irrigation system, waterproof membrane, or any other damage caused by this work. The Contractor shall be responsible for all additional traffic control. No addition time will be provided in the contract to perform remedial work.

Method of Measurement: Planting Soil Mix Furnish and Place will be measured for payment in place to the depth specified in square yards. Areas not meeting the depth specified shall not be measured for payment.

Basis of Payment: This work will be paid for at the contract unit price per square yard for PLANTING SOIL MIX FURNISH AND PLACE, of the thickness specified. Payment shall include all testing, furnishing, stockpiling, transporting of materials, all labor and equipment necessary, disposal and incidentals required to complete the work as specified herein and to the satisfaction of the Engineer.

CONCRETE CURB, TYPE B (SPECIAL) (CDOT)

Description: Work under this item shall be performed according to Section 606 of the IDOT Standard Specifications for Road and Bridge Construction and to the City of Chicago Department of Transportation Regulations for Openings, Construction and Repair in the Public Way. The work consists of constructing variable height Portland Cement Concrete (PCC) curb greater than 3" in height and less than 9" in height.

Materials: Materials shall meet the applicable requirements of Division 1000 of the Standard Specifications.

Construction Requirements: Meet applicable requirements of Section 606 of the Standard Specifications. Construct CONCRETE CURB, TYPE B (SPECIAL) (CDOT) at the locations, widths and thickness shown on the Plans.

Method of Measurement: CONCRETE CURB, TYPE B (SPECIAL) (CDOT) will be measured for payment in feet along the face of the concrete curb, which measurement will include drainage castings incorporated in various curbs and curbs and gutters.

Basis of Payment: This work will be paid for at the contract unit price per foot for CONCRETE CURB, TYPE B (SPECIAL) (CDOT).

COMBINED SEWER (EXTRA STRENGTH VITRIFIED CLAY PIPE) (CDOT)

Description. Work under these items shall be performed according to Section 550 of the IDOT Standard Specifications and the current City of Chicago Department of Water Management (DWM) Regulations for Sewer Construction and Stormwater Management and DWM Standard Specifications for Water and Sewer Main Construction, except as herein modified.

This work shall consist of constructing combined sewers at locations designated by the Engineer, including any dewatering, sheeting and/or shoring required to perform the work as specified.

Materials. Materials shall be per the most current DWM Standard Specifications for Water and Sewer Main Construction:

Construction Requirements. Where a sewer or drain connection is to be made to a proposed E.S.V.C.P. storm sewer a manufactured Y or T branch pipe shall be installed in the sewer at this junction.

Where a sewer or drain connection is to be made to a proposed R.C.P. sewer a pipe section with a predrilled hole of the proper diameter shall be installed at this junction.

Where a sewer or drain connection is made to an existing sewer, a "T" or "Y" saddle shall be installed. The circular opening in the existing sewer must be core drilled to the same size as the external diameter of the proposed or drain connection. The protrusion of the proposed sewer into the existing sewer must not exceed a maximum of 1 inch. Edge of core holes must be a minimum of 1.5 feet from the edge of pipe and a minimum distance of 5 feet horizontally between holes. Do not drill holes higher than 10 and 2 o'clock.

QC/QA Requirements.

The Contractor must provide a Manufacturer's written certification that the materials comply with these specifications. All sewers and sewer structures must be inspected prior to the final payment to the Contractor.

Method of Measurement. This work will be measured for payment in place per foot.

Basis of Payment. This work will be paid for at the contract unit price per foot for the COMBINED SEWER (EXTRA STRENGTH VITRIFIED CLAY PIPE) of the diameter specified of the type, diameter, and material specified (CDOT).

Trench backfill will be paid for according to Article 208.04.

FILLING CATCH BASINS, SPECIAL (CTA)

Description. This work shall be according to Section 605.4 of the Standard Specifications, with the following exceptions/additions:

All existing catch basins within the CTA Right-of-Way identified to be filled shall have the tops of the existing catch basins be removed to a depth three (3) inches below the bottom of subballast in the surrounding area. After all inlet and/or outlet connections have been securely sealed and the remaining portion of the catch basin has been filled, subballast and ballast from the surrounding area shall be placed over the filled catch basin to provide a uniformly graded area to the satisfaction of the Engineer.

Basis of Payment. This work will be paid for at the contract unit price per each for FILLING CATCH BASINS, SPECIAL (CTA) as described herein.

CATCH BASINS, TYPE A, 4'-DIAMETER, TYPE 1 FRAME, OPEN LID (CITY OF CHICAGO)

Description. This work shall be according to Section 602 of the Standard Specifications and as detailed in the Plans with the following additional requirements:

The catch basins to be installed under this item will be placed within the CTA track areas that has an existing track bed and additional area covered with railroad ballast, subballast and other materials. The work under this item includes moving existing ballast and subballast materials away from the immediate area of the proposed catch basin as well as any storm sewers entering or exiting the proposed catch basin. The catch basin shall be installed from the ground elevation of the subbase soil below the ballast and subballast. After the installation of the catch basin as detailed in the Plans, subballast and ballast previously moved shall be regraded over the catch basin and storm sewer installations to the satisfaction of the Engineer. Special care shall be used during subballast and ballast grading so as to not damage all frames, ballast screens and grates.

All elements of the catch basin as detailed in the Plans are considered included within this item.

Basis of Payment. This work will be paid for at the contract unit price per each for CATCH BASINS, TYPE A, 4'-DIAMETER, TYPE 1 FRAME, OPEN LID (CITY OF CHICAGO) as described herein and as detailed in the Plans.

TEMPORARY CHAIN LINK FENCE

Description. This work shall consist of furnishing, installing, maintaining, relocating and removing temporary chain link fence and gates with a nominal height of six (6) feet. Temporary chain link fence shall be used to provide access control around various staging areas during construction. The fence and gates are to be installed at locations as specified on the plans or as directed by the Engineer. Work under this item shall be performed according to Section 664 of the IDOT Standard Specifications for Road and Bridge Construction, except as herein modified.

General Requirements. The Temporary Chain Link Fence shall be at least 6 feet in height. The Temporary Chain Link Fence shall be self-standing without the need to disturb the surface ground by excavation when adjacent to areas where no proposed work is to take place. The stand shall be made of galvanized steel pipe or similar materials. The Temporary Chain Link Fence may be anchored into existing pavement where the pavement is shown to be removed. Each fence panel shall be made from welded wire panels or out of chain link fence materials. All the necessary bases, panel clamps and bolts shall be included and installed in accordance to the manufacturer specifications and to the satisfaction of the Engineer.

Gates shall be installed at locations approved by the Engineer to provide Contractor access to the work area. The gates shall be locked at the end of each work day.

Method of Measurement. Temporary Chain Link Fence shall be measured for payment in feet, along the top of the fence from center to center of end posts, including the length occupied by gates.

Basis of Payment. Temporary Chain Link Fence will be paid for at the contract unit price per foot for TEMPORARY CHAIN LINK FENCE for which said price shall include all labor, materials, equipment, furnishing, installing, maintaining and incidentals necessary for placement, relocation and removal and disposal of the temporary chain link fence and gates. No additional payment will be made for the temporary relocation of the fence in order to allow ingress/egress of Contractor personnel, vehicles or equipment.

CHAIN LINK FENCE REMOVAL

Description. This work shall consist of removing and disposing the existing chain link fence as shown in the Plans or otherwise directed by the Engineer. The removal of gates installed along sections of existing fence is considered under this item. Existing fence and gates include all chain link fence installations.

Construction Requirements. No removal work shall be completed without the approval of the Engineer. All associated hardware and appurtenances of the existing fence including but not limited to post foundations, fittings, gates, post, and accessories, shall be removed off-site and disposed of by the Contractor in a legal disposal site. Any part of the fence that is damaged that is not called out for to be removed shall be replaced at the Contractor's expense.

Contractor shall not damage the existing buildings adjacent to the fence. Any damage to the building shall be repaired by the Contractor at no additional cost to the Department.

Any posts identified to remain must be protected from damage during the removal of adjacent fence or gates.

Method of Measurement. Fence removal shall be measured for payment in feet of CHAIN LINK FENCE REMOVAL and measured along the top of the fence from center to center of end post, including the length occupied by gates.

Basis of Payment. This work will be paid for at the contract unit price per foot for CHAIN LINK FENCE REMOVAL, at the specified locations. Additionally, this price shall include all equipment, labor, and materials necessary to remove and dispose of the existing fence, including all chain link installations and their associated fence hardware, and appurtenances.

REMOVE TEMPORARY CONCRETE BARRIER

Description. This work shall consist of removing precast concrete barrier at locations specified in the Plans. This work shall be completed in accordance with the applicable portions of Section 704 of the Standard Specifications and as noted herein. This work shall also include the removal and disposal of any anchor and connection pins. After removal, all anchor holes in the pavement or paved shoulder shall be filled with a rapid hardening mortar or concrete. Only enough water to permit placement and consolidation by rodding shall be used and the material shall be struck-off flush.

Method of Measurement. REMOVE TEMPORARY CONCRETE BARRIER shall be measured for payment per foot.

Basis of Payment. This work shall be paid for at the contract unit price per foot for REMOVE TEMPORARY CONCRETE BARRIER, which price shall include all labor, equipment, and materials necessary to remove the precast concrete barrier, including anchoring and connection pins and filling of anchor holes as required.

FLY ASH RESTRICTION

The use of fly ash in any PCC mixtures will not be allowed. All references to fly ash in the Standard Specifications or contract special provisions shall not apply.

TEMPORARY FENCE (SPECIAL)

Description. In order to allow unimpeded access within portions of the right of way of the Chicago Transit Authority (CTA) Blue Line to execute proposed work, the CTA has identified that a temporary fence can be installed within their right of way. The location of the fence shall be approved by the CTA and the Engineer prior to the start of fence installation. The work shall consist of furnishing all labor, tools, equipment, and materials required to design, furnish and install the fence; maintain the fence throughout contract work; and remove all fence elements to the satisfaction of the CTA at the conclusion of the need for the fence. The work shall be done in accordance with the applicable portions of Section 664 of the Standard Specifications, CTA and the Chicago Building code and the details in the plans.

General Requirements. The Temporary Fence (Special) shall be designed and constructed to resist a horizontal wind pressure of not less than 30 pounds per square foot in addition to all other forces to which the Temporary Fence (Special) may be subjected; or, designed and constructed to resist a simultaneous vertical and horizontal thrust of 50 pounds per linear foot applied to each rail or a simultaneous vertical and horizontal concentrated load of 200 pounds in any direction applied to each rail, whichever loading produces the greatest stress.

Wood shall be pressure treated Southern Yellow Pine, #2 or better, minimum Fb = 1500 psi.

Wood Post size shall be 4" X 4" spaced a maximum of 8 feet on center.

Wood Rail size shall be minimum 4" X 4" spaced a maximum 24" center to center.

Support 4" X 4" posts with pre-engineered hot-dip galvanized steel ground anchors

- a. If larger wood posts are required by the Contractor's Illinois licensed Structural Engineer, provide steel ground anchor model type that is compatible with wood post size required and provided.
- b. Submit certifications and independent load tests from manufacturer that post anchors. Posts shall be capable of resisting a minimum 120 mile per hour wind load for a minimum of 5 minutes.
- c. The top of the steel ground anchors shall be set a minimum of 4" below grade and backfilled to match existing adjacent area.

Wood to wood connections shall be made with hot-dip galvanized or stainless steel nails or hot-dip galvanized or stainless steel connectors. Galvanizing shall conform to ASTM A653, G185 coating protection.

Fabric material shall be attached to the 4" X 4" posts. Fabric shall consist of plywood, snow fence, fiberglass or windscreen, as designed by Contractor and approved by Engineer and CTA.

Design calculations and details for the Temporary Fence (Special) adjacent to the CTA tracks and/or CTA Right of Way proposed by Contractor must also be submitted to the CTA for approval. This approval will not relieve the Contractor of responsibility for the safety of the installation. Approval shall be contingent upon acceptance by all involved utilities and/or railroads.

Submittals. The Contractor shall submit shop drawings of the proposed Temporary Fence (Special) to the Engineer and CTA for review. The shop drawings shall consist of the minimum information:

1. Layout of the Temporary Fence (Special) including dimensions and elevation.
2. Foundation locations.
3. Design calculations for members and connections, drawings and details.
4. Installation and removal/reinstallation methods and details.

Additional information may be requested to complete the review of the submittal by the Engineer. No additional compensation will be made for the additional requested information. The submittal and design calculations shall be sealed and signed by an Illinois licensed Structural Engineer employed by the Contractor for review and comment by the Engineer and the Chicago Transit Authority (CTA). Review and comment by Engineer and CTA shall not relieve the Contractor of his responsibility for the design of the Temporary Fence (Special). The cost of preparing the submittals for approval is included with this item.

Method of Measurement. Temporary Fence (Special) will be measured for payment in feet (meters), along the top of the fence from center to center of end posts.

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for TEMPORARY FENCE (SPECIAL). The cost of any relocations and the cost of the removal and disposal of the TEMPORARY FENCE (SPECIAL) shall be included in the cost and will not be paid for separately.

SELECT GRANULAR BACKFILL, SPECIAL

Description. This work shall consist of backfilling at locations shown on the Plans.

Materials. Backfill shall be clean angular stone meeting IDOT Gradation requirements CA 6 and compacted in a manner approved by the Engineer.

Construction Requirements. Stone shall be placed in maximum 1 foot lifts. Each lift shall be compacted to achieve proper interlocking as determined by the Engineer.

Method of Measurement. SELECT GRANULAR BACKFILL, SPECIAL shall be measured for payment in cubic yards in place.

Basis of Payment. This work shall be measured and paid for at the contract unit price per cubic yard for SELECT GRANULAR BACKFILL, SPECIAL.

WATER MAIN REMOVAL

Description. This work will consist of the removal of water main of various sizes.

Water main shall be removed according to Article 561 of the "Standard Specifications" and in conformance with the methods identified in Article 551.03 of the "Standard Specifications"

Method of Measurement. This work shall be measured for payment according to Article 561.04 of the "Standard Specifications".

Any reducer pipe sections will be measured as the pipe size of the larger opening. Water main within a vault structure to be removed will be considered a part of the vault structure unless the vault is easily removed around the pipe and the pipe can be removed as part of the removal of adjacent pipe.

Excavation in rock will be measured for payment according to Article 502.12.

Trench backfill for water main removal will be measured for payment according to Article 208.03, except an addition will be made for one-half of the volume of the pipe removed.

Basis of Payment. This work will be paid for at the contract unit price per foot for WATER MAIN REMOVAL, of the diameter specified.

Excavation in rock will be paid for according to Article 502.13.

Trench backfill will be paid for according to Article 208.04.

Removal and replacement of unsuitable material below plan bedding grade will be paid for according to Article 109.04.

CATCH BASINS, TYPE A, 4'-DIAMETER, WITH SPECIAL FRAME AND GRATE

Description. This work shall be according to Section 602 of the Standard Specifications and as detailed in the Plans with the following additional requirements:

The catch basins to be installed under this item will be placed within the CTA Right-of-Way that has an existing track bed and additional area covered with railroad ballast, subballast and other materials. The work under this item includes moving existing ballast and subballast materials away from the immediate area of the proposed catch basin as well as any storm sewers entering or exiting the proposed catch basin. The catch basin shall be installed from the ground elevation of the subbase soil below the ballast and subballast. After the installation of the catch basin as detailed in the Plans, subballast and ballast previously moved shall be regraded over the catch basin and storm sewer installations to the satisfaction of the Engineer. Special care shall be used during subballast and ballast grading so as to not damage all frames, ballast screens and grates.

All elements of the catch basin as detailed in the Plans are considered included within this item.

Basis of Payment. This work will be paid for at the contract unit price per each for CATCH BASINS, TYPE A, 4'-DIAMETER, WITH SPECIAL FRAME AND GRATE as described herein and as detailed in the Plans.

STEEL POSTS, SPECIAL

Description: This work consists of furnishing sign poles of various lengths and installation either by dig method or drill method as shown on the Contract Drawings. The poles installed using dig method shall be 10 feet and 8 inches in length and the poles installed using drill method shall be 9 feet and 8 inches in length. The cost of wedges, sleeves, pole bases and all other required hardware to install poles is included in the cost of these items.

Materials: The material for the poles furnished must 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 must be 0.08". The sign pole must be formed to the size and type specified in the Contract Drawings. Holes must be drilled prior to coating to prevent indentations and dimples in the poles.

Finish: The poles must be galvanized, straight and have a smooth, black, uniform powder coating finish as specified below. The interior of the sign poles must be coated with a minimum of an 81% zinc rich primer. The exterior of the poles must be galvanized with material conforming to AASHTO M 120 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 must meet the following requirements:

Color: Vulcan Black Polyester
Product No.: PFB-401-S6
Cure: 400F-18 minutes PMT
Resin type: Polyester
Gloss: Medium or approved equal.

Pretreatment Process:

Cleaning: All parts must be cleaned utilizing spray washers and an alkaline cleaner to remove any remaining grease, dirt, or other contaminants.

Rinsing: All parts must be spray rinsed in a continuously overflowing rinse stage to remove any remaining cleaning solution.

Phosphating: All parts must be spray phosphated with a heated phosphate solution to provide a transition coating between metal and powder.

Rinse: All parts must be spray rinsed in a continuously overflowing rinse stage to remove any remaining phosphate / sealant solution.

Powder Coating Process:

- Drying: All parts must be preheated to totally eliminate moisture and Prevent offgassing of casting.
- Powder Coating: A premium TGIC polyester powder must 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 must be applied with one application. The manufacturer must be responsible for ensuring proper adhesion to the metal surface.
- Curing: All parts must 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 inch inside diameter that allows for a minimum of 13-1/4 " of sign pole to nest inside the sleeve. The overall length of pole sleeve must be 27". A drawing detail as shown in the Appendix I shall govern.

Locking wedge: Material shall be 11 gauge 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 Appendix I 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 must be free from burrs, cracks, voids, or other defects.

Support base: Twelve-inch diameter, aluminum -zinc alloy casting per ASTM A197. The casting must have the words "City of Chicago" cast in relief as shown in the drawings provided in the Appendix I of these specifications.

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

Anchor Bolt: Galvanized steel expansion anchors conforming to Article 1006.09 of the Standard Specifications. Red Head #1236 (1/2"x 3-3/4"). Furnish three (3) per each sign base provided.

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

Submittals/Material Acceptance: Shop Drawings: Fabrication shop drawings showing the full size layout, color, and proposed materials for poles, bases, and hardware must 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: Manufacturer's Certification for compliance with these specifications.

Stainless steel bolts and nuts, anchor bolts: sample, product data sheet.

Installation: All installation shall be performed in accordance with Article 720.04 of the Standard Specifications.

Dig Method: This method shall be used to install all poles in turf. 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 to 12 inches 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: This method shall be used to install all poles in pavement, sidewalk, and bridge decks. The base will be secured to the concrete surface by steel expansion anchors and must be leveled by using stainless steel washers as shims at the anchor bolt locations and under the base castings. The sign pole will 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 Appendix I. The holes at the top of the sign pole must be aligned such that the sign to be installed will properly face the flow of traffic.

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

Warranty: Manufacturer's warranties shall be 5 (five) years. The final punch list completion and acceptance date constitutes the start of the warranty period.

Method of Measurement. STEEL POSTS, SPECIAL shall be measured for payment for each pole furnished and installed.

Basis of Payment. This work will be paid for at the contract unit price per each for STEEL POSTS, SPECIAL which shall include the poles, all sleeves, locking wedges, bases and all other required hardware to complete the installation of poles.

CONCRETE BARRIER

Description. This work shall consist of constructing a concrete barrier wall with reinforcement bars on a concrete barrier base as detailed in the plans.

Construction Requirements. This work shall be done in accordance with the applicable portions of Section 637 of the Standard Specifications. The concrete barrier wall shall be constructed on a concrete barrier base as detailed in the plans. The concrete barrier wall shall be constructed separately and not poured monolithically with the concrete barrier base.

Method of Measurement. Concrete barrier walls shall be measured for payment in feet in place, along the centerline of the concrete barrier. Concrete barrier base will be paid for separately according to CONCRETE BARRIER BASE (SPECIAL).

Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE BARRIER WALL (SPECIAL) or CONCRETE BARRIER, VARIABLE CROSS-SECTION 42" HEIGHT; or as shown in the plans. This contract unit price shall include all equipment, labor, and materials necessary to construct the concrete barrier wall including all reinforcement bars in the concrete barrier wall.

REMOVE IMPACT ATTENUATORS, NO SALVAGE

Description. This work shall consist of removing and disposing of existing impact attenuators at locations designated on the plans.

Construction Requirements. No materials removed shall be salvaged under the contract. All materials shall be removed and disposed of according to Article 202.03 of the Standard Specifications.

Method of Measurement. This work will be measured for payment in units of each at the location designated on the plans regardless of size, type or material.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE IMPACT ATTENUATORS, NO SALVAGE, regardless of size or type, which payment shall constitute full compensation for all removal, disposal, transportation and incidentals necessary to complete the work as specified.

CHAIN LINK FENCE, 4' ATTACHED TO STRUCTURE

Description. This work shall consist of fabricating, furnishing and erecting chain link fence attached to the top of proposed Retaining Wall 12 (SN 016-1801). This work shall conform to the applicable portions of Sections 509 and 664 of the Standard Specifications, as modified herein, and as shown on the Plans.

Submittals. Prior to fabrication or ordering materials, the Contractor shall submit detailed shop drawings to the Engineer for approval as described in Article 505.03 of the Standard Specifications; including but not limited to materials, fittings, attachments, anchors, and accessories required for complete assembly of the chain link fence.

Materials. Materials shall meet the requirements of Section 1006 of the Standard Specifications except as specified herein.

Fabric: Type IV fabric identified in Article 1006.27 will not be allowed.

Self Tapping Screws: Self tapping screws shall conform to S.A.E. J81 thread rolling screws.

The self tapping screws used to attach the welded wire mesh frames and closure angles to the fence frames shall be Zinc Electroplated with a Service Condition SC 4, Type I Finish, Unslotted Hex Washer Head, Thread Rolling Tapping Screws. Self tapping screws shall be galvanized by electroplating according to ASTM B633-98.

Anchors Bolts and Rods: All anchor bolts and rods shall conform to Section 1006.09 be galvanized according to AASHTO M232.

Base and Angled Plates: Base and angled plates shall be structural steel conforming to the requirements of AASHTO M270 Grade 36 and Section 1006.04 of the Standard Specifications.

Posts, post tops, base and angled plates, railings, braces, stretcher bars, fittings and hardware shall be hot dip galvanized or galvanize coated after fabrication according to Articles 1006.27, 1006.28 and 1006.34 of the Standard Specifications and ASTM F1043. Vent holes for galvanizing shall be placed in the posts and rails at locations that will not allow the accumulation of moisture in the members.

Elastomeric Pad: Fabric reinforced elastomeric pad shall conform to Section 1028.

Construction Requirements.

The layout of the fence shall be in accordance with the Plans and be approved by the Engineer in the field prior to installation.

The Contractor shall locate posts to avoid construction and expansion joints. The posts shall be mounted to the retaining wall parapet using base and anchor plates. Posts shall be set vertical and in true alignment.

The Contractor shall space bars, rods, or anchor bolts to miss parapet reinforcement.

Method of Measurement. CHAIN LINK FENCE, 4' ATTACHED TO STRUCTURE shall be measured in feet along the top of the fence, from center to center of end posts, installed and accepted.

Basis of Payment. This work shall be paid for at the contract unit price per foot for CHAIN LINK FENCE, 4' ATTACHED TO STRUCTURE, which price shall be payment in full for all shop and fabrication drawings, materials, fabricating and installing the complete fence including the posts, base and angled plates, fittings, chain link fabric, anchorage, hardware, grounding, and other incidentals for the fence, as specified herein.

TEMPORARY CHAIN LINK FENCE WITH SCREENING

Description. Work under this item shall consist of furnishing, installing, maintaining, relocating and removing chain link fence with screening, of the height specified on the Plans, or as directed by the Engineer onto the precast temporary concrete barrier. Work under this item shall be performed according to Section 664 of the IDOT Standard Specifications for Road and Bridge Construction, except as herein modified.

General Requirements. The individual fence panels shall be securely fastened together and the stands or other mounting devices shall be permanently installed onto the temporary concrete barrier. The chain link fence shall be anchored sufficiently to resist wind loads of 30 pounds per square foot without deflection of more than three inches between top and bottom fence. The base shall not interfere with pedestrian and/or vehicular traffic, and shall be approved by the Engineer.

Opaque fabric meshing shall be affixed to the chain link fence face. The fabric meshing shall allow passage of air but shall contain dust and dirt. The mesh fabric shall be the full height of the fence and cover the entire length of the fence. The fabric meshing and fence shall not contain any advertisement. The color of the fabric shall be approved by the Engineer.

The Contractor shall submit a catalog cut or details of the fence, mounting stands, hardware, opaque fabric meshing or other appurtenances for approval by the Engineer.

Method of Measurement. Chain link fence will be measured for payment in feet along the top of fence from center to center of end posts.

Basis of Payment. This work will be paid at the contract unit price per foot for TEMPORARY CHAIN LINK FENCE WITH SCREENING, of the height specified, which price shall include furnishing, installing, maintaining, relocating and removing the chain link fence with screening during construction.

TEMPORARY EPOXY PAVEMENT MARKING

Description. This work shall consist of furnishing, installing, and maintaining Temporary Epoxy Pavement Markings.

Material. Materials shall be according to Article 1095.04 of the Standard Specifications.

Equipment. Equipment shall be according to Article 1105.02.

Construction Requirements. Prior to application a surface preparation adhesive shall be applied to a clean, dry road surface. The pavement shall be cleaned by a method of approved by the Engineer to remove all dirt, grease, glaze, or other material that would reduce the adhesion of the markings with minimum or no damage to the pavement surface. No markings shall be placed until the Engineer approves the cleaning. The Temporary Epoxy Pavement Marking shall be placed according to the applicable portions of Article 780.09.

Method of Measurement and Basis of Payment. This work will be paid for at the contract unit price per foot for TEMPORARY EPOXY PAVEMENT MARKING of the line width specified; and/or per square foot (square meters) for TEMPORARY EPOXY PAVEMENT MARKING – LETTERS AND SYMBOLS.

Removal will be paid at the contract unit price per square foot (square meter) for PAVEMENT MARKING REMOVAL of the method specified.

When temporary pavement marking is shown on the Standard, the cost of the temporary pavement marking will be included in the cost of the Standard.

REMOVE EXISTING SIGN SUPPORT

This work shall consist of removing an existing steel sign support as shown in the REMOVE EXISTING SIGN SUPPORT plan detail or as otherwise specified by the Engineer. The support, including hardware, shall become the property of the Contractor.

Method of Measurement: This work will be measured for payment in units of each. Each unit shall include the existing sign support as specified as well as any material or hardware removed as part of the removal of the unit from the structure.

Basis of Payment: This work will be paid for at the contract unit price each for REMOVE EXISTING SIGN SUPPORT, which price shall include complete removal of the sign support, including hardware, from the right-of-way.

BRIDGE MOUNTED SIGN SUPPORT

This item shall involve building a bridge mounted sign support as shown in the BRIDGE MOUNTED SIGN SUPPORT plan detail and installation at the location shown in the plan or as otherwise specified by the Engineer.

Prior to installation the Contractor shall confirm the design as shown is suitable at each location specified and if changes are required shall produce measurements and a shop drawing for review and approval by the Engineer prior to altering the design and subsequent installation.

Method of Measurement: This work will be measured for payment in units of each. Each unit shall include the BRIDGE MOUNTED SIGN SUPPORT as specified as well as any additional material or hardware required to secure the unit to the structure.

Basis of Payment: This work will be paid for at the contract unit price each for BRIDGE MOUNTED SIGN SUPPORT, which price shall include providing shop drawings, fabricating, furnishing, and erecting the support brackets, angles, and any other necessary hardware.

RAISED REFLECTIVE PAVEMENT MARKER, REFLECTOR REMOVAL

Description. This work shall consist of completely removing and disposing of the existing reflector.

The Contractor shall take care not to damage the raised reflective pavement marking unit. All damaged units shall be removed and replaced at the Contractor's expense.

Method of Measurement. RAISED REFLECTIVE PAVEMENT MARKER, REFLECTOR REMOVAL shall be measured for payment on a per each unit removed basis.

Basis of Payment. RAISED REFLECTIVE PAVEMENT MARKER, REFLECTOR REMOVAL shall be paid for per each unit removed, which price shall include all equipment, labor, and materials necessary to remove the reflector.

CLASS SI CONCRETE

Description. This work shall consist of providing equipment, materials and labor required to install cast-in-place concrete between existing retaining wall number 9 (SN 016-Z028) and the proposed Concrete Barrier Wall (Special) at locations shown on the drawings and/or designated by the Engineer.

Materials. Concrete shall conform to Standard Specification for Road and Bridge Construction Section 1020-Portland Cement Concrete, and shall conform to Class SI concrete mix.

Preformed flexible foam expansion joint filler shall conform to Section 1051.09, and is included in this pay item.

Place expansion and/or control joints as described on the drawings and Standard Specifications. Horizontal construction joints are not allowed

Method of Measurement. The work included in CLASS SI CONCRETE shall be measured in place and the volume computed in cubic yards from base of existing retaining wall number 9 and proposed concrete barrier wall to the top of existing retaining wall number 9.

Any other appurtenances required for the completed wall will not be measured separately but shall be included in this pay item.

Basis of Payment. The work will be paid for at the contract unit price per furnished and installed CUBIC YARD of concrete for CLASS SI CONCRETE.

MULCH

This work shall be done in accordance with the applicable portion of Section 253.02 (c) and Section 1081.06 (b) of the Standard Specifications for Road and Bridge Construction.

Description: This work shall consist of furnishing, transporting, and spreading an approved shredded hardwood bark mulch to the depth specified in areas as shown in the plans or as directed by the Engineer.

Material: Hardwood bark mulch shall be clean, finely shredded mixed-hardwood bark meeting the following requirements:

- Material shall be free of sticks, leaves, stones, dirt clods, and other debris.
- Individual wood chips shall not exceed 2 inches (50 mm) in the largest dimension.

A mulch sample and request for material inspection must be supplied to the Engineer for approval prior to performing any work 72 hours prior to application.

Method: The grade, depth, and condition of the area must be approved by the Engineer prior to placement.

The Contractor shall remove all weeds, litter and plant debris before mulching. Pre-emergent herbicide, if specified, shall be applied prior to the placement of shredded mulch. The Contractor shall prepare a neatly spaded edge between the landscaped bed and/or tree ring and the turf. The Contractor shall repair the grade by raking and adding topsoil as needed, before mulching.

The shredded mulch shall be placed according at the required depth as specified in the plans for planting trees, shrubs, vines and perennial plants. Care shall be taken not to bury leaves, stems, or vines under mulch material. Mulch shall not be in contact with the base of the trunk.

All finished mulch areas shall be left smooth and level to maintain uniform surface and appearance.

After the mulch placement, any debris or piles of material shall be immediately removed from the right of way, including raking excess mulch out of turf areas.

Method of Measurement: Mulch placement will be measured in place in square yards. Areas not meeting the depth specified shall not be measured for payment.

Basis of Payment: This work will be paid for at the contract unit price per square yard for MULCH. Payment shall include all costs for materials, equipment and labor required to complete the work specified herein, including the cost of removing and disposing of any debris. Any mulch placement included as part of the work in other work items will not be measured separately for payment. Pre-emergent herbicide, if required, shall be paid for separately.

BALLAST

Description. As part of restoration of the CTA Right-of-Way after the completion of barrier wall and drainage improvements as shown in the Plans, this work consists of furnishing and placing ballast and includes all labor, materials, tools, equipment, and incidentals necessary to place ballast. The supply and placement of ballast under this item will supplement existing ballast regraded as part of work under separate items.

Materials. Ballast materials placed under this item shall meet all current requirements of the CTA, including, but not limited to:

1. The ballast furnished and installed as part of lifting, blending, or replacement in existing track shall be AREMA No. 3 gradation limestone.
2. The limestone shall conform to all AREMA testing requirements for properties related to soundness, hardness, abrasion, etc. The Contractor shall submit all testing results that enable the supplying quarry to define the ballast as AREMA standard.
3. All test results must have been completed no earlier than within twelve (12) months of the date of the notice to proceed issued by the Department. All documentation related to testing shall be submitted to the Engineer for review and approval prior to the start of work.
4. A stone gradation of CA-1 may be acceptable provided all other test results comply with AREMA standard for limestone ballast.
5. The use of trap rock, slag or any metal bearing rock is not allowed.

A sample of the limestone ballast shall be submitted to the Engineer for review and approval prior to the start of work. Approval shall be provided by the CTA. All test results and samples shall be provided for approval a minimum of four (4) weeks prior to the start of work. No work under this item shall commence prior to receiving material approval.

Construction. The Contractor shall place and grade ballast to the lines, grades and depths shown on the Plans or as directed by the Engineer.

Method of Measurement. Ballast will be measured for payment in cubic yards of ballast placed.

Basis of Payment. This work shall be paid for at the contract unit price per cubic yard for BALLAST.

STABILIZED CONSTRUCTION ENTRANCE

Description. This work consists of constructing a stabilized pad of coarse aggregate underlain with geotechnical fabric at locations shown on the plans. Cellular confinement grids shall be used to contain the aggregate at the pad boundaries. Also included is the removal and satisfactory disposal of the stabilized construction entrance when no longer required.

All work must conform to the applicable portions of Section 202, 210, 1004 and 1080 of the Standard Specifications, the details shown on the plans or as directed by the Engineer.

Materials. Aggregate shall consist of coarse aggregate gradations CA-1, CA-2, CA-3, or CA-4 meeting the requirements of Article 1004.04 of the Standard Specifications. Aggregate thickness shall be as detailed on the plans. Geotechnical fabric shall meet the requirements of Article 1080.02 of the Standard Specifications.

General Requirements. Excess of unsuitable excavated materials shall be disposed of in accordance with Article 202.03 of the Standard Specifications. The coarse aggregate surface course shall be compacted to the satisfaction of the Engineer. The stabilized pad shall be a minimum of 6 inches thick. The area shall be restored as shown on the plans.

Method of Measurement. This work will be measured for payment in place and the area computed in square yards.

Basis of Payment. This work will be paid for at the contract unit price per square yard for STABILIZED CONSTRUCTION ENTRANCE, which price shall be payment in full for geotechnical fabric, cellular confinement grids, furnishing, placing, compacting and disposing of coarse aggregate, and for all labor, tools and equipment necessary to construct the work as specified.

AIR QUALITY COMPLIANCE

Description. This work includes meeting or exceeding air quality requirements described herein, other Special Provision sections and the Standard Specifications.

General. The Contractor shall meet standards established to minimize air quality impacts due to construction activities. The obligations by the Contractor include the following:

Air Quality Plan – Prior to the start of construction activities, the Contractor will be supplied an Air Quality Plan developed by the Engineer. The Plan will serve as a guidance document for the duration of construction activities. The Air Quality Plan is intended to identify maximum thresholds of dust levels, particulate matter and diesel components in the air in and around the project site and will incorporate requirements identified within the Special Provisions. Baseline sampling in nearby areas without construction activity will be performed by the IEPA. Real-time monitoring will be conducted at the two locations adjacent to Circle Interchange. If during real-time monitoring there are exceedances of the screening standards, the Engineer will contact the Contractor and activities will cease and corrective actions will be developed.

Dust Control Plan – The Contractor shall comply with the requirements of CONSTRUCTION AIR QUALITY – DUST CONTROL in addition to Article 107.36 of the Standard Specifications.

Diesel Emissions – The maximum concentration of Diesel Components (PAHs) in sampled air shall not exceed $1 \mu\text{g}/\text{m}^3$, which is above the Chicago background level according to the IEPA. Following receipt of laboratory data that indicate exceedances of screening standards for diesel components as PAHs, IDOT will investigate the activity that was being performed at the time of the exceedance. IDOT will document the exceedance in the monthly report. Observations of consistent patterns in exceedances and potential corresponding work activities will assist in developing measures to manage the activity that caused the exceedance. Factors that will be evaluated include the activity being performed, the equipment being used for the activity, weather conditions, and general air quality at the time of the exceedance.

Construction Requirements. To ensure a prompt response to incidents involving the integrity of work zone Air Quality, the Contractor shall provide a telephone number where a responsible individual can be contacted on a 24 hour a day basis.

When the Engineer is notified, or determines, that an environmental control deficiency exists, he/she will notify the Contractor in writing, and direct the Contractor to correct the deficiency within a specified time frame. The specified time frame, which begins upon Contractor notification, will be from 1/2 hour to 24 hours long, and is based on the urgency of the situation and the nature of the deficiency. The Contractor may appeal the indicated deficiency to the Engineer on the grounds that the deficiency was caused by actions by a separate contractor, agency or public entity. The Engineer shall be the sole judge of these conditions and any appeal by the Contractor.

The deficiency may include lack of repair, maintenance or non-compliance with the related Articles of the Standard Specifications, the CONSTRUCTION AIR QUALITY – DUST CONTROL Special Provision and this Special Provision.

If the Contractor fails to respond within the allotted time frame, the Engineer may take action to correct the deficiency, or may cause the correction of the deficiency to be made by others, the cost thereof being 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, and shall not be grounds for any claim.

If the Contractor accumulates three (3) environmental deficiency deductions for the same deficiency, all related Contractor activities will be shut down until the deficiency is corrected. Such a shut down will not be grounds for any extension of the completion date, waiver of penalties, or be grounds for any claim.

Basis of Payment. This work will not be paid for separately. All obligations described herein are included associated pay items. No extension of the completion date, waiver of penalties or claims shall arise from any Contractor activity shut down enacted due to deficiencies described herein.

CONSTRUCTION AIR QUALITY – DUST CONTROL

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

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

Work on this contract shall be conducted in a manner that will not result in generating excessive total nuisance dust conditions or air borne particulate matter (PM_{2.5}). The IEPA will provide the Baseline Air Sampling in areas where there is no construction on the Circle Interchange. Two air quality monitoring locations have been identified; the UIC Student Recreational Building and IDOT Pump Station No. 5.

Following the baseline establishment, air quality will be monitored for total nuisance dust and air borne particulate matter (PM_{2.5}) as shown in the table below. Real-time monitoring will be conducted at the two locations adjacent to Circle Interchange. If during real-time monitoring there are exceedances of the screening standards, the Engineer will contact the Contractor and activities will cease and corrective actions will be developed.

Air Sample/Screening Standards			
Parameter		Concentration	Basis
Total Dust	Nuisance	335 µg/m ³	IEPA/IDPH
PM _{2.5}		35 µg/m ³	24 hours NAAQS

Notes: NAAQS = National Ambient Air Quality Standards
 IEPA = Illinois Environmental Protection Agency
 IDPH = Illinois Department of Public Health

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

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

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

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

Materials.

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

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

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

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

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

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

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

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

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

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

FENCE REMOVAL

Description. This work shall consist of removing and disposing the existing fence of all kinds as shown in the Plans or otherwise directed by the Engineer. The removal of gates installed along sections of existing fence is considered under this item. Existing fence and gates include wrought iron, wood, steel aluminum or chain link fence installations.

Construction Requirements. No removal work shall be completed without the approval of the Engineer. All associated hardware and appurtenances of the existing fence including but not limited to post foundations, fittings, gates, post, and accessories, shall be removed off-site and disposed of by the Contractor in a legal disposal site. Any part of the fence that is damaged that is not called out for to be removed shall be replaced at the Contractor's expense.

Contractor shall not damage the existing buildings adjacent to the fence. Any damage to the building shall be repaired by the Contractor at no additional cost to the Department.

Any posts identified to remain must be protected from damage during the removal of adjacent fence or gates.

Method of Measurement. Fence removal shall be measured for payment in feet of FENCE REMOVAL and measured along the top of the fence from center to center of end post, including the length occupied by gates.

Basis of Payment. This work will be paid for at the contract unit price per foot for FENCE REMOVAL, at the specified locations. Additionally, this price shall include all equipment, labor, and materials necessary to remove and dispose of the existing fence of all kinds, including but not limited to wrought iron, wood, steel aluminum, or chain link installations and their associated fence hardware, and appurtenances.

COMBINED SEWER ADJACENT TO OR CROSSING WATER MAIN

STORM SEWER ADJACENT TO OR CROSSING WATER MAIN

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

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

Method of Measurement. Sewers installed adjacent to or crossing water main shall be paid for per foot for COMBINED SEWER (WATER MAIN REQUIREMENTS) CDOT, of the diameter specified or STORM SEWER (WATER MAIN REQUIREMENTS) of the diameter specified.

Basis of Payment. This work will be paid according to Article 550.10 of the Standard Specifications, except the pay items shall be COMBINED SEWER (WATER MAIN REQUIREMENTS) CDOT, of the diameter specified or STORM SEWER (WATER MAIN REQUIREMENTS) of the diameter specified.

TEMPORARY PAVEMENT

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

The contractor shall use either Portland cement concrete (PCC) according to Sections 353 and 354 of the Standard Specifications or HMA according to Sections 355, 356, 406 of the Standard Specifications, and other applicable PCC and HMA special provisions as contained herein. The HMA mixtures to be used shall be specified in the plans. The thickness of the Temporary Pavement shall be as described in the plans or variable in order to meet existing or interim conditions. The contractor shall have the option of constructing either material type if both Portland cement concrete and HMA are shown in the plans. The Contractor shall furnish and construct Subbase Granular Material, Type B of the thickness specified on the plans and under the temporary pavement in accordance with the Standard Specifications.

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

The Temporary Pavement shall remain in place unless otherwise noted on the Plans, and if so, the removal shall conform to Section 440 of the Standard Specification.

Method of Measurement. TEMPORARY PAVEMENT and SUBBASE GRANULAR MATERIAL, TYPE B of the thickness specified on the plans will be measured in place and the area computed in square yards. The Temporary Pavement will be measured in place at the equivalent weight in tons based upon the area and average depth placed.

Basis of Payment. This work will be paid for at the contract unit price per square yard for TEMPORARY PAVEMENT and SUBBASE GRANULAR MATERIAL, TYPE B of the thickness specified on the plans.

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

SUB-BALLAST

Description. As part of restoration of the CTA Right-of-Way after the completion of barrier wall and drainage improvements as shown in the Plans, this work consists of furnishing and placing sub-ballast and includes furnishing all labor, materials, tools, equipment, and incidentals necessary to place sub-ballast. The supply and placement of sub-ballast under this item will supplement existing sub-ballast regraded as part of work under separate items.

Materials.

All sub-ballast furnished and installed shall be a crushed limestone that conforms to the most recent version for the Illinois Department of Transportation Standard Specification for Road and Bridge Construction CA-6 gradation standard. The stone must be angular in structure and all forms of crushed concrete, bank run stone or river rock shall be strictly prohibited.

Sub-ballast shall be comprised of virgin material that is of clean, hard, uncoated particles free of lumps of clay, shale and other objectionable materials.

The sub-ballast shall conform to the most recent version of Illinois Department of Transportation Standard Specification for Road and Bridge Construction Class A standard for course aggregate sample testing. The supplier must furnish test results that demonstrate the product complies with the Illinois Department of Transportation Standard Specification for Road and Bridge Construction requirements and the testing were completed no earlier than within the twelve month period before the date of the NTP issued by the Department.

Construction. The Contractor shall place and grade ballast to the lines, grades and depths shown on the Plans or as directed by the Engineer. Sub-ballast shall be compacted to ninety five (95%) percent and verify with a modified proctor test using a nuclear density meter for every two thousand five hundred (2,500 sq ft) square feet of sub-ballast furnished and installed. The stone is typically installed in six (6") in lifts; however, the sub-ballast may be installed in one eight (8") inch lift provided the required compaction can be developed.

Method of Measurement. Sub-ballast will be measured for payment in cubic yards of sub-ballast placed.

Basis of Payment. This work shall be paid for at the contract unit price per cubic yard for SUB-BALLAST.

COMBINED SEWER REMOVAL (EXTRA STRENGTH VITRIFIED CLAY PIPE) (CDOT)

Description. This work shall consist of the removal of portions of the existing combined sewer and end plugging of the portions that are to remain in place or portions plugged inside manholes. This work shall be performed at locations shown on the plans and/or subject to the review of the Engineer in accordance with Section 551 of the Standard Specifications, except as specified herein.

Sewer plugs shall be 2' long (minimum) concrete or grout plug. The plug shall prevent ground water from entering the existing sewer and through drainage. The cost of any existing sewer which shall be abandoned and plugged will be measured for payment separately as CONTROLLED LOW-STRENGTH MATERIAL.

Excavation required for existing sewer removal shall be performed in accordance with the applicable portions of the "Standard Specifications for Water and Sewer Main Construction in Illinois" and Section 605 of the Standard Specifications. Existing sewer removal shall end either at a joint or at a location where the existing pipe has been sawcut so as to provide a smooth, even surface allowing for a watertight joint. Additional removal required by non-compliance with this Special Provision will be performed at the Contractor's expense and no additional compensation will be allowed. The existing sewer shall be plugged at all locations where removal is specified and sewer is to be abandoned.

If the excavation required for the removal operation falls within a paved area, it shall be backfilled with trench backfill. This work shall be performed in accordance with the applicable requirements of the Standard Specifications and the Special Provisions included herein. TRENCH BACKFILL will be measured for payment separately.

Basis of Payment. This work will be paid for at the contract unit price per lineal foot for COMBINED SEWER REMOVAL (EXTRA STRENGTH VITRIFIED CLAY PIPE) (CDOT), of the diameter specified, measured as removed, regardless of the type or material. This price shall include labor, excavation, materials, and plugging of existing sewer to remain in place as herein specified.

RELOCATE WATER SERVICE LINE

Description. This item consists of partial replacement of an existing 2" water service that passes through the area where drilled shafts will be installed for the proposed retaining wall #9 (SN 016-1728) and under EB Interstate 290 where the pavement is being lowered. The existing water service is located west of the west line of South Morgan Street. It is supplied by an 8" water main in West Congress Parkway and the service runs to the north down the existing embankment slope and under EB Interstate 290 into the CTA right-of-way where it supplies rest room facilities for the Morgan Street CTA Station. There is an existing meter vault in the embankment slope. The portion of the water service under EB Interstate 290 is in a casing pipe of unknown diameter. The water service is supplied from a water main that is owned, operated and maintained by the City of Chicago Department of Water Management (CDWM). The Contractor shall coordinate the work with CDWM and be responsible for obtaining any necessary permits.

General Requirements. The work under this item generally consists of the work operations described below. The work must be sequenced and coordinated with the construction of the proposed retaining wall and the pavement lowering work:

- 1) The work shall include terminating the existing water service at the water main before wall construction begins. A new 2" service tap shall be installed in the water main approximately 10 feet from the existing tap. The Chicago Department of Water Management will perform the service termination and installation work under a force account fee.
- 2) Construct a new meter vault and shut off box in the south sidewalk of West Congress Parkway adjacent to the new service tap.
- 3) Install a new 6" casing pipe under EB Interstate 290 from south to north within the limits shown in the plan. The new 6" casing pipe shall extend from West Congress Parkway down through the proposed retaining wall area to the area just north of the highway barrier wall within the limits shown in the plan. The casing pipe shall be capped and protected during the drilled shaft and retaining wall construction work.
- 4) After the wall construction is complete, install the new 2" copper service pipe from the meter vault to the north side of EB Interstate 290. Connect the new pipe to the new service in the meter vault.
- 5) In coordination with the closing of the north most lanes of EB Interstate 290, excavate and expose the existing and new casing pipes in the shoulder of the roadway.
- 6) Carefully cut and remove a portion of the existing casing pipe to expose the existing 2" service pipe. Connect the new 2" copper service pipe to the existing 2" service pipe. Install insulation around the piping and connections. Backfill the excavation.
- 7) Flush and disinfect the service line. The work under this item shall include disinfection of the entire service pipe including the portions of piping in the CTA right-of-way and rest room facilities as required by CDWM and in conformance with Section 33 13 00 Hydrostatic Testing and Disinfecting Water Mains, included within Appendix C.

Construction Requirements. The partial replacement of an existing 2” water service shall conform to the Contract and the applicable sections of the Chicago Department of Water Management’s Technical Specifications for Water Main Construction shown below and included as part of this special provision (See Appendix C):

UTILITY PIPE JACKING	SECTION 33 05 21
TRENCHLESS UTILITY INSTALLATIONS	SECTION 33 05 23
INSULATION FOR WATER MAIN PIPE AND APPURTENANCES	SECTION 33 07 00
WATER SERVICES-2-INCH & SMALLER	SECTION 33 12 13
WATER MAIN VALVE BASINS & METER VAULTS	SECTION 33 12 20
HYDROSTATIC TESTING AND DISINFECTING	
WATER MAINS	SECTION 33 13 00

All required work for excavating, installation of a temporary soil retention system, shoring, dewatering, stabilization, backfilling of the jacking and receiving pits and removal all temporary items is included under this item.

Any temporary retention system required to support excavation shall be designed and constructed per Article 522.07, Temporary Soil Retention System. The Contractor shall determine the required size based on intended means and methods. The design calculations, site layout and shop drawings for the temporary soil retention system proposed by the Contractor shall be submitted according to Article 522.05. This approval will not relieve the Contractor of responsibility for the safety of the excavation and structural adequacy of adjacent properties. Approval shall be contingent upon acceptance by all involved utilities and/or railroads.

The Contractor shall design a temporary soil retention system such that at any location the maximum total lateral deflection at the top of the temporary soil retention system shall not exceed 0.25 inches. The Plans include soil boring log data within the vicinity of the project. If deemed necessary, the Contractor shall obtain additional geotechnical data at no additional cost to the contract.

All excavated areas are to be illuminated with flashing warning lights and shall be fenced the excavated areas are backfilled. This work shall be considered included with this work.

The backfill material shall be placed in 6 inch lifts, loose measurements, and each layer shall be compacted with a mechanical tamper of a type approved by the Engineer before the next layer is placed, and the backfill shall be compacted to or not less than 95% of the maximum dry density as determined by ASTM D1557. All backfill material shall be deposited in such a manner as not to damage the conduit or water service.

Method of Measurement. This work will be measured for payment in place in units of each.

No separate measurement of temporary soil retention system will be made. No measurement of excavation or backfill of excavations to install the conduit and/or service will be made.

Basis of Payment. This work will be paid for at the contract unit price per each for RELOCATE WATER SERVICE LINE, 2" which price will be payment in full for all labor, equipment, materials and permits necessary to complete the work as described in this special provision, shown in the plans, and per CDWM standards. Excavation and other required work to access the limits of water service that is to be relocated is considered included within this item. Backfilling the excavation required under this item is included within the cost of this item and will not be paid for separately.

REPAIR IRRIGATION SYSTEM

Description. This work includes the repair of the impacted irrigation system by reinstalling impacted components within the project area as indicated on the drawings and as specified herein.

This work shall include all labor, material, equipment, tools, transportation, permits, and services to remove and replace the portions of the irrigation system impacted by the project as shown in the plans, in accordance with sections 561, 562, 563, and 565 of the Standard Specification for Road and Bridge Construction and Highway Standards, except as herein modified.

This work is to remove and replace components (lines, heads, etc.) of an already functioning irrigation system. It is not intended to upgrade or modify the existing system, rather replace the components removed due to the excavation. The Contractor, in the presence of the Engineer, will be shown that existing irrigation system is working before construction. The Contractor shall locate and record the existing sprinkler lines, sprinkler heads, fittings, valves, and accessories which will be impacted by the construction. These shall be replaced with the same size and type or approved equal product, meeting these specifications and placed at their original locations. The Contractor shall include the following materials in this work:

- 5 - Rain Bird 1804 SAM Spray Head MP Rotator Nozzle Full, Hunter PROS-04-PRS40-CV Spray Head MP Rotator Nozzle Full or Approved Equal Sprinkler Heads
- 9 - Rain Bird 1812 SAM Spray Head MPR/VAN Nozzles Part, Hunter PROS-12-PRS30-CV Spray Head PRO Spray Nozzles Part or Approved Equal Sprinkler Heads
- 5 - Rain Bird 1812 SAM Spray Head MPR/VAN Nozzles Full, Hunter PROS-12-PRS30-CV Spray Head PRO Spray Nozzles Full or Approved Equal Sprinkler Heads
- 10 - Rain Bird 1812 SAM Spray Head MP Rotator Nozzle Part, Hunter PROS-12-PRS40-CV Spray Head MP Rotator Nozzle Part or Approved Equal Sprinkler Heads
- 250 feet of Polyethylene HD100 pipe sprinkler lines 1" or 1.5" diameter to match existing
- Associated fittings, connectors and accessories.

Install all piping and fittings using glue methods consistent with the manufacturer's recommendations. Mainline piping and lateral lines shall be installed at a minimum depth of 12". Cap or plug all openings as soon as lines are installed to prevent debris in the line. Thoroughly flush all lines prior to the operation of sprinkler heads. The irrigation system shall be tested at operating pressure for a minimum of 4 hours, repair all leaks and retest after curing. Upon completion of test, complete assembly of all equipment and sprinklers for proper distribution.

The existing sprinkler lines shall be cut and capped at the construction limits in a manner approved by the Engineer so that the existing sprinkler lines to remain are not damaged and are operational. If any part of the irrigation system outside of the construction limits is damaged by the Contractor it shall be replaced at the Contractor's own expense.

The Contractor shall demonstrate to the Engineer that the repaired system is working properly and shall make minor adjustments to ensure proper coverage. If the Engineer finds that the plants need watering when the irrigation system is down, the Contractor shall water the plantings and this work will be paid for as Supplemental Watering.

Measurement. The contract unit price for irrigation system shall be measured per partial system removed, replaced and tested.

Basis of Payment. This work shall be paid for at the contract unit price per lump sum for REPAIR IRRIGATION SYSTEM, which shall include all labor, material, equipment, and services necessary for repairing and re-assembling the landscape irrigation systems to a serviceable, fully operational manner, including, but not limited to, excavation, backfilling all piping, sprinkler heads, isolation valves, valve boxes, adjustment of automatic controls, system testing, plumbing permits, inspection fees, valve tags, supports, sleeves, fittings, valves, and accessories.

WATER SERVICE LINE 2"

Description. This item consists of partial replacement of an existing 2" water service that passes under EB Interstate 290 where the pavement is being lowered. The existing water service is located west of the west line of Racine Avenue. It is supplied by a 12" water main in West Congress Parkway and the service runs to the north down the existing embankment slope and under EB Interstate 290 into the CTA right-of-way where it supplies rest room facilities for the Racine Avenue CTA Station. There is an existing meter vault in the embankment slope. The portion of the water service under EB Interstate 290 is in a casing pipe of unknown diameter. The water service is supplied from a water main that is owned, operated and maintained by the City of Chicago Department of Water Management (CDWM). The Contractor shall coordinate the work with CDWM and be responsible for obtaining any necessary permits.

General Requirements. The work under this item generally consists of the work operations described below. The work must be sequenced and coordinated with the construction of the pavement lowering work:

- 1) The work shall include terminating the existing water service at the existing meter vault. The Chicago Department of Water Management will perform the service termination under a force account fee.
- 2) Install a new 6" casing pipe under EB Interstate 290 from south to north within the limits shown in the plan. The new 6" casing pipe shall extend from the south side of EB Interstate 290 to the area just north of the highway barrier wall within the limits shown in the plan.
- 3) Install new 2" copper service pipe from the existing meter vault to the north side of EB Interstate 290. Connect the new pipe to the existing service in the meter vault.
- 4) In coordination with the closing of the north most lanes of EB Interstate 290, excavate and expose the existing and new casing pipes in the shoulder of the roadway.
- 5) Carefully cut and remove a portion of the existing casing pipe to expose the existing 2" service pipe. Connect the new 2" copper service pipe to the existing 2" service pipe. Install insulation around the piping and connections. Backfill the excavation.
- 6) Flush and disinfect the service line. The work under this item shall include disinfection of the entire service pipe including the portions of piping in the CTA right-of-way and rest room facilities as required by CDWM and in conformance with Section 33 13 00 Hydrostatic Testing and Disinfecting Water Mains, included within Appendix C.

Construction Requirements. The partial replacement of an existing 2" water service shall conform to the Contract and the applicable sections of the Chicago Department of Water Management's Technical Specifications for Water Main Construction shown below and included as part of this special provision (See Appendix C):

UTILITY PIPE JACKING	SECTION 33 05 21
TRENCHLESS UTILITY INSTALLATIONS	SECTION 33 05 23
INSULATION FOR WATER MAIN PIPE AND APPURTENANCES	SECTION 33 07 00
WATER SERVICES-2-INCH & SMALLER	SECTION 33 12 13
HYDROSTATIC TESTING AND DISINFECTING WATER MAINS	SECTION 33 13 00

All required work for excavating, installation of a temporary soil retention system, shoring, dewatering, stabilization, backfilling of the jacking and receiving pits and removal all temporary items is included under this item.

Any temporary retention system required to support excavation shall be designed and constructed per Article 522.07, Temporary Soil Retention System. The Contractor shall determine the required size based on intended means and methods. The design calculations, site layout and shop drawings for the temporary soil retention system proposed by the Contractor shall be submitted according to Article 522.05. This approval will not relieve the Contractor of responsibility for the safety of the excavation and structural adequacy of adjacent properties. Approval shall be contingent upon acceptance by all involved utilities and/or railroads.

The Contractor shall design a temporary soil retention system such that at any location the maximum total lateral deflection at the top of the temporary soil retention system shall not exceed 0.25 inches. The Plans include soil boring log data within the vicinity of the project. If deemed necessary, the Contractor shall obtain additional geotechnical data at no additional cost to the contract.

All excavated areas are to be illuminated with flashing warning lights and shall be fenced the excavated areas are backfilled. This work shall be considered included with this work.

The backfill material shall be placed in 6 inch lifts, loose measurements, and each layer shall be compacted with a mechanical tamper of a type approved by the Engineer before the next layer is placed, and the backfill shall be compacted to or not less than 95% of the maximum dry density as determined by ASTM D1557. All backfill material shall be deposited in such a manner as not to damage the conduit or water service.

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

No separate measurement of temporary soil retention system will be made. No measurement of excavation or backfill of excavations to install the conduit and/or service will be made.

Basis of Payment. This work will be paid for at the contract unit price per foot for WATER SERVICE LINE 2" which price will be payment in full for all labor, equipment, materials and permits necessary to complete the work as described in this special provision, shown in the plans, and per CDWM standards. Excavation and other required work to access the limits of water service that is to be replaced is considered included within this item. Backfilling the excavation required under this item is included within the cost of this item and will not be paid for separately.

CONCRETE BARRIER BASE (SPECIAL)

Description. This work shall consist of constructing a concrete barrier base with reinforcement bars below a concrete barrier wall as detailed in the plans.

Construction Requirements. This work shall be done in accordance with the applicable portions of Section 637 of the Standard Specifications. The concrete barrier base shall be constructed as detailed in the plans. The concrete barrier wall shall be constructed separately and not poured monolithically with the concrete barrier base.

Method of Measurement. CONCRETE BARRIER BASE (SPECIAL) per the number indicated on plans will be measured for payment in feet in place along the centerline of the barrier base. The concrete barrier wall will be paid for separately according to CONCRETE BARRIER.

Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE BARRIER BASE (SPECIAL) per the number indicated on plans, which price shall include all equipment, labor, and materials necessary to construct the concrete barrier base including all reinforcement bars in the concrete barrier base and those extending into the concrete barrier wall or concrete barrier transition.

CONCRETE BARRIER AND BASE

Description. This work shall consist of constructing a concrete barrier wall with reinforcement bars and a concrete barrier base as detailed in the plans.

Construction Requirements. This work shall be done in accordance with the applicable portions of Section 637 of the Standard Specifications. The concrete barrier wall shall be constructed with concrete barrier base as detailed in the plans. The concrete barrier wall shall be constructed monolithically with the concrete barrier base.

Method of Measurement. Concrete barrier walls shall be measured for payment in feet in place, along the centerline of the concrete barrier and base.

Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE BARRIER AND BASE, SINGLE FACE, 42 INCH HEIGHT (SPECIAL) or CONCRETE BARRIER AND BASE, VARIABLE WIDTH, 42 INCH HEIGHT (SPECIAL); or as shown in the plans. This contract unit price shall include all equipment, labor, and materials necessary to construct the concrete barrier wall and base including all reinforcement bars in the concrete barrier wall and base.

CONCRETE BARRIER WALL, VERTICAL FACE (SPECIAL)

Description. This work shall consist of constructing a concrete barrier wall, vertical face with reinforcement bars on a concrete barrier base as detailed in the plans.

Construction Requirements. This work shall be done in accordance with the applicable portions of Section 637 of the Standard Specifications. The concrete barrier wall shall be constructed on a concrete barrier base as detailed in the plans. The concrete barrier wall shall be constructed separately and not poured monolithically with the concrete barrier base.

Method of Measurement. CONCRETE BARRIER WALL, VERTICAL FACE (SPECIAL) shall be measured for payment in feet along the centerline of the barrier. The concrete barrier base will be paid for separately according to CONCRETE BARRIER BASE (SPECIAL).

Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE BARRIER WALL, VERTICAL FACE (SPECIAL), which price shall include all equipment, labor, and materials necessary to construct the concrete barrier wall including all reinforcement bars in the concrete barrier wall.

REMOVE TEMPORARY CONCRETE BARRIER, NO SALVAGE

Description. This work shall consist of removing existing precast temporary concrete barriers including all fixtures attached to the temporary concrete barrier installed in previous contracts by others at locations as specified in the Plans.

Construction Requirement. When the Engineer determines the existing precast temporary concrete barriers are no longer required, the installation shall be dismantled with all hardware becoming the property of the Contractor.

When the existing precast temporary concrete barriers have been anchored to the pavement, the anchor holes shall be repaired with rapid set mortar with only enough water to permit placement. Consolidation by rodding shall be used and the material shall be struck-off flush.

Method of Measurement. This work will be measured for payment in feet (meters) in place along the centerline of the barrier.

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for REMOVE TEMPORARY CONCRETE BARRIER, NO SALVAGE regardless of size or type, which payment shall constitute full compensation for all removal, disposal, transportation and incidentals necessary to complete the work as specified.

REMOVAL OF SOIL RETENTION SYSTEM

Description. This work shall consist of all material, labor and equipment required for the removal and disposal of the soil retention systems installed in previous contracts as shown on the Plans and according to this specification.

General. The soil retention systems that were installed near the south abutment of the Halsted St. Bridge (SN 016-1716) as part of IDOT Contract No. 60W26 shall be removed to allow the construction of proposed Retaining Wall 12 (SN 016-1801). The systems and its attached components, including chain link fence, shall be removed and disposed of by the Contractor as directed by the Engineer. System components include, but are not limited to, sheet piles, channels, plates, tie rods, plates, angles, nuts, bolts, and washers. Removed system components shall become the property of the Contractor.

This work does not include the use of a temporary soil retention system and is covered by the pay item TEMPORARY SOIL RETENTION SYSTEM.

Construction. The Contractor shall verify locations of all soil retention systems left in place from previous contracts before commencing work. Utility and existing structure information shown on the drawings was collected from information available at the time of the design. There is no guarantee of complete accuracy with the utility or structure locations or types.

Any damage to any existing structures or utilities not to be removed shall be repaired at no additional cost to the satisfaction of the Engineer prior to construction of the proposed Retaining Wall 12 (SN 016-1801).

Removal limits shall consider the construction of the drilled shafts for Retaining Wall 12 and be approved by the Engineer.

Method of Measurement. No separate measurement will be made for removal of existing structures. Excavation of earth necessary to perform the removal of existing structures is included and will not be measured for payment.

Basis of Payment. This work shall be paid for at the contract unit price lump sum for REMOVAL OF SOIL RETENTION SYSTEM.

Payment for any excavation related to the removal of the soil retention systems and its components shall not be paid for separately but shall be included in the unit bid price for REMOVAL OF SOIL RETENTION SYSTEM.

REMOVE AND RE-ERECT SIGN PANEL, TYPE 3

Description: This work shall consist of removing, storing and re-erecting Type 3 sign panels, sign brackets, and hardware connected to an overhead bridge mounted sign structure.

Removal: The Contractor shall remove the existing sign panels, sign support brackets, support beams, and any hardware completely from the bridge mounted sign. Transport and store these items for re-erecting the sign panels at a later stage.

The Contractor shall remove all of the sign support brackets including the existing W10x22 steel beam supporting the existing sign. The existing W10x22 beam shall be replaced by a new beam of the size and length specified in the plan details.

A temporary sign panel shall be displayed once the sign is removed, to be paid for as SIGN PANEL – TYPE 3.

All items shall be transported and stored offsite, as directed by the Engineer. The Contractor shall notify the Engineer 72 hours in advance of any sign removal activities planned to take place over the expressway.

Re-Erection: The Contractor shall re-erect the proposed sign panel and supports with the bottom of the sign panel or support brackets a minimum of 3” above the bridge beam which it is mounted to. All sign panels placed above the expressway shall be tightly fastened and meet the approval of the Engineer.

Method of Measurement: Each sign removed, transported, stored, and re-erected on a bridge mount, including all brackets, beams, hardware, and any additional materials attaching sign to the bridge, not including brackets supporting walkway, will be measured for payment, in units of SQ FT.

Basis of Payment: This work will be paid for at the contract unit price per SQ FT. for REMOVE AND REERECT SIGN PANEL, TYPE 3. The contract unit price per SQ FT. for REMOVE AND REERECT SIGN PANEL, TYPE 3 shall include all equipment, materials and labor required to remove and dispose of designated sign, supports, and corresponding hardware.

STORM SEWERS, RUBBER GASKET

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

Pipe materials shall meet the requirements of Sections 40 and 41-2.01 of the "Standard Specifications for Water and Sewer Main Construction in Illinois", except PVC pipe will not be allowed. Rubber Gasket shall meet the requirements of Section 1056 of the Standard Specifications.

Basis of Payment: This work will be paid according to Article 550.10 of the Standard Specifications, except the pay item shall be STORM SEWERS, RUBBER GASKET, CLASS A, TYPE 2 EQUIVALENT ROUND-SIZE, 18".

HIGH-EARLY-STRENGTH PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED)

This work shall consist of constructing high-early-strength portland cement concrete pavement at locations directed by the Engineer. This work shall be performed in accordance with Section 420 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price per square yard for HIGH-EARLY-STRENGTH PORTLAND CEMENT CONCRETE PAVEMENT (JOINTED), of the thickness specified.

APPENDIX A: STORM WATER POLLUTION PREVENTION PLAN



Storm Water Pollution Prevention Plan



Route FAI 90/94/290	Marked Route EB I-290 Mainline	Section 2014-002R&B
Project Number C-91-187-14	County Cook	Contract Number 60X76

This plan has been prepared to comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit No. ILR10 (Permit ILR10), issues by the Illinois Environmental Protection Agency (IEPA) for storm water discharges from construction site activities.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name Anthony Quigley, P.E.	Title Regional Engineer, Region One	Agency IDOT
Signature 	Date 3-3-17	

I. Site Description

A. Provide a description of the project location (include latitude and longitude):

The project is located along FAI Route 90/94/290 from FAI Route 90/94 (41° 52' 31.53" latitude; 87° 38' 45.63" longitude) to west of Racine on FAI Route 290 (41° 52' 32.20" latitude; 87° 39' 35.77" longitude) and along a portion of the ramp between eastbound FAI Route 290 and southbound FAI Route 90/94 as well as the ramp between eastbound FAI Route 290 and northbound FAI Route 90/94. The project is within township 39N, Range 14E, and Section 16. The gross and net length of the project is 3780.48 Feet (0.718 Miles).

The design, installation, and maintenance of BMPs at these locations are within an area where annual erosivity (R value) is less than or equal to 160. Erosivity is less than 5 in all two-week periods between October 12 and April 15, which would qualify for a construction rainfall erosivity waiver under the US Construction General Permit requirements. At these locations, erosivity is highest in spring to autumn, April 16 - October 11.

B. Provide a description of the construction activity which is subject of this plan:

The work consists of the reconstruction of EB I-290, a portion of Ramp EN from EB I-290 to NB I-90/94, and a portion of Ramp ES from EB I-290 to SB I-90/94.

Work will be completed in 3 stages of work and will include retaining wall construction, roadway reconstruction, erosion control and protection, utility relocation of existing storm sewers, non-special waste excavation, earth excavation and embankment, removal of existing improvements, miscellaneous storm sewers, pavements, pavement marking and signage, roadway lighting, ITS, traffic control and protection, urban enhancements and all incidental and collateral work necessary to complete the improvements as shown on the Plans and as described herein.

Drainage improvements include the installation of a new storm system along EB I-290 which will connect to the existing main drain along I-290 west of Peoria Street and to the existing main drain along I-90/94 (Dan Ryan Expressway) east of Peoria Street. The project includes installation, maintenance and removal of temporary erosion and sediment control measures. Permanent stabilization is included in the contract and consists of a mixture of seeding and sodding. The permanent stabilization shall be installed as soon as an area will no longer be needed for construction access or traffic.

- C. Provide the estimated duration of this project:

20 months

- D. The total area of the construction site is estimated to be 21.3 acres.

The total area of the site estimated to be disturbed by excavation, grading or other activities is 13.4 acres.

- E. The following is a weighted average of the runoff coefficient for this project after construction activities are completed:

C=0.76 (Proposed); C=0.76 (Existing)

- F. List all soils found within project boundaries. Include map unit name, slope information and erosivity:

NRCS Soil Survey classification classifies the site soil as urban land.

From EB I-290, the general lithologic succession encountered beneath the topsoil/pavement, in descending order, includes: 1) man-made ground (fill); 2) medium stiff to very stiff silty clay; and 3) very soft to soft clay to silty clay. -- Found in the Roadway Geotechnical Report (RGR).

From Ramp EN, the general lithologic succession encountered beneath the topsoil/pavement, in descending order, includes: 1) man-made ground (fill); 2) medium stiff to stiff silty clay; and 3) very soft to medium stiff clay to silty clay. -- Found in the Roadway Geotechnical Report (RGR).

From Ramp ES/Taylor Street Exit Ramp, the general lithologic succession encountered beneath the topsoil/pavement, in descending order, includes: 1) man-made ground (fill); 2) medium stiff to hard silty clay to silty clay loam; and 3) very soft to medium stiff clay to silty clay. -- Found in the Roadway Geotechnical Report (RGR).

- G. Provide an aerial extent of wetland acreage at the site:

No wetlands were identified on site.

- H. Provide a description of potentially erosive areas associated with this project:

Potentially erosive areas are located along to the EB I-290 south embankment just west of Racine Avenue and just west of Morgan Street, the Ramp ES southwest embankment, and the infield areas between Ramp ES and Ramp EN and between Ramp EN and EB I-290.

- I. The following is a description of soil disturbing activities by stages, their locations, and their erosive factors (e.g. steepness of slopes, length of scopes, etc.):

Pre-Stage: Soil disturbing activities will consist of excavation for the following:

- The temporary pavement in the gore area between EB Congress Parkway and Ramp EN
- The sewer crossing SB I-90/94, the sewer along Ramp WS and the east half of the sewer crossing Ramp WS and Ramp ES
- The temporary pavement along SB I-90/94 and Ramp WS
- Remove the existing overhead sign truss and install proposed overhead sign truss between Peoria Street and Halsted Street

Stage 1A: Soil disturbing activities will consist of excavation for the following:

- EB Mainline Lanes 3/4 and outside shoulder from the west project limit to STA 5121+85.00
- EB Mainline Lanes 4/5 and outside shoulder/barrier from STA 5121+85.00 to STA 5136+65.74
- EB Mainline Lanes 4/5/6 and outside shoulder/barrier from STA 5136+65.74 to STA 5142+75.22
- EB Mainline Lanes 5/6 and outside shoulder/barrier from STA 5142+75.22 to STA 5145+15.22
- EB Mainline Lane 6 and outside shoulder/barrier from STA 5145+15.22 to STA 5147+02.82
- EB Mainline Lanes 1/2 and inside shoulder/barrier from STA 5149+18.56 to the east project limit
- The outside lane of Ramp EN, Taylor Street Ramp, and south half of the temporary pavement to remain
- The temporary pavement to be used for traffic in Stage 1B on the mainline west of Halsted Street
- Retaining Walls #9, #11, and #12 (complete); moment slabs on existing Retaining Walls #10 and #13
- The pavement on Congress Parkway adjacent to existing Retaining Walls #10 and #13
- Appurtenant drainage systems within the roadway paving limits

Stage 1B: Soil disturbing activities will consist of excavation for the following:

- EB Mainline Lane 4 from STA 5142+75.22 to STA 5145+15.22
- EB Mainline Lanes 4 and 5 from the STA 5145+15.22 to STA 5147+02.82
- EB Mainline Lanes 5 and 6 from STA 5147+02.82 to STA 5147+62.82
- The outside lane of Ramp EN
- The temporary pavement to be used for traffic in Stage 2 along Ramp EN
- The moment slab on Retaining Wall #9
- The pavement on Congress Parkway adjacent to Retaining Wall #9
- Appurtenant drainage systems within the roadway paving limits

Stage 2: Soil disturbing activities will consist of excavation for the following:

- EB Mainline Lane 2 from the STA 5118+85.00 to STA 5122+36.00
- EB Mainline Lane 3 from STA 5122+36.00 to STA 5137+40.74 & STA 5146+42.82 to STA 5147+02.82
- EB Mainline Lanes 3 and 4 and outside shoulder from STA 5147+02.82 to the east project limit
- Ramp EN from STA 1600+00.00 to STA 1602+82.00
- Ramp EN gore area from STA 1600+00.00 to STA 1602+42.18
- Ramp ES gore area from STA 1503+02.29 to STA 1505+50.81
- The north half of the temporary pavement to remain on Ramp ES
- Ramp EN temporary pavement to remain
- Appurtenant drainage systems within the roadway paving limits

Stage 3: Soil disturbing activities will consist of excavation for the following:

- EB Mainline Lanes 1/2 and inside shoulder/barrier from the west project limit to STA 5118+85.00
- EB Mainline Lane 1 and inside shoulder/barrier from STA 5118+85.00 to STA 5122+36.00
- EB Mainline Lanes 1/2 and inside shoulder/barrier from STA 5122+36.00 to STA 5137+40.74
- EB Mainline Lanes 1/2/3 and inside shoulder barrier from STA 5137+40.74 to STA 5146+42.82
- EB Mainline Lanes 1/2 and inside shoulder/barrier from STA 5146+42.82 to STA 5149+18.56
- Ramp EN gore area from STA 1602+42.18 to STA 1602+82.00
- Ramp ES gore area from STA 1505+74.81 to STA 1507+75.00
- Ramp ES inside lane from STA 1505+50.81 to STA 1507+75.00
- Appurtenant drainage systems within the roadway paving limits
- Existing Retaining wall #9 repair

J. See the erosion control plans and/or drainage plans for this contract for information regarding drainage patterns, approximate slopes anticipated before and after major grading activities, locations where vehicles enter or exit the site and controls to prevent off site sediment tracking (to be added after contractor identifies locations), areas of soil disturbance, the location of major structural and non-structural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands) and locations where storm water is discharged to surface water including wetlands.

K. Identify who owns the drainage system (municipality or agency) this project will drain into:

IDOT / City of Chicago

L. The following is a list of General NPDES ILR40 permittees within whose reporting jurisdiction this project is located.

City of Chicago / Cook County / IDOT / Metropolitan Water Reclamation District of Greater Chicago (MWRD)

M. The following is a list of receiving water(s) and the ultimate receiving water(s) for this site. The location of the receiving waters can be found on the erosion and sediment control plans:

Eastbound I-290 from the western limits of the contract to station 5143+82.55 drains to the existing 7'-2 3/8" x 8'-0" main drain sewer and outlets to Pump Station #5 which discharges into the South Branch Chicago River via a 48" diameter pipe at the southwest corner of Van Buren Street and Des Plaines Street. The pipe outlets into an existing 60" diameter brick sewer near Clinton Street before outletting into the South Branch of the Chicago River. Pump Station #26 will receive portions of overflow from Pump Station #5.

Eastbound I-290 from station 5143+82.55 to the eastern project limit, Ramp EN, Ramp ES, and the Taylor Street Ramp drains to the existing 4'-6" x 5'-0" main drain sewer under I-90/94 and outlets to Pump Station #26. Pump Station #26 outfalls at the South Union Avenue interceptor sewer.

The South Branch Chicago River will be the ultimate receiving water this site and it is not identified by the IDNR as a "biologically significant stream". The South Branch Chicago River (segment IL_HC-01) is listed on the 2014 IEPA 303(d) list as impaired for the designated use of fish consumption due to the PCBs and the indigenous aquatic life use as being impaired by dissolved oxygen, total dissolved solids, and phosphorous (Total). No TMDLs are currently being developed for these impairments.

N. Describe areas of the site that are to be protected or remain undisturbed. These areas may include steep slopes, highly erodible soils, streams, stream buffers, specimen trees, natural vegetation, nature preserves, etc.

Existing trees that will not be impacted during construction will need to be protected as shown on the plans.

O. The following sensitive environmental resources are associated with this project, and may have the potential to be impacted by the proposed development:

- Floodplain
- Wetland Riparian
- Threatened and Endangered Species
- Historic Preservation
- 303(d) Listed receiving waters for suspended solids, turbidity, or siltation
- Receiving waters with Total Maximum Daily Load (TMDL) for sediment, total suspended solids, turbidity, or siltation
- Applicable Federal, Tribal, State or Local Programs
- Other

1. 303(d) Listed receiving waters (fill out this section if checked above):

a. The name(s) of the listed water body, and identification of all pollutants causing impairment:

b. Provide a description of how erosion and sediment control practices will prevent a discharge of sediment resulting from a storm event equal to or greater than a twenty-five (25) year, twenty-four (24) hour rainfall event:

c. Provide a description of the location(s) of direct discharge from the project site to the 303(d) water body:

d. Provide a description of the location(s) of any dewatering discharges to the MS4 and/or water body:

2. TMDL (fill out this section if checked above)

a. The name(s) of the listed water body:

b. Provide a description of the erosion and sediment control strategy that will be incorporated into the site design that is consistent with the assumptions and requirements of the TMDL:

c. If a specific numeric waste load allocation has been established that would apply to the project's discharges, provide a description of the necessary steps to meet the allocation:

P. The following pollutants of concern will be associated with this construction project:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Soil Sediment | <input checked="" type="checkbox"/> Petroleum (gas, diesel, oil, kerosene, hydraulic oil / fluids) |
| <input checked="" type="checkbox"/> Concrete | <input checked="" type="checkbox"/> Antifreeze / Coolants |
| <input checked="" type="checkbox"/> Concrete Truck waste | <input checked="" type="checkbox"/> Waste water from cleaning construction equipment |
| <input checked="" type="checkbox"/> Concrete Curing Compounds | <input type="checkbox"/> Other (specify) _____ |
| <input checked="" type="checkbox"/> Solid waste Debris | <input type="checkbox"/> Other (specify) _____ |
| <input checked="" type="checkbox"/> Paints | <input type="checkbox"/> Other (specify) _____ |
| <input checked="" type="checkbox"/> Solvents | <input type="checkbox"/> Other (specify) _____ |
| <input checked="" type="checkbox"/> Fertilizers / Pesticides | <input type="checkbox"/> Other (specify) _____ |

II. Controls

This section of the plan addresses the controls that will be implemented for each of the major construction activities described in I.C. above and for all use areas, borrow sites, and waste sites. For each measure discussed, the Contractor will be responsible for its implementation as indicated. The Contractor shall provide to the Resident Engineer a plan for the implementation of the measures indicated. The Contractor and subcontractors, will notify the Resident Engineer of any proposed changes, maintenance, or modifications to keep construction activities compliant with the Permit ILR10. Each such Contractor has signed the required certification on forms which are attached to, and are a part of, this plan:

A. **Erosion and Sediment Controls:** At a minimum, controls must be coordinated, installed, and maintained to:

1. Minimize the amount of soil exposed during construction activity;
2. Minimize the disturbance of steep slopes;
3. Maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration, unless infeasible;
4. Minimize soil compaction and, unless infeasible, preserve topsoil.

B. **Stabilization Practices:** Provided below is a description of interim and permanent stabilization practices, including

site- specific scheduling of the implementation of the practices. Site plans will ensure that existing vegetation is preserved where attainable and disturbed portions of the site will be stabilized. Stabilization practices may include but are not limited to: temporary seeding, permanent seeding, mulching, geotextiles, sodding, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Except as provided below in II(B)(1) and II(B)(2), stabilization measures shall be initiated **immediately** where construction activities have temporarily or permanently ceased, but in no case more than **one (1) day** after the construction activity in that portion of the site has temporarily or permanently ceases on all disturbed portions of the site where construction will not occur for a period of fourteen (14) or more calendar days.

1. Where the initiation of stabilization measures is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.
2. On areas where construction activity has temporarily ceased and will resume after fourteen (14) days, a temporary stabilization method can be used.

The following stabilization practices will be used for this project:

- | | |
|---|--|
| <input type="checkbox"/> Preservation of Mature Vegetation | <input checked="" type="checkbox"/> Erosion Control Blanket / Mulching |
| <input type="checkbox"/> Vegetated Buffer Strips | <input checked="" type="checkbox"/> Sodding |
| <input checked="" type="checkbox"/> Protection of Trees | <input type="checkbox"/> Geotextiles |
| <input checked="" type="checkbox"/> Temporary Erosion Control Seeding | <input checked="" type="checkbox"/> Other (specify) Surface Roughening |
| <input type="checkbox"/> Temporary Turf (Seeding, Class 7) | <input type="checkbox"/> Other (specify) _____ |
| <input checked="" type="checkbox"/> Temporary Mulching | <input type="checkbox"/> Other (specify) _____ |
| <input checked="" type="checkbox"/> Permanent Seeding | <input type="checkbox"/> Other (specify) _____ |

Describe how the stabilization practices listed above will be utilized during construction:

Refer to the Erosion and Sedimentation Control plan sheets for the contract for the specific stabilization practices called out for temporary conditions during construction. Temporary and permanent stabilization shall be completed during the current stage prior to switching traffic to the next stage. Stabilization controls runoff volume and velocity, peak runoff rates and volumes of discharges from the construction and provide for natural buffers and minimization of soil compaction. Existing vegetated areas where disturbance can be avoided will not require stabilization.

Protection of Trees - Areas of trees, shrubs and other woody vegetation designated to remain undisturbed during any stage of construction shall be protected. Clearly delineate protected areas prior to clearing/grubbing or other soil disturbing activities.

Temporary Erosion Control Seeding: This item will be applied to all bare areas every seven days to minimize the amount of exposed surface area. Earth stockpiles shall be temporarily seeded if they are to remain unused for more than 14 days. Within the construction limits, areas which may be susceptible to erosion as determined by the Engineer shall remain undisturbed until full scale construction is underway to prevent unnecessary soil erosion. Bare and sparsely vegetated ground in highly erodible areas as determined by the Engineer shall be temporarily seeded at the beginning of construction where no construction activities are expected within seven days, regardless of when permanent stabilization is anticipated.

Temporary Mulching: Mulch is applied to temporary erosion control seeding to allow for the seeding to take hold in the ground and grow. Without the mulching, the seeding will be displaced by wind and rain and therefore would not grow. Mulch will be paid separately from temporary seeding and shall conform to Section 251 of the Standard Specifications. Mulch Method 2 and surface roughening shall be used for temporary stabilization during winter on top of temporary erosion control seeding when grading will occur after September 30th because temporary seed will not germinate to provide erosion control protection until the following spring.

Surface Roughening: All slopes steeper than 3:1 (horizontal to vertical) shall be surface roughened by either stair-step grading, grooving, or tracking. Areas with slopes flatter than 3:1 shall have the soil surface lightly roughened and loosed to a depth of 2 to 4 inches prior to seeding. Surface roughening is included in the cost of Mulch Method 2.

Describe how the stabilization practices listed above will be utilized after construction activities have been completed:

Refer to the Permanent Erosion and Sedimentation Control plan sheets for the contract for the specific stabilization practices used for permanent conditions after construction activities. All areas disturbed by construction will be stabilized with permanent seeding and erosion control blanket, sodding, artificial turf or mulching. Stabilization controls runoff volume and velocity, peak runoff rates and volumes of discharge to minimize exposed soil, disturbed slopes, sediment discharges from construction, and provides natural buffers and minimization of soil compaction. Existing vegetated areas where disturbance can be avoided will not require stabilization.

Permanent Seeding: Seeding, Class 2A will be installed per IDOT specifications to areas where there will be no more disturbance. The seeding will keep the soil from eroding due to natural conditions (wind, rain, etc.)

Erosion Control Blanket: Erosion Control Blankets will be installed over all areas to be permanently seeded to protect slopes from erosion and allow seeds to germinate and allow the seeding to take hold in the ground and grow. Without protection, the seeding will be displaced by wind and rain. Mulch may not be used in place of erosion control blanket to protect the disturbed areas and prevent further erosion.

Sodding: Sod is a stabilization of fine graded disturbed areas using a continuous cover of grass sod. It shall be applied at disturbed areas where it requires immediate cover for erosion protection or sediment control, residential or commercial areas where quick establishment or aesthetics are factors, locations where surface water concentrates, areas adjacent to drop inlets or in swales, or all other areas where seeding is not appropriate but an immediate vegetative cover is required. Irrigate sod according to Article 252.08.

- C. **Structural Practices:** Provided below is a description of structural practices that will be implemented, to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include but are not limited to: perimeter erosion barrier, earth dikes, drainage swales, sediment traps, ditch checks, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. The installation of these devices may be subject to Section 404 of the Clean Water Act.

The following stabilization practices will be used for this project:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Perimeter Erosion Barrier | <input type="checkbox"/> Rock Outlet Protection |
| <input type="checkbox"/> Temporary Ditch Check | <input type="checkbox"/> Riprap |
| <input checked="" type="checkbox"/> Storm Drain Inlet Protection | <input type="checkbox"/> Gabions |
| <input checked="" type="checkbox"/> Sediment Trap | <input type="checkbox"/> Slope Mattress |
| <input type="checkbox"/> Temporary Pipe Slope Drain | <input type="checkbox"/> Retaining Walls |
| <input type="checkbox"/> Temporary Sediment Basin | <input type="checkbox"/> Slope Walls |
| <input type="checkbox"/> Temporary Stream Crossing | <input type="checkbox"/> Concrete Revetment Mats |
| <input checked="" type="checkbox"/> Stabilized Construction Exits | <input type="checkbox"/> Level Spreaders |
| <input type="checkbox"/> Turf Reinforcement Mats | <input checked="" type="checkbox"/> Other (specify) Stabilized Flow Line |
| <input type="checkbox"/> Permanent Check Dams | <input checked="" type="checkbox"/> Other (specify) Temporary Sump Pit |
| <input type="checkbox"/> Permanent Sediment Basin | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Aggregate Ditch | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Paved Ditch | <input type="checkbox"/> Other (specify) _____ |

Describe how the structural practices listed above will be utilized during construction:

Refer to the Erosion and Sedimentation Control plan sheets for the contract for the specific stabilization practices called out for temporary and permanent conditions.

Perimeter Erosion Barrier: As soon as reasonable access is available to all locations where water drains away from the project, perimeter erosion barrier shall be installed as called out in this plan and directed by the Engineer. Silt fences shall be placed along the contour at the limits in an effort to contain silt and runoff from leaving the site. Silt fence shall not be installed in areas of concentrated flow such as across ditches. Silt fence should only be used as Perimeter Erosion Barrier in areas where the work area is higher than the perimeter. The use of silt fence at the top of the slope/elevations higher than the work area should always be avoided. If necessary, temporary fence should be utilized in these locations (where the top of slope/elevation is higher than the work area) in lieu of silt fence.

Storm Drain Inlet Protection: Sediment filters will be placed in all open lid inlets, catch basins and manholes during construction and will be cleaned on a regular basis. Avoid using the INLET AND PIPE PROTECTION shown on the Highway Standard 280001. Straw bales and silt fence shall not be used as inlet and pipe protection. Inlet and pipe protection shall be comprised of Inlet Filters, Temporary Ditch Checks, Temporary Seeding and Temporary Erosion Control Blanket, as applicable, at all inlets, catch basins, and manholes for the duration of construction. Inlet filters shall be cleaned on a regular basis.

Stabilized Construction Exits: Stabilized Construction Exits or Entrances will be provided by the Contractor. The entrance shall be maintained in a condition which shall prevent tracking or flowing of sediment onto Public Right-Of-Way. Periodic inspection and needed maintenance shall be provided after heavy use and each rainfall event.

Temporary Sump Pit: The Contractor shall provide a temporary sump pit if unfiltered runoff needs to be pumped from the work area. A perforated vertical standpipe shall be placed in the center of the pit to collect filtered water. The standpipe will be a perforated 12 to 24 inch diameter corrugated metal or PVC pipe. Water is then pumped from the center of the pipe to a suitable discharge area. The pit will be filled with coarse aggregate meeting the requirements of IDOT standards for gradations of CA-2, CA-3 or CA-4. If water from the sump pit will be pumped directly to a storm drainage system, filter fabric will be wrapped around the standpipe to ensure clean water discharge. The installation, inspection, maintenance and materials will not be paid for separately but shall be considered included in the cost of the contract.

Stabilized Flow Line: The Contractor should provide to the Engineer a plan to ensure that a stabilized flow line will be provided during storm sewer construction. The use of a stabilized flow line between installed storm sewer and open disturbance will reduce the potential for the offsite discharge of sediment bearing waters, particularly when rain is forecasted so that flow will not erode. This work will not be paid for separately and will be included in the cost for STORM SEWERS, of the class, type and diameter specified. Lack of an approved plan or failure to comply will result in an ESC Deficiency Deduction.

All work associated with installation and maintenance of Concrete Washouts is incidental to the contract.

All erosion control products furnished shall be specifically recommended by the manufacturer for the use specified in the erosion control plan prior to the approval and use of the product. The Contractor shall submit to the Engineer a notarized certification by the producer stating the intended use of the product and that the physical properties required for this application are met or exceeded. The contractor shall provide manufacturer installation procedures to facilitate the Engineer in construction inspection.

Describe how the structural practices listed above will be utilized after construction activities have been completed:

Once construction is completed and the vegetation has been established, the perimeter erosion barrier will be removed and areas disturbed by the removal will be stabilized with permanent stabilization methods as shown on the plans.

D. Treatment Chemicals

Will polymer flocculents or treatment chemicals be utilized on this project: Yes No

If yes above, identify where and how polymer flocculents or treatment chemicals will be utilized on this project.

E. Permanent Storm Water Management Controls: Provided below is a description of measures that will be installed during the construction process to control volume and pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the Clean Water act.

1. Such practices may include but are not limited to: storm water detention structures (including wet ponds), storm water retention structures, flow attenuation by use of open vegetated swales and natural depressions, infiltration of runoff on site, and sequential systems (which combine several practices).

The practices selected for implementation were determined on the basis of the technical guidance in Chapter 41 (Construction Site Storm Water Pollution Control) of the IDOT Bureau of Design & Environment Manual. If practices other than those discussed in Chapter 41 are selected for implementation or if practices are applied to situations different from those covered in Chapter 41, the technical basis for such decisions will be explained below.

2. Velocity dissipation devices will be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

Description of permanent storm water management controls:

The Phase I Location Drainage Study indicates no modifications are planned for Pump Station #5 nor Pump Station #26. The tailwater conditions representing the South Branch of the Chicago River (outfall for Pump Station #5) and the South Union Avenue interceptor sewer (outfall for Pump Station #26) will not be modified from existing conditions.

The drainage area for Pump Station #5 is along I-290 from the western extent at Central Avenue to the eastern extent at Des Plaines Street within the Jane Byrne Interchange. For Pump Station #26, the drainage area is along I-90/94 from the northern extent at the Jane Byrne Interchange (Harrison Street) to the southern extent at Roosevelt Road. A proposed storage tank will be constructed south of the Jane Byrne Interchange in a future contract, improving water quality in runoff from the 5-year and greater storms discharged to Pump Station #26.

Phosphorous fertilizer has been eliminated from the project to reduce project impacts on the receiving waters.

F. Approved State or Local Laws: The management practices, controls, and provisions contained in this plan will be in accordance with IDOT specifications, which are at least as protective as the requirements contained in the Illinois Environmental Protection Agency's Illinois Urban Manual. Procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials shall be described or incorporated by reference in the space provided below. Requirements specified in sediment and erosion site plans, site permits, storm water management site plans or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of an NOI, to be authorized to discharge under the Permit ILR10 incorporated by reference and are enforceable under this permit even if they are not specifically included in the plan.

Description of procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials:

All management practices, controls and other provisions provided in this plan are in accordance with "IDOT Standard Specifications for Road and Bridge Construction" and "Illinois Urban Manual".

G. **Contractor Required Submittals:** Prior to conducting any professional services at the site covered by this plan, the Contractor and each subcontractor responsible for compliance with the permit shall submit to the Resident Engineer a Contractor Certification Statement, BDE 2342a.

1. The Contractor shall provide a construction schedule containing an adequate level of detail to show major activities with implementation of pollution prevention BMPs, including the following items:
 - Approximate duration of the project, including each stage of the project
 - Rainy season, dry season, and winter shutdown dates
 - Temporary stabilization measures to be employed by contract phases
 - Mobilization time frame
 - Mass clearing and grubbing/roadside clearing dates
 - Deployment of Erosion Control Practices
 - Deployment of Sediment Control Practices (including stabilized construction entrances/exits)
 - Deployment of Construction Site Management Practices (including concrete washout facilities, chemical storage, refueling locations, etc.)
 - Paving, saw-cutting, and any other pavement related operations
 - Major planned stockpiling operations
 - Time frame for other significant long-term operations or activities that may plan non-storm water discharges such as dewatering, grinding, etc.
 - Permanent stabilization activities for each area of the project
2. The Contractor and each subcontractor shall provide, as an attachment to their signed Contractor Certification Statement, a discussion of how they will comply with the requirements of the permit in regard to the following items and provide a graphical representation showing location and type of BMPs to be used when applicable:
 - Vehicle Entrances and Exits - Identify type and location of stabilized construction entrances and exits to be used and how they will be maintained.
 - Material delivery, Storage, and Use - Discuss where and how materials including chemicals, concrete curing compounds, petroleum products, etc. will be stored for this project.
 - Stockpile Management - Identify the location of both on-site and off-site stockpiles. Discuss what BMPs will be used to prevent pollution of storm water from stockpiles.
 - Waste Disposal - Discuss methods of waste disposal that will be used for this project.
 - Spill Prevention and Control - Discuss steps that will be taken in the event of a material spill (chemicals, concrete curing compounds, petroleum, etc.).
 - Concrete Residuals and Washout Wastes - Discuss the location and type of concrete washout facilities to be used on this project and how they will be signed and maintained.
 - Litter Management - Discuss how litter will be maintained for this project (education of employees, number of dumpsters, frequency of dumpster pick-up, etc.).
 - Vehicle and Equipment Cleaning and Maintenance - Identify where equipment cleaning and maintenance locations for this project and what BMPs will be used to ensure containment and spill prevention.
 - Dewatering Activities - Identify the controls which will be used during dewatering operations to ensure sediments will not leave the construction site.
 - Polymer Flocculants and Treatment Chemicals - Identify the use and dosage of treatment chemicals and provide the Resident Engineer with Material Safety Data Sheets. Describe procedures on how the chemicals will be used and identify who will be responsible for the use and application of these chemicals. The selected individual must be trained on the established procedures.
 - Additional measures indicated in the plan.

III. Maintenance

When requested by the Contractor, the Resident Engineer will provide general maintenance guides to the Contractor for the practices associated with this project. The following additional procedures will be used to maintain, in good and effective operating conditions, the vegetation, erosion and sediment control measures and other protective measures identified in this plan. It will be Contractor's responsibility to attain maintenance guidelines for any manufactured BMPs which are to be installed and maintained per manufacture's specifications.

The Contractor will be responsible for the inspection, maintenance, and repair of all sedimentation and erosion control measures. If the Engineer notices or is notified of an erosion or sedimentation deficiency, the Engineer will notify the Contractor to correct it. All maintenance of erosion control systems will be the responsibility of the contractor until construction is complete and accepted by IDOT after final inspection. All Offsite Borrow, Waste, and Use areas are part of the construction site and are to be inspected according to the language in this section and Section IV.

Inspection of all ESC measures shall be made at least once every seven days and within 24 hours of the end of each 0.5 inches or greater rainfall (including snowfall). Additionally during winter months, all measures should be checked after each significant snowmelt. Any necessary repairs or cleanup to maintain the effectiveness of said measures shall be made immediately. The project shall additionally be inspected by the Construction Field Engineer on a bi-weekly basis to determine that the erosion control efforts are in place and effective and if other erosion control work is necessary.

All ESC measures shall be maintained in accordance with the IDOT Erosion and Sediment Control Field Guide for Construction Inspection and IDOT's Best Management Practices – Maintenance Guide:<http://www.idot.illinois.gov/transportation-system/environment/erosion-and-sediment-control>

In addition, the following links may also be useful for maintenance:

Illinois Urban Manual (IUM): http://www.aiswcd.org/wp-content/uploads/2013/11/IUM_FM_2013_WEBSITE_hyperlinks.pdf

Best Management Practices (BMP): <http://www.idot.illinois.gov/transportation-system/environment/erosion-sediment-control>

Construction equipment shall be stored and fueled only at designated locations. All necessary measures shall be taken to contain any fuel or pollution runoff in compliance with environmental law and EPA Water Quality Regulations. Leaking equipment or supplies shall be immediately repaired or removed from the site. On a weekly basis, the Engineer shall inspect the project to determine whether erosion control efforts are in place and effective and if additional control measures are necessary. Sediment collected during construction by the various temporary erosion control systems shall be disposed on the site on a regular basis as directed by the Engineer and stabilized accordingly.

Protection of trees: Any protective measures which are knocked down shall be repaired immediately. Damaged trees shall be replaced with similar species. Trim any cuts, skins, scrapes or bruises to the bark of the vegetation and utilize local nursery accepted procedures to seal damaged bark. Prune all tree branches broken, severed, or damaged during construction. Smoothly cut, perpendicular to the root, all cut, broken, or severed during construction, roots 1 inch or greater in diameter. Cover roots exposed during excavation with moist earth and/or backfill immediately to prevent roots from drying.

Temporary Erosion Control Seeding: All areas seeded with temporary seeding are to be inspected every 7 calendar days and after a storm even of 0.5 inches or greater (including snowfall). A visual inspection of this item is necessary to determine whether or not it has germinated. If the seed has failed to germinate, another application of seed may be necessary. If seed has been washed away or found to be concentrated in ditch bottoms, temporary mulch may have to be used to hold seed in place. Inspect other BMPs around the location of the temporary seeding to ensure the successful function of temporary erosion control seeding. Rills greater than 4 inches in depth shall be restored as quickly as possible on slopes steeper than 1V:4H to prevent sheet flow from becoming concentrated flow patterns.

Temporary Mulching: This item shall be inspected every 7 calendar days and after a storm event of 0.5 inch or greater (including snowfall). Additional mulch shall be placed if straw is blown or washed away, erosion control blanket curls or slides down a slope, or hydraulic mulch is washed away.

See Additional Inspections Required for additional maintenance requirements.

IV. Inspections

Qualified personnel shall inspect disturbed areas of the construction site which have not yet been finally stabilized, structural control measures, and locations where vehicles and equipment enter and exit the site using IDOT Storm Water Pollution Prevention Plan Erosion Control Inspection Report (BC 2259). Such inspections shall be conducted at least once every seven (7) calendar days and within twenty-four (24) hours of the end of a storm or by the end of the following business or work day that is 0.5 inch or greater or equivalent snowfall.

Inspections may be reduced to once per month when construction activities have ceased due to frozen conditions. Weekly inspections will recommence when construction activities are conducted, or if there is 0.5" or greater rain event, or a discharge due to snowmelt occurs.

If any violation of the provisions of this plan is identified during the conduct of the construction work covered by this plan, the Resident Engineer shall notify the appropriate IEPA Field Operations Section office by e-mail at: epa.swnoncomp@illinois.gov, telephone or fax within twenty-four (24) hours of the incident. The Resident Engineer shall then complete and submit an "Incidence of Non-Compliance" (ION) report for the identified violation within five (5) days of the incident. The Resident Engineer shall use forms provided by IEPA and shall include specific information on the cause of noncompliance, actions which were taken to prevent any further causes of noncompliance, and a statement detailing any environmental impact which may have resulted from the noncompliance. All reports of non-compliance shall be signed by a responsible authority in accordance with Part VI. G of the Permit ILR10.

The Incidence of Non-Compliance shall be mailed to the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attn: Compliance Assurance Section
1021 North Grand East
Post Office Box 19276
Springfield, Illinois 62794-9276

Additional Inspections Required:

Surface Roughening: The slope shall be inspected after every runoff producing rain and repairs made as needed. Fill any eroded areas to slightly above the original grade, re-roughen the surface, then re-seed and mulch as soon as possible.

Perimeter Erosion Barrier: This item shall be inspected every 7 calendar days and after a storm event of 0.5 inch or greater (including snowfall). Repair when tears, gaps, leaning or undermining occur and restore erosion barrier taut. Repair or replace any missing or broken stakes immediately. Sediment shall be removed if the integrity of the fencing is in jeopardy. Remove once permanent stabilization is established.

Erosion Control Blanket: Repair damage due to water running beneath the blanket and restore and reseed when displacement occurs. Replace and re-staple all displaced erosion control blankets immediately.

Storm Drain Inlet Protection: This item shall be inspected every 7 calendar days and after a storm event of 0.5 inch or greater (including snowfall). Remove sediment from inlet filter basket when basket is 25% full or 50% of the fabric pores are covered with silt. Remove ponded water on road surfaces immediately. Clean filter if standing water is present longer than one hour after a rain event. Remove trash accumulated around or on top of filter. When filter is removed for cleaning, replace filter if any tear is present.

Stabilized Construction Exits: This item shall be inspected every 7 calendar days and after a storm event of 0.5 inch or greater (including snowfall). Replenish stone or replace exit if vehicles continue to track sediment onto the roadway from the construction site. Sweep sediment on roadway from construction activities immediately. Use street sweeping in conjunction with this BMP to remove sediment not removed by the stabilized construction exit.

Material Delivery and Storage: Document the various types of materials delivered and their storage locations in the SWPPP. Update the SWPPP when significant changes occur to material storage or handling locations and when they have been removed. Clean up spills immediately. Remove empty containers.

Stabilized Flow Line: Follow approved maintenance plans provided by the Contractor to avoid the flow from eroding at the upstream and downstream ends of the storm sewer when it is under construction.

Sediment Trap: Removed sediment and silt from the trap when it becomes 50% full. Other BMP measures, such as sand filters, shall be implemented to filter pollutants if sediment discharges or other pollutants are identified at the discharge point. Once the sediment has been removed, the trap shall be restored to its original dimensions. The sediment that has been removed must be placed in the designated disposal area. The depth of spillway shall be periodically checked to ensure it is a minimum of 1.5 feet below the low point of the embankment to slightly above design grade. Any aggregate or riprap displaced from the spillway while the sediment is being removed shall be replaced immediately. After all areas around the sediment trap have been permanently stabilized, regrade the area to drain and stabilize the area.

Temporary Sump Pit: The pit and filter fabric shall be replaced when it is 75% full of sediment.

All offsite Borrow, Waste and Use areas are part of the construction site and are to be inspected according to the language in this section.

V. Failure to Comply

Failure to comply with any provisions of this Storm Water Pollution Prevention Plan will result in the implementation of a National Pollutant Discharge Elimination System/Erosion and Sediment Control Deficiency Deduction against the Contractor and/or penalties under the Permit ILR10 which could be passed on to the Contractor.



Contractor Certification Statement



Reset Form

Prior to conducting any professional services at the site covered by this contract, the Contractor and every subcontractor must complete and return to the Resident Engineer the following certification. A separate certification must be submitted by each firm. Attach to this certification all items required by Section II.G of the Storm Water Pollution Prevention Plan (SWPPP) which will be handled by the Contractors/subcontractor completing this form.

Route FAI 90/94/290	Marked Route EB I-290 Mainline	Section 2014-002R&B
Project Number C-91-187-14	County Cook	Contract Number 60X76

This certification statement is a part of SWPPP for the project described above, in accordance with the General NPDES Permit No. ILR10 issued by the Illinois Environmental Protection Agency.

I certify under penalty of law that I understand the terms of the Permit No. ILR10 that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

In addition, I have read and understand all of the information and requirements stated in SWPPP for the above mentioned project; I have received copies of all appropriate maintenance procedures; and, I have provided all documentation required to be in compliance with the Permit ILR10 and SWPPP and will provide timely updates to these documents as necessary.

- Contractor
- Sub-Contractor

Print Name <input type="text"/>	Signature <input type="text"/>
Title <input type="text"/>	Date <input type="text"/>
Name of Firm <input type="text"/>	Telephone <input type="text"/>
Street Address <input type="text"/>	City/State/Zip <input type="text"/>

Items which the Contractor/subcontractor will be responsible for as required in Section II.G. of SWPPP:

APPENDIX B: SIGNED IEPA FORM LPC 663



Illinois Environmental Protection Agency

Page 1 of 2

Bureau of Land • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Uncontaminated Soil Certification
by Licensed Professional Engineer or Licensed Professional Geologist
for Use of Uncontaminated Soil as Fill in a CCDD or Uncontaminated Soil Fill Operation
LPC-663

Revised in accordance with 35 Ill. Adm. Code 1100, as amended by PCB R2012-009 (eff. Aug. 27, 2012)

This certification form is to be used by professional engineers and professional geologists to certify, pursuant to 35 Ill. Adm. Code 1100.205(a)(1)(B), that soil (i) is uncontaminated soil and (ii) is within a pH range of 6.26 to 9.0. If you have questions about this form, please telephone the Bureau of Land Permit Section at 217/524-3300.

This form may be completed online, saved locally, printed and signed, and submitted to prospective clean construction or demolition debris (CCDD) fill operations or uncontaminated soil fill operations.

I. Source Location Information

(Describe the location of the source of the uncontaminated soil)

Project Name: I-90/94 @ I-290 (Circle Interchange) Office Phone Number, if available: _____

Physical Site Location (address, including number and street):

I-90/I-94 between Grand Avenue and W.14th Street (ISGS Site No. 2615V-1)

City: Chicago State: IL Zip Code: _____

County: Cook Township: _____

Lat/Long of approximate center of site in decimal degrees (DD.ddddd) to five decimal places (e.g., 40.67890, -90.12345):

Latitude: 41.873793317 Longitude: -87.645749801

(Decimal Degrees) (-Decimal Degrees)

Identify how the lat/long data were determined:

GPS Map Interpolation Photo Interpolation Survey Other

IEPA Site Number(s), if assigned: BCL: _____ BOW: _____ BOA: _____

II. Owner/Operator Information for Source Site

Site Owner

Site Operator

Name: Illinois Department of Transportation

Name: Illinois Department of Transportation

Street Address: 201 West Center Court

Street Address: 201 West Center Court

PO Box: _____

PO Box: _____

City: Schaumburg State: IL

City: Schaumburg State: IL

Zip Code: 60196-1096 Phone: 847-705-4101

Zip Code: 60196-1096 Phone: 847-705-4101

Contact: Sam Mead

Contact: Sam Mead

Email, if available: Sam.Mead@Illinois.gov

Email, if available: Sam.Mead@Illinois.gov

This Agency is authorized to require this information under Section 4 and Title X of the Environmental Protection Act (415 ILCS 5/4, 5/39). Failure to disclose this information may result in: a civil penalty of not to exceed \$50,000 for the violation and an additional civil penalty of not to exceed \$10,000 for each day during which the violation continues (415 ILCS 5/42). This form has been approved by the Forms Management Center.

IL 532-2922
LPC 663 Rev. 8/2012

Project Name: I-90/94 @ I-290 (Circle Interchange)

Latitude: 41.873793317 Longitude: -87.645749801

Uncontaminated Site Certification

III. Basis for Certification and Attachments

For each item listed below, reference the attachments to this form that provide the required information.

- a. A Description of the soil sample points and how they were determined to be sufficient in number and appropriately located 35 Ill. Adm. Code 1100.610(a):

LOCATIONS X76-47, X76-48, AND X76-51 WERE SAMPLED ADJACENT TO ISGS SITE No. 2615V-1. SEE FIGURES 3-3/3-4 AND TABLE 4-1 OF THE FINAL PRELIMINARY SITE INVESTIGATION REPORT FOR SAMPLING DETAILS.

- b. Analytical soil testing results to show that soil chemical constituents comply with the maximum allowable concentrations established pursuant to 35 Ill. Adm. Code Part 1100, Subpart F and that the soil pH is within the range of 6.25 to 9.0, including the documentation of chain of custody control, a copy of the lab analysis; the accreditation status of the laboratory performing the analysis; and certification by an authorized agent of the laboratory that the analysis has been performed in accordance with the Agency's rules for the accreditation of environmental and the scope of the accreditation [35 Ill. Adm. Code 1100.201(g), 1100.205(a), 1100.610]:

TESTAMERICA ANALYTICAL REPORT - JOB IDs: 500-125243-1, 500-125321-1, and 500-125325-1. ALSO SEE FIGURES 4-3/4-4 OF THE FINAL PRELIMINARY SITE INVESTIGATION REPORT.


IV. Certification Statement, Signature and Seal of Licensed Professional Engineer or Licensed Professional Geologist

I, Michael Castillo, P.G. (name of licensed professional engineer or geologist) certify under penalty of law that the information submitted, including but not limited to, all attachments and other information, is to the best of my knowledge and belief, true, accurate and complete. In accordance with the Environmental Protection Act [415 ILCS 5/22.51 or 22.51a] and 35 Ill. Adm. Code 1100.205(a), I certify that the soil from this site is uncontaminated soil. I also certify that the soil pH is within the range of 6.25 to 9.0. In addition, I certify that the soil has not been removed from the site as part of a cleanup or removal of contaminants. All necessary documentation is attached.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44(h))

Company Name: Weston Solutions, Inc.
Street Address: 300 Circle Plaza, Suite 202
City: Mundelein State: IL Zip Code: 60060
Phone: (224) 864-7200

Michael Castillo, P.G.
Printed Name:


Licensed Professional Engineer or
Licensed Professional Geologist Signature:

4/14/2017
Date:



P.E. or L.P.G. Seal:

APPENDIX C: CHICAGO DEPARTMENT OF WATER MANAGEMENT (CDWM) TECHNICAL SPECIFICATIONS FOR WATER MAIN CONSTRUCTION

CHICAGO DEPARTMENT OF WATER MANAGEMENT (CDWM) TECHNICAL SPECIFICATIONS FOR WATER MAIN CONSTRUCTION

This specification amends the Chicago Department of Water Management (CDWM) Technical Specifications for Water Main Construction included in Appendix B and shall be construed to be a part thereof, superseding any conflicting provisions thereof applicable to the work under the Contract:

1. Revise all references to the Commissioner to the Engineer.
2. Section 33 05 21 – Utility Pipe Jacking
 - a) Delete Article 1.3.
 - b) Modify Article 2.1 to "Casing pipe must be steel pipe as specified herein or approved by the Engineer.
 - c) Delete Article 2.3.
 - d) Modify Article 3.1 B to delete "and as specified in Section 31 23 10 Excavation, Trenching and Backfilling".
 - e) Modify Article 3.1 C to delete "as specified in Section 03 30 00 Cast-In-Place Concrete".
 - f) Delete Article 3.2.
 - g) Modify Article 3.5 A to delete "per the requirements of Section 01 55 26 Traffic Control and Regulations".
3. Section 33 05 23 – Trenchless Utility Installations
 - a) Modify Article 1.1 A to "This Section describes the requirements for the installation of water services as shown on the Drawings using the trenchless directional drilling method of installation."
 - b) Delete Article 1.2.
 - c) Modify Article 3.1 D to "Layout routing of relocated services and locations and size for entrance and receiving drilling pits."
 - d) Delete Article 3.2 C.
4. Section 33 07 00 – Insulation For Water Main Pipe & Appurtenances
 - a) This section covers the requirements for insulating water mains and their appurtenances installed with less than the recommended depth of cover, detailed on the Drawings, or as directed by the Commissioner."
 - b) Add Article 1.3.
5. Section 33 12 20 – Water Main Valve Basins & Meter Vaults

- a) Modify Article 1.1 A to “This Section includes requirements for construction and/or adjustment of water main meter vaults using precast concrete structures.”
 - b) Delete Article 1.2.
 - c) Delete Article 1.4 A.
 - d) Modify Article 1.4 B to “Shop Drawings: Submit detailed drawings of precast utility structures and related metal work.”
 - e) Delete Articles 2.6, 2.7, 2.8, and 2.9.
 - f) Delete Articles 3.1 and 3.3.
 - g) Modify Article 3.5 A to delete “CLSM flowable material must meet standards specified in Section 31 23 10, “Excavation, Trenching and Backfilling”, paragraph 2.3, C of these specifications.”
6. Section 33 13 00 – Hydrostatic Testing & Disinfecting Water Mains
- a) Modify Article 3.11 to “For all types of flushing, the Contractor must prepare and submit a flushing plan to the Engineer that indicates the City sewers to which discharges are planned and the flow rates. Flushing must be performed in

UTILITY PIPE JACKING

SECTION 33 05 21

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. This section includes requirements for work associated with jacking or augering casing pipe, for locations shown on the drawings.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM), latest edition:

1. ASTM A139 - Electric Fusion Arc Welded Steel Pipe.
2. ASTM C76 - Reinforced Concrete Storm and Sanitary Sewer Pipe.
3. AWWA C203 - Coal Tar, Enamel, and Hot-Applied Tape Coatings.
4. AWWA C206 - Field Welding Steel Water Pipe.

1.3 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 01 55 26 - Traffic Control and Regulations.
- B. Section 31 23 10 - Excavation, Trenching and Backfilling.
- C. Section 03 30 00 - Cast in Place Concrete.

PART 2 - PRODUCTS

2.1 GENERAL

Casing pipe must be either steel pipe or reinforced concrete pipe, as specified here, unless otherwise shown on the Plans, or approved by the Commissioner.

2.2 STEEL PIPE

All casing pipes must be smooth welded steel pipe meeting the requirements of ASTM A139, Grade B. The exterior of casing pipe must have coal-tar enamel in accordance with AWWA C203 and must be of the following diameters and wall thickness:

<u>Carrier Pipe Nominal Diameter</u>	<u>Casing Pipe Outside Diameter</u>	<u>Casing Pipe Wall Thickness</u>
6"	20"	0.344"
8"	20"	0.344"
12"	24"	0.375"
16"	30"	0.469"
24"	42"	0.625"
36"	54"	0.781"
48"	72"	1.000"

2.3 CONCRETE PIPE

Concrete pipe must conform to ASTM C76, Class V, straight wall reinforced concrete pipe. Pipe must have "O" ring joints conforming to ASTM C361. Concrete pipe will not be permitted for use as casing pipe where the required casing pipe diameter is less than 36-inches in diameter.

2.4 CARRIER PIPE SPACERS

Spacers for carrier pipes must be either the two-piece metal band type with 2-inch wide non-metallic runners or units manufactured entirely out of high-density polyethylene. On two-piece metal band type spacers, bands and fasteners must be of corrosion resistant material. All spacers must be rated for heavy-duty service, manufactured by (PSI) Pipeline Seal & Insulator, Incorporated, Cascade Waterworks Manufacturing Company or RACI Spacers North America.

PART 3 - EXECUTION

3.1 GENERAL

- A. Where shown on the Plans, directed by the Commissioner, or otherwise specified, the pipeline must be installed in a casing pipe beneath roadways, railroads or other structures, which prohibit excavation by open cut.
- B. Excavate jacking and receiving pits in locations as shown on the Plans or as directed by the Commissioner and as specified in Section 31 23 10 - "Excavation, Trenching and Backfilling".
- C. Provide a minimum 4-Inch concrete mud slab, as specified in Section 03 30 00 - "Cast-In-Place Concrete", in the jacking pit as a working surface. All casing pipes installed by augering and jacking must conform to the lines and grades shown on the Plans, specified, or as directed by the Commissioner.
- D. The casing pipe must be installed by simultaneously augering and jacking the casing pipe into place in the location shown on the Drawings. All operations must conform to the regulations of the railroad, highway department, or other agency having jurisdiction over the crossing installation. After approval of the crossing, the Contractor must give a one (1) week advanced notice to the Commissioner and all other authorities having jurisdiction over the installation, before starting construction. The Contractor is responsible for complying with all permits associated with the casing pipe installation. All insurance requirements must be submitted prior to starting construction.

3.2 INSTALLATION OF CONCRETE CASING PIPES

- A. In general, the use of reinforced concrete pipe for casing pipe must have prior Approval from the Commissioner.
- B. Before installing the casing pipe, it must be inspected for damage or manufacturing defects such as cracks or damaged joints. Such defect if found is cause for rejection of the pipe, and rejected pipe is to be removed from the site at the Contractor's expense.
- C. The casing pipe must be installed so as not to create any voids between the surrounding soil and the casing pipe. Any voids must be filled in accordance with the requirements set forth by the permitting agency having jurisdiction over the crossing. If no such requirements exist, void spaces are to be grouted to the satisfaction of the Commissioner.
- D. To avoid concentrated loads at the joints from pipe to pipe, a resilient cushioning material should be inserted around the circumference of the pipe between the joints as each pipe is placed ahead of the thrust ring. Resilient materials must also be used between the pipe end and the thrust ring.

3.3 INSTALLATION OF STEEL CASING PIPES

- A. Steel casing pipes must be joined together in the field prior to jacking them in place and must be seamless pipe or pipe having not more than one longitudinal weld. All joints must be fully butt-welded together per AWWA C206. After welding, the welded area must be covered and treated with hot tar 1/8-Inch thick. The tar must then be allowed to cool prior to jacking the casing pipe in place.
- B. The casing pipe must be installed so as not to create any voids between the surrounding soil and the casing pipe. Any voids must be filled in accordance with the requirements set forth by the permitting agency having jurisdiction over the crossing. If no such requirements exist, void spaces are to be grouted to the satisfaction of the Commissioner.

3.4 INSTALLATION OF CARRIER PIPES IN CASING PIPES

- A. Prior to insertion in the casing, each length of pipe must be supported on casing spacers in such a manner that at no time will the weight of the pipe bear on the bell or any part of the pipe touch the casing.
- B. All pipes must be jointed prior to being pushed or pulled through the casing pipe. After placement of the carrier pipe through the casing, the ends of the casing are to be sealed with brick and mortar, rubber end seal, or other appropriate method, to the satisfaction of the Commissioner and completely leak-tight. Backfilling of the casing pipe must be as detailed on the Plans, directed by the railroad or other authority having jurisdiction over the installation, or as directed by the Commissioner.

3.5 PEDESTRIAN AND VEHICLE PROTECTION

- A. Provide traffic control and protection to provide a safe and convenient public traveled way per the requirements of Section 01 55 26 - Traffic Control and Regulations. The Contractor must provide any flagmen required for warning and directing vehicular or railroad traffic as required.
- B. The Contractor will be held responsible for all damage or injury regardless of barricades, signs, lights, reflectors, and flagmen furnished during the installation of the casing pipe, Jacking and Receiving Pits, and Carrier Pipe.

END OF SECTION 33 05 21

TRENCHLESS UTILITY INSTALLATIONS
SECTION 33 05 23

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section describes the requirements for the installation of water services and water mains as shown on the Drawings using the trenchless directional drilling method of installation.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 31 23 10 – Excavation, Trenching and Backfilling
- B. Section 33 12 13 - Water Services 2-inches and Smaller
- C. Section 31 23 19 – Dewatering Excavations
- D. Section 32 90 00 – Landscape Restoration
- E. Section 32 12 16 – Asphalt Pavement
- F. Section 32 13 13 – Concrete Pavement
- G. Section 32 16 21 – Concrete Curbs, Gutters, Walks and Alley Ramps

1.3 REFERENCES

- A. City of Chicago Plumbing Code, latest edition.

1.4 SUBMITTALS

- A. Trenchless Directional Drilling Plan.
 - 1. Pipe and equipment manufacturer's data on installation procedures.
 - 2. Describe method to be used for containing, handling, and disposing of drilling fluid. Emergency procedure for containing fluids, which may be discharged by accident, or failure of equipment.
 - 3. Submit operational drilling plan a minimum of thirty (30) days prior to beginning drilling.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Locate and mark all existing utilities, which may interfere with new service routings.
- B. Excavate all necessary test holes for determination of drill path centerline depth.
- C. Layout routing of services between new water main and existing shutoff valves, and locations and size for entrance and receiving drilling pits.
- D. Provide adequate supplies of soil lubricant, grout mixture, dewatering equipment, pipe sections, and drill rods and boring equipment to ensure that steady, continuous drilling operations can be maintained when boring begins.
- E. Contractor is responsible for dewatering, diverting water, and controlling elimination of discharged water from drilling operations. Drill fluid is not to be disposed of in City sewers. Collected drill fluid must be disposed of in the same off-site location acceptable to the Commissioner.
- F. Contractor must determine types of soil material, which may be found and determine the proper drilling fluid mixture to be used.

3.2 INSTALLATION

- A. Directional Drilling
 - 1. Guide directional drilling continuously and accurately monitoring the drill head location and depth. Verify line and grade of drill head, at a maximum of 5-foot intervals or less, in areas of potential conflict with existing utilities, foundations of structures or plantings.
- B. Installation of Service Piping
 - 1. Install service piping through drilled hole, at depth and grade shown on the drawings, unless approved otherwise by the Commissioner.
 - a. Provide winch systems designed to protect structures, provide directional stability, and capable of pulling pipe from insertion to exit point without causing damage to the pipe being pulled.
 - b. Install copper service piping in a continuous operation from point to point. No joints will be allowed in service pipe between entrance and exit drilling pits.
 - c. Provide lubricants when applicable or as specified by pipe manufacturer to avoid stressing of pipe during insertion.
 - 2. Installed piping and service connections must meet the requirements specified in Section 33 12 13 - Water Services 2-inch and Smaller.
- C. Contractor must excavate, maintain, dewater backfill and restore all entrance and receiving drilling pits required by this operation per the requirements this Section as well as Section 31 23 10-Excavation, Trenching and Backfilling; Section 31 23 19 – Dewatering Excavations; Section 32 90 00-Landscape Restoration; Section 32 12 16-Asphalt Pavement; Section 32 13 13 – Concrete Pavement and Section 32 16 21 – Concrete Curbs, Gutters, Walks and Alley Ramps.
- D. When drilling in the vicinity of sewers or sewer services monitor the adjacent upstream and downstream manholes for the intrusion of drilling fluid.

END OF SECTION 33 05 23

INSULATION FOR WATER MAIN PIPE & APPURTENANCES
 SECTION 33 07 00

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section covers the requirements for insulating water mains and their appurtenances installed with less than the recommended depth of cover as specified in SECTION 33 11 13 – Ductile Iron Water Mains and Fittings, detailed on the Drawings, or as directed by the Commissioner.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM), latest edition
1. ASTM C578 - Rigid, Cellular Polystyrene Insulation.
 2. ASTM D1621 - Test Method for Compressive Properties.
 3. ASTM C272 - Test Method for Water Absorption.
- B. Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, (SSRBC), latest edition.

1.3 MINIMUM DEPTH OF COVER FOR WATER MAINS AND WATER SERVICE LINES

Size of Pipe	Depth of Cover
¾ to 3-inches	5-ft 6 inches ± 3-inches
4-inch	5-ft 6 inches ± 3-inches
6-inch	5-ft 6 inches ± 3-inches
8-inch	5-ft 6 inches ± 3-inches
12-inch	5-ft ± 2-inches
16-inch	5-ft ± 2-inches
24-inch	4-ft 6 inches ± 2-inches
30 to 42-inches	3-ft 6 inches (min) or as detailed on the drawings
48-inches & larger	3-ft (min) or as detailed on the drawings

PART 2 - PRODUCTS

- A. Rigid insulation must be closed cell extruded polystyrene foam meeting the requirements of ASTM C578, Type VI.
- B. Minimum width of the insulation board must be 2-feet, the minimum length must be 4-feet, and the minimum thickness must be 2-inches.
- C. The insulation must have the following properties:
 - 1. Compressive strength of 40 pounds per square inch average, when tested in accordance with ASTM D1621.
 - 2. Maximum water absorption of 0.1% by volume when tested in accordance with ASTM C272.
- D. Furnish mastic approved by the insulation manufacturer for use with the insulation provided.
- E. Sand backfill around insulation board must be of gradation FA 7 and conform to Section 1003, Fine Aggregates, of the SSRBC, unless directed otherwise by the Commissioner.

PART 3 - EXECUTION

- A. Provide insulation where water main pipe used for distribution, water service pipe and branch connections have less than 5-feet of cover, or where water main pipe used for transmission has less than 3 ½-feet of cover, when shown on the Drawings or as directed by the Commissioner.
- B. Excavate the water main trench to the width required for the rigid board insulation.
- C. Spread and compact sand beneath and around all sides of the insulation board. Do not damage the insulation board during compaction. Lay the insulation board flat with no breaks or cracks. Stagger joints of the insulation board not less than 1-foot joint to joint.
- D. Insulation must consist of two (2) layers of insulation board. Minimum total thickness of insulation must be 4-inches.
- E. Cover all joints with minimum 2-inch thick insulation board that is minimum 6-inches wide. Connect all joints together with mastic. The bond strength of all joints must be proved at least equal to the material strength before any backfill is placed.

- F. Spread sand over the insulation board and compact it by suitable mechanical means prior to backfilling.
- G. Cut and fit insulation board around valve and service boxes.

END OF SECTION 33 07 00

WATER SERVICES 2-INCHES & SMALLER
SECTION 33 12 13

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes the requirements for the installation of water services 2-inch and smaller in diameter as shown on the Drawings and specified here.

1.2 REFERENCES

- A. City of Chicago Plumbing Code.
- B. ASTM B62 - Composition of Bronze or Ounce Metal Castings.
- C. ASTM B63 - Resistivity of Metallically Conducting Resistance and Contact Materials.
- D. ASTM B88 - Seamless Copper Water Tube.
- E. AWWA C800 - Underground Service Line Valves and Fittings.
- F. Follow the latest edition of the above references.

1.4 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. The Contractor must provide the Commissioner, prior to the use of any materials in this section, certified test and inspection reports from an approved testing laboratory, or at the point of manufacture, that all materials and/or equipment to be utilized in this work are in accordance with the Contract Documents.
- C. All tests as specified are to be performed at the point of manufacture. The cost of testing is considered incidental to the construction and no additional payment will be allowed.
- D. Each individual unit must be pressure tested and guaranteed for service at pressures minimally equal to pressure ratings specified for design purposes in AWWA C800. The Contractor must provide an affidavit that materials furnished comply with this standard.

1.5 QUALITY ASSURANCE

- A. The Work necessary for the installation of new, or modification to existing services, must be performed by a plumber licensed in the State of Illinois or the City. This Work will include, but not be limited to, tapping the main; installing corporation cocks; cutting and flaring the ends of copper tubing; installing copper tubing, fittings, and roundway (curb stop) valves; and connecting new service tubing to existing services, as specified herein.

PART 2 – PRODUCTS

2.1 COPPER TUBING

- A. Type "K" (soft) copper tubing, seamless annealed conforming to ASTM B88.

2.2 ROUNDWAY (CURB STOP)

- A. All roundways must be ball valve type with copper flare connections on both ends and Minneapolis type curb box threads. The roundway must conform to requirements of AWWA C800. Minneapolis thread size for 1-inch roundway will be 1 ½-inches; 1 ½-inch and 2-inch roundways will be 2-inches.
- B. Roundways must be composed of bronze or ounce metal alloy conforming to the chemical and physical requirements of ASTM B62 and AWWA C800. Castings must be high grade, smooth, and free from sand, blowholes, shrinkage, or other foundry defects. No roundway can be plugged or filled in any manner. All threads must be cut full and without defects.
- C. Acceptable manufactures and products for roundway valves are A.Y. McDonald, model # 6104, Ford Meter Box, model # B22-M, or Mueller, model # B-25154.

2.3 SHUT-OFF BOX

- A. Shut-off boxes must conform to details for the "Plastic Shut-off Box – Type B" shown in the Drawings, as manufactured by C.P. Test Services-Valvco, Inc.
- B. The shut-off box is to be manufactured from ABS plastic, and be of a two (2) piece tubular design, employing sliding friction between the upper and lower tube sections to maintain length adjustments. A threaded bushing is to be bonded to the plastic of the bottom end section to enable attachment to a roundway (curb stop) shut-off valve. A cast iron lid and rim is to be bonded to the plastic of the top section of the unit. The lid is to have a removable pentagon head bolt for locking the lid into the rim. The letters "WATER" must be cast on the top of the lid. The total length of the plastic shut-off box must be a minimum of 72-inch when fully extended.

2.4 BRASS CORPORATION COCKS.

- A. Corporation cocks for water service connections must be of a plug type design conforming to ASTM B62 and AWWA C800. Corporation cocks, when ordered complete, must be furnished with a 1/8-bend tailpiece coupling, inlet end swivel nut with female flare copper thread and gasket, and outlet end copper flare connection, as manufactured by A.Y. McDonald, model # 4701L, with model # 4750S couplings.
- B. 1-inch corporation cocks used for test taps must be ordered without gasket, coupling nut and tailpiece, and be of type manufactured by A. Y. McDonald, model # 3120C.

2-inch corporation cocks used for test taps must be ordered without gasket, coupling nut, and tailpiece, and be of type manufactured by A.Y. McDonald, model # 3131.
- C. Corporation cocks must be manufactured from composition bronze or ounce metal alloy conforming to ASTM B62 and AWWA C800. The valve castings must be high grade, smooth, and free from sand, blowholes, shrinkage, or other foundry defects. Castings must not be plugged or filled in any manner. All threads must be cut full and without defects. All gaskets, screws, or other parts necessary for proper installation and operation of the corporation stop must be supplied.

2.5 COMPRESSION COUPLINGS

- A. Provide compression couplings to join lead or iron water services to brass fittings and copper water services. Couplings must be manufactured from composition bronze or ounce metal alloy conforming to ASTM B62 and AWWA C800. Castings must be high grade, smooth, and free from sand, blowholes, shrinkage, or other foundry defects. No coupling may be plugged or filled in any manner. All threads must be cut full and without defects.
- B. Couplings must be equipped with clamps or setscrews to engage the pipe and act as locking devices. Screws must be manufactured from silicone bronze or stainless steel.

- C. Furnish the appropriate type and number of compression couplings listed below for connecting existing water services to the brass fittings or copper water services:
1. 1-inch strong lead to 1-inch copper flare.
 2. 1 ½-inch extra strong lead to 1 ½-inch copper pack fitting.
 3. 2-inch extra strong lead to 2-inch copper pack fitting.
 4. 1-inch strong lead to 1-inch MIP thread.
 5. 1 ½-inch extra strong lead to 1 ½-inch MIP thread.
 6. 2-inch extra strong lead to 2-inch MIP thread.
 7. 1-inch strong lead to 1-inch strong lead.
 8. 1-inch extra strong lead to 1-inch copper flare.
 9. 1-inch extra strong lead to 1-inch MIP thread.
 10. ¾-inch strong lead to ¾-inch FIP thread.
 11. ¾-inch strong lead to ¾-inch strong lead.
 12. ¾-inch iron pipe to ¾-inch FIP thread.
 13. 5/8-inch strong lead to ¾-inch FIP thread.
 14. ½-inch strong lead to ¾-inch MIP thread.
- D. Acceptable manufactures for compression coupling kits are Ford Meter Box, "Lead-Pak" and "Pack Joint" kits; A.Y. McDonald, "Mac-Pak" or "Compression Coupling" kits; or Mueller "Pack Joint" kit.

2.6 BRASS AND COPPER PIPE FITTINGS AND COUPLINGS

- A. Fittings and couplings must be manufactured from composition bronze or ounce metal alloy conforming ASTM B62 and AWWA C800. Castings must be high grade, smooth, and free from sand, blowholes, shrinkage, or other foundry defects. No coupling or fitting may be plugged or filled in any manner. All threads must be cut full and without defects.
- B. Furnish the appropriate number of brass and copper fittings and couplings listed below needed to connect the existing water services to the new main.
1. ¾-inch FIP X 1-inch flare.
 2. 1-inch FIP X 1-inch flare.
 3. 1 ½-inch FIP X 1 ½-inch flare.
 4. 2-inch FIP X 2-inch flare.
 5. ¾-inch MIP X 1-inch flare.
 6. 1-inch MIP X 1-inch flare.
 7. 1 ½-inch MIP X 1 ½-inch flare.
 8. 2-inch MIP X 2-inch flare.
 9. ¾-inch FIP X 1-inch MIP.
 10. Unions, 1-inch, 1 ½-inch, 2-inch, three parts, flared both ends.
 11. Tube nuts, 1-inch, 1 ½-inch, 2-inch.
- C. Furnish fittings and couplings by A.Y. McDonald, Ford Meter Box, or Mueller.

2.7 2-INCH COMBINATION AIR RELIEF VALVE ASSEMBLY

- A. Where shown or specified, the Contractor must furnish 2-inch combination air relief assemblies. The 2-inch combination air relief assemblies must be Val-Matic Model 202 C or APCO Model 145C.

PART 3 – EXECUTION

3.1. ADJUSTMENT OF SHUT-OFF BOXES AND VALVE BOXES

- A. The Contractor is responsible for vertically adjusting existing water service shut-off boxes and valve boxes to the proper surface elevation as shown on Plans, or directed by Commissioner. The Contractor must obtain copies of information for water service pipe from the Department to verify and confirm the exact location of water shut-off boxes or valve boxes to be adjusted. The Contractor must notify the Department seventy-two (72) hours before the excavation of sidewalk or parkway commences to determine if the services are active and also to clarify any discrepancies with water service pipe plats and field survey.
- B. If a service is inactive, the Contractor must cut the top part of the box 36-inches below the proposed grade and backfill.
- C. If the service is active and the shut-off/valve box is made of plastic or other approved materials, the Contractor must excavate and vertically adjust the box to proposed grade. If the existing shut-off/valve box is made of cast iron, the top 36-inches of the box must be replaced with a length of plastic tubing sleeved over the existing shut-off/valve box. The cast iron rim must be bonded to the top of the plastic tubing. The materials and dimensions of the plastic tubing and cast iron rim must conform to the requirements as specified herein and shown in the Drawings for Plastic Shut-off Box-Type B.

3.2 DIRECT TAPPING OF DUCTILE IRON PIPE ENCASED IN POLYETHYLENE FILM

- A. Installation procedures must be a method as recommended by the Ductile Iron Pipe Research Association:
1. Method 1: Apply two (2) or three (3) wraps of polyethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted. After the tapping machine is mounted, install the corporation stop directly through the tape and polyethylene. After the direct tap is completed, inspect the entire circumferential area for damage and repair as needed.
 2. Method 2: Directly tap through the polyethylene film without applying a layer of tape on the encasement. Mount the tapping machine directly on the polyethylene encased pipe and install the corporation stop using normal tapping procedures. Once the direct service connection is completed, repair all polyethylene that may have been damaged during the procedure. Inspect the bottom of the encased pipe where the mounting chain has been in contact with the polyethylene for damage and repair as needed.
 3. Method 3: Make an X-shaped cut in the polyethylene and temporarily fold back the film at the point where the corporation stop will be installed. Then mount the tapping machine over the exposed pipe surface and make the service tap. After the tap is made and the corporation installed, remove the tapping machine and repair the "X" shaped cut with polyethylene-compatible adhesive tape.
- B. Before backfilling. Inspect the polyethylene around the exposed circumferential area, particularly at the bottom where the mounting chain has been in contact with the polyethylene, to ensure that all damage is repaired.
- C. House Services. Wrap the attendant corporation stop and a minimum clear distance of 3-feet of the copper service with polyethylene or a suitable dielectric tape.

3.3 TEST FOR CONTROL

- A. The Contractor must test all services for flow. If the service has water flow, it must be connected to the new water main. Otherwise, the Contractor must terminate any services without water flow.

END OF SECTION 33 12 13

WATER MAIN VALVE BASINS & METER VAULTS

SECTION 33 12 20

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes requirements for construction and/or adjustment of water main valve basins and meter vaults using precast concrete or masonry structures.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 31 23 10 - Excavation, Trenching and Backfilling.
- B. Section 03 20 00 – Concrete Reinforcing.
- C. Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM), latest edition:
 - 1. ASTM A48 - Standard Specification for Gray Iron Castings.
 - 2. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete Reinforcement.
 - 3. ASTM A197 - Standard Specification for Cupola Malleable Iron.
 - 4. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 5. ASTM A615 - Standard Specification for Deformed and Plain Billet- Steel Bars for Concrete Reinforcement.
 - 6. ASTM C32 - Standard Specification for Sewer and Manhole Brick.
 - 7. ASTM C55 - Standard Specification for Concrete Building Brick.
 - 8. ASTM C139 - Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
 - 9. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets
 - 10. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections
 - 11. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
 - 12. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.
 - 13. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants.

- B. IDOT Standard Specification for Road and Bridge Construction (SSRBC), latest edition.
- C. American Association of State Highway Transportation Officials, Standard Specifications for Highway (AASHTO), latest edition.

1.4 SUBMITTALS

- A. Refer to Book I for submittal requirements and procedures for Shop Drawings, Product Data, Records and Samples.
- B. Shop Drawings: When not indicated on the Contract Drawings in sufficient detail or definition, submit detailed drawings of cast-in-place and precast concrete utility structures and related metal work.
- C. Product Data: Submit manufacturers' product data for standard manufactured precast concrete sections and structures, for metal gratings and covers, and for other, related miscellaneous metal items.
- D. Certification: Submit certification or other acceptable evidence that covers and grates to be provided for roadways and parking areas meet prooftesting requirements for AASHTO H2O traffic loading.

PART 2 - PRODUCTS

2.1 PRECAST CONCRETE STRUCTURES

- A. Fabrication standards - Circular precast concrete base and riser sections furnished for manholes, valve basins and other structures must conform to ASTM C478. Non-circular precast concrete monolithic and sectional structures for meter vaults, riser manholes and other structures must conform to ASTM C858.
- B. Furnish riser sections in various heights, including an offset tapered section, as detailed on the Drawings, or as directed by the Commissioner.
- C. Precast reinforced concrete flat slab tops for manholes must conform to ASTM C857, and be designed to accommodate a minimum AASHTO loading of H 20, unless directed otherwise by the Commissioner.

2.2 JOINT SEALANTS

- A. Rubber gaskets must conform to ASTM C443.
- B. Preformed butyl rubber flexible rope type gaskets must conform to ASTM C990.

2.3 ADJUSTING RINGS

- A. Adjusting rings are to be precast concrete in conformance with ASTM C478.
- B. Mating Faces:
 - 1. Smooth
 - 2. Parallel
 - 3. Free from cracks, chips, spalls or casting irregularities interfering with watertight mating to structure top or casting.
 - 4. Provide grooves in faces to contain extrudible preformed gasket material when possible.

2.4 CASTINGS

- A. Iron castings are to be ductile iron castings conforming to ASTM A536, Grade 60-40-18, or gray iron conforming to ASTM A48, free from blowholes, shrinkage, cracks and other defects.
- B. Allowance for shrinkage must be made in the patterns to meet the specified thickness. Frames and lids are to seat at all points.
- C. Malleable castings are to conform to ASTM A197.
- D. All castings are to be made accurately to dimensions shown on the plans, and planed, filed, or ground where otherwise necessary to secure flat and true surfaces.

2.5 STEPS

- A. Steps are to be polypropylene plastic encased Grade 60 steel reinforcement conforming to ASTM C478.

2.6 CAST-IN-PLACE CONCRETE

- A. Concrete in accordance with Section 03 30 00 – Cast-In-Place Concrete.
- B. Concrete reinforcing in accordance with Section 03 20 00 – Concrete Reinforcing.

2.7 CONCRETE AND MASONRY BLOCKS AND BRICKS

- A. Precast concrete brick must conform to ASTM C55 quality designated Grade N-1.
- B. Clay brick must be best quality sewer brick conforming to the qualifications of ASTM C32, except where modified here.
 - 1. Brick must be uniform, sound, hard burned, of compact texture, free from lime and cracks with a clear ringing sound when struck, whole and with edges full and square, and of standard dimensions.
 - 2. Brick, when thoroughly dried and immersed in water for twenty-four (24) hours, must not absorb more than 15% by weight of water.
 - 3. If in any load of brick more than 10% are inferior, the whole load is rejected.
 - 4. If in any load of brick less than 10% are inferior, the brick is accepted provided the Contractor pulls out all inferior bricks, and immediately removes them from the Site of the Work.

2.8 MORTAR

- A. Mortar for brickwork is to be composed of one (1) part Portland cement and two (2) parts screened sand.
 - 1. Portland cement must conform to the requirements of Section 1001 of the SSRBC.
 - 2. Sand must be class A quality and gradation FA-9 as specified in Article 1003.02 of the SSRBC.
- B. The cement and sand must be proportioned by volume and thoroughly mixed in a tight box.
- C. After the initial mixing, water is to be added gradually and the ingredients mixed until the mortar is of proper consistency. The amount of water must be no more than necessary to produce a workable, plastic mortar.
- D. Prepare only a sufficient amount of mortar for immediate use and any mortar that has begun to set must not be retempered or used in any way in the Work

2.9 REINFORCING STEEL

- A. Reinforcing steel in accordance with Section 03 30 00 – Cast-In-Place Concrete.

PART 3 - EXECUTION

3.1 GENERAL

- A. Excavate, backfill and compact in accordance with Section 31 23 10 - Excavation, Trenching and Backfilling.
- B. All brick must be thoroughly wetted immediately before being laid.
- C. Old brickwork must be thoroughly cleaned and wetted before new work is jointed thereto.
- D. No masonry work is to be done when the temperature is below 33° Farenheit unless otherwise approved, and then only under conditions for protecting it from frost.

3.2 PRE-CAST STRUCTURE INSTALLATION

- A. Carefully place precast sections for all structures on prepared bedding so as to fully and uniformly support the structure and allow pipes to be laid to proper grade.
- B. All lift holes on precast sections must be completely filled with mortar, smoothed on both inside and outside surfaces.
- C. Seal joints between riser sections with approved mastic sealant or rubber gaskets, or as directed by the Commissioner.
- D. Place one adjusting ring (only) on manhole top. Select thickness of adjusting ring to bring completed structure to required elevation.
- E. Seal joints between adjusting rings and frames with approved mastic sealant before backfilling structures.
- F. Install manhole frame and cover.

3.3 MASONRY STRUCTURE INSTALLATION

- A. Install precast concrete or cast in place base as shown on the Drawings.
- B. Lay brick courses to the line, straight and parallel, breaking joints with those in adjacent courses.
- C. Lay brick radially as headers in a full bed of mortar with joints not exceeding 3/8-Inch in thickness.
- D. Fill joints with mortar. Interior joints must be trowel-struck.
- E. Fresh masonry must be plastered inside and outside and must be protected from damage of all kinds.
- F. New work, unless immediately covered with earth or brick backing, or an approved form of curing compound, must be kept moist until the mortar has hardened.
- G. Install manhole frame and cover.

3.4 FINAL ADJUSTMENT OF STRUCTURES

- A. After the base course and binder course have been placed, and prior to placing the surface course, the structures must be adjusted to match the final pavement elevation.
- B. Remove the binder and base course adjacent to and for a distance not exceeding 12-inches outside the base of the castings.
- C. Adjust the castings to final pavement elevation with adjusting rings set in mortar.
- D. Fill the space around the casting with Class SI concrete to the elevation of the surface of the binder course.

3.5 ABANDONMENT OF VALVE BASINS AND OTHER STRUCTURES.

- A. Valve basins and other structures being abandoned, the Contractor must remove the existing frame and lid and return it the City as requested by the Commissioner. The remaining parts of the structure are to be remove to a depth of 36-inch below grade and filled with fine graded aggregate or controlled low strength material (CLSM) flowable fill, as appropriate, or directed by the Commissioner. CLSM flowable material must meet standards specified in Section 31 23 10, "Excavation, Trenching and Backfilling", paragraph 2.3, C of these specifications.

END OF SECTION 33 12 20

HYDROSTATIC TESTING AND DISINFECTING WATER MAINS
SECTION 33 13 00

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section includes requirements for hydrostatic testing and disinfecting water mains as shown on the drawings and specified here.

1.2 WORK OF THIS SECTION SPECIFIED ELSEWHERE

- A. Section 33 11 13 – Ductile Iron Water Pipe and Fittings.
- B. Section 33 12 16 – Water Main Control Valves

1.3 REFERENCES

- A. AWWA C600 – Installation of Ductile-Iron Water Mains and Their Appurtenances, latest version.
- B. AWWA C651 – Disinfecting Water Main, latest edition.
- C. AWWA C509 – Resilient Seated Gate Valves for Water Supply Service, latest edition.

1.4 SUBMITTALS

- A. Prior to starting work, furnish the Commissioner a detailed outline of the proposed sequence of operation. Include the manner of filling and flushing the water main, the method of disposing of the water flushed from the main, the hydrostatic testing procedure, the disinfecting procedure, relevant safety procedures and other relevant procedures to be used. Include the name of the Contractor that will be disinfecting the water main.
- B. All submittals will be subject to review by the Water Quality Surveillance Section (WQSS) of the Department.

1.5 QUALITY ASSURANCE

- A. Hydrostatic testing of water mains must be performed in accordance with AWWA C600 and the Department's requirement specified here. The disinfection of water mains must be performed in accordance with IEPA Regulations, AWWA C651, and the Department's requirements specified here.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 PRESSURE TESTING AND FLUSHING

- A. All flushing and pressure testing of water mains must meet the requirements of AWWA Specification C600.

3.2 TEST SECTIONS

- A. New water pipe must be tested in section isolated from the existing city water system. All existing valves must be tested to determine if they are water tight when in the closed position. If the valves are not found to be water tight, they must be repaired or replaced before proceeding with the testing and chlorination procedure.

3.3 INITIAL FILLING

- A. Each valved section of pipeline must be slowly filled with water. The sections may be filled through the isolation valves via the test taps if they are available. Before applying the specified test pressure, all air must be expelled completely from the pipeline section to be tested. When venting air from the pipeline, it is important to limit the pipeline fill rate to avoid excessive surge pressures when the water reaches the air venting opening(s). When the pipeline has been filled do not permit water to backflow into existing water mains.

3.4 PRELIMINARY FLUSHING

- A. All new water mains, extensions, connections, and hydrant branches must be flushed prior to the hydrostatic testing so that water flows clear from all hydrants and test taps. The flushing operation must continue uninterrupted for a minimum of eight (8) hours or until the water flows clear. Flushing operations may be extended longer when directed by the Commissioner.

3.5 HYDROSTATIC TESTING

A. Setup

Water-pressure testing is the only method allowed for performing hydrostatic tests. Compressed-air testing methods are not permitted. Ensure that all air has been expelled after the preliminary flushing. Use a suitable pump connected to the existing water main system to apply the test pressure. Allow the pipeline to stabilize at the test pressure before conducting the hydrostatic test.

B. Testing

The test must subject the water main to a minimum hydrostatic pressure of 100 psi for a minimum period of two (2) hours. The minimum hydrostatic pressure is to be maintained at the highest point of the pipe in the test section. The test pressure may not vary by more than ± 5 psi for the duration of the test. Test pressure is to be maintained within this tolerance by adding makeup water into the pipeline through the pressure test pump. The amount of makeup water added must be accurately measured in gallons (accurate to two decimal places) by suitable methods.

C. Allowable Makeup Water

The amount of makeup water added during the test must not exceed the amount calculated using the following equations:

$$L = \frac{S \times D \times T \times \sqrt{P}}{148000} \quad \text{Equation 1}$$

L = allowable makeup water, gallons
S = length of pipe tested, feet
D = nominal diameter of pipe tested, inches
T = duration of the test, hours
P = average test pressure, pounds per square inch (gauge)

When testing against closed metal-seated valves, additional makeup water is allowed per valve, as follows:

$$L_v = D \times T \times .0078 \quad \text{Equation 2}$$

L_v = allowable makeup water per metal-seated valve, gallons
D = nominal diameter of valve, inches
T = duration of the test, hours

For a 1,000' section of pipe tested for 2 hours at 100 psi against one closed metal-seated valve, the allowable makeup water is equal to:

Table 1
Allowable Makeup Water per 1,000 feet of Pipe, gallons
Tested at 100 psi for 2 hours

Nominal Pipe Diameter									
8"	12"	16"	24"	30"	36"	42"	48"	54"	60"
1.21	1.81	2.41	3.62	4.52	5.43	6.33	7.24	8.14	9.04

D. Visual Examination

Any and all exposed pipe, fittings, valves, hydrants, and joints must be examined carefully during the pressure test. Any damaged or defective pipe, fittings, valves, hydrants, or joints that are discovered during or following the pressure test must be repaired or replaced with reliable material. All visible leaks are to be repaired regardless of the allowance used for testing.

E. Acceptance

Hydrostatic testing is to be repeated until all visible leaks are repaired and the amount of makeup water used is below the allowable amount. After all visible leaks have been repaired, acceptance will be determined on the basis of allowable makeup water only. If any test of a new pipeline discloses a small amount of makeup water greater than that specified above, repairs or replacements are to be accomplished in accordance with the contract documents or directed by the Commissioner.

3.6 SECONDARY FLUSHING

- A. After each test section has satisfactorily passed the hydrostatic pressure test, a secondary flushing must be performed. The secondary flushing must be performed before the pipeline is disinfected. The Contractor must give a minimum forty-eight (48) hour notice to the Commissioner before performing the secondary flushing procedure.
- B. For water mains less than 24-Inches in diameter, the test section must be flushed at a minimum velocity of 2.5 feet per second for a minimum of four (4) hours until the water flows clear. Flushing operations may be extended longer when directed by the Commissioner.
- C. For water mains 24-Inches in diameter and larger, the test section must be flushed for a minimum of twenty-four (24) hours while maintaining a discharge flow of approximately 2,500 gallons per minute through at least one fire hydrant within the test section until the water flows clear. Flushing operations may be extended longer when directed by the Commissioner.

3.7 DISINFECTING WATER MAINS

- A. After the secondary flushing has been completed and the water flows clear from the pipeline being tested, the water main must be disinfected. The disinfection procedure must be performed by a Contractor qualified to conduct such work. The Water Quality Surveillance Section (WQSS) of the Department of Water Management will observe the disinfection procedure.

3.8 FINAL FLUSHING

After completion of the chlorination process, the chlorination water must be thoroughly flushed from all pipelines. The water main must be flushed until the water flows clear and has representative distribution system chlorine residual as determined by the WQSS of the Department.

3.9 SAMPLING

When the WQSS of the Department has determined that the pipeline is ready to be sampled, the samples are to be collected under the direction of the WQSS. The samples are tested for bacterial content before the pipeline can be approved for service.

3.10 APPROVAL

Final approval of the water main rests with the WQSS of the Department.

3.11 DISPOSAL OF FLUSHING WATER

For all types of flushing, limit flow rates to existing City sewers as specified in Section 01 11 00 - Summary of Work of this specification.

3.12 SAFETY

The Contractor must have sufficient equipment to properly carry out the hydrostatic testing and disinfecting operations and have the necessary safety equipment on hand; including a Chlorine Institute Emergency Kit "A" and self contained breathing apparatus. Failure to provide such equipment will be cause for not allowing the disinfection operation to be performed.

3.13 CONTRACTOR RESPONSIBILITY

The Contractor must have overall responsibility for hydrostatic testing, disinfecting, and sampling. The Contractor must provide all the necessary personnel to: assist in the disinfection operation; perform the final flushing operation; and assist the WQSS of the Department in the water sampling. The Contractor must be responsible for guaranteeing that sufficient and necessary sanitary precautions are taken during construction to ensure approval of the main for service.

3.14 DISINFECTION PROCEDURES WHEN CUTTING INTO OR REPAIRING EXISTING MAINS

Swab pipe and fittings that will not be pressure tested or chlorinated with chlorine solution during installation and use extra precaution to prevent soil and debris from entering the pipe. Incorporate untested pipe into the flushing routine when possible. When connecting new pipe to the existing water system, use operating pressure to visually inspect for leaks. When feasible, perform inspection prior to backfilling. Comply with all standards and requirements of the WQSS of the Department.

END OF SECTION 33 13 00

PIPE UNDERDRAINS FOR STRUCTURES

Effective: May 17, 2000

Revised: January 22, 2010

Description. This work shall consist of furnishing and installing a pipe underdrain system as shown on the plans, as specified herein, and as directed by the Engineer.

Materials. Materials shall meet the requirements as set forth below:

The perforated pipe underdrain shall be according to Article 601.02 of the Standard Specifications. Outlet pipes or pipes connecting to a separate storm sewer system shall not be perforated.

The drainage aggregate shall be a combination of one or more of the following gradations, FA1, FA2, CA5, CA7, CA8, CA11, or CA13 thru 16, according to Sections 1003 and 1004 of the Standard Specifications.

The fabric surrounding the drainage aggregate shall be Geotechnical Fabric for French Drains according to Article 1080.05 of the Standard Specifications.

Construction Requirements. All work shall be according to the applicable requirements of Section 601 of the Standard Specifications except as modified below.

The pipe underdrains shall consist of a perforated pipe drain situated at the bottom of an area of drainage aggregate wrapped completely in geotechnical fabric and shall be installed to the lines and gradients as shown on the plans.

Method of Measurement. Pipe Underdrains for Structures shall be measured for payment in feet (meters), in place. Measurement shall be along the centerline of the pipe underdrains. All connectors, outlet pipes, elbows, and all other miscellaneous items shall be included in the measurement. Concrete headwalls shall be included in the cost of Pipe Underdrains for Structures, but shall not be included in the measurement for payment.

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for PIPE UNDERDRAINS FOR STRUCTURES of the diameter specified. Furnishing and installation of the drainage aggregate, geotechnical fabric, forming holes in structural elements and any excavation required, will not be paid for separately, but shall be included in the cost of the pipe underdrains for structures.

STRUCTURAL REPAIR OF CONCRETE

Effective: March 15, 2006

Revised: April 1, 2016

Description. This work shall consist of structurally repairing concrete.

Materials. Materials shall be according to the following.

Item	Article/Section
(a) Portland Cement Concrete (Note 1)	1020
(b) R1 or R2 Concrete (Note 2)	
(c) Normal Weight Concrete (Notes 3 and 4)	
(d) Shotcrete (High Performance) (Notes 5 and 6)	
(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	1023.01
(k) Epoxy (Note 7)	1025
(l) Mechanical Bar Splicers	508.06(c)

- Note 1. The concrete shall be Class SI, except the cement factor shall be a minimum 6.65 cwt/cu yd (395 kg/cu m), the coarse aggregate shall be a CA 16, and the strength shall be a minimum 4000 psi (27,500 kPa) compressive or 675 psi (4650 kPa) flexural at 14 days. A high range water-reducing admixture shall be used to obtain a 5-7 in. (125-175 mm) slump, but a cement factor reduction according to Article 1020.05(b)(8) is prohibited. A self-consolidating concrete mixture is also acceptable per Article 1020.04, except the mix design requirements of this note regarding the cement factor, coarse aggregate, strength, and cement factor reduction shall apply.
- Note 2. The R1 or R2 concrete shall be from the Department's approved list of Packaged, Dry, Rapid Hardening, Cementitious Materials for Concrete Repairs. The R1 or R2 concrete shall comply with the air content and strength requirements for Class SI concrete as indicated in Note 1. Mixing shall be per the manufacturer's recommendations, except the water/cement ratio shall not exceed the value specified for Class SI concrete as indicated in Note 1. A high range water-reducing admixture shall be used to obtain a 5-7 in. (125-175 mm) slump, and a retarder may be required to allow time to perform the required field tests. The admixtures shall be per the manufacturer's recommendation, and the Department's approved list of Concrete Admixtures shall not apply.
- Note 3. The "high slump" packaged concrete mixture shall be from the Department's approved list of Packaged, Dry, Formed, Concrete Repair Mixtures. The materials and preparation of aggregate shall be according to ASTM C 387. The cement factor shall be 6.65 cwt/cu yd (395 kg/cu m) minimum to 7.05 cwt/cu yd (418 kg/cu m) maximum. Cement replacement with fly ash or ground granulated blast-furnace slag shall be according to Section 1020. The "high slump" packaged concrete mixture shall have a water soluble chloride ion content of less than 0.40 lb/cu yd (0.24 kg/cu m). The test shall be performed according to ASTM C 1218, and the "high slump" packaged concrete mixture shall have an age of 28 to 42 days at the time of test. The ASTM C 1218 test shall be performed by an independent lab a minimum of once every two years, and the test results shall be provided to the Department. The coarse aggregate shall be a maximum size of 1/2 in. (12.5 mm). The packaged concrete mixture shall comply with the air content and strength requirements for Class SI concrete as indicated in Note 1. Mixing shall be per the manufacturer's recommendations, except the water/cement ratio shall not exceed the value specified for Class SI concrete as indicated in Note 1. A high range water-reducing admixture shall be used to obtain a 5-7 in. (125-175 mm) slump. The admixture shall be per the manufacturer's recommendation, and the Department's approved list of Concrete Admixtures shall not apply. A maximum slump of 10 in. (250 mm) may be permitted if no segregation is observed by the Engineer in a laboratory or field evaluation.

Note 4 The “self-consolidating concrete” packaged concrete mixture shall be from the Department’s approved list of Packaged, Dry, Formed, Concrete Repair Mixtures. The materials and preparation of aggregate shall be according to ASTM C 387. The cement factor shall be 6.65 cwt/cu yd (395 kg/cu m) minimum to 7.05 cwt/cu yd (418 kg/cu m) maximum. Cement replacement with fly ash or ground granulated blast-furnace slag shall be according to Section 1020. The “self-consolidating concrete” packaged concrete mixture shall have a water soluble chloride ion content of less than 0.40 lb/cu yd (0.24 kg/cu m). The test shall be performed according to ASTM C 1218, and the “self-consolidating concrete” packaged concrete mixture shall have an age of 28 to 42 days at the time of test. The ASTM C 1218 test shall be performed by an independent lab a minimum of once every two years, and the test results shall be provided to the Department. The concrete mixture should be uniformly graded, and the coarse aggregate shall be a maximum size of 1/2 in. (12.5 mm). The fine aggregate proportion shall be a maximum 50 percent by weight (mass) of the total aggregate used. The packaged concrete mixture shall comply with the air content and strength requirements for Class SI concrete as indicated in Note 1. Mixing shall be per the manufacturer’s recommendations, except the water/cement ratio shall not exceed the value specified for Class SI concrete as indicated in Note 1. The admixtures used to produce self-consolidating concrete shall be per the manufacturer’s recommendation, and the Department’s approved list of Concrete Admixtures shall not apply. The packaged concrete mixture shall meet the self-consolidating requirements of Article 1020.04.

Note 5. Packaged shotcrete that includes aggregate shall be from the Department’s approved list of Packaged High Performance Shotcrete, and independent laboratory test results showing the product meets Department specifications will be required. The product shall be a packaged, pre-blended, and dry combination of materials, for the wet-mix shotcrete method according to ASTM C 1480. A non-chloride accelerator may be used according to the shotcrete manufacturer’s recommendations. The shotcrete shall be Type FA or CA, Grade FR, and Class I. The fibers shall be Type III synthetic according to ASTM C 1116.

The packaged shotcrete shall have a water soluble chloride ion content of less than 0.40 lb/cu yd (0.24 kg/cu m). The test shall be performed according to ASTM C 1218, and the hardened shotcrete shall have an age of 28 to 42 days at the time of test. The ASTM C 1218 test shall be performed by an independent lab a minimum of once every two years, and the test results shall be provided to the Department.

Each individual aggregate used in the packaged shotcrete shall have either a maximum ASTM C 1260 expansion of 0.16 percent or a maximum ASTM C 1293 expansion of 0.040 percent. However, the ASTM C 1260 value may be increased to 0.27 percent for each individual aggregate if the cement total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) does not exceed 0.60 percent. As an alternative to these requirements, ASTM C 1567 testing which shows the packaged shotcrete has a maximum expansion of 0.16 percent may be submitted. The ASTM C 1260, C 1293, or C 1567 test shall be performed a minimum of once every two years.

The 7 and 28 day compressive strength requirements in ASTM C 1480 shall not apply. Instead the shotcrete shall obtain a minimum compressive strength of 4000 psi (27,500 kPa) at 14 days.

The packaged shotcrete shall be limited to the following proportions:

The portland cement and finely divided minerals shall be 6.05 cwt/cu yd (360 kg/cu m) to 8.50 cwt/cu yd (505 kg/cu m) for Type FA and 6.05 cwt/cu yd (360 kg/cu. m) to 7.50 cwt/cu yd (445 kg/cu m) for Type CA. The portland cement shall not be below 4.70 cwt/cu yd (279 kg/cu m) for Type FA or CA.

The finely divided mineral(s) shall constitute a maximum of 35 percent of the total cement plus finely divided mineral(s).

Class F fly ash is optional and the maximum shall be 20 percent by weight (mass) of cement.

Class C fly ash is optional and the maximum shall be 25 percent by weight (mass) of cement.

Ground granulated blast-furnace slag is optional and the maximum shall be 30 percent by weight (mass) of cement.

Microsilica is required and shall be a minimum of 5 percent by weight (mass) of cement, and a maximum of 10 percent. As an alternative to microsilica, high-reactivity metakaolin may be used at a minimum of 5 percent by weight (mass) of cement, and a maximum of 10 percent.

Fly ash shall not be used in combination with ground granulated blast-furnace slag. Class F fly ash shall not be used in combination with Class C fly ash. Microsilica shall not be used in combination with high-reactivity metakaolin. A finely divided mineral shall not be used in combination with a blended hydraulic cement, except for microsilica or high-reactivity metakaolin.

The water/cement ratio as defined in Article 1020.06 shall be a maximum of 0.42.

The air content as shot shall be 4.0 – 8.0 percent.

Note 6 Packaged shotcrete that does not include pre-blended aggregate shall be from the Department's approved list of Packaged High Performance Shotcrete, and independent laboratory test results showing the product meets Department specifications will be required. The shotcrete shall be according to Note 5, except the added aggregate shall be according to Articles 1003.02 and 1004.02 in addition to each individual aggregate meeting the maximum expansion requirements of Note 5. The aggregate gradation shall be according to the manufacturer. The shotcrete shall be batched and mixed with added aggregate according to the manufacturer.

Note 7. In addition ASTM C 881, Type IV, Grade 2 or 3, Class A, B, or C may be used.

Equipment. Equipment shall be according to Article 503.03 and the following.

Chipping Hammer – The chipping hammer for removing concrete shall be a light-duty pneumatic or electric tool with a 15 lb. (7 kg) maximum class or less.

Blast Cleaning Equipment – Blast cleaning equipment for concrete surface preparation shall be the abrasive type, and the equipment shall have oil traps.

Hydrodemolition Equipment – Hydrodemolition equipment for removing concrete shall be calibrated, and shall use water according to Section 1002.

High Performance Shotcrete Equipment – The batching, mixing, pumping, hose, nozzle, and auxiliary equipment shall be for the wet-mix shotcrete method, and shall meet the requirements of ACI 506R.

Construction Requirements

General. The repair methods shall be either formed concrete repair or shotcrete. The repair method shall be selected by the Contractor with the following rules.

- (a) Rule 1. 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.
- (b) Rule 2. Formed concrete repair shall not be used for overhead applications.
- (c) Rule 3. If formed concrete repair is used for locations that have reinforcement with less than 0.75 in. (19 mm) of concrete cover, the concrete mixture shall contain fly ash or ground granulated blast-furnace slag at the maximum cement replacement allowed.
- (d) Rule 4. 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.
- (e) Rule 5. 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.

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 review and approval. When ever 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 appropriate and approved support system is installed.

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 preferred. The repair perimeter shall be sawed a depth of 1/2 in. (13 mm) or less, as required to avoid cutting the reinforcement. Any cut reinforcement shall be repaired or replaced at the expense of the Contractor. 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 chipping hammers, hydrodemolition equipment, or other methods approved by the Engineer. The concrete removal shall extend along the reinforcement bar until the reinforcement is free of bond inhibiting corrosion. Reinforcement bar with 50 percent or more exposed shall be undercut to a depth of 3/4 in. (19 mm) or the diameter of the reinforcement bar, whichever is greater.

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.

The repair depth shall be a minimum of 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 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.

The Contractor shall have a maximum of 14 calendar days to complete each repair location with concrete or shotcrete, once concrete removal has started for the repair.

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 6 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.

Surface Preparation. Prior to placing the concrete or shotcrete, the Contractor shall prepare the repair area and exposed reinforcement by blast cleaning. The blast cleaning shall provide a surface that is free of oil, dirt, and loose material.

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 (i.e. shotcrete material leaner than the original mixture which ricochets off the receiving surface), and overspray. Preparation may be by lightly brushing or blast cleaning if the previous shotcrete surface is less than 36 hours old. If more than 36 hours old, the surface shall be prepared by blast cleaning.

The repair area and perimeter vertical face shall have a rough surface. Care shall be taken to ensure the sawcut face is roughened by blast cleaning. Just prior to concrete or shotcrete placement, saturate the repair area with water to a saturated surface-dry condition. Any standing water shall be removed.

Concrete or shotcrete placement shall be done within 3 calendar days of the surface preparation or the repair area shall be prepared again.

Reinforcement. Exposed reinforcement bars shall be cleaned of concrete and corrosion by blast cleaning. After cleaning, all exposed reinforcement shall be carefully 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 shall be performed.

Intersecting reinforcement bars shall be tightly secured to each other using 0.006 in. (1.6 mm) or heavier gauge tie wire, and shall be adequately supported to minimize movement during concrete placement or application of shotcrete.

For reinforcement bar locations with less than 0.75 in. (19 mm) of cover, protective coat shall be applied to the completed repair. The application of the protective coat shall be according to Article 503.19, 2nd paragraph, except blast cleaning shall be performed to remove curing compound.

The Contractor shall anchor the new concrete to the existing concrete with 3/4 in. (19 mm) diameter hook bolts for all repair areas 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 hook bolts shall be spaced at 15 in. (380 mm) maximum centers both vertically and horizontally, and shall be a minimum of 12 in. (305 mm) away from the perimeter of the repair. The hook bolts shall be installed according to Section 584.

Repair Methods. All repair areas shall be inspected and approved by the Engineer prior to placement of the concrete or application of the shotcrete.

- (a) Formed Concrete Repair. Falsework shall be according to Article 503.05. Forms shall be according to Article 503.06. Formwork shall provide a smooth and uniform concrete finish, and shall approximately match the existing concrete structure. Formwork shall be mortar tight and closely fitted where they adjoin the existing concrete surface to prevent leakage. 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 that may be entrapped.

The concrete for formed concrete repair shall be a Class SI Concrete, or a packaged R1 or R2 Concrete with coarse aggregate added, or a packaged Normal Weight Concrete at the Contractor's option. The concrete shall be placed and consolidated according to Article 503.07. The concrete 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.

Curing shall be done according to Article 1020.13.

If temperatures below 45°F (7°C) are forecast during the curing period, protection methods shall be used. Protection Method I according to Article 1020.13(d)(1), or Protection Method II according to Article 1020.13(d)(2) shall be used during the curing period.

The surfaces of the completed repair shall be finished according to Article 503.15.

- (b) Shotcrete. Shotcrete shall be tested by the Engineer for air content according to Illinois Modified 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.

For compressive strength of shotcrete, a 18 x 18 x 3.5 in. (457 x 457 x 89 mm) test panel shall be shot by the Contractor for testing by the Engineer. A steel form test panel shall have a minimum thickness of 3/16 in. (5 mm) for the bottom and sides. A wood form test panel shall have a minimum 3/4 in. (19 mm) thick bottom, and a minimum 1.5 in. (38 mm) thickness for the sides. 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. After delivery to the laboratory for testing, curing and testing shall be according to ASTM C 1140.

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.

For air temperature limits when applying shotcrete in cold weather, the first paragraph of Article 1020.14(b) shall apply. For hot 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. The shotcrete shall not be applied 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). 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 to 5 ft. (0.6 to 1.5 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 45 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. The maximum thickness shall be according to Rules 4 and 5 under Construction Requirements, General. 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. Cutting shall not cause cracks or delaminations in the shotcrete. 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 shall be used to approximately match the existing concrete texture. A manufacturer approved finishing aid may be used. Water shall not be used as a finishing aid. All repaired members shall be restored as close as practicable to their original dimensions.

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. The curing compound shall be according to Article 1022.01. Note 5 of the Index Table in Article 1020.13 shall apply to the membrane curing method.

When a shotcrete layer is to be covered by a succeeding shotcrete layer within 36 hours, the repair area shall be protected with intermittent hand fogging, or wet curing with either burlap or cotton mats shall begin within 10 minutes. Intermittent hand fogging may be used only for the first hour. Thereafter, wet curing with burlap or cotton mats shall be used until the succeeding shotcrete layer is applied. Intermittent hand fogging may be extended to the first hour and a half if the succeeding shotcrete layer is applied by the end of this time.

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.

If temperatures below 45°F (7°C) are forecast during the curing period, protection methods shall be used. Protection Method I according to Article 1020.13(d)(1), or Protection Method II according to Article 1020.13(d)(2) shall be used during the curing period

Inspection of Completed Work. The Contractor shall provide ladders or other appropriate equipment for the Engineer to inspect the repaired areas. After curing but no sooner than 28 days after placement of concrete or shooting of shotcrete, the repair shall be examined for conformance with original dimensions, cracks, voids, and delaminations. Sounding for delaminations will be done with a hammer or by other methods determined by the Engineer.

The acceptable tolerance for conformance of a repaired area shall be within 1/4 in. (6 mm) of the original dimensions. A repaired area not in dimensional conformance or with delaminations shall be removed and replaced.

A repaired area with cracks or voids shall be considered as nonconforming. Exceeding one or more of the following crack and void criteria shall be cause for removal and replacement of a repaired area.

1. The presence of a single surface crack greater than 0.01 in. (0.25 mm) in width and greater than 12 in. (300 mm) in length.
2. The presence of 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.
3. The presence of map cracking in one or more regions totaling 15 percent or more of the gross surface area of the repair.
4. The presence of two or more surface voids with least dimension 3/4 in. (19 mm) each.

A repaired area with cracks or voids that do not exceed any of the above criteria may remain in place, as determined by the Engineer.

If a nonconforming repair is allowed to remain in place, 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 may be applied to the surface of the crack. Voids shall be repaired according to Article 503.15.

Publications and Personnel Requirements. The Contractor shall provide a current copy of ACI 506R to the Engineer a minimum of one week prior to 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. A copy of the nozzle men certificate(s) shall be given to the Engineer.

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.

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 IN. (125 MM), STRUCTURAL REPAIR OF CONCRETE (DEPTH EQUAL TO OR LESS THAN 5 IN. (125 MM).

When not specified to be paid for elsewhere, the work to design, install, and remove the temporary shoring and cribbing will be paid for according to Article 109.04.

With the exception of reinforcement damaged by the Contractor during removal, the furnishing and installation of supplemental reinforcement bars, mechanical bar splicers, hook bolts, and protective coat will be paid according to Article 109.04.

DRILLED SHAFTS

Effective: October 5, 2015

Revised: October 4, 2016

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.
- (b) 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.

- (c) 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. 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.”

CROSSHOLE SONIC LOGGING TESTING OF DRILLED SHAFTS

Effective: April 20, 2016

Description. This work shall consist of furnishing and installing materials and equipment necessary to install access ducts in all drilled shafts of structures identified on the plans, and to perform Crosshole Sonic Logging (CSL) testing of selected drilled shafts on these structures. This work shall be according to Illinois Modified ASTM D6760. This work also includes analysis of the CSL data, preparation of reports summarizing the CSL data, and investigating anomalies identified in the CSL data. This work shall also include grouting of all access ducts after testing and approval by the Engineer.

Materials. Materials shall be according to the following.

- (a) Grout (Note 1).....1024.01

Note 1. Grout shall attain a minimum strength equal to the required strength of the drilled shaft concrete at 14 days.

Qualifications. A consulting firm experienced in CSL testing shall conduct this work. The CSL consulting firm shall be a company independent from the Contractor with a minimum of 3 years of experience in performing CSL testing of drilled shafts. The individual employee of the CSL consulting firm performing analysis of the CSL data and preparing the report shall be an Illinois Licensed Professional Engineer and have experience on a minimum of 5 projects performing CSL testing of drilled shafts.

The name, contact information, and qualifications of the CSL consulting firm, including the names and experience of the individual employees performing and analyzing the test results and preparing the report, shall be submitted to the Engineer at least 30 days prior to drilled shaft construction.

Construction. Access ducts shall be placed in all drilled shafts for the structures indicated on the plans, attached to the reinforcement cage and situated symmetrically around the diameter of the shaft according to the Illinois Modified ASTM D6760. The Engineer will determine which drilled shafts shall have CSL testing performed after the concrete has been placed in the drilled shafts, and may direct additional tests, if necessary, due to problems encountered or observed during drilled shaft construction.

After permission is given by the Engineer, the access ducts shall be grouted. The grout shall be placed with a pump, starting at the bottom of each access duct.

Superimposed loads, either dead or live, shall not be applied to a drilled shaft until CSL testing is completed, CSL reports have been submitted, any necessary repairs have been completed, access ducts have been grouted, and permission has been granted by the Engineer.

Reports. Reports shall be according to Illinois Modified ASTM D6760. Each anomalous zone detected by the CSL testing shall be identified and discussed in the report. An anomalous zone shall be defined as areas where velocity reduction exceeds 20 percent of the average velocity of properly placed and cured shaft concrete at the time of testing.

Anomalies. If anomalies are identified, they shall be investigated by coring or other methods approved by the Engineer.

Correction of Drilled Shaft Defects. When testing determines that a defect is present, the Engineer will direct the Contractor to submit remedial measures for approval. No compensation will be made for remedial work, or losses, or damage, due to remedial work of drilled shafts found defective or not in accordance with the drilled shaft specifications or plans. Modifications to the drilled shaft design, or any load transfer mechanisms required by the remedial action, must be designed, detailed, and sealed by an Illinois Licensed Structural Engineer, and submitted for approval.

Method of Measurement. Installation and grouting of access ducts will be measured for payment per shaft by the linear foot of drilled shaft(s) with access ducts.

CSL testing, analysis, and reporting will be measured for payment by each drilled shaft foundation tested.

Investigation of anomalies will not be measured for payment.

Basis of Payment. Installation and grouting of access ducts will be paid for at the contract unit price per foot for CROSSHOLE SONIC LOGGING ACCESS DUCTS. CSL testing, analysis, and reporting will be paid for at the contract unit price per each for CROSSHOLE SONIC LOGGING TESTING.

ILLINOIS MODIFIED ASTM D6760
 Effective Date: April 20, 2016
 Standard Test Method for
Integrity Testing of Concrete Deep Foundations by Ultrasonic Crosshole Testing
 Reference ASTM D6760-14

ASTM SECTION	Illinois Modification										
3.1.1	Revise this section as follows: <i>access ducts, n</i> – preformed steel tubes or drilled boreholes, placed in the concrete to allow probe entry in pairs to measure pulse transmission in the concrete between the probes.										
6.1	Revise the second sentence of this section as follows: The tubes shall be mild steel. Delete the third, fourth, and fifth sentences of this section.										
7.1.1	Revise this section as follows: The access ducts shall be installed during construction of the drilled shaft. For drilled shafts foundations, access ducts shall be provided according to the following table. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Reinforcing Cage Diameter (feet)</th> <th>Number of access ducts</th> </tr> </thead> <tbody> <tr> <td>≤ 4.0</td> <td>3</td> </tr> <tr> <td>4.1 to 5.0</td> <td>4</td> </tr> <tr> <td>5.1 to 7.0</td> <td>6</td> </tr> <tr> <td>> 7.1</td> <td>8</td> </tr> </tbody> </table> Access ducts shall be spread equally around the perimeter and spaced at an equal distance from the axis. Delete Fig. 4.	Reinforcing Cage Diameter (feet)	Number of access ducts	≤ 4.0	3	4.1 to 5.0	4	5.1 to 7.0	6	> 7.1	8
Reinforcing Cage Diameter (feet)	Number of access ducts										
≤ 4.0	3										
4.1 to 5.0	4										
5.1 to 7.0	6										
> 7.1	8										
7.1.2	Revise the second sentence of this section as follows: The exterior tube surface shall be free from contamination (for example, oil, dirt, loose rust, mill scale, etc.) to ensure a good bond between the tube surface and the surrounding concrete.										
7.1.3	Delete the third sentence of this section.										

ILLINOIS MODIFIED ASTM D6760
 Effective Date: April 20, 2016
 Standard Test Method for
Integrity Testing of Concrete Deep Foundations by Ultrasonic Crosshole Testing
 Reference ASTM D6760-14

7.2	<p>Revise the first sentence of this section as follows: The access tubes shall be installed such that their bottom is within 4 inches of the bottom of the concrete deep foundation element so that the bottom condition can be tested.</p> <p>Revise the sixth sentence of this section as follows: Access tubes shall be filled with water prior to concrete placement to assure good bonding of the concrete to the tube after the concrete cools. The access tubes shall be kept full of water until the tubes are grouted.</p>
7.3	<p>Revise the first sentence of this section as follows: In cases where drilled shafts to be tested have access ducts that do not permit passage of the probes, do not retain water, are not plumb, are debonded from the concrete, or cannot be used for testing for other reasons, drilled boreholes shall be used to provide probe access.</p>
7.4.2	<p>Revise the second sentence of this section as follows: The tests shall be performed no later than 21 days after concrete casting.</p>
7.6	Delete this section.
7.8.1	<p>Revise the first sentence of this section as follows: If the ultrasonic profile indicates an anomaly, then the suspect anomaly zone shall be further investigated by special test procedures such as fan shaped tests, tests with the probes raised at a fixed offset distance, or other tomographical techniques (1, 2).</p>
7.8.2	Delete Note 5 of this section.

ADJUSTING FRAMES AND GRATES (BDE)

Effective: April 1, 2017

Add the following to Article 602.02 of the Standard Specifications:

- “(s) High Density Expanded Polystyrene Adjusting Rings
 with Polyurea Coating (Note 4) 1043.04
- (t) Expanded Polypropylene (EPP) Adjusting Rings (Note 5) 1043.05

Note 4. High density expanded polystyrene adjusting rings with polyurea coating shall meet the design load requirements of AASHTO HS20/25. The rings may be used to adjust the frames and grates of drainage and utility structures up to a maximum of 6 in. (150 mm). They shall be installed and sealed underneath the frames according to the manufacturer’s specifications.

Note 5. Riser rings fabricated from EPP may be used to adjust the frames and grates of drainage and utility structures up to a maximum of 6 in. (150 mm). An adhesive meeting ASTM C 920, Type S, Grade N5, Class 25 shall be used with EPP adjustment rings. The top ring of the adjustment stack shall be a finish ring with grooves on the lower surface and flat upper surface. The joints between all manhole adjustment rings and the frame and cover shall be sealed using the approved adhesive. In lieu of the use of an adhesive, an internal or external mechanical frame-chimney seal may be used for watertight installation. EPP adjustment rings shall not be used with heat shrinkable infiltration barriers.”

Add the following to Section 1043 of the Standard Specifications:

“1043.04 High Density Expanded Polystyrene Adjusting Rings with Polyurea Coating.

High density expanded polystyrene adjustment rings with polyurea coating shall be designed and tested to meet or exceed an HS25 wheel load according to the AASHTO Standard Specifications for Highway Bridges (AASHTO M306 HS-25). The raw material suppliers shall provide certifications of quality or testing using the following ASTM standards, and upon request, certify that only virgin material was used in the manufacturing of the expanded polystyrene rings.

Physical Property	Test Standard	Value	
		3.0 lb/cu ft	4.5 lb/cu ft
Compression Resistance at 10% deformation	ASTM D 1621	50 - 70	70 - 90
at 5% deformation		45 - 60	60 - 80
at 2% deformation		15 - 20	20 - 40
Flexural Strength	ASTM D 790	90 - 120	130 - 200
Water Absorption	ASTM D 570	2.0%	1.7%
Coefficient of Linear Expansion	ASTM D 696	2.70E-06 in./in./°F	2.80E-06 in./in./°F
Sheer Strength	ASTM D 732	55	80
Tensile Strength	ASTM D 1623	70 - 90	130 - 140
Water Vapor Transmission	ASTM C 355	0.82 – 0.86 perm – in.	

High density expanded polystyrene adjustment rings with polyurea coating shall have no void areas, cracks, or tears. The actual diameter or length shall not vary more than 0.125 in. (3 mm) from the specified diameter or length. Variations in height are limited to ± 0.063 in. (± 1.6 mm). Variations shall not exceed 0.25 in. (6 mm) from flat (dish, bow, or convoluting edge) or 0.125 in. (3 mm) for bulges or dips in the surface.

1043.05 Expanded Polypropylene (EPP) Adjusting Rings. The EPP adjusting rings shall be manufactured using a high compression molding process to produce a minimum finished density of 7.5 lb/cu ft (120 g/l). The EPP rings shall be made of materials meeting ASTM D 3575 and ASTM D 4819-13. The grade adjustments shall be designed and tested according to the AASHTO Standard Specifications for Highway Bridges (AASHTO M 306 HS-25).

Grade rings shall contain upper and lower keyways (tongue and groove) for proper vertical alignment and sealing. The top ring, for use directly beneath the cast iron frame, shall have keyways (grooves) on the lower surface with a flat upper surface.

Adhesive or sealant used for watertight installation of the manhole grade adjustment rings shall meet ASTM C 920, Type S, Grade NS, Class 25, Uses NT, T, M, G, A, and O.

EPP adjustment rings shall have no void areas, cracks, or tears. The actual diameter or length shall not vary more than 0.125 in. (3 mm) from the specified diameter or length. Variations in height are limited to ± 0.063 in. (± 1.6 mm). Variations shall not exceed 0.25 in. (6 mm) from flat (dish, bow, or convoluting edge) or 0.125 in. (3 mm) for bulges or dips in the surface.”

COMPENSABLE DELAY COSTS (BDE)

Effective: June 2, 2017

Revise Article 107.40(b) of the Standard Specifications to read:

“(b) Compensation. Compensation will not be allowed for delays, inconveniences, or damages sustained by the Contractor from conflicts with facilities not meeting the above definition; or if a conflict with a utility in an unanticipated location does not cause a shutdown of the work or a documentable reduction in the rate of progress exceeding the limits set herein. The provisions of Article 104.03 notwithstanding, compensation for delays caused by a utility in an unanticipated location will be paid according to the provisions of this Article governing minor and major delays or reduced rate of production which are defined as follows.

- (1) Minor Delay. A minor delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two hours, but not to exceed two weeks.
- (2) Major Delay. A major delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two weeks.
- (3) Reduced Rate of Production Delay. A reduced rate of production delay occurs when the rate of production on the work in conflict with the utility in an unanticipated location decreases by more than 25 percent and lasts longer than seven calendar days.”

Revise Article 107.40(c) of the Standard Specifications to read:

“(c) Payment. Payment for Minor, Major, and Reduced Rate of Production Delays will be made as follows.

- (1) Minor Delay. Labor idled which cannot be used on other work will be paid for according to Article 109.04(b)(1) and (2) for the time between start of the delay and the minimum remaining hours in the work shift required by the prevailing practice in the area.

Equipment idled which cannot be used on other work, and which is authorized to standby on the project site by the Engineer, will be paid for according to Article 109.04(b)(4).

- (2) Major Delay. Labor will be the same as for a minor delay.

Equipment will be the same as for a minor delay, except Contractor-owned equipment will be limited to two weeks plus the cost of move-out to either the Contractor's yard or another job and the cost to re-mobilize, whichever is less. Rental equipment may be paid for longer than two weeks provided the Contractor presents adequate support to the Department (including lease agreement) to show retaining equipment on the job is the most economical course to follow and in the public interest.

- (3) Reduced Rate of Production Delay. The Contractor will be compensated for the reduced productivity for labor and equipment time in excess of the 25 percent threshold for that portion of the delay in excess of seven calendar days. Determination of compensation will be in accordance with Article 104.02, except labor and material additives will not be permitted.

Payment for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be determined according to Article 109.13."

Revise Article 108.04(b) of the Standard Specifications to read:

"(b) No working day will be charged under the following conditions.

- (1) When adverse weather prevents work on the controlling item.
- (2) When job conditions due to recent weather prevent work on the controlling item.
- (3) When conduct or lack of conduct by the Department or its consultants, representatives, officers, agents, or employees; delay by the Department in making the site available; or delay in furnishing any items required to be furnished to the Contractor by the Department prevents work on the controlling item.
- (4) When delays caused by utility or railroad adjustments prevent work on the controlling item.
- (5) When strikes, lock-outs, extraordinary delays in transportation, or inability to procure critical materials prevent work on the controlling item, as long as these delays are not due to any fault of the Contractor.
- (6) When any condition over which the Contractor has no control prevents work on the controlling item."

Revise Article 109.09(f) of the Standard Specifications to read:

“(f) Basis of Payment. After resolution of a claim in favor of the Contractor, any adjustment in time required for the work will be made according to Section 108. Any adjustment in the costs to be paid will be made for direct labor, direct materials, direct equipment, direct jobsite overhead, direct offsite overhead, and other direct costs allowed by the resolution. Adjustments in costs will not be made for interest charges, loss of anticipated profit, undocumented loss of efficiency, home office overhead and unabsorbed overhead other than as allowed by Article 109.13, lost opportunity, preparation of claim expenses and other consequential indirect costs regardless of method of calculation.

The above Basis of Payment is an essential element of the contract and the claim cost recovery of the Contractor shall be so limited.”

Add the following to Section 109 of the Standard Specifications.

“**109.13 Payment for Contract Delay.** Compensation for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be allowed when such costs result from a delay meeting the criteria in the following table.

Contract Type	Cause of Delay	Length of Delay
Working Days	Article 108.04(b)(3) or Article 108.04(b)(4)	No working days have been charged for two consecutive weeks.
Completion Date	Article 108.08(b)(1) or Article 108.08(b)(7)	The Contractor has been granted a minimum two week extension of contract time, according to Article 108.08.

Payment for each of the various costs will be according to the following.

(a) Escalated Material and/or Labor Costs. When the delay causes work, which would have otherwise been completed, to be done after material and/or labor costs have increased, such increases will be paid. Payment for escalated material costs will be limited to the increased costs substantiated by documentation furnished by the Contractor. Payment for escalated labor costs will be limited to those items in Article 109.04(b)(1) and (2), except the 35 percent and 10 percent additives will not be permitted.

(b) Extended Project Overhead. For the duration of the delay, payment for extended project overhead will be paid as follows.

(1) Direct Jobsite and Offsite Overhead. Payment for documented direct jobsite overhead and documented direct offsite overhead, including onsite supervisory and administrative personnel, will be allowed according to the following table.

Original Contract Amount	Supervisory and Administrative Personnel
Up to \$5,000,000	One Project Superintendent
Over \$ 5,000,000 - up to \$25,000,000	One Project Manager, One Project Superintendent or Engineer, and One Clerk
Over \$25,000,000 - up to \$50,000,000	One Project Manager, One Project Superintendent, One Engineer, and One Clerk
Over \$50,000,000	One Project Manager, Two Project Superintendents, One Engineer, and One Clerk

(2) Home Office and Unabsorbed Overhead. Payment for home office and unabsorbed overhead will be calculated as 8 percent of the total delay cost.

(c) Extended Traffic Control. Traffic control required for an extended period of time due to the delay will be paid. For working day contracts the payment will be made according to Article 109.04. For completion date contracts, an adjustment will be determined as follows.

Extended Traffic Control occurs between April 1 and November 30:

$$\text{ETCP Adjustment (\$)} = \text{TE} \times (\% / 100 \times \text{CUP} / \text{OCT})$$

Extended Traffic Control occurs between December 1 and March 31:

$$\text{ETCP Adjustment (\$)} = \text{TE} \times 1.5 (\% / 100 \times \text{CUP} / \text{OCT})$$

Where: TE = Duration of approved time extension in calendar days.
 % = Percent maintenance for the traffic control, % (see table below).
 CUP = Contract unit price for the traffic control pay item in place during the delay.
 OCT = Original contract time in calendar days.

Original Contract Amount	Percent Maintenance
Up to \$2,000,000	65%
\$2,000,000 to \$10,000,000	75%
\$10,000,000 to \$20,000,000	85%
Over \$20,000,000	90%

When an ETCP adjustment is paid under this provision, an adjusted unit price as provided for in Article 701.20(a) for increase or decrease in the value of work by more than ten percent will not be paid.

Upon payment for a contract delay under this provision, the Contractor shall assign subrogation rights to the Department for the Department's efforts of recovery from any other party for monies paid by the Department as a result of any claim under this provision. The Contractor shall fully cooperate with the Department in its efforts to recover from another party any money paid to the Contractor for delay damages under this provision."

CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE)

Effective: June 1, 2010

Revised: November 1, 2014

The reduction of emissions of particulate matter (PM) for off-road equipment shall be accomplished by installing retrofit emission control devices. The term “equipment” refers to diesel fuel powered devices rated at 50 hp and above, to be used on the jobsite in excess of seven calendar days over the course of the construction period on the jobsite (including rental equipment).

Contractor and subcontractor diesel powered off-road equipment assigned to the contract shall be retrofitted using the phased in approach shown below. Equipment that is of a model year older than the year given for that equipment’s respective horsepower range shall be retrofitted:

Effective Dates	Horsepower Range	Model Year
June 1, 2010 ^{1/}	600-749	2002
	750 and up	2006
June 1, 2011 ^{2/}	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006
June 1, 2012 ^{2/}	50-99	2004
	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006

1/ Effective dates apply to Contractor diesel powered off-road equipment assigned to the contract.

2/ Effective dates apply to Contractor and subcontractor diesel powered off-road equipment assigned to the contract.

The retrofit emission control devices shall achieve a minimum PM emission reduction of 50 percent and shall be:

- a) Included on the U.S. Environmental Protection Agency (USEPA) *Verified Retrofit Technology List* (<http://www.epa.gov/cleandiesel/verification/verif-list.htm>), or verified by the California Air Resources Board (CARB) (<http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm>); or
- b) Retrofitted with a non-verified diesel retrofit emission control device if verified retrofit emission control devices are not available for equipment proposed to be used on the project, and if the Contractor has obtained a performance certification from the retrofit device manufacturer that the emission control device provides a minimum PM emission reduction of 50 percent.

Note: Large cranes (Crawler mounted cranes) which are responsible for critical lift operations are exempt from installing retrofit emission control devices if such devices adversely affect equipment operation.

Diesel powered off-road equipment with engine ratings of 50 hp and above, which are unable to be retrofitted with verified emission control devices or if performance certifications are not available which will achieve a minimum 50 percent PM reduction, may be granted a waiver by the Department if documentation is provided showing good faith efforts were made by the Contractor to retrofit the equipment.

Construction shall not proceed until the Contractor submits a certified list of the diesel powered off-road equipment that will be used, and as necessary, retrofitted with emission control devices. The list(s) shall include (1) the equipment number, type, make, Contractor/rental company name; and (2) the emission control devices make, model, USEPA or CARB verification number, or performance certification from the retrofit device manufacturer. Equipment reported as fitted with emissions control devices shall be made available to the Engineer for visual inspection of the device installation, prior to being used on the jobsite.

The Contractor shall submit an updated list of retrofitted off-road construction equipment as retrofitted equipment changes or comes on to the jobsite. The addition or deletion of any diesel powered equipment shall be included on the updated list.

If any diesel powered off-road equipment is found to be in non-compliance with any portion of this special provision, the Engineer will issue the Contractor a diesel retrofit deficiency deduction.

Any costs associated with retrofitting any diesel powered off-road equipment with emission control devices shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall not be grounds for a claim.

Diesel Retrofit Deficiency Deduction

When the Engineer determines that a diesel retrofit deficiency exists, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be \$1,000.00 for each deficiency identified.

The deficiency will be based on lack of diesel retrofit emissions control.

If a Contractor accumulates three diesel retrofit deficiency deductions for the same piece of equipment in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of the contract time, waiver of penalties, or be grounds for any claim.

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)

Effective: September 1, 2000

Revised: July 2, 2016

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR Part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract that the Contractor signs with a subcontractor.

The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (a) Withholding progress payments;
- (b) Assessing sanctions;
- (c) Liquidated damages; and/or
- (d) Disqualifying the Contractor from future bidding as non-responsible.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR Part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. The determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform **17.00%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

- (a) The bidder documents that enough DBE participation has been obtained to meet the goal or,
- (b) The bidder documents that a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders shall consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217) 785-4611, or by visiting the Department's website at:

<http://www.idot.illinois.gov/doing-business/certifications/disadvantaged-business-enterprise-certification/il-ucp-directory/index>.

BIDDING PROCEDURES. Compliance with this Special Provision is required prior to the award of the contract and the failure of the low bidder to comply will render the bid not responsive.

In order to assure the timely award of the contract, the low bidder shall submit:

- (a) The bidder shall submit a DBE Utilization Plan on completed Department forms SBE 2025 and 2026.
 - (1) The final Utilization Plan must be submitted within five calendar days after the date of the letting in accordance with subsection (a)(2) of Bidding Procedures herein.
 - (2) To meet the five day requirement, the bidder may send the Utilization Plan electronically by scanning and sending to **DOT.DBE.UP@illinois.gov** or faxing to (217) 785-1524. The subject line must include the bid Item Number and the Letting date. The Utilization Plan should be sent as one .pdf file, rather than multiple files and emails for the same Item Number. It is the responsibility of the bidder to obtain confirmation of email or fax delivery.

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

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

The Department will not accept a Utilization Plan if it does not meet the five day submittal requirement and the bid will be declared not responsive. In the event the bid is declared not responsive due to a failure to submit a Utilization Plan or failure to comply with the bidding procedures set forth herein, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty, and may deny authorization to bid the project if re-advertised for bids. The Department reserves the right to invite any other bidder to submit a Utilization Plan at any time for award consideration.

- (b) The Utilization Plan shall indicate that the bidder either has obtained sufficient DBE participation commitments to meet the contract goal or has not obtained enough DBE participation commitments in spite of a good faith effort to meet the goal. The Utilization Plan shall further provide the name, telephone number, and telefax number of a responsible official of the bidder designated for purposes of notification of Utilization Plan approval or disapproval under the procedures of this Special Provision.
- (c) The Utilization Plan shall include a DBE Participation Commitment Statement, Department form SBE 2025, for each DBE proposed for the performance of work to achieve the contract goal. For bidding purposes, submission of the completed SBE 2025 forms, signed by the DBEs and scanned or faxed to the bidder will be acceptable as long as the original is available and provided upon request. All elements of information indicated on the said form shall be provided, including but not limited to the following:
- (1) The names and addresses of DBE firms that will participate in the contract;
 - (2) A description, including pay item numbers, of the work each DBE will perform;
 - (3) The dollar amount of the participation of each DBE firm participating. The dollar amount of participation for identified work shall specifically state the quantity, unit price, and total subcontract price for the work to be completed by the DBE. If partial pay items are to be performed by the DBE, indicate the portion of each item, a unit price where appropriate and the subcontract price amount;
 - (4) DBE Participation Commitment Statements, form SBE 2025, signed by the bidder and each participating DBE firm documenting the commitment to use the DBE subcontractors whose participation is submitted to meet the contract goal;
 - (5) If the bidder is a joint venture comprised of DBE companies and non-DBE companies, the Utilization Plan must also include a clear identification of the portion of the work to be performed by the DBE partner(s); and,
 - (6) If the contract goal is not met, evidence of good faith efforts; the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor is selected over a DBE for work on the contract.

GOOD FAITH EFFORT PROCEDURES. The contract will not be awarded until the Utilization Plan submitted by the apparent successful bidder is approved. All information submitted by the bidder must be complete, accurate and adequately document that enough DBE participation has been obtained or document that good faith efforts of the bidder, in the event enough DBE participation has not been obtained, before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan documents sufficient commercially useful DBE work to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A. The Utilization Plan will not be approved by the Department if the Utilization Plan does not document sufficient DBE participation to meet the contract goal unless the apparent successful bidder documented in the Utilization Plan that it made a good faith effort to meet the goal. This means that the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts that the bidder has made. Mere *pro forma* efforts, in other words, efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

- (a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases, and will be considered by the Department.
 - (1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.
 - (2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime Contractor might otherwise prefer to perform these work items with its own forces.

- (3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.
 - b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable. In accordance with subsection (c)(6) of the above Bidding Procedures, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.
- (5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
- (6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.

- (7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.
- (b) If the Department determines that the apparent successful bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided that it is otherwise eligible for award. If the Department determines that the bidder has failed to meet the requirements of this Special Provision or that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification shall include a statement of reasons for the determination. If the Utilization Plan is not approved because it is deficient as a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no more than a five calendar day period in order to cure the deficiency.
- (c) The bidder may request administrative reconsideration of a determination adverse to the bidder within the five working days after the receipt of the notification date of the determination by delivering the request to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217) 785-1524). Deposit of the request in the United States mail on or before the fifth business day shall not be deemed delivery. The determination shall become final if a request is not made and delivered. A request may provide additional written documentation or argument concerning the issues raised in the determination statement of reasons, provided the documentation and arguments address efforts made prior to submitting the bid. The request will be forwarded to the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person in order to consider all issues of documentation and whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for consideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR Part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR Part 26.55, the provisions of which govern over the summary contained herein.

- (a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.
- (b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.
- (c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the prime Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.
- (d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contract. Credit will be given for the following:
 - (1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
 - (2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission is receives as a result of the lease arrangement.

e) DBE as a material supplier:

- (1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.
- (2) 100 percent goal credit for the cost of materials of supplies obtained from a DBE manufacturer.
- (3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a DBE regular dealer or DBE manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal. All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the DBE Participation Commitment Statement.

- (a) NO AMENDMENT. No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764. Telephone number (217) 785-4611. Telefax number (217) 785-1524.

- (b) CHANGES TO WORK. Any deviation from the DBE condition-of-award or contract plans, specifications, or special provisions must be approved, in writing, by the Department as provided elsewhere in the Contract. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract. Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A or AER 260A, must be signed and submitted. If the commitment of work is in the form of additional tasks assigned to an existing subcontract, then a new Request for Approval of Subcontractor shall not be required. However, the Contractor must document efforts to assure that the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.
- (c) SUBCONTRACT. The Contractor must provide DBE subcontracts to IDOT upon request. Subcontractors shall ensure that all lower tier subcontracts or agreements with DBEs to supply labor or materials be performed in accordance with this Special Provision.
- (d) ALTERNATIVE WORK METHODS. In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:
- (1) That the replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or
 - (2) That the DBE is aware that its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or
 - (3) That the DBE is not capable of performing the replacement work or has declined to perform the work at a reasonable competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.

- (e) TERMINATION AND REPLACEMENT PROCEDURES. The Contractor shall not terminate or replace a DBE listed on the approved Utilization Plan, or perform with other forces work designated for a listed DBE except as provided in this Special Provision. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the Department's written consent as provided in subsection (a) of this part. Unless Department consent is provided for termination of a DBE subcontractor, the Contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the DBE in the Utilization Plan.

As stated above, the Contractor shall not terminate or replace a DBE subcontractor listed in the approved Utilization Plan without prior written consent. This includes, but is not limited to, instances in which the Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Written consent will be granted only if the Bureau of Small Business Enterprises agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate or replace the DBE firm. Before transmitting to the Bureau of Small Business Enterprises any request to terminate and/or substitute a DBE subcontractor, the Contractor shall give notice in writing to the DBE subcontractor, with a copy to the Bureau, of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor shall give the DBE five days to respond to the Contractor's notice. The DBE so notified shall advise the Bureau and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Bureau should not approve the Contractor's action. If required in a particular case as a matter of public necessity, the Bureau may provide a response period shorter than five days.

For purposes of this paragraph, good cause includes the following circumstances:

- (1) The listed DBE subcontractor fails or refuses to execute a written contract;
- (2) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;

- (3) The listed DBE subcontractor fails or refuses to meet the prime Contractor's reasonable, nondiscriminatory bond requirements;
- (4) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (5) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1200 or applicable state law.
- (6) You have determined that the listed DBE subcontractor is not a responsible contractor;
- (7) The listed DBE subcontractor voluntarily withdraws from the projects and provides to you written notice of its withdrawal;
- (8) The listed DBE is ineligible to receive DBE credit for the type of work required;
- (9) A DBE owner dies or becomes disabled with the result that the listed DBE subcontractor is unable to complete its work on the contract;
- (10) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the prime Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the prime Contractor can self-perform the work for which the DBE contractor was engaged or so that the prime Contractor can substitute another DBE or non-DBE contractor after contract award.

When a DBE is terminated, or fails to complete its work on the Contract for any reason the Contractor shall make a good faith effort to find another DBE to substitute for the original DBE to perform at least the same amount of work under the contract as the terminated DBE to the extent needed to meet the established Contract goal. The good faith efforts shall be documented by the Contractor. If the Department requests documentation under this provision, the Contractor shall submit the documentation within seven days, which may be extended for an additional seven days if necessary at the request of the Contractor. The Department shall provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

- (f) PAYMENT RECORDS. The Contractor shall maintain a record of payments for work performed to the DBE participants. The records shall be made available to the Department for inspection upon request. After the performance of the final item of work or delivery of material by a DBE and final payment therefore to the DBE by the Contractor, but not later than thirty calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Agreement on Department form SBE 2115 to the Resident Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes that the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (h) of this part.
- (g) ENFORCEMENT. The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.
- (h) RECONSIDERATION. Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of "Good Faith Effort Procedures" of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

GROOVING FOR RECESSED PAVEMENT MARKINGS (BDE)

Effective: November 1, 2012

Revised: August 1, 2014

Description. This work shall consist of grooving the pavement surface in preparation for the application of recessed pavement markings.

Equipment. Equipment shall be according to the following.

- (a) Pavement Marking Tape Installations: The grooving equipment shall have a free-floating saw blade cutting head equipped with gang-stacked diamond saw blades. The diamond saw blades shall be of uniform wear and shall produce a smooth textured surface. Any ridges in the groove shall have a maximum height of 15 mils (0.38 mm).
- (b) Liquid and Thermoplastic Pavement Marking Installations: The grooving equipment shall be equipped with either a free-floating saw blade cutting head or a free-floating grinder cutting head configuration with diamond or carbide tipped cutters and shall produce an irregular textured surface.

CONSTRUCTION REQUIREMENTS

General. The Contractor shall supply the Engineer with a copy of the pavement marking material manufacturer's recommendations for constructing a groove.

Pavement Grooving Methods. The grooves for recessed pavement markings shall be constructed using the following methods.

- (a) Wet Cutting Head Operation. When water is required or used to cool the cutting head, the groove shall be flushed with high pressure water immediately following the cut to avoid build up and hardening of slurry in the groove. The pavement surface shall be allowed to dry for a minimum of 24 hours prior to the final cleaning of the groove and application of the pavement marking material.
- (b) Dry Cutting Head Operation. When used on HMA pavements, the groove shall be vacuumed or cleaned by blasting with high-pressure air to remove loose aggregate, debris, and dust generated during the cutting operation. When used on PCC pavements, the groove shall be flushed with high pressure water or shot blasted to remove any PCC particles that may have become destabilized during the grooving process. If high pressure water is used, the pavement surface shall be allowed to dry for a minimum of 24 hours prior to the final cleaning of the groove and application of the pavement marking material.

Pavement Grooving. Grooving shall not cause ravels, aggregate fractures, spalling or disturbance of the joints to the underlying surface of the pavement. Grooves shall be cut into the pavement prior to the application of the pavement marking material. Grooves shall be cut such that the width is 1 in. (25 mm) greater than the width of the pavement marking line as specified on the plans. Grooves for letters and symbols shall be cut in a square or rectangular shape so that the entire marking will fit within the limits of the grooved area. The position of the edge of the grooves shall be a minimum of 4 in. (100 mm) from the edge of all longitudinal joints. The depth of the groove shall not be less than the manufacturer's recommendations for the pavement marking material specified, but shall be installed to a minimum depth of 110 mils (2.79 mm) and a maximum depth of 200 mils (5.08 mm) for pavement marking tapes thermoplastic markings and a minimum depth of 40 mils (1.02 mm) and a maximum depth of 80 mils (2.03 mm) for liquid markings. The cutting head shall be operated at the appropriate speed in order to prevent undulation of the cutting head and grooving at an inconsistent depth.

At the start of grooving operations, a 50 ft (16.7 m) test section shall be installed and depth measurements shall be made at 10 ft (3.3 m) intervals within the test section. The individual depth measurements shall be within the allowable ranges according to this Article. If it is determined the test section has not been grooved at the appropriate depth or texture, adjustments shall be made to the cutting head and another 50 ft (16.7 m) test section shall be installed and checked. This process shall continue until the test section meets the requirements of this Article.

For new HMA pavements, grooves shall not be installed within 14 days of the placement of the final course of pavement.

Final Cleaning. Immediately prior to the application of the pavement marking material or primer sealer, the groove shall be cleaned with high-pressure air blast.

Method of Measurement. This work will be measured for payment in place, in feet (meter) for the groove width specified.

Grooving for letter, numbers and symbols will be measured in square feet (square meters).

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for GROOVING FOR RECESSED PAVEMENT MARKING of the groove width specified, and per square foot (square meter) for GROOVING FOR RECESSED PAVEMENT MARKING, LETTERS AND SYMBOLS.

The following shall only apply when preformed plastic pavement markings are to be recessed:

Add the following paragraph after the first paragraph of Article 780.07 of the Standard Specifications.

“The markings shall be capable of being applied in a grooved slot on new and existing portland cement concrete and HMA surfaces, by means of a pressure-sensitive, precoated adhesive, or liquid contact cement which shall be applied at the time of installation. A primer sealer shall be applied with a roller and shall cover and seal the entire bottom of the groove. The primer sealer shall be recommended by the manufacturer of the pavement marking material and shall be compatible with the material being used. The Contractor shall install the markings in the groove as soon as possible after the primer sealer cures according to the manufacturer’s recommendations. The markings placed in the groove shall be rolled and tamped into the groove with a roller or tamper cart cut to fit the groove and loaded with or weighing at least 200 lb (90kg). Vehicle tires shall not be used for tamping. The Contractor shall roll and tamp the material with a minimum of 6 passes to prevent easy removal or peeling.”

HOT-MIX ASPHALT - DENSITY TESTING OF LONGITUDINAL JOINTS (BDE)

Effective: January 1, 2010

Revised: April 1, 2016

Description. This work shall consist of testing the density of longitudinal joints as part of the quality control/quality assurance (QC/QA) of hot-mix asphalt (HMA). Work shall be according to Section 1030 of the Standard Specifications except as follows.

Quality Control/Quality Assurance (QC/QA). Delete the second and third sentence of the third paragraph of Article 1030.05(d)(3) of the Standard Specifications.

Add the following paragraphs to the end of Article 1030.05(d)(3) of the Standard Specifications:

“Longitudinal joint density testing shall be performed at each random density test location. Longitudinal joint testing shall be located at a distance equal to the lift thickness or a minimum of 4 in. (100 mm), from each pavement edge. (i.e. for a 5 in. (125 mm) lift the near edge of the density gauge or core barrel shall be within 5 in. (125 mm) from the edge of pavement.) Longitudinal joint density testing shall be performed using either a correlated nuclear gauge or cores.

a. Confined Edge. Each confined edge density shall be represented by a one-minute nuclear density reading or a core density and shall be included in the average of density readings or core densities taken across the mat which represents the Individual Test.

b. Unconfined Edge. Each unconfined edge joint density shall be represented by an average of three one-minute density readings or a single core density at the given density test location and shall meet the density requirements specified herein. The three one-minute readings shall be spaced 10 ft (3 m) apart longitudinally along the unconfined pavement edge and centered at the random density test location.”

Revise the Density Control Limits table in Article 1030.05(d)(4) of the Standard Specifications to read:

“Mixture Composition	Parameter	Individual Test (includes confined edges)	Unconfined Edge Joint Density Minimum
IL-4.75	Ndesign = 50	93.0 – 97.4% ^{1/}	91.0%
IL-9.5	Ndesign = 90	92.0 – 96.0%	90.0%
IL-9.5,IL-9.5L	Ndesign < 90	92.5 – 97.4%	90.0%
IL-19.0	Ndesign = 90	93.0 – 96.0%	90.0%
IL-19.0, IL-19.0L	Ndesign < 90	93.0 ^{2/} – 97.4%	90.0%
SMA	Ndesign = 50 & 80	93.5 – 97.4%	91.0%”

HOT MIX ASPHALT – QUALITY CONTROL FOR PERFORMANCE (BDE)

Effective: April 1, 2017

Revised: April 2, 2017

Description. This special provision describes the procedures for production, placement and payment of hot-mix asphalt (HMA) under the quality control for performance (QCP) program; as well as the requirements for intelligent compaction. This special provision shall apply to the HMA mixtures specified in the plans. This work shall be according to the Standard Specifications except as modified herein.

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

Definitions.

- (a) Quality Control (QC). All production and construction activities by the Contractor required to achieve the required level of quality.
- (b) Quality Assurance (QA). All monitoring and testing activities by the Engineer required to assess product quality, level of payment, and acceptability of the product.
- (c) Pay Parameters. Pay parameters shall be field voids in the mineral aggregate (Field VMA), voids, and density. Field VMA will be calculated using the combined aggregates bulk specific gravity (G_{sb}) from the mix design.
- (d) Mixture Lot. A mixture lot shall begin once an acceptable test strip has been completed and the adjusted job mix formula has been determined. If the test strip is waived, a mixture lot shall begin with the start of production. A mixture lot shall consist of four sublots unless it is the last or only lot, in which case it may consist of as few as one subplot.
- (e) Mixture Sublot. A mixture subplot for Field VMA, voids, and dust/AC shall be a maximum of 1000 tons (910 metric tons).
 - (1) If the remaining quantity is greater than 200 tons (180 metric tons) but less than 1000 tons (910 metric tons), the last mixture subplot will be that quantity.

- (2) If the remaining quantity is 200 tons (180 metric tons) or less, the quantity shall be combined with the previous mixture subplot.
- (f) Density Interval. Density intervals shall be every 0.2 miles (320 m) for lift thicknesses of 3 in. (75 mm) or less and 0.1 miles (160 m) for lift thicknesses greater than 3 in. (75 mm). If a density interval is less than 200 ft (60 m), it will be combined with the previous density interval.
- (g) Density Sublot. A density subplot shall be the average of five consecutive density intervals.
- (1) If less than three density intervals remain outside a density subplot, they shall be included in the previous density subplot.
- (2) If three or more density intervals remain, they shall be considered a density subplot.
- (h) Density Test. A density test shall consist of a core taken at a random location within each density interval.

When establishing the target density, the HMA maximum theoretical gravity (G_{mm}) shall be based on the running average of four Department test results. Initial G_{mm} shall be based on the average of the first four test results. If less than four G_{mm} results are available, an average of all available Department G_{mm} test results shall be used.

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

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

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

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

Intelligent Compaction. When a “Number of Roller Passes” is specified in the HMA Mixture Requirements table on the plans, the Contractor may opt to use intelligent compaction (IC) in lieu of density testing.

The IC equipment shall be mounted on the breakdown roller(s) and shall record GPS location data, roller pass counts, roller speeds, and HMA mat temperatures. Each day, the accuracy of the GPS and temperature data shall be verified and documented. If the verification fails or is not performed, the IC data will not be used for the affected density sublots.

The IC data for each density subplot shall be analyzed using Veta software to determine the average roller speed, percent roller coverage, and average mat surface temperature for the final roller pass. The Contractor shall submit these summary results, and if requested the raw data from the IC equipment and the data analysis software, to the Engineer within 24 hours of each day of paving using IC.

The required number of roller passes shall be as specified on the plans. The roller speeds shall be according to Article 406.07. The minimum roller coverage shall be 95 percent. The average HMA mat temperature for the final roller pass shall be according to the following table.

Asphalt Mixture Type	Temperature Range (°F (°C))
Warm Mix Asphalt	215-275 °F (102-135 °C)
IL-4.75	310-350 °F (155-175 °C)
HMA using SBS PG76-22	310-350 °F (155-175 °C)
HMA using SBS PG76-28	310-350 °F (155-175 °C)
Other HMA not listed above	260-325 °F (125-165 °C)

Quality Assurance (QA) by the Engineer. Quality Assurance by the Engineer will be as follows.

- (a) Voids, Field VMA and Dust/AC Ratio. The Engineer will determine the random tonnage and the Contractor shall be responsible for obtaining the sample according to the Department's Manual of Test Procedures for Materials "PFP Hot-Mix Asphalt Random Jobsite Sampling Procedure".
- (b) Density: After final rolling, the Engineer will identify the random core locations within each density testing interval according to the Department's Manual of Test Procedures for Materials "PFP and QCP Random Density Procedure".

The Contractor shall cut the 4 in. (100 mm) cores within the same day and prior to opening to traffic unless otherwise approved by the Engineer. All core holes shall be filled immediately upon completion of coring. All water shall be removed from the core holes prior to filling. All core holes shall be filled with a rapid hardening mortar or concrete which shall be mixed in a separate container prior to placement in the hole. Any depressions in the surface of the filled core holes greater than 1/4 in. (6 mm) at the time of final inspection will require removal of the fill material to the depth of the lift thickness and replacement.

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

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

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

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

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

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

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

1/ Based on minimum required VMA from mix design

2/ Does not apply to SMA.

3/ Acceptable density limits for IL-9.5FG placed less than 1 1/4 in. (32 mm) shall be 89.0% - 98.0%

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

Basis of Payment. Payment will be based on the calculation of the composite pay factor using QA test results for each mixture according to the Department's Manual of Test Procedures for Materials "QCP Pay Calculation" document.

If intelligent compaction is successfully implemented, the Contractor will receive 100 percent for the density pay factor in Equation 1 of the "QCP Pay Calculation" document for each applicable HMA mixture; otherwise, the density tests and pay adjustments will apply. The pay factor for each density subplot will be based upon either intelligent compaction or density tests and the two will not be mixed.

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

Dust/AC Pay Adjustment Table ^{1/}	
Range	Deduct / subplot
$0.6 \leq X \leq 1.2$	\$0
$0.5 \leq X < 0.6$ or $1.2 < X \leq 1.4$	\$1000
$0.4 \leq X < 0.5$ or $1.4 < X \leq 1.6$	\$3000
$X < 0.4$ or $X > 1.6$	Shall be removed and replaced

1/ Does not apply to SMA.

HOT-MIX ASPHALT – TACK COAT (BDE)

Effective: November 1, 2016

Revise Article 1032.06(a) of the Standard Specifications to read:

“(a) Anionic Emulsified Asphalt. Anionic emulsified asphalts shall be according to AASHTO M 140. SS-1h emulsions used as a tack coat shall have the cement mixing test waived.”

LIGHT TOWER (BDE)

Effective: July 1, 2016

Revise the third paragraph of Article 1069.08 of the Standard Specifications to read:

“The design shall be based upon AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” in effect on the date of invitation for bids, however the width of reinforced opening requirement in Chapter 5, Section 5.6.6.1 shall not apply. Light Towers shall be designed for ADT > 10,000, Risk Category Typical, and Fatigue Importance Category I.”

PAVEMENT MARKING BLACKOUT TAPE (BDE)

Effective: November 1, 2014

Revised: April 1, 2016

Revise the fourth paragraph of Article 701.04 of the Standard Specifications to read:

“The traffic control shall remain in place only as long as needed and shall be removed when directed by the Engineer. Signs that do not apply to current conditions shall be removed, covered, or turned from the view of motorists. All existing pavement markings which conflict with the revised traffic pattern shall be removed according to Section 783 or when specified, temporarily covered with pavement marking blackout tape. The width of blackout tape shall be at least 1 in. (25 mm) wider than the width of the pavement marking being covered. The removing or covering of existing markings shall be scheduled immediately to facilitate the revised traffic pattern. If darkness or inclement weather prohibits the removal or covering operations, such operations shall be resumed the next morning or when weather permits.”

Revise Article 701.19(f) of the Standard Specifications to read:

“(f) Removal of existing pavement markings and raised reflective pavement markers will be measured for payment according to Article 783.05. Temporary covering of existing pavement markings with blackout tape will be measured for payment in feet (meters) in place. Removal of blackout tape will be measured for payment in square feet (square meters).”

Revise Article 701.20(j) of the Standard Specifications to read:

“(j) Removal of existing pavement markings and raised reflective pavement markers will be paid for according to Article 783.06. Temporary covering of existing pavement markings with blackout tape will be paid for at the contract unit price per foot for PAVEMENT MARKING BLACKOUT TAPE, of the line width specified.” Removal of blackout tape will be paid for as short term pavement marking removal according to Article 703.07.”

Revise the first two paragraphs of Article 1095.06 of the Standard Specifications to read:

“**1095.06 Pavement Marking Tape.** White or yellow marking tape shall consist of glass spheres of high optical quality embedded into a binder on a suitable 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. Blackout marking tape shall be a Type III tape consisting of a matte black, non-reflective, patterned surface that is precoated with a pressure sensitive adhesive. The surface of the blackout pavement marking tape shall provide a minimum skid resistance value of 45 BPN when tested according to ASTM E 303-74.

The material shall be white, yellow, or matte black as specified. White and yellow colors shall conform closely to Federal color tolerances for pavement marking paint.”

Revise the second table of Article 1095.06 to read:

“Test	Type I		Type III		
	White	Yellow	White	Yellow	Blackout
Initial Thickness, mils (mm)	20 (0.51)	20 (0.51)	20 (0.51)	20 (0.51)	65 (1.65) ^{1/} 10 (0.25) ^{2/}
Durability (cycles)	5,000	5,000	1,500	1,500	1,500

Notes:

- 1/ Measured at the thickest point of the patterned surface.
- 2/ Measured at the thinnest point of the patterned surface.”

PAVEMENT MARKING REMOVAL (BDE)

Effective: July 1, 2016

Revise Article 783.02 of the Standard Specifications to read:

“783.02 Equipment. Equipment shall be according to the following.

Item	Article/Section
(a) Grinders (Note 1)	
(b) Water Blaster with Vacuum Recovery	1101.12

Note 1. Grinding equipment shall be approved by the Engineer.”

Revise the first paragraph of Article 783.03 of the Standard Specifications to read:

“783.03 Removal of Conflicting Markings. Existing pavement markings that conflict with revised traffic patterns shall be removed. If darkness or inclement weather prohibits the removal operations, such operations shall be resumed the next morning or when weather permits. In the event of removal equipment failure, such equipment shall be repaired, replaced, or leased so removal operations can be resumed within 24 hours.”

Revise the first and second sentences of the first paragraph of Article 783.03(a) of the Standard Specifications to read:

“The existing pavement markings shall be removed by the method specified and in a manner that does not materially damage the surface or texture of the pavement or surfacing. Small particles of tightly adhering existing markings may remain in place, if in the opinion of the Engineer, complete removal of the small particles will result in pavement surface damage.”

Revise the first paragraph of Article 783.04 of the Standard Specifications to read:

“783.04 Cleaning. The roadway surface shall be cleaned of debris or any other deleterious material by the use of compressed air or water blast.”

Revise the first paragraph of Article 783.06 of the Standard Specifications to read:

“783.06 Basis of Payment. This work will be paid for at the contract unit price per each for RAISED REFLECTIVE PAVEMENT MARKER REMOVAL, or at the contract unit price per square foot (square meter) for PAVEMENT MARKING REMOVAL – GRINDING and/or PAVEMENT MARKING REMOVAL – WATER BLASTING.”

Delete Article 1101.13 from the Standard Specifications.

PORTABLE CHANGEABLE MESSAGE SIGNS (BDE)

Effective: November 1, 2016

Revised: April 1, 2017

Revise the second paragraph of Article 701.20(h) of the Standard Specifications to read:

“For all other portable changeable message signs, this work will be paid for at the contract unit price per calendar day for each sign as CHANGEABLE MESSAGE SIGN.”

Revise this second sentence of the first paragraph of Article 1106.02(i) of the Standard Specifications to read:

“The message panel shall be a minimum of 7 ft (2.1 m) above the edge of pavement in urban areas and a minimum of 5 ft (1.5 m) above the edge of pavement in rural areas, present a level appearance, and be capable of displaying up to eight characters in each of three lines at a time.”

PORTLAND CEMENT CONCRETE SIDEWALK (BDE)

Effective: August 1, 2017

Revise the first paragraph of Article 424.12 of the Standard Specifications to read:

“424.12 Method of Measurement. This work will be measured for payment in place and the area computed in square feet (square meters). Curb ramps, including side curbs and side flares, will be measured for payment as sidewalk. No deduction will be made for detectable warnings located within the ramp.”

PROGRESS PAYMENTS (BDE)

Effective: November 2, 2013

Revise Article 109.07(a) of the Standard Specifications to read:

- “(a) Progress Payments. At least once each month, the Engineer will make a written estimate of the quantity of work performed in accordance with the contract, and the value thereof at the contract unit prices. The amount of the estimate approved as due for payment will be vouchered by the Department and presented to the State Comptroller for payment. No amount less than \$1000.00 will be approved for payment other than the final payment.

Progress payments may be reduced by liens filed pursuant to Section 23(c) of the Mechanics’ Lien Act, 770 ILCS 60/23(c).

If a Contractor or subcontractor has defaulted on a loan issued under the Department’s Disadvantaged Business Revolving Loan Program (20 ILCS 2705/2705-610), progress payments may be reduced pursuant to the terms of that loan agreement. In such cases, the amount of the estimate related to the work performed by the Contractor or subcontractor, in default of the loan agreement, will be offset, in whole or in part, and vouchered by the Department to the Working Capital Revolving Fund or designated escrow account. Payment for the work shall be considered as issued and received by the Contractor or subcontractor on the date of the offset voucher. Further, the amount of the offset voucher shall be a credit against the Department’s obligation to pay the Contractor, the Contractor’s obligation to pay the subcontractor, and the Contractor’s or subcontractor’s total loan indebtedness to the Department. The offset shall continue until such time as the entire loan indebtedness is satisfied. The Department will notify the Contractor and Fund Control Agent in a timely manner of such offset. The Contractor or subcontractor shall not be entitled to additional payment in consideration of the offset.

The failure to perform any requirement, obligation, or term of the contract by the Contractor shall be reason for withholding any progress payments until the Department determines that compliance has been achieved.”

STEEL PLATE BEAM GUARDRAIL (BDE)

Effective: January 1, 2017

Revise Article 630.02 of the Standard Specifications to read:

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

Item	Article/Section
(a) Steel Plate Beam Guardrail	1006.25
(b) Wood Posts and Wood Block	1007.01, 1007.02, 1007.06
(c) Steel Posts, Blockouts, Restraints and Wire Rope for Guardrail	1006.23
(d) Preservative Treatment	1007.12
(e) Reinforcement Bars	1006.10
(f) Plastic Blockouts (Note 1)	
(g) Chemical Adhesive Resin System	1027.01
(h) Controlled Low-Strength Material (CLSM)	1019

Note 1. Plastic blockouts may be used in lieu of wood blockouts for steel plate beam guardrail. The plastic blockouts shall be the minimum dimensions shown on the plans and shall be on the Department’s qualified product list.”

Revise Article 630.05 of the Standard Specifications to read:

“**630.05 Posts.** Posts shall be as follows.

- (a) Wood Posts. Wood posts and blocks shall be treated. The posts and blocks shall be cut to the proper dimensions before treatment. No cutting of the posts or blocks will be permitted after treatment. Posts shall be erected according to Article 634.05.
- (b) Steel Posts. Steel posts may be driven by hand or mechanical methods provided they are protected by a suitable driving cap and the earth around the posts compacted, if necessary, after driving. When steel posts are driven to incorrect alignment or grade, they shall be removed and set according to Article 634.05.

When it is necessary to shorten the posts in the field, the lower portion shall be cut off in a manner to provide a smooth cut with minimum damage to the galvanizing. Cut areas shall be repaired according to the requirements of AASHTO M 36.”

Revise Article 630.06 of the Standard Specifications to read:

“630.06 Shoulder Stabilization at Guardrail. Shoulder stabilization shall be constructed at the locations of steel plate beam guardrail installation according to the details shown on the plans. On new construction projects, the material used in the shoulder stabilization shall be the same as that used in the adjacent paved shoulder. On shoulder resurfacing projects, the material used in the shoulder stabilization shall be the same as that used for the shoulder resurfacing.

When portland cement concrete is used, shoulder stabilization shall be constructed according to the applicable portions of Section 483. The shoulder stabilization shall be constructed simultaneously with the adjacent portland cement concrete shoulder. Guardrail posts shall be driven through leaveouts or holes cored in the completed shoulder stabilization. The void around each post shall be backfilled with earth or aggregate and capped with hot-mix asphalt (HMA) or CLSM.

When HMA is used, shoulder stabilization shall be constructed according to the applicable portions of Section 482. On new construction, the shoulder stabilization shall be constructed simultaneously with the HMA shoulder. On shoulder resurfacing projects, the portion of the shoulder stabilization below the surface of the existing paved shoulder shall be placed and compacted separately. The guardrail posts shall be driven through holes cored in the completed shoulder stabilization. The void around each post shall be backfilled with earth or aggregate and capped with HMA or CLSM.

When driving guardrail posts through existing shoulders, shoulder stabilization, or other paved areas, the posts shall be driven through cored holes. The void around each post shall be backfilled with earth or aggregate and capped with HMA or CLSM.”

Revise Article 630.08 of the Standard Specifications to read:

“630.08 Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for NON-BLOCKED STEEL PLATE BEAM GUARDRAIL; STEEL PLATE BEAM GUARDRAIL, TYPE A, 6 FOOT (1.83 M) POSTS; STEEL PLATE BEAM GUARDRAIL, TYPE A, 9 FOOT (2.74 M) POSTS; STEEL PLATE BEAM GUARDRAIL, TYPE B, 6 FOOT (1.83 M) POSTS; STEEL PLATE BEAM GUARDRAIL, TYPE B, 9 FOOT (2.74 M) POSTS; or STEEL PLATE BEAM GUARDRAIL, TYPE D, 6 FOOT (1.83 M) POSTS.

When end sections are specified, they will not be paid for as a separate item, but shall be considered as included in the unit price for steel plate beam guardrail.

Steel plate beam guardrail mounted on existing culverts will be paid for at the contract unit price per foot (meter) for STRONG POST GUARDRAIL ATTACHED TO CULVERT or WEAK POST GUARDRAIL ATTACHED TO CULVERT, of the case specified.

Portland cement concrete shoulder stabilization at guardrail will be paid for according to Article 483.10.

HMA shoulder stabilization at guardrail will be paid for according to Article 482.08.

Excavation in rock will be paid for according to Article 502.13.

Steel plate beam guardrail incorporating long-span spacing will be paid for at the contract unit price per foot (meter) for LONG-SPAN GUARDRAIL OVER CULVERT, 12 FT 6 IN (3.8 M) SPAN; LONG-SPAN GUARDRAIL OVER CULVERT, 18 FT 9 IN (5.7 M) SPAN; or LONG-SPAN GUARDRAIL OVER CULVERT, 25 FT (7.6 M) SPAN.

Steel plate beam guardrail incorporating treated timber at the back side of the post will be paid for at the contract unit price per foot (meter) for BACK SIDE PROTECTION OF GUARDRAIL.”

SURFACE TESTING OF HOT-MIX ASPHALT OVERLAYS (BDE)

Effective: January 1, 2013

Revised: April 1, 2016

Revise Article 406.03(h) of the Standard Specifications to read:

“(h) Pavement Surface Test Equipment 1101.10”

Revise Article 406.11 of the Standard Specifications to read:

“**406.11 Surface Tests.** The finished surface of the pavement shall be tested for smoothness according to Article 407.09, except as follows:

One wheel track shall be tested per lane. Testing shall be performed 3 ft (1 m) from and parallel to the edge of the lane away from traffic.

SMOOTHNESS ASSESSMENT SCHEDULE (HMA Overlays)		
High-Speed Mainline Pavement Average Profile Index in./mile (mm/km)	Low-Speed Mainline Pavement Average Profile Index in./mile (mm/km)	Assessment per subplot
6.0 (95) or less	15.0 (240) or less	+\$150.00
>6.0 (95) to 10.0 (160)	>15.0 (240) to 25.0 (400)	+\$80.00
>10.0 (160) to 30.0 (475)	>25.0 (400) to 45.0 (710)	+\$0.00
>30.0 (475) to 40.0 (635)	>45.0 (710) to 65.0 (1025)	+\$0.00
Greater than 40.0 (635)	Greater than 65.0 (1025)	-\$300.00”

TRAINING SPECIAL PROVISIONS (BDE)

Effective: October 15, 1975

This Training Special Provision supersedes Section 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," and is in implementation of 23 U.S.C. 140(a).

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade or job classification involved. The number of trainees to be trained under this contract will be 4. In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within the reasonable area of recruitment. Prior to commencing construction, the Contractor shall submit to the Illinois Department of Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g. by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the Illinois Department of Transportation and the Federal Highway Administration. The Illinois Department of Transportation and the Federal Highway Administration shall approve a program, if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved by not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Illinois Department of Transportation and the Federal Highway Administration. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirement of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program.

It is not required that all trainees be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The Contractor shall provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

Method of Measurement. The unit of measurement is in hours.

Basis of Payment. This work will be paid for at the contract unit price of 80 cents per hour for TRAINEES. The estimated total number of hours, unit price, and total price have been included in the schedule of prices.

IDOT TRAINING PROGRAM GRADUATE ON-THE-JOB TRAINING SPECIAL PROVISION

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 4 .

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.

WARM MIX ASPHALT (BDE)

Effective: January 1, 2012

Revised: April 1, 2016

Description. This work shall consist of designing, producing and constructing Warm Mix Asphalt (WMA) in lieu of Hot Mix Asphalt (HMA) at the Contractor's option. Work shall be according to Sections 406, 407, 408, 1030, and 1102 of the Standard Specifications, except as modified herein. In addition, any references to HMA in the Standard Specifications, or the special provisions shall be construed to include WMA.

WMA is an asphalt mixture which can be produced at temperatures lower than allowed for HMA utilizing approved WMA technologies. WMA technologies are defined as the use of additives or processes which allow a reduction in the temperatures at which HMA mixes are produced and placed. WMA is produced by the use of additives, a water foaming process, or combination of both. Additives include minerals, chemicals or organics incorporated into the asphalt binder stream in a dedicated delivery system. The process of foaming injects water into the asphalt binder stream, just prior to incorporation of the asphalt binder with the aggregate.

Approved WMA technologies may also be used in HMA provided all the requirements specified herein, with the exception of temperature, are met. However, asphalt mixtures produced at temperatures in excess of 275 °F (135 °C) will not be considered WMA when determining the grade reduction of the virgin asphalt binder grade.

Equipment.

Revise the first paragraph of Article 1102.01 of the Standard Specifications to read:

“1102.01 Hot-Mix Asphalt Plant. The hot-mix asphalt (HMA) plant shall be the batch-type, continuous-type, or dryer drum plant. The plants shall be evaluated for prequalification rating and approval to produce HMA according to the current Bureau of Materials and Physical Research Policy Memorandum, “Approval of Hot-Mix Asphalt Plants and Equipment”. Once approved, the Contractor shall notify the Bureau of Materials and Physical Research to obtain approval of all plant modifications. The plants shall not be used to produce mixtures concurrently for more than one project or for private work unless permission is granted in writing by the Engineer. The plant units shall be so designed, coordinated and operated that they will function properly and produce HMA having uniform temperatures and compositions within the tolerances specified. The plant units shall meet the following requirements.”

Add the following to Article 1102.01(a) of the Standard Specifications.

“(11) Equipment for Warm Mix Technologies.

- a. Foaming. Metering equipment for foamed asphalt shall have an accuracy of ± 2 percent of the actual water metered. The foaming control system shall be electronically interfaced with the asphalt binder meter.
- b. Additives. Additives shall be introduced into the plant according to the supplier’s recommendations and shall be approved by the Engineer. The system for introducing the WMA additive shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all rates of production and batch sizes.”

Mix Design Verification.

Add the following to Article 1030.04 of the Standard Specifications.

“(e) Warm Mix Technologies.

- (1) Foaming. WMA mix design verification will not be required when foaming technology is used alone (without WMA additives). However, the foaming technology shall only be used on HMA designs previously approved by the Department.
- (2) Additives. WMA mix designs utilizing additives shall be submitted to the Engineer for mix design verification.”

Construction Requirements.

Revise the second paragraph of Article 406.06(b)(1) of the Standard Specifications to read:

“The HMA shall be delivered at a temperature of 250 to 350 °F (120 to 175 °C).
WMA shall be delivered at a minimum temperature of 215 °F (102 °C).”

Basis of Payment.

This work will be paid at the contract unit price bid for the HMA pay items involved. Anti-strip will not be paid for separately, but shall be considered as included in the cost of the work.

WEEKLY DBE TRUCKING REPORTS (BDE)

Effective: June 2, 2012

Revised: April 2, 2015

The Contractor shall submit a weekly report of Disadvantaged Business Enterprise (DBE) trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) that are used for DBE goal credit.

The report shall be submitted to the Engineer on Department form "SBE 723" within ten business days following the reporting period. The reporting period shall be Monday through Sunday for each week reportable trucking activities occur.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

BITUMINOUS MATERIALS COST ADJUSTMENTS (BDE)

Effective: November 2, 2006

Revised: August 1, 2017

Description. Bituminous material cost adjustments will be made to provide additional compensation to the Contractor, or credit to the Department, for fluctuations in the cost of bituminous materials when optioned by the Contractor. The bidder shall indicate with their bid whether or not this special provision will be part of the contract.

The adjustments shall apply to permanent and temporary hot-mix asphalt (HMA) mixtures, bituminous surface treatments (cover and seal coats), and preventative maintenance type surface treatments that are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply to bituminous prime coats, tack coats, crack filling/sealing, joint filling/sealing, or extra work paid for at a lump sum price or by force account.

Method of Adjustment. Bituminous materials cost adjustments will be computed as follows.

$$CA = (BPI_P - BPI_L) \times (\%AC_V / 100) \times Q$$

- Where: CA = Cost Adjustment, \$.
BPI_P = Bituminous Price Index, as published by the Department for the month the work is performed, \$/ton (\$/metric ton).
BPI_L = Bituminous Price Index, as published by the Department for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price, \$/ton (\$/metric ton).
%AC_V = Percent of virgin Asphalt Cement in the Quantity being adjusted. For HMA mixtures, the % AC_V will be determined from the adjusted job mix formula. For bituminous materials applied, a performance graded or cutback asphalt will be considered to be 100% AC_V and undiluted emulsified asphalt will be considered to be 65% AC_V.
Q = Authorized construction Quantity, tons (metric tons) (see below).

For HMA mixtures measured in square yards: $Q, \text{ tons} = A \times D \times (G_{mb} \times 46.8) / 2000$. For HMA mixtures measured in square meters: $Q, \text{ metric tons} = A \times D \times (G_{mb} \times 1) / 1000$. When computing adjustments for full-depth HMA pavement, separate calculations will be made for the binder and surface courses to account for their different G_{mb} and % AC_V.

For bituminous materials measured in gallons: $Q, \text{ tons} = V \times 8.33 \text{ lb/gal} \times SG / 2000$
For bituminous materials measured in liters: $Q, \text{ metric tons} = V \times 1.0 \text{ kg/L} \times SG / 1000$

- Where: A = Area of the HMA mixture, sq yd (sq m).
D = Depth of the HMA mixture, in. (mm).
G_{mb} = Average bulk specific gravity of the mixture, from the approved mix design.
V = Volume of the bituminous material, gal (L).
SG = Specific Gravity of bituminous material as shown on the bill of lading.

Basis of Payment. Bituminous materials cost adjustments may be positive or negative but will only be made when there is a difference between the BPI_L and BPI_P in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(BPI_L - BPI_P) \div BPI_L\} \times 100$$

Bituminous materials cost adjustments will be calculated for each calendar month in which applicable bituminous material is placed; and will be paid or deducted when all other contract requirements for the work placed during the month are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

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.

STEEL COST ADJUSTMENT (BDE)

Effective: April 2, 2004

Revised: August 1, 2017

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, mesh reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), and frames and grates will be subject to a steel cost adjustment when the pay items they are used in have a contract value of \$10,000 or greater.

The adjustments shall apply to the above items when they are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply when the item is added as extra work and paid for at a lump sum price or by force account.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

- (a) The dates and quantity of steel, in lb (kg), shipped from the mill to the fabricator.
- (b) The quantity of steel, in lb (kg), incorporated into the various items of work covered by this special provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment. Steel cost adjustments will be computed as follows:

$$SCA = Q \times D$$

Where: SCA = steel cost adjustment, in dollars
Q = quantity of steel incorporated into the work, in lb (kg)
D = price factor, in dollars per lb (kg)

$$D = MPI_M - MPI_L$$

Where: MPI_M = The Materials Cost Index for steel as published by the Engineering News-Record for the month the steel is shipped from the mill. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

MPI_L = The Materials Cost Index for steel as published by the Engineering News-Record for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price,. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

The unit weights (masses) of steel that will be used to calculate the steel cost adjustment for the various items are shown in the attached table.

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the letting date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the MPI_M will be based on the date the steel arrives at the job site. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment. Steel cost adjustments may be positive or negative but will only be made when there is a difference between the MPI_L and MPI_M in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(\text{MPI}_L - \text{MPI}_M) \div \text{MPI}_L\} \times 100$$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Attachment

Item	Unit Mass (Weight)
Metal Piling (excluding temporary sheet piling)	
Furnishing Metal Pile Shells 12 in. (305 mm), 0.179 in. (3.80 mm) wall thickness)	23 lb/ft (34 kg/m)
Furnishing Metal Pile Shells 12 in. (305 mm), 0.250 in. (6.35 mm) wall thickness)	32 lb/ft (48 kg/m)
Furnishing Metal Pile Shells 14 in. (356 mm), 0.250 in. (6.35 mm) wall thickness)	37 lb/ft (55 kg/m)
Other piling	See plans
Structural Steel	See plans for weights (masses)
Reinforcing Steel	See plans for weights (masses)
Dowel Bars and Tie Bars	6 lb (3 kg) each
Mesh Reinforcement	63 lb/100 sq ft (310 kg/sq m)
Guardrail	
Steel Plate Beam Guardrail, Type A w/steel posts	20 lb/ft (30 kg/m)
Steel Plate Beam Guardrail, Type B w/steel posts	30 lb/ft (45 kg/m)
Steel Plate Beam Guardrail, Types A and B w/wood posts	8 lb/ft (12 kg/m)
Steel Plate Beam Guardrail, Type 2	305 lb (140 kg) each
Steel Plate Beam Guardrail, Type 6	1260 lb (570 kg) each
Traffic Barrier Terminal, Type 1 Special (Tangent)	730 lb (330 kg) each
Traffic Barrier Terminal, Type 1 Special (Flared)	410 lb (185 kg) each
Steel Traffic Signal and Light Poles, Towers and Mast Arms	
Traffic Signal Post	11 lb/ft (16 kg/m)
Light Pole, Tenon Mount and Twin Mount, 30 - 40 ft (9 - 12 m)	14 lb/ft (21 kg/m)
Light Pole, Tenon Mount and Twin Mount, 45 - 55 ft (13.5 - 16.5 m)	21 lb/ft (31 kg/m)
Light Pole w/Mast Arm, 30 - 50 ft (9 - 15.2 m)	13 lb/ft (19 kg/m)
Light Pole w/Mast Arm, 55 - 60 ft (16.5 - 18 m)	19 lb/ft (28 kg/m)
Light Tower w/Luminaire Mount, 80 - 110 ft (24 - 33.5 m)	31 lb/ft (46 kg/m)
Light Tower w/Luminaire Mount, 120 - 140 ft (36.5 - 42.5 m)	65 lb/ft (97 kg/m)
Light Tower w/Luminaire Mount, 150 - 160 ft (45.5 - 48.5 m)	80 lb/ft (119 kg/m)
Metal Railings (excluding wire fence)	
Steel Railing, Type SM	64 lb/ft (95 kg/m)
Steel Railing, Type S-1	39 lb/ft (58 kg/m)
Steel Railing, Type T-1	53 lb/ft (79 kg/m)
Steel Bridge Rail	52 lb/ft (77 kg/m)
Frames and Grates	
Frame	250 lb (115 kg)
Lids and Grates	150 lb (70 kg)

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor

performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection

for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#).

The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the

employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates

(expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular

programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this

section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential

that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction.

The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal

Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension,

continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

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.

Contract Provision - Cargo Preference Requirements

In accordance with Title 46 CFR § 381.7 (b), the contractor agrees—

“(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.”

Provisions (1) and (2) apply to materials or equipment that are acquired solely for the project. The two provisions do not apply to goods or materials that come into inventories independent of the project, such as shipments of Portland cement, asphalt cement, or aggregates, when industry suppliers and contractors use these materials to replenish existing inventories.

**MINIMUM WAGES FOR FEDERAL AND FEDERALLY
ASSISTED CONSTRUCTION CONTRACTS**

This project is funded, in part, with Federal-aid funds and, as such, is subject to the provisions of the Davis-Bacon Act of March 3, 1931, as amended (46 Sta. 1494, as amended, 40 U.S.C. 276a) and of other Federal statutes referred to in a 29 CFR Part 1, Appendix A, as well as such additional statutes as may from time to time be enacted containing provisions for the payment of wages determined to be prevailing by the Secretary of Labor in accordance with the Davis-Bacon Act and pursuant to the provisions of 29 CFR Part 1. The prevailing rates and fringe benefits shown in the General Wage Determination Decisions issued by the U.S. Department of Labor shall, in accordance with the provisions of the foregoing statutes, constitute the minimum wages payable on Federal and federally assisted construction projects to laborers and mechanics of the specified classes engaged on contract work of the character and in the localities described therein.

General Wage Determination Decisions, modifications and supersedes decisions thereto are to be used in accordance with the provisions of 29 CFR Parts 1 and 5. Accordingly, the applicable decision, together with any modifications issued, must be made a part of every contract for performance of the described work within the geographic area indicated as required by an applicable DBRA Federal prevailing wage law and 29 CFR Part 5. The wage rates and fringe benefits contained in the General Wage Determination Decision shall be the minimum paid by contractors and subcontractors to laborers and mechanics.