

2X

FOR REVIEW AND INSPECTION ONLY
Letting June 13, 2025

Notice to Bidders, Specifications and Proposal



**Contract No. 64C24
WINNEBAGO County
Section (201-3)R&(4-1,5)R
Route FAI 39,FAP 301
Project # NHPP-5F4Z(497)
District 2 Construction Funds**

Prepared by

F

Checked by



**Illinois Department
of Transportation**

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 12:00 p.m. June 13, 2025 at which time the bids will be publicly opened from the iCX SecureVault.
- 2. DESCRIPTION OF WORK.** The proposed improvement is identified and advertised REVIEW AND INSPECTION ONLY in the Invitation for Bids as:

**Contract No. 64C24
WINNEBAGO County
Section (201-3)R&(4-1,5)R
NHPP-5F4Z(497)
Route FAI 39,FAP 301
District 2 Construction Funds**

2.09 miles of reconstruction of I-39/US 20 from 0.3 mile east of Mulford Rd to 0.2 mile north of Harrison Ave.

By Order of the
Illinois Department of Transportation

Gia Biagi,
Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2025

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

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 1-1-22) (Revised 1-1-25)

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STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the “Standard Specifications for Road and Bridge Construction, adopted January 1, 2022”, the latest edition of the “Manual on Uniform Traffic Control Devices for Streets and Highways”, and the “Manual of Test Procedures for Materials” in effect on the date of invitation for bids, and the “Supplemental Specifications and Recurring Special Provisions” indicated on the Check Sheet included herein, which apply to and govern the construction of FAI Route 39 (I-39) & FAP Route 301 (US 20), Project NHPP-5F4Z(497), Section (201-3)R & (4-1,5)R, Winnebago County, Contract No. 64C24 and in case of conflict with any part, or parts, of said Specifications, the said Special Provisions shall take precedence and shall govern.

LOCATION OF PROJECT

This project location starts near the interchange of I-39 (FAI Route 39) and US 20 (FAP Route 301), approximately 3.9 miles north of the I-39 and Baxter Road interchange on I-39 and ends just past the interchange of I-39 (FAI Route 39) and Harrison Avenue/US 20 (FAP Route 301), approximately 0.7 miles south of the I-39/I-90 interchange on I-39, T43N & T44N, R2E, sections 16, 9, 10, 11, 3, 2, 35, and 36 in Cherry Valley Township, in Winnebago County, IL.

DESCRIPTION OF PROJECT

This project consists of the reconstruction of I-39 from approximately 0.3 miles north of Mulford Road to 0.2 miles north of Harrison Avenue. The project also consists of Harrison Avenue improvements under the I-39 bridge. Structural work for this project includes the installation of 6 new bridges, removal of 6 existing bridges, installation of Cherry Valley Path Tunnel, removal and replacement of the Madigan Creek culvert, installation of noisewalls along Ramp AD and I-39, and removal and replacement of an existing noisewall along Ramp DB.

Structure Location	Existing Structure No.	Proposed Structure No.
NB I-39 over CNRR	SN 101-0067	SN 101-0208
SB I-39 over CNRR	SN 101-0068	SN 101-0209
NB I-39 over UPRR	SN 101-0070	SN 101-0211
SB I-39 over UPRR	SN 101-0069	SN 101-0210
NB I-39 over Harrison Avenue	SN 101-0071	SN 101-0213
SB I-39 over Harrison Avenue	SN 101-0072	SN 101-0214
Ramp AD Noisewall (NAW 20)	N/A	SN 101-N7009
Ramp DB Noisewall (NAW 16-18)	N/A	SN 101-N7010
I-39 Noisewall (NAW 8-10)	N/A	SN 101-N7011
Madigan Creek Culvert	N/A	SN 101-2053
Cherry Valley Path Tunnel	N/A	SN 101-1360

Improvements consist of, but are not limited, to the following:

- I-39/US 20 – reconstruction and adding lanes from 0.3 miles north of Mulford Road to 0.2 miles north of Harrison Avenue
 - Pavement removal
 - Shoulder removal
 - Approach slab removal
 - Impact attenuator removal
 - Guardrail removal
 - CRC pavement
 - PCC shoulders
 - Lug systems
 - Median barrier wall
 - Closed median drainage
 - Median lighting
 - Impact attenuators
 - Guardrail placement
- Ramps B and D at 64R71 – reconstruction near gore areas
 - Pavement removal
 - Shoulder removal
 - PCC pavement
 - PCC shoulders
- Harrison Avenue – reconstruction of inside lanes and shared-use path near bridge piers
 - Pavement removal
 - Impact attenuator removal
 - PCC pavement
 - Curb and gutter
 - Shared-Use path pavement
 - Impact attenuators
 - Median surface
 - Guardrail placement

The project also includes earthwork, ditch grading, stockpile grading, traffic control, lighting, erosion and sediment control, landscaping, pavement marking, signing, proposed sign trusses, removal and construction of new bridges, culverts, path tunnel, drainage removal and proposed drainage, subsurface drainage and other associated items necessary to complete the project as shown in the Plans and described herein.

COMPLETION DATE PLUS WORKING DAYS

Revise Article 108.05(b) of the Standard Specifications to read:

“(b) Completion Date Plus Working Days. When a completion date plus working days is specified, the Contractor shall complete all contract items to safely open all roadways to traffic by 11:59 p.m. on or prior to **Friday, October 13, 2028**, except as specified herein.

The Contractor will be allowed 30 working days after the completion date for opening the roadway to traffic to complete clean-up work, ground mount signs on steel work, and punch list items. Miscellaneous items may be completed within the working days allowed for clean-up work and punch list items if approved by the Engineer. Temporary lane closures for this work (adhering to the restrictions set forth in the TRAFFIC CONTROL PLAN) may be allowed at the discretion of the Engineer.”

INTERIM COMPLETION TIME RESTRICTION – RAMP DB NOISEWALL (SN 101-N7010)

The Contractor must place the new noisewall within 60 calendar days of the start of demolition of the existing walls. The calendar days restriction shall begin when any portion or element of the existing wall is removed. The new wall must be in place at the end of the calendar days restriction. The calendar days restriction shall end when all panels of the new wall are in place.

INTERIM COMPLETION TIME RESTRICTION – RAMP AD NOISEWALL (SN 101-N7009)

The Contractor must place the new noisewall within 60 calendar days of the start of construction of the new wall. The calendar days restriction shall begin when any portion or element of the proposed wall is started. The new wall must be in place at the end of the calendar days restriction. The calendar days restriction shall end when all panels of the new wall are in place.

INTERIM COMPLETION DATE – RAMP DB (SN 101-N7010) AND RAMP AD (SN 101-N7009)

The Ramp DB and Ramp AD proposed noisewalls shall be in place on or before 11:59PM Friday, November 20, 2026. Proposed noise walls shall be considered complete when all panels of the new walls are in place.

The work associated with the proposed Ramp DB and Ramp AD noise walls shall be as shown in the plans.

START DATE – STAGE 1

The Contractor shall not place the traffic configuration for Stage 1 on or before 12:01AM Monday, March 16, 2026. These work restrictions will be valid in order to not have traffic in a staged configuration over the Winter of 2025.

Offline construction may proceed where traffic control is not required for the work.

START DATE – STAGE 1B AT CHERRY VALLEY PATH AND MADIGAN CREEK

The Contractor shall not close the existing Cherry Valley Path tunnel along Madigan Creek or restrict access to the Cherry Valley Path on or before 12:01AM Monday, July 6, 2026 and until the sidewalk constructed by Contract 64R72 on the west side of Mill Road from US 20 to E. State Street is open and operational, including the connection to the existing path in the northwest corner at US 20/Mill Road.

The Contractor may elect to install the Stage 1B traffic configuration on I-39 prior to the start date for Cherry Valley Path and Madigan Creek while maintaining full public access to the Cherry Valley Path tunnel.

The work associated with the Stage 1B shall be per the Special Provision for TRAFFIC CONTROL PLAN and as shown in the plans.

INTERIM COMPLETION DATE – STAGE 2

The Stage 2B traffic configuration shall be in place on or before 11:59PM Sunday, May 2, 2027. Southbound Lane 2 pavement construction under Perryville Road shall be complete and open to traffic. These Stage 2 work restrictions will be valid in order to open three lanes of traffic on southbound I-39 in Stage 2B. Stage 2 work outside of the Lane 2 construction under Perryville Road necessary to open 3 lanes of southbound I-39 traffic may continue into Stage 2B.

The work associated with the Stage 2 shall be per the Special Provision for TRAFFIC CONTROL PLAN and as shown in the plans.

INTERIM COMPLETION DATE – WINTER SHUTDOWN 2025

All traffic control shall be removed on or before 11:59PM Friday, November 21, 2025. All temporary concrete barrier, barricades, drums, vertical panels, etc. shall be removed. These Winter Shutdown work restrictions will be valid in order to not have traffic in a staged configuration over the Winter of 2025. Work may start on or after 12:01AM Monday, March 16, 2026. Work may start before March 16, 2026, if approved by Operations.

The work associated with the Winter Shutdown shall be per the Special Provision for TRAFFIC CONTROL PLAN Winter Shutdown.

INTERIM COMPLETION DATE – WINTER SHUTDOWN 2026

The Winter Stage traffic configuration shall be in place on or before 11:59PM Friday, November 20, 2026. These Winter Shutdown work restrictions will be valid in order to complete the work per the specifications. Work may start on or after 12:01AM Monday, March 15, 2027. Work may start before March 15, 2027, if approved by Operations.

The work associated with the Winter Shutdown shall be per the Special Provision for TRAFFIC CONTROL PLAN Winter Shutdown.

INTERIM COMPLETION DATE – WINTER SHUTDOWN 2027

The Winter Stage traffic configuration shall be in place on or before 11:59PM Friday, November 19, 2027. These Winter Shutdown work restrictions will be valid in order to complete the work per the specifications. Work may start on or after 12:01AM Monday, March 13, 2028. Work may start before March 13, 2028, if approved by Operations.

The work associated with the Winter Shutdown shall be per the Special Provision for TRAFFIC CONTROL PLAN Winter Shutdown.

FAILURE TO COMPLETE THE WORK ON TIME – INTERIM COMPLETION DATE, TIME RESTRICTION, START DATE, AND WINTER SHUTDOWN

Should the Contractor fail to complete the work on or before the interim completion date as specified in the Special Provisions for **RAMP DB NOISEWALL (SN 101-N7010) or RAMP AD NOISEWALL (SN 101-N7009) or RAMP DB (SN 101-N7010) AND RAMP AD (SN 101-N7009) or STAGE 1 or STAGE 1B AT CHERRY VALLEY PATH AND MADIGAN CREEK or STAGE 2 or WINTER SHUTDOWN 2025 or WINTER SHUTDOWN 2026 or WINTER SHUTDOWN 2027**, 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 SIXTY THOUSAND DOLLARS (**\$60,000**), not as a penalty but as liquidated damages, for each calendar day overrun in the contract time or such extended time as may have been allowed. Such damages may be deducted by the Department for any monies due to the Contractor.

In fixing the damages set herein, the desire is to establish a certain mode of calculation for the work because the Department's actual loss in the event of delay, cannot be predetermined, would be difficult of ascertainment, and a matter of argument and unprofitable litigation. This 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 provisions of this clause shall be construed as a penalty, as such is not the intention of the parties.

A calendar day is every day on the calendar and starts at 12:00 midnight and ends at the following 12:00 midnight, twenty-four hours later.

COORDINATION WITH ADJACENT AND/ OR OVERLAPPING CONTRACTS

This contract abuts and/ or overlaps with other concurrent and future Illinois Department of Transportation (IDOT) and Illinois Tollway Contracts as listed below.

Each contract includes work items requiring close coordination between the various Contractors regarding the sequence and timing for execution of work items in accordance with Article 105.08 of the Standards Specifications and as herein noted.

This contract also includes critical work items that affect the future staging of traffic and/ or the completion dates of other contracts. Each of the contracts depends on certain portions of the work to be completed by others in order to complete the program on schedule. These critical items along with their completion dates are listed herein.

The following paragraph shall be added to the beginning of Article 105.08. "The Contractor shall identify such work items (including the critical items listed in the Contract and these Special Provisions) at the beginning of the contract and coordinate the sequence and timing for their execution and completion with the other Contractors through the Engineer. All of these work items shall be identified as separate line items in the Contractor's proposed Construction Progress

Schedule. Additional compensation or the extension of contract time will not be allowed for the progress of the work items affected by the lack of such coordination by the Contractor”.

The adjacent and/or overlapping Contracts will be (but not limited to):

- I-39 Reconstruction Contracts:
 - IDOT Contract 64R71 (Harrison Avenue)
 - IDOT Contract 64T74 (Kishwaukee Tree Removal)
 - IDOT Contract 64R72 (Kishwaukee Bridge and US 20/Mill Road Paving)
- Other Adjacent Contracts:
 - IDOT Contract 64R15 (FAP 525 (US 20) Hot-Mix Asphalt Resurfacing)
 - Tollway Project Wheeler/Aspen Road

No adjustments will be made for delay or suspension of the work due to the fault of the Contractor in coordinating project schedule, staging and work items with adjacent Contracts.

Some of the Contracts noted above may have detours implemented. The anticipated seasons or timeframe of the detours are listed below:

- 64R71
 - No detours anticipated.
- 64R72
 - Potential detour could utilize northbound entrance ramp movements from Harrison Avenue/US 20 to northbound I-39, southbound exit ramp movements from southbound I-39 to Harrison Avenue, and US 20/Harrison Avenue from the I-39 interchange to Mill Road. If utilized, the detours could be in place in the 2025 construction season.
- 64R15
 - No known detours
- 64T74
 - No known detours
- Tollway Project Wheeler/Aspen Road
 - No known detours

The list below indicates all such items of the work which have specific completion dates. It is essential that the Contractor responsible for the work complete these items on or before the date indicated so that other contracts may plan and execute their work accordingly.

Interim Completion Dates and Coordination with Adjacent Contract 64R71

The construction limits for Contract 64R71 and Contract 64C24 will overlap.

Contract 64R71 is scheduled to be completed and open to traffic by **Friday, November 21, 2025** (plus an additional 30 Working Days for cleanup and punch list). Therefore, it is anticipated that the 64R71 and 64C24 Contractors will overlap during the same time period.

Contract 64R71 is anticipated to complete all construction activities associated with the proposed Ramp D, and Ramp D shall be open to traffic by **Monday, June 30, 2025**. The construction items that are to be completed in Contract 64R71 prior to June 30, 2025, are to include, but may not be limited to:

- All Ramp D pavement and shoulders from STA 400+00.00 to STA 412+00.00.
- All Ramp D temporary pavement from STA 412+00.00 to STA 416+33.00 to remain in place.
- All Ramp D Final pavement markings in place
- Installation of all drainage structures, storm sewer, pipes, and culverts along and under Ramp D from STA 400+00.00 to STA 412+00.00.
- All Clearing, Utility Removal, Tree Removal, Non-Special Waste Removal, Debris Removal, and general site grading required.
- All appropriate Erosion Control measures in place.
- All Construction equipment, materials and vehicles belonging to Contract 64R71 Contractor shall be removed from the area southwest of the Ramp B terminus at STA 412+00.00.

The temporary pavement at Ramp B and Ramp D, on northbound and southbound I-39, on Harrison Avenue underneath the I-39 bridges, and on Harrison Avenue west of Mill Road at locations indicated in the plans shall remain in place for use by the Contract 64C24 Contractor for Maintenance of Traffic.

Two weeks after 64C24 Contractor Notice to Proceed, on a date specified by the Resident Engineers of both Contract 64R71 and Contract 64C24, the Resident Engineers and one representative from each Contractor shall conduct a joint inspection of the completed Contract 64R71 construction. The Resident Engineers shall jointly develop a punch list for items that the Contract 64R71 Contractor must complete, or remedy, prior to the Contract 64R71 Contractor vacation of the work area near the interface between the 64R71 and 64C24 Contracts. This punch list must be completed by the Contract 64R71 Contractor within two weeks after the inspection, and prior to the Contract 64C24 Contractor occupation of said work area.

Interim Completion Dates and Coordination with Adjacent Contract 64R72

The construction limits for Contract 64R72 and Contract 64C24 will overlap.

Contract 64R72 is scheduled to be completed and open to traffic by **Friday, October 15, 2027** (plus an additional 30 Working Days for cleanup and punch list). Therefore, it is anticipated that the 64R72 and 64C24 Contractors will overlap during the same time period.

Contract 64R72 is anticipated to complete all construction activities associated with the proposed shared use path and Mill Road sidewalk shall be open to pedestrian traffic by **Monday, July 6, 2026**. The construction items that are to be completed in Contract 64R72 prior to July 6, 2026, are to include, but may not be limited to:

- All sidewalk and shared use path along the west side of Mill Road from E. State Street to US 20. Including associated grading and fencing.
- All shared use path in the northwest corner of Mill Road and US 20, including associated grading.
- All appropriate Erosion Control measures in place.

Coordination with Adjacent Contract 64T74

The construction limits for Contract 64C24 and Contract 64T74 will not overlap.

Coordination between the two contracts may be required to minimize/eliminate conflicts in traffic staging, and to maximize safety of both the traveling public and of the respective work zones.

Coordination with Adjacent Contract 64R72

The construction limits for Contract 64C24 and Contract 64R72 will overlap. Regular coordination between the two contracts will be required in order to minimize/eliminate conflicts in traffic staging, and to maximize safety of both the traveling public and of the respective work zones along Harrison Avenue.

Coordination with Adjacent Contract 64R15

The construction limits for Contract 64C24 and Contract 64R15 will not overlap. It is anticipated that Contract 64R15 will begin during the 2025 Construction Season. The 64R15 asphalt overlay work will be approximately 0.4 miles east of Mill Road. Regular coordination between the two contracts may be required in order to minimize/eliminate conflicts in traffic staging, and to maximize safety of both the traveling public and of the respective work zones along Harrison Avenue.

Coordination with Adjacent Tollway/Aspen Road Contract

The construction limits for Contract 64C24 and the Tollway Contract are not anticipated to overlap. It is unknown when this contract is expected to start.

Shared Access and Work Area

When necessary for proper prosecution of work, each Contractor shall permit the other access through the overlapping construction areas and the use of any access or haul roads constructed by others.

When necessary for the proper prosecution of work, each Contractor shall permit the other to work within predetermined areas of overlapping construction work areas for a predetermined duration. The Contractor working within the adjacent overlapping construction work areas will be responsible for cleaning the work area upon completion and leaving the work area in a suitable condition, including application of temporary erosion control measures as required, to the satisfaction of both Engineers. Examples of work requiring occupation of overlapping work areas include (but are not limited to): Earth Excavation/ Grading, Landscaping, Maintenance of Erosion Control Items.

Any damages resulting from the shared use of access facilities or overlapping work area shall be repaired by the Contractor which caused the damage at his own expense and at no additional cost to the Contract.

Basis of Payment. All expenses incurred by the Contractor by reason of compliance with these requirements shall be considered as included in and completely covered by the contract unit prices for the various items included in the contract.

JURISDICTION LIMITS-TOLLWAY (ILLINOIS TOLLWAY)

Effective: April 23, 2021

Revised: October 23, 2023

Description. The following special provisions of this contract are restricted in application to the Tollway's jurisdiction/property. Any references to locations/objects that are within the project limits, whether stated or implied within the following special provisions, shall be modified to be the limits of Tollway's jurisdiction as noted in the plans, unless otherwise directed by the Engineer. In addition to the following special provisions, any Tollway Drawings included in the plans are also restricted in application to the Tollway's jurisdiction/property.

- Dynamic Message Sign – Walk-In (Illinois Tollway)
- Maintain Intelligent Transportation Systems (Illinois Tollway)
- Remove Dynamic Message Sign (Illinois Tollway)
- Dynamic Message Signs Electrical Work (Illinois Tollway)
- Remove ITS Enclosure (Illinois Tollway)
- ITS Pole Mounted Enclosure, ITS Assembly (CCTV or MVDS) (Illinois Tollway)
- ITS Disconnect Switch Assembly (Illinois Tollway)
- Closed Circuit Television (CCTV) Camera, ITS Assembly (Illinois Tollway)
- Fiber Optic Communications, ITS Assembly (Illinois Tollway)
- ITS Element Site Grounding (Illinois Tollway)
- Remove CCTV Camera (Illinois Tollway)
- Underground Conduit, Coilable Non-Metallic Conduit, SDR 11 (Illinois Tollway)
- Ground Mounted Light Pole, Galvanized Steel, Without Mast Arm (Illinois Tollway)
- ITS Element Pole Foundation Steel Helix (Illinois Tollway)
- Concrete Service Pad (Illinois Tollway)
- Handhole for Fiber Optic Cable, Torsion Assist (Illinois Tollway)
- Remove Fiber Optic Cable (Illinois Tollway)
- Warranty (Illinois Tollway)

COORDINATION OF CONTRACT DOCUMENTS

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

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

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

AVAILABILITY OF ELECTRONIC FILES

Effective: October 2016

Revised: January 29, 2025

Electronic files of this project will be made available to the Contractor after the contract has been awarded. This information will be provided upon request in a Bentley CONNECT Platform software format ONLY. If data is required in other formats, it will be your responsibility to make these conversions. The Contractor shall coordinate obtaining electronic files through the Project Engineer. If there is a conflict between the electronic files and the printed contract plans and documents, the printed contract plans and documents shall take precedence over the electronic files. The Contractor shall accept all risk associated with using the electronic files and shall hold the Department harmless for any errors or omissions in the electronic files and the data contained therein. Errors or delays resulting from the use of the electronic files by the Contractor shall not result in an extension of time for any interim or final completion date or shall not be considered cause for additional compensation. The Contractor shall not use, share, or distribute these electronic files except for the purpose of constructing this contract. Any claims by third parties due to use or errors shall be the sole responsibility of the Contractor. The Contractor shall include this disclaimer with the transfer of these electronic files to any other parties and shall include appropriate language binding them to similar responsibilities.

3D MODEL – CONTRACTOR SUPPLIED

Effective: January 29, 2025

If the Contractor develops a 3D model of the project site, then it shall be provided to the Resident Engineer. 3D models developed by the Contractor shall be provided to the Resident Engineer at no additional cost to the Department.

CRITICAL PATH SCHEDULE – TYPE B

Effective: September 27, 2024

Description

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

General

Revise the first and second paragraphs of Article 108.02 of the Standard Specifications to read:

“After the award of the contract and prior to starting of work, the Contractor shall submit to the Engineer a satisfactory progress schedule, which shall show the proposed sequence of work, including traffic control and staging, and how the Contractor proposes to complete the various items of work within the number of working days setup in the contract or on or before the completion date specified in the contract. Additionally, the Contractor shall submit an updated progress schedule on the first Monday of each month and as deemed necessary by the Engineer. The progress schedule shall be the intended work schedule and shall be used to plan, organize, and execute the work; record and report actual performance and progress, and forecast remaining work.

The progress schedule shall be used as a basis for establishing the controlling item of the construction operations and for checking the progress of all work under the contract. The controlling item shall be defined as the item which must be completed either partially or completely to permit continuation of progress. It shall be the responsibility of the Contractor to show the intended rate of production **for each controlling item** listed on the schedule during the period such item is controlling.”

Revise the fifth paragraph of Article 108.02 of the Standard Specifications to read:

“No payment under this contract will be made until a progress schedule has been submitted for approval. Payment may be withheld until a satisfactory schedule has been submitted and approved. If the Contractor deviates from the current approved progress schedule by not following the logical sequence of the critical path, payment will be withheld until a revised progress schedule is submitted and approved by the Engineer. Payment may be withheld if scheduled updated progress schedules are not submitted as required.”

Revise the first paragraph of Article 108.03 of the Standard Specifications to read:

“Time is of the essence in this contract. The Contractor shall begin the work to be performed under the contract not later than ten days after the execution of the contract by the Department, unless otherwise provided in the contract. The work shall be prosecuted in such a manner and with such a supply of materials, equipment and labor as is considered necessary to ensure its completion according to the time specified in the contract.

Requirements

The progress schedule shall be developed using a project management software approved by the Engineer. The progress schedule submitted shall be a Gantt chart with a tabular data report for each activity and accompanied by a narrative report.

A. Format

The electronic schedule format shall contain the following on each page printed:

- Project Name
- Project Title: Contract number
- Company Name: Contractor's name
- Type and edition of software
- Submittal date
- Number/Version: Original or update number

- Planning Unit: Calendar Days or Working Days
- Start Date of contract work
- Milestone Completion Date(s) as specified in contract documents
- Page number

B. Target Schedule Development

1. The Contractor shall take account in the schedule for any critical closure periods and limitations of operations specified in Article 107.09 of the Standard Specifications or the contract documents

C. Schedule Updates

1. All updates shall be plotted against the Target Schedule. The Contractor shall not make any changes to the original duration, activity relationships or constraints, and shall not add or delete activities, or alter the Target Schedule's logic when updating the schedule.

2. The updated information will include the original schedule detail and the following additional information:

- Actual start dates
- Actual finish dates
- Activity percent completion
- Remaining duration of activities in progress
- Identified or highlighted critical activities

3. The Engineer shall withhold progress payments if the Contractor does not submit scheduled updates as required.

4. Upon receipt of the updated CPM progress schedule, the Engineer will review the schedule for conformance with the Contract Documents and degree of detail. The Engineer, within 14 calendar days after receipt of the updated CPM progress schedule and supporting documents, will approve or reject it with written comments. If the updated CPM progress schedule is rejected, the Contractor must submit a revised updated CPM progress schedule within seven calendar days after the date of rejection.

5. The updated progress schedule must accurately represent the Project's current status.

D. Schedule Revisions

Revisions to the Target Schedule may be initiated by a proposal by the Contractor or by direction from the Engineer.

1. Contractor Changes to the Target Schedule.

The Contractor shall comply with the following requirements regarding proposed changes to the Target Schedule:

- If the Contractor proposes to make any changes in the Target 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 submittal including compact discs and printed

copies of the proposed revised schedule. Every effort must be made by the Contractor to retain the original Activity ID numbers.

- The Engineer has the authority to approve or reject the proposed change(s) in the Target Schedule and shall do so in writing within 14 calendar days after receipt of the Contractor's submittal. If the Engineer approves the change in the Target Schedule, all future monthly updates will be plotted against the new Target Schedule.
- If the Engineer approves a portion of the change to the Target Schedule, the Contractor shall submit a revised schedule incorporating such change(s) within seven calendar days after the partial approval along with a written description of the change(s) to the schedule.

2. Engineer Changes to the Target Schedule

The Engineer may direct the Contractor to revise the approved baseline CPM progress schedule. Reasons for such direction may include, are limited to the following: (1) changes in the work, (2) re-phasing 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.

- The Engineer will direct the Contractor to provide a revised CPM schedule in writing.
- The Contractor shall submit the revised CPM progress schedule within ten calendar days of receipt of the Engineer's written direction.
- The Engineer has the authority, in its sole discretion, to approve or reject the revised CPM progress schedule and will do so in writing within fourteen calendar days after receipt of the Contractor's submittal. If the Engineer approves the revised CPM progress schedule, such schedule will be designated the new "Target Schedule".
- If the Engineer approves a portion of the change to the Target Schedule, the Contractor shall submit a revised schedule incorporating such change(s) within seven calendar days after the partial approval along with a written description of the change(s) to the schedule.

E. Schedule Presentation (Gantt Chart)

1. The following shall be included for each activity in the graphic part of the schedule in the Gantt chart format:
 - Activity identification numbers
 - Description of the work activity
 - Maximum 45 characters
 - Usage of percentage numbers shall not be permitted in the description
 - Multiple activities with the same description shall include a location as part of the description
 - Duration of the work activity in whole days
 - Must be contiguous and not interruptible
 - Include production rates
 - Sequence and interdependence of work activities

- Sequence shall not violate the schedule logic
- Critical path to milestone and contract completion
 - Only one (1) controlling item shall be designated at any point in time on the schedule
- 2. Work activities shall 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. Each activity shall have a duration of not more than 20 working days, except for non-work type activities (such as mobilization), unless otherwise approved by the Engineer.
- 3. Include the following dates:
 - Start/End for each stage of construction
 - Milestones identified in the contract
 - Document Submittals
 - Shop drawings, etc.
 - Work activities
 - Equipment, Access, Installation
- 4. Calculate total float as finish float. Calculate the schedule using retained logic. Do 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.
- 5. Include a legend defining all abbreviations, terms, and symbols used

Review and Approval Process

The Contractor shall electronically submit the progress schedule to the Engineer for review in both its original file format and in pdf format.

The Engineer will notify the Contractor in writing, within 14 calendar days after receiving any progress schedule submittal or resubmittal, if the schedule is approved or if any corrections or revisions are required. If corrections or revisions are required to the progress schedule, the Contractor shall submit the revised progress schedule to the Engineer within 7 calendar days after receiving the Engineer's request for corrections or revisions.

Submittals that are required to be revised and resubmitted shall have the revisions clouded or annotated to designate revisions.

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 included in the cost for MOBILIZATION.

MAINTENANCE OF ROADWAYS

Effective: June 26, 2003

Revised: April 4, 2023

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 such as patching, intermittent resurfacing, sign maintenance, and shoulder work deemed necessary by the Engineer, but shall not include snow removal operations. Traffic control and protection for maintenance of roadways will be provided by the Contractor as required by the Engineer.

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

STATUS OF UTILITIES

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

UTILITIES TO BE ADJUSTED OR RELOCATED

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

STAGE / LOCATION	TYPE	DESCRIPTION	RESPONSIBLE AGENCY	DURATION OF TIME
PR I-39 STA 2704+33	Fiber Optic	Existing underground fiber optic line from north/west of the project limits will be relocated to a new IDOT FO handhole on the north/west side of I-39	iFiber	30 days

STAGE / LOCATION	TYPE	DESCRIPTION	RESPONSIBLE AGENCY	DURATION OF TIME
PR I-39 STA 2656+88	Sanitary Sewer – 42" RCP	Existing sewer will be lowered to avoid conflicts with proposed I-39 ditches.	Four Rivers Sanitation Authority (FRSA)	30 days
Various (7 locations)	Sanitary Sewer	Manholes to be vertically adjusted by IDOT contractor. See separate provision for details.	Owner: FRSA Work performed by: IDOT Contractor	See separate provision for details
PR I-39 STA 2665+70 to 2666+00	Telephone	Existing cable/fiber to be lowered to avoid ditch	Frontier	30 days
Proposed Cherry Valley Path Sidewalk at Valley Woods	Telephone	Existing fiber to be relocated to avoid proposed Valley Woods Drive sidewalk	Frontier	30 days
Mill Road Sidewalk	Telephone	Existing fiber to be relocated to avoid proposed sidewalk	Frontier	30 days
PR I-39 STA 2665+70 to 2666+00	CATV	Existing CATV to be lowered to avoid ditch	Comcast	30 days
Mill Road Sidewalk	CATV	Existing CATV to be relocated to avoid sidewalk	Comcast	30 days
PR I-39 STA 2663+00 to 2666+00	Watermain	Existing watermain to be lowered to avoid ditches	Village of Cherry Valley	30 days
PR I-39 STA 2709+50	Watermain	Existing watermain to be relocated to avoid Madigan Creek culvert wingwall	Village of Cherry Valley	30 days
Mill Road Sidewalk	Watermain	Existing watermain to be lowered to avoid sidewalk	Village of Cherry Valley	30 days

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

Agency/Company Responsible to Resolve Conflict	Name of contact	Phone	E-mail address
iFiber	1. George Lamplota	630-639-7077	glamplota@ex2technology.com
	2. Lance Sandy	815-753-5798	lsandy@stratusnet.com
FRSA	Kyle Gruhn	815-387-7400	kgruhn@fourrivers.illinois.gov
Frontier	Paulo Javier	309-820-1242	paulo.t.javier@ftr.com
Comcast	Tom Yuccas	815-509-8653	thomas_yuccas@cable.comcast.com
Village of Cherry Valley	Stave Strasser	815-332-3441	

UTILITIES TO BE WATCHED AND PROTECTED

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

LOCATION	TYPE	DESCRIPTION	RESPONSIBLE AGENCY
PR I-39 STA 2650+75	Sanitary Sewer - 24" RCP in casing (size unknown)	84" culvert P-I170 will be jacked in close proximity to sewer. Bore pit should be located to avoid sewer.	Four Rivers Sanitation Authority (FRSA)
PR I-39 STA 2711+57	6" gas main	Gas line is exposed in existing ditch bottom on west side of I-39. Use extreme caution when placing fill material above gas line.	Nicor
Mill Road Sidewalk	Fiber Optic	Buried fiber optic at Mill Rd. & State St.	IFiber

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

Agency/Company Responsible to Resolve Conflict	Name of contact	Phone	E-mail address
FRSA	Kyle Gruhn	815-387-7400	kgruhn@fourrivers.illinois.gov
Nicor	Brian Schorr	630-918-1657	bschorr@southernco.com
iFiber	1. George Lamplota 2. Lance Sandy	630-639-7077 815-753-5798	glamplota@ex2technology.com lsandy@stratusnet.com
ComEd	Deji Akosile	779-231-0781	Deji.akosile@comed.com
Adesta/ComEd Fiber	Bob Sullivan	630-272-9245	Bob.sullivan@aus.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 considered in the bid as this information has also been factored into the timeline identified for the project when setting the completion date. The applicable portions of the Standard Specifications for Road and Bridge Construction shall apply.

The estimated relocation duration must be part of the progress schedule submitted by the contractor. A utility kickoff meeting will be scheduled between the Department, the Department's contractor and the utility companies when necessary. The Department's contractor is responsible for contacting J.U.L.I.E. prior to all excavation work.

PCC AUTOMATIC BATCHING EQUIPMENT

Effective: January 1, 2015

Revised: January 31, 2023

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

Plants shall have computerized batching interfaced with a printer. IDOT Producer Number, IDOT Design Number, Concrete Material Code, batch weights, aggregate mixtures, water added, amount of each admixture or additive, and percent variance from design shall be printed for each batch. Tickets shall state the actual water-cement ratio as batched, and the amount of water that can be added to the batch without exceeding the maximum water-cement ratio. Truck delivery tickets are still required as per Article 1020.11(a)(7) of the Standard Specifications.

PCC QC/QA ELECTRONIC REPORTS SUBMITTAL

Effective: January 1, 2015

Revised: January 31, 2023

The Contractor's QC personnel shall be responsible for electronically submitting the following reports to the Department: PRO and IND data for BMPR MI654 "Concrete Air, Slump, and Quantity,"; PRO data for BMPR MI655 "P.C. Concrete Strength," and PRO data for BMPR MI504 "Aggregate Gradation" reports to the Department. The format for the electronic submittals shall be the QMP package reporting program, which will be provided by the Department. Microsoft Excel 2007 or newer and Microsoft Outlook is required for this program which shall be provided by the Contractor.

TRAFFIC CONTROL PLAN

Effective: January 14, 1999

Revised: January 13, 2017

Traffic Control shall be according to the applicable sections of the Standard Specifications for Road and Bridge Construction, the applicable guidelines contained in the National Manual on Uniform Traffic Control Devices for Streets and Highways, Illinois Supplement to the National Manual on Uniform Traffic Control Devices, these special provisions, and any special details and Highway Standards contained herein and in the Plans.

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

Standards:

701001	701006	701101	701106	701301	701400
701401	701402	701406	701411	701426	701427
701428	701446	701456	701501	701601	701606
701701	701801	701901	704001		

Details:

- Detour Plans
- Staging Plans
- Contractor Access Details
- District Standard WORK ZONE SIGN DETAILS (DIST STD. 34.1)
- District Standard TRAFFIC CONTROL TYPICAL WEAVE (DIST STD 39.1)
- District Standard TRAFFIC CONTROL FOR ROAD CLOSURE (DIST STD 40.1)

Signs:

When covering existing Department signs, no tape shall be used on the reflective portion of the sign. Contact the District sign shop for covering techniques.

Any plates or direct applied sheeting used to alter signs shall have the same sheeting as the base sign.

No more than one kind of alteration shall be used to alter a sign.

Any post stubs without a sign in place and visible shall have a reflector placed on each post.

Flaggers:

Flaggers shall comply with all requirements and signaling methods contained in the Department's "Traffic Control Field Manual" current at the time of letting. The flagger equipment listed for flaggers employed by the Illinois Department of Transportation shall apply to all flaggers.

In addition to the flaggers shown on applicable standards, on major sideroads, flaggers shall be required on all legs of the intersection.

When the mainline flagger is within 200 feet of an intersection, the sideroad flagger shall be required.

When the road is closed to through traffic and it is necessary to provide access for local traffic, all flaggers as shown on the applicable standards will be required. No reduction in the number of flaggers shall be allowed.

Pavement Marking:

All temporary pavement markings that will be operational during the winter months (December through March) shall be Modified Urethane.

Short term pavement markings on a milled surface shall be paint.

Temporary pavement markings shall be paid for separately at the contract unit prices of specified temporary pavement marking items.

Changeable Message Signs:

A changeable message sign shall be in place for a minimum of 2 weeks (14 calendar days) prior to the start of work, for a stage switch, for a major change in traffic patterns, and prior to beginning construction. Locations for change in traffic patterns are to be determined by the engineer.

A changeable message sign shall be in place for a minimum of 1 week (7 calendar days) prior to nighttime full closures for overhead beam removal and/or setting and overhead sign truss placement or removal and sign installation or removal. Locations are to be determined by the Engineer. The message boards shall state location of work.

This work will be paid for at the Contract Unit Price per Calendar Day for Changeable Message Sign.

Highway Standards Application:

Traffic Control and Protection, Standard 701400:

This work shall be done according to Standard 701400, staging details, and Section 701 of the Standard Specification and as contained herein.

Lane closures will not be implemented except during allowable lane closure hours per Work Restrictions, but lane shifts and narrow lanes will be installed.

Advance signing shall be placed at locations shown in the Plans. The Road Construction Ahead sign shall include a cardinal direction and a route shield below the sign.

This work will not be measured for payment.

Traffic Control and Protection, Standard 701401 and Traffic Control and Protection, Standard 701456:

This work shall be done according to Standard 701401, Standard 701456, staging details, and Section 701 of the Standard Specification and as contained herein. This work consists of closing traffic lanes to conduct nighttime operations as detailed in the plans.

Lane closures shall only be implemented during allowable lane closure hours per Work Restrictions.

One additional portable changeable message board will be required for each direction of travel affected during all nightly closures and shall be included within the cost of TRAFFIC CONTROL AND PROTECTION, STANDARD 701401 and TRAFFIC CONTROL AND PROTECTION, STANDARD 701456.

Any additional and miscellaneous costs associated with Maintenance of Traffic are included in the pay items TRAFFIC CONTROL AND PROTECTION, STANDARD 701401 and TRAFFIC CONTROL AND PROTECTION, STANDARD 701456.

Traffic Control and Protection, Standard 701401 (Special):

This work consists of setting up traffic control in accordance with Section 701 of the Standard Specification for the purpose of removing or setting bridge beams or overhead signs on roads open to traffic.

Up to four lanes in each direction of travel on I-39/US 20 may be closed up to twenty (20) minutes to remove or set bridge beams, sign trusses, and overhead sign panels. This shall be done by closing one lane in each direction according to Standards 701400, 701401, and 701446. The second and third lanes shall be closed by denying access to the lane for up to a twenty (20) minute period. At the end of the twenty-minute period, the second and third lane shall be opened to traffic and all queued traffic shall be cleared prior to closing the second lane again.

This work shall be completed during nighttime hours, 9:00 PM Monday to 6:00 AM Friday (9:00 PM to 6:00 AM daily). Traffic control set up shall not begin prior to 9 p.m. on any day and shall be completely removed by 6:00 AM the following morning. No lane closures shall be allowed on Friday, Saturday, and Sunday evenings. During legal holidays, section 107 of the Standard Specifications shall apply.

Traffic control devices shall be removed from the traffic lane and all lanes shall be opened to traffic thirty (30) minutes after bridge beam removal and/or setting operations cease, or defined by work restriction hours, whichever comes first.

The Contractor shall contact the District 2 Electrical Engineer, Scott Kullerstrand at Ph. (815) 677-3892 two weeks before any closure on I-39/US 20 so that messages can be put on the permanent message overhead message boards.

One additional portable changeable message board will be required for each direction of travel affected during all nightly closures.

The barricades shown in Standard 701401 shall not encroach on the lane open to live traffic at any time.

The Contractor shall be liable if they fail to completely open and keep open all traffic lanes on I-39/ US 20 in accordance with the limitations specified. The Contractor shall be liable to the Department in the amount of \$500 for each lane blocked as a monetary deduction damages for each and every fifteen (15) minute interval, or portion thereof, that a lane is blocked outside the allowable time limitations. Such deduction may be deducted by the Department from any monies due to the Contractor. These deductions shall apply during the contract time and during any extensions of the contract time.

All traffic control signing, barricades or drums and appurtenances, vertical panels, and flaggers described herein shall be paid for at the contract unit price per Lump Sum for TRAFFIC CONTROL AND PROTECTION, STANDARD 701401 (SPECIAL).

Traffic Control and Protection, Standard 701402:

This work shall be done according to Section 701 of the Standard Specifications and the Typical Application of Traffic Control Devices for Highway Construction, Standard 701402, I-39 staging Plans and as specified herein. Lane closures will not be implemented except during allowable lane closure hours per Work Restrictions, but lane shifts and narrow lanes will be installed. 701402 shall be modified as shown in the Plans. Each installation includes one direction of travel including substages.

All traffic control signing, barricades or drums and appurtenances, vertical panels, and reflectors shown in the Plans and described herein shall be included in the contract unit price per Each location per stage, including substages, which shall include one direction of travel, for TRAFFIC CONTROL AND PROTECTION, STANDARD 701402.

Traffic Control and Protection, Standard 701406 (Special):

This work shall include furnishing, installing, maintaining, replacing, relocating, and removing all contractor access locations for access to and from I-39 to and from work zones.

This work shall also include furnishing, installing, maintaining, replacing, relocating and removing the contractor access location to and from EB US 20 to and from the existing Stockpile (located at the southwest quadrant of the I-39/US 20 System Interchange).

The Contractor shall provide comprehensive Traffic Control and Access Plans showing proposed construction entrances and layout for each stage of construction within 30 calendar days of contract execution. Traffic Control and Access Plans shall be reviewed and approved by the Engineer prior to the start of any work which may require traffic staging.

The Contractor shall submit Traffic Control and Access Plans to Union Pacific Railroad within 45 calendar days of contract execution.

The Contractor shall be limited to opening one access location along I-39 within each of the following limits per each direction of travel at a time (up to 4 open per direction of travel at a time), and in accordance with the Contractor Access Details.

- From the south project limits to the CN Railroad
- From the CN railroad to the UP Railroad.
- From the UP Railroad to Harrison Avenue
- From Harrison Avenue to the north project limits

The Contractor shall be limited to one entrance and one exit access location along EB US 20 to and from the Stockpile quadrant, subject to the following restrictions:

- Access to the Stockpile shall NOT be allowed to or from Linden Rd.
- Access to the Stockpile to and from EB US 20 outside shoulder shall be located approximately between Sta. 1147+00 to Sta. 1156+00
- The EB US 20 outside shoulder will be closed to traffic, and access to and from EB US 20 shall be a right in and right out configuration.
- Construction vehicle acceleration and deceleration shall be designed to take place

- primarily on the EB US 20 outside shoulder (outside the travel lane).
- Construction vehicle acceleration and deceleration lane shall be a minimum of 16' in width.
- Construction equipment, or any other roadside obstacles, shall not be left within 30' clear zone of the EB US 20 travel lanes.
- Temporary concrete barrier wall at the Stockpile access location MAY be omitted if there is no other staged TCB immediately upstream or downstream of the Stockpile entrance/exit, and if the Contractor presents a safe and suitable alternative in the TRAFFIC CONTROL AND ACCESS PLANS.
- For any proposed shift in EB US 20 travel lanes in order to achieve full outside acceleration and deceleration shoulder width, all pavement marking (installation and removal), all rumble strip (removal and installation), and all advance signing and other considerations and shall be included in the cost of TRAFFIC CONTROL AND PROTECTION, STANDARD 701406 (SPECIAL).

A single access point may be entrance only, exit only, or a combined entrance/exit as depicted in the plans. If an access point is moved upstream or downstream to allow construction to be completed at the previous access point, the previous access point must be closed prior to opening the new location. All Contractor Access points shall be approved by the Engineer. Contractor Access points shall not be located within 500 feet of an entrance or exit ramp merge point.

For Temporary Pavement design and construction, any front slopes or back slopes that are not protected by barrier wall (or other positive protection) shall not exceed 1:3.

A changeable message board shall be placed advising of additional trucks entering and leaving the highway for the first two weeks of a change in the traffic staging to help the motoring public with changes in configuration and location of construction entrances/exits. After 2 weeks, the changeable message board can be removed. This cost shall be included in TRAFFIC CONTROL AND PROTECTION, STANDARD 701406 (SPECIAL). The Contractor shall coordinate with the Engineer for message to display.

Estimated quantities shown on the Contractor Access Details are for estimating purposes only and shall not be paid for separately. Additional payment will not be made for temporary pavement, concrete barrier, or impact attenuators if additional quantity is required to provide safe access at any locations. Initial placement of concrete barrier is covered by TEMPORARY CONCRETE BARRIER or RELOCATE TEMPORARY CONCRETE BARRIER as shown in the maintenance of traffic plans.

All temporary concrete barrier, temporary concrete barrier relocation, impact attenuators, impact attenuator relocation, temporary pavement, temporary pavement removal, signs, devices, flaggers and work necessary to meet the requirement of Contractor Access Details and described herein shall be included in the contract unit price per unit price per Lump Sum for TRAFFIC CONTROL AND PROTECTION, STANDARD 701406 (SPECIAL).

Traffic Control and Protection, Standard 701411:

This work shall be done according to Section 701 of the Standard Specifications and Standard 701411 and as modified in the plans for Stage 1, Stage 1B, and Stage 1C southbound US 20/Ramp D to I-39 and Stage 3 and Stage 3B northbound I-39/Ramp B to US 20.

Method of Measurement. As per the Standard Specifications for TRAFFIC CONTROL AND PROTECTION, STANDARD 701411.

All traffic control signing, barricades or drums and appurtenances, vertical panels, and reflectors shown in the Plans and described herein shall be included in the contract unit price per Each for TRAFFIC CONTROL AND PROTECTION, STANDARD 701411.

Traffic Control and Protection, Standard 701701:

This work shall be done according to Section 701 of the Standard Specifications and the Typical Application of Traffic Control Devices for Highway Construction, Standard 701701, and as specified herein.

The "left" leg of the intersection shown on this standard also applies when the right turn lane is closed. When the right turn lane is closed, "RIGHT TURN LANE CLOSED AHEAD" shall be substituted for the LEFT TURN LANE CLOSED AHEAD" and the set up would be a mirror image to what is shown.

This work shall be included in the contract unit price per Lump Sum for TRAFFIC CONTROL AND PROTECTION STANDARD 701701.

Traffic Control and Protection, Standard 701801:

This work shall be done according to Standard 701801, staging details, and Section 701 of the Standard Specification and as contained herein. The Shared Use Path (SUP) closure will be allowed during proposed path access underneath I-39.

This work shall be included in the contract unit price per Lump Sum for TRAFFIC CONTROL AND PROTECTION, STANDARD 701801.

District Standards Application:

Traffic Control for Cherry Valley Path Closure: This work shall be done according to the Sidewalk Closure Standard and Section 701 of the Standard Specifications.

"ROAD CLOSED AHEAD" (W20-3(O)-48) with flasher shall be overlayed with "PATH" cover "ROAD" and shall be placed in advance of the standard sidewalk closure standard signage. "PATH CLOSED AHEAD" signs and overlays shall be included within the cost of TRAFFIC CONTROL AND PROTECTION, (SPECIAL).

Signing and devices required to close the path, according to the Traffic Control for Sidewalk Closure detail and contained herein, shall be the responsibility of the Contractor.

The day the detour signing begins, the detour will be in effect when the Contractor has notified the Resident Engineer or personnel on the project. No detour shall be erected on Friday, Saturday, or Sunday. The path shall not be closed until the detour signing is completely installed, verified, and ready to accept traffic.

The "SIDEWALK CLOSED" sign on the Type III barricades shall be unobstructed and visible to path traffic at all times. No equipment, debris, or other materials shall be stored within 20 feet of the first set of Type III barricades, unless approved by the Engineer.

The Contractor shall not drive around the outside of the Type III barricades, but shall relocate the barricades temporarily for access. When it is necessary for the barricades to be moved for access, the Contractor shall move the devices into the left lane and/or left shoulder area behind barricades that are to remain in place. At no time shall the barricades be turned parallel to traffic flow for access purposes.

If a path becomes evident around the outside of the barricades, the Contractor shall be required to place additional Type III barricades to prevent going around the existing barricades. Additional barricades shall be included in the cost of applicable Traffic Control Standards

This work shall be paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION, (SPECIAL).

Maintenance of Traffic:

The Contractor shall notify the Village of Cherry Valley, City of Rockford, Cherry Valley Township and Rockford Township emergency response agencies (fire, ambulance, police), school bus companies and the Department of Transportation (Bureau of Project Implementation) regarding any changes in traffic control.

The Contractor shall notify the Village of Cherry Valley, City of Rockford, Cherry Valley Township, Rockford Township, and Winnebago County for any sideroad closure or opening.

The Contractor shall submit a maintenance of local traffic plan to the Engineer at the preconstruction meeting telling how local access will be maintained at each access location. It will show which locations will be completely closed, and which locations will be constructed utilizing Traffic Control Standard 701206 and/or barricades. This traffic plan will need to be approved by the Engineer before the roadway is closed to traffic.

The Contractor shall be responsible for providing an article and a map to the news media describing the work being performed and stages closed to traffic when there are changes to the traffic control configuration.

Work Restrictions:

The Contractor shall have all lanes open on I-39/US 20 and all ramps as shown in the Plans or per TRAFFIC CONTROL AND PROTECTION, STANDARD 701401 (SPECIAL) unless prior approval is obtained from the Resident Engineer.

There shall be no I-39/US 20 or Ramp Lane Closures allowed at the following times:

- Sunday: 10:00 am to 8:00 pm
- Monday through Friday: 6:00 am to 8:00 pm
- Saturday: 9:00 am to 6:00 pm

Setting and removal of traffic control, setting and removing of temporary concrete barrier, and placement and removal of temporary pavement markings must follow the lane closure restrictions.

Additional restrictions due to local events or inclement weather may also be imposed.

Any additional lane closures on other than what is shown on the Plans shall be approved by Traffic Operations in advance. Work hour restrictions may be impacted.

Interstates and multi-lane divided highways where the existing speed is greater than 45 mph: The Contractor shall equip all machinery and vehicles with flashing amber lights, installed so the illumination is visible from all directions.

The median crossover will generally not be available for Contractor use. It may be used only when both lanes adjacent to the median are closed. Under no condition shall left turn lanes be made to cross the median from lanes open to traffic. Where interchanges are not available, the Contractor shall only be allowed to turn around where left turn lanes are present.

Parking of personal vehicles within the right-of-way will be strictly prohibited. Parking of construction equipment within the right-of-way will be permitted only at locations approved by the Engineer.

Winter Shutdown

The Winter Stage traffic configurations shall be in place on or before 11:59PM Thursday, November 20, 2025 or Thursday, November 19, 2026, or November 18, 2027. These Winter Shutdown work restrictions will be valid in order to complete the work per the specifications. Traffic may be shifted out of the Winter configuration and into the next configuration on or after 11:59PM Friday, March 15, of the following year. Work may start before March 15th if approved by the Engineer.

Winter Shutdown Requirements:

- November 2025 – March 2026
 - Traffic should be in the Prestage or existing configuration on the existing surface. No traffic control devices or temporary concrete barrier should be in place.
- November 2026 – March 2027
 - Northbound I-39 traffic will be placed in the configuration shown in the Winter Stage 1 plans (existing configuration). The pavement riding surface will be the existing surface.
 - Southbound I-39 traffic will be placed in the configuration shown in the Winter Stage 1 plans. The pavement riding surface will be the proposed surface constructed in stage 1, 1B, & 1C. This will include all traffic control devices and temporary concrete barriers.
- November 2027 – March 2028
 - Northbound and Southbound I-39 traffic will be placed in the Winter Stage 2 configuration as shown in the plans. The pavement riding surface for all ML traffic will be the proposed surface constructed in stage 1, 1B, 1C, 2, & 2B. Southbound traffic will be in the proposed configuration. Final pavement markings and signing shall be installed for southbound traffic prior to start of Winter Stage 2.
- Failure to complete the required segments of roadway to provide the lane configurations and shoulder widths shown in the configurations listed above prior to initiation of a winter shutdown will be subject to the Special Provision for FAILURE TO COMPLETE THE WORK ON TIME- INTERIM COMPLETION DATE, TIME RESTRICTION, START DATE, AND WINTER SHUTDOWN.
- Lane drop-offs will not be allowed for winter shutdown.
- Temporary Pavement Marking
 - Any pavement markings shall be replaced to the proposed configuration with Temporary pavement markings prior to Winter Shutdown. Short term pavement marking will not be allowed to remain for Winter Shutdown.

- Contractor equipment shall not be left in the clear zone or within any restricted areas as identified by the Engineer within the project limits over the Winter Shutdown.
- The Contractor shall be responsible for all necessary maintenance and upkeep of all temporary pavement markings and associated traffic control and temporary concrete barrier and attenuators during winter shutdown months.
- Contractor shall be responsible for snow plowing and removal around all traffic control devices in place over the Winter Shutdown. IDOT maintenance forces will plow active traffic lanes, but not around traffic control devices.

No additional compensation will be provided to comply with these winter shutdown restrictions.

MAXIMUM DROP-OFFS BETWEEN ADJACENT LANES

Effective April 21, 2023

When the Contractor's operations cause a difference in elevation greater than 1.5 in. (38 mm) for a vertical milled face or 2 in. (50 mm) for a lift of HMA resurfacing between adjacent lanes, the lane shall remain closed. The Contractor shall adjust his milling and paving operations so that all traffic lanes are open at the end of each work day.

To meet the above requirement, the Contractor shall:

Place the binder lift immediately following the milling operation before opening the lane to traffic or

Place a temporary wedge after the milling operations (minimum 1V:3H slope) or

Mill a sloped wedge between lanes (minimum 1V:3H slope).

When the difference in elevation between adjacent open traffic lanes is greater than 1 in. (25 mm) and less than or equal to 1.5 in. (38 mm) for a vertical milled face or 2 in. (50 mm) for an HMA lift, "UNEVEN LANES" signs (W8-11(FO)) shall be erected at 1-mile (1.6 km) intervals.

The above requirements were developed based on IDOT Safety Engineering Policy Memorandum 4-21. Any changes to the proposed lift thicknesses, milling depths, or sequence of operations that change drop-offs at the centerline or edge of pavement must follow this policy and be approved by the Engineer.

This work will not be paid for separately but shall be included in the cost of the applicable HMA surface removal pay items.

WORK ZONE PAVEMENT MARKING AND REMOVAL

Effective: December 29, 2008

Revised: October 5, 2021

This work shall consist of installing and removing temporary pavement marking according to Section 703 and 783 of the Standard Specifications and the following:

All temporary paint on the final wearing surface shall be removed according to Article 1101.12 Water Blaster with Vacuum Recovery and the applicable portions of Section 783 of the Standard Specifications and as described herein.

Add the following paragraph to Article 1101.12 of the Standard Specifications.

“For the high-pressure water spray, the pressure at the nozzle shall be approximately 25,000 psi with maximum flow rate of 15 gal/min. The nozzle shall be in close proximity to the pavement surface.”

MOWING

Effective: January 1, 2002
Revised: April 12, 2016

This work consists of mowing all Seeding Class 1A and Class 2A at the completion of the project or before winter shut down. The vegetation must be at least 6” long before mowing. The vegetation shall be mowed to obtain a height of not more than 3 inches. All debris must be cleared from the right-of-way immediately after the mowing.

This work will be paid for at the contract unit price per Acre for MOWING.

JOINTED CONCRETE PAVEMENT DOWEL BAR PLACEMENT TESTING AND REMEDIATION

Description. The Engineer reserves the right to test final dowel bar position in hardened concrete pavement and require remedial action as described in this specification. This specification shall apply to dowels placed with baskets, dowel bar inserter, or as part of a Class B patch construction. This specification replaces testing and corrective action for dowel bar position in Article 420 of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction.

Testing of Dowel Bar Placement:

Materials Engineering Consultant (MEC): Dowel bar testing will be accomplished by a consultant working for the contractor with specialized equipment to enable determining dowel bar position in hardened concrete.

Test Frequency: The Engineer may have the **MEC** test any and all dowels in the concrete pavement.

Test Equipment: A MIT SCAN2-BT or an equivalent device that conforms to ASTM E3013 – 17: Standard Test Method for Evaluating Concrete Pavement Dowel Bar Alignment Using Magnetic Pulse Induction will be used for dowel bar testing. The device shall be calibrated to the type and size dowel bar used in the work according to the manufacturer’s instructions.

Test Schedule: The contractor shall coordinate with the Engineer to allow testing of completed pavement sections by the **MEC** before proceeding to subsequent sections. This will aid in the determination of construction procedures contributing to placement deficiencies. It will also allow the **MEC** testing team to be protected by existing traffic control while performing the dowel bar scanning. The contractor shall be responsible for any additional traffic control required so that testing can be completed safely. The Contractor shall facilitate dowel bar testing by providing access to transverse joints so that testing can be completed in a timely manner; by cleaning all transverse contraction joints following saw cutting and other construction activities; and, clearing the pavement of any obstructions.

Test Report: The **MEC** will provide a test report of the dowel bar positions which shall be an MS-Excel spreadsheet with an embedded map showing dowel bar layout in horizontal and side views, as produced by the device software. The latest version of the device manufacturer's software will be used. The electronic report will include the following:

1. Contract number, date, and location details.
2. Joint number, lane number and station.
3. Bar number and x-location of dowel bar.
4. Horizontal skew and vertical tilt (misalignment) in inches.
5. Embedment (Sideshift) in inches.
6. Depth to center of dowel bar in inches.
7. Depth to the top end of the dowel bar in inches.
8. Joint Score.
9. All out-of-tolerance readings shall be highlighted in red.
10. Joint images generated by MagnoProof software.
11. Scan direction.
12. Any external sources of interference noted.

Test Exclusions: The following locations shall be excluded from dowel bar measurement.

1. Transverse construction joints (headers).
2. Dowel bars within 24 in. (610 mm) of metallic manholes, inlets, metallic castings, or other nearby or underlying steel reinforced objects.
3. The outside dowel bar when tie bars are installed with mechanical equipment in fresh concrete. Installation of tie bars in preformed or drilled holes shall be completed after testing with the MIT Scan-2 device.
4. Any other contributors to magnetic interference determined appropriate to exclude by the Engineer.

Dowel bar Tolerance and required remedial action: The following tolerances and remedial action will apply to final dowel bar position determined by testing.

1. **Embedment length:** Embedment length is defined as the length of dowel bar embedded on the short side of the sawed joint. The wheel paths are defined as the pavement lane width excluding the middle 2.5 ft. Each joint shall have more than 50 percent of dowel bars per wheelpath with a minimum embedment length of 4.5 inches. Any joint not meeting this tolerance shall be remediated as described under the **Joint Repair** section of this specification.

2. **Concrete cover:** Concrete cover over the top of the dowel shall exceed the minimums in Table 1. Concrete depth below the dowel shall not be less than 2.0 inches. Any joint not meeting this tolerance shall be remediated as described under the **Joint Repair** section of this specification.

Table 1 – Required Minimum Concrete Cover	
Pavement Thickness	Required Cover (inches)
7.0	2.1
7.5	2.3
8.0	2.3
8.5	2.5
9.0	2.7
9.5	2.7
10.0	2.7
10.5	2.9
11.0	3.1
11.5	3.3
12.0	3.5
12.5	3.5
13.0	3.5
13.5	3.6
14.0	3.9

3. **Locked joints:** Vertical tilt or horizontal skew shall be defined as the difference in position of the dowel bar ends with respect to each other. Vertical tilt is measured in the vertical axis; horizontal skew is measured in the horizontal axis. Excessive vertical tilt or horizontal skew causes locked joints.

Single bar tolerance: A single dowel bar with a vertical tilt or horizontal skew greater than 2.0 in. shall be cut. Any joint out of this tolerance shall be remediated as described under the **Joint Repair** section of this specification.

Locked joint determination: Locked joints for specification compliance shall be determined by a joint score. The joint score is defined as the degree of misalignment of the dowels in a single transverse joint for each lane of pavement. The joint score shall be determined as follows:

$$Joint\ Score = (1 + (x/(x - n)) \sum_{i=1}^{(x-n)} W_i)$$

where:

W_i = weighting factor (Table 2) for dowel i

x = number of dowels in a single joint

n = number of dowels excluded from joint score due to measurement interference

d = maximum dowel misalignment = The maximum of the vertical or horizontal degree of misalignment applicable to a single dowel bar

Table 2 - Dowel Bar Tilt or Skew	
Maximum Dowel Misalignment (d)	Weighting Factor
$d < 0.6$ in	0
$0.6 \text{ in} < d < 0.8$ in	2
$0.8 \text{ in} < d < 1$ in	4
$1 \text{ in} < d < 1.5$ in	5

Locked joint Score: A joint score greater than 14 will be considered locked. Three consecutive locked joints shall be corrected by selecting one joint and cutting one or several dowel bars. Preference shall be given to cutting a dowel bar within the middle 2.5 ft of the pavement lane to avoid wheelpaths. If none of the three locked joints will have a joint score less than or equal to 12 after selecting one or several dowel bars to cut, the joint shall be remediated as described under the **Joint Repair** section of this specification.

Joint Repair: Joint repair shall consist of either:

1. Replacing the joint with a minimum 6 ft (1.8 m) pavement patch centered over the joint according to Section 442 for Class B patches, or
2. Corrected to the required tolerance with one or more dowel bar retrofits as described in the **Dowel Bar Retrofit** section of this specification.

Joint Repair Plan: Prior to performing joint repairs, the Contractor shall submit a joint repair plan which will produce a final doweled pavement meeting all required tolerances. The plan shall address deficiencies defined in this specification and corrective actions to comply with minimum requirements. The plan shall describe techniques, materials, and schedule prior to corrective actions being taken.

DOWEL BAR RETROFIT

Description. This work shall consist of furnishing and installing epoxy coated, round steel dowels into concrete pavement across transverse joints for correction of non-compliant dowel bar alignment. This work shall include sawing slots into the pavement; cleaning, placing dowels, and filling the slots with concrete; then sawing and sealing the retrofitted joints, cleanup and other related work.

Materials.

1. Dowels. The dowel bars shall consist of a smooth, round, epoxy, and bond breaker coated 14-inch long, 1.5-inch diameter steel dowel meeting the requirements of Article 1006.06(b) of the SSRBC.
2. Bond Breaker. Acceptable bond-breaker compounds include white pigmented curing compound, concrete form oil, or other approved bond breaker materials.
3. Expansion Caps. Tight-fitting, commercial quality end caps made of a non-metallic, non-organic material that allows for $\frac{1}{2}$ inch of movement at each end of the dowel bar.

4. Dowel Bar Support Chairs. Chair devices for supporting the dowel bars shall conform to the epoxy-coated steel requirements of ASTM A 884 or plastic chair devices that conform to Article 508.06 of the SSRBC. Dowel bar chairs are used to firmly hold the dowels centered in the slots during backfill operations. The dowel bar chairs must hold the bar a minimum of ½ inch above the bottom of the slot while the backfill material is placed and consolidated.
5. Caulking Filler. Caulking filler used for sealing the existing transverse crack at the bottom and sides of the slot shall be concrete sealant that is compatible with the patch material being used.
6. Concrete Backfill Material. The concrete backfill material shall be chosen from the [IDOT PACKAGED, DRY, RAPID HARDENING CEMENTITIOUS MATERIALS FOR CONCRETE REPAIRS](#) qualified product list, or the current Illinois [Tollway Approved List of Fast Set Concrete](#). Coarse aggregate shall have a maximum nominal particle size of 3/8" or less.
7. Curing Compound. Type I, II, or III curing compounds shall conform to Article 1022.01 of the SSRBC. Cure shall be applied at a rate that provides 100% coverage of the concrete backfill material.
8. Joint / Crack Sealer. Hot poured joint/crack sealer used at retrofitted joints shall be in accordance with Article 1050.02 of the SSRBC. Any proposed sealant product shall be approved in writing by the Engineer prior to the delivery to the work site. The backer rod, if needed, shall consist of a material capable of withstanding the application temperatures of hot poured sealant to 400° F. The backer rod shall be extruded from a cross-linked, closed cell polyolefin and shall be available in a variety of diameters to readily fill the gap of any particular application.

Equipment.

1. A template shall be used to locate the sawcuts on any non-skewed crack or joint to align the sawcuts consistently. Either single diamond bladed saws or diamond bladed gang saws shall be used to make the saw cuts within the specified tolerances for dowel bar placements
2. Chipping hammers shall be hand held with a maximum weight of 30 lbs. (prior to any handle modification) to minimize damage to the concrete pavement that remains.
3. The compressor for air blasting shall have a minimum capacity of 120 cu. ft. per minute. The compressed air shall be free from oil and other contaminants.
4. Hand held internal vibrators used to consolidate the concrete repair material shall have a diameter of 1 inch and a resilient covering that will not damage the epoxy-coated dowels.
5. Equipment for mixing and pumping any backfill materials for retrofitting the dowel bars shall be in accordance with the material manufacturer's instructions and specifications.
6. Routing or sawing equipment for crack sealant, where required, shall be power driven and be capable of cutting the cracks to the required dimensions without spalling of the adjacent surface.

7. Equipment for heating and placing hot poured sealant material shall be an oil jacketed, double boiler type, heating kettle or other thermostatically controlled equipment of a type approved by the Engineer, capable of heating the material to 400° F (205° C) and pumping the material into the prepared crack or joint.

CONSTRUCTION METHODS

Detailed Dowel Bar Retrofit Plan: Before proceeding with the work, the contractor shall submit a plan for slot cutting, dowel bar installation and concrete replacement. The plan shall include a description of the construction procedures and methods to achieve minimum damage to existing pavement. The plan must include a schedule and be approved by the Engineer.

1. Concrete Removal. Create slots to a depth and length that allow the center of the dowel to be placed at mid-depth in the pavement slab and parallel to the pavement surface. Slots can be created with a gang saw, or by making two saw cuts and removing the concrete between the sawcuts with a 30-lb maximum jackhammer or hand tools. Slots are to be parallel to each other, and to the centerline of the roadway, with a maximum tolerance of ¼ inches per 12 inches of dowel bar length. The dowel bar shall be placed parallel to the centerline of the roadway. For non-skewed cracks and joints, the saw cut locations shall be pre-marked using a template. Skewed cracks may require slots longer than the length specified in the plans to allow for equal length of the dowel bar to be placed across the transverse joint (?) or crack. Remove water and residue immediately after sawing.
2. If the concrete removal operations cause damage to the pavement that is to remain, operations shall stop until corrective measures are taken. Pavement damaged during concrete removal operations shall be repaired or replaced at no additional cost to the Department. The bottom of the slot must be flat and level. Dispose of any concrete removal debris according to Article 202.03 of the SSRBC
3. Slot Cleaning and Preparation. Sandblast all exposed surfaces in the dowel bar slot to remove saw slurry and debris such that clean aggregate is exposed. After sandblasting, clean the slot with moisture-free, oil-free compressed air having a minimum capacity of 120 cu. ft. per minute to remove any dust, residue, or debris.
4. Sealing Joints and Cracks in Slot before Backfilling. Seal the existing transverse contraction joint or crack at the bottom and the sides of the dowel bar slot with an approved caulk or silicone filler to prevent backfill material from entering these areas. The caulk filler should not be placed any farther than ½ inch outside either side of the slot. Excessive sealant inside the slot should also be avoided to prevent the concrete patching material from bonding to interior surfaces of slot. Prior to slot sealing, ensure that surfaces receiving the caulking filler are clean and free of moisture. Do not extend the caulking filler beyond 3/8 inches of each side of the existing joint or crack.

5. Placing Dowel Assembly in Slot. Prevent contamination of the cleaned slot before, or while placing, dowel assemblies. Place the dowel bars to within 0.5 inch of the midpoint of the slab. Ensure that the bar is parallel to the traffic lane centerline and the top of the roadway surface within a tolerance of $\frac{1}{4}$ inch per 12 inches of dowel bar length. Center dowels at the transverse joints such that at least 6 inches of the dowel extends into each adjacent panel. For dowel bars at any cracks, the dowel shall be centered over the crack in each slot. Cease and adjust operations if the chairs do not hold dowel bars securely in place during placement of the backfill material.
6. Foam insert: Place a foam core insert extending from the dowel bar to the surface of the pavement. Place the insert so it fills the existing transverse joint or crack and can remain in a vertical position, tight to all edges during backfill placement operations. Re-establish the joint or crack above the foam core insert within 4 hours of backfill placement by sawing after the backfill material has hardened sufficiently.
7. Mixing and Placing Backfill Material. Mix backfill material in accordance with the manufacturer's instructions. Refer to manufacturer's information on handling, mixing, and placing backfill material. Backfill material shall be mixed mechanically using a power-driven mechanical mixer or a drill mounted mixer.
8. Backfill: Fill each dowel bar slot with backfill material after placement of the caulking filler, the coated dowel bar, expansion caps, support chairs, and the foam core insert. Ensure that the foam core inserts remain upright, extends to the surface of existing pavement, and is over the existing joint or crack during the backfill process. Consolidate the backfill material thoroughly into the slot around the dowel bars and support chairs.

Slightly overfill the slot and finish the surface to no more than $\frac{1}{4}$ " above the existing pavement surface. Slots which are not filled to at least the existing pavement surface shall be redone at no additional cost. Cure the backfill material in accordance with the manufacturer's recommendations.
9. Sawing Cracks after Backfilling. If the foam insert is not present on the finished surface of the patch, the slots shall be saw cut to prolongate the existing crack over the bar. The saw cuts shall be a nominal 1.5-inch depth and cut within 24 hours of placement. Saw cutting will be at no additional cost.
10. Opening to Traffic. No traffic will be permitted on repaired pavement until after strength specimens cast from the last batch of backfill material have obtained a minimum compressive strength of 2,500 psi. An average of three 4x8 inch cylinders or two 6X12 cylinder shall be utilized for acceptance of the compressive strength. Compressive strength cylinders shall be prepared and cured as per Article 1020.09, stored on-site for a minimum of two hours prior to transporting, and tested as per AASHTO T-22. Testing may be witnessed by the Engineer or a designated representative.

Basis of Payment. All work necessary to address deficiencies and to coordinate testing are included in the contract unit price for concrete pavement and are at no additional cost to the Department.

REMOVAL OF EXISTING STRUCTURES

This work shall be done in accordance with Section 501 of the Standard Specifications. The work shall consist of removing and disposing of existing structures. The work shall include removing and disposing of existing box culverts, existing box culverts end treatments, and other types of drainage structures or portions thereof, including but not limited to drainage drop structures, drainage outfall structures, and wing-wall end sections. This work shall be included in the cost of Removal of Existing Structure for that location.

No.	Station	Description
1	2648+44	NB I-39 over CNRR (bridge)
2	2648+25	SB I-39 over CNRR (bridge)
3	2684+24	SB I-39 over UPRR (bridge)
4	2685+13	NB I-39 over UPRR (bridge)
5	2724+61	NB I-39 over Harrison Ave (bridge)
6	2724+33	SB I-39 over Harrison Ave (bridge)
7	2708+82	Madigan Creek Culvert (culvert)
8	2650+15 LT	Culvert End Treatment (Twin 84" pipes)
9		Ramp DB Noise Wall

This work shall be paid for at the contract unit price per each for REMOVAL OF EXISTING STRUCTURES of the number specified.

The removal of the Madigan Creek Culvert shall include the path inside the box and the modular block retaining wall extension on the southeast wing.

GRANULAR BACKFILL FOR STRUCTURES

Effective: April 19, 2012

Revised: July 10, 2024

Revise the third sentence of the first paragraph of Article 586.03 of the Specifications to read:

“The backfill volume shall be placed in Department acceptable lift thicknesses for the full width to be backfilled and shall be compacted to not less than 95 percent of the standard laboratory density.”

Delete the fourth sentence of the first paragraph of Article 586.03 of the Specifications.

GUARDRAIL REMOVAL

Effective: August 20, 1990

Revised: April 10, 2014

This work shall be done according to Section 632 of the Standard Specifications except that all removed guardrail will become the property of the Contractor.

This work will be paid for at the contract unit price per Foot for GUARDRAIL REMOVAL, measured from center-to-center of end posts.

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES

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

Contract Specific Work Areas. For stationing, the lateral distance is measured from centerline and the farthest distance is the offset distance or construction limit, whichever is less.

The following contract specific work areas shall be monitored by the Environmental Firm for soil contamination and workers protection.

ISGS Site 1681V3-1 – I-39 ROW – Rockford/Cherry Valley, Winnebago County

- Station 2625+00 to Station 2627+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.
- Station 2633+00 to Station 2635+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.
- Station 2633+00 to Station 2637+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron and manganese.
- Station 2635+00 to Station 2637+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminants of concern sampling parameters include: benzo(a)pyrene.
- Station 2639+00 to Station 2645+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron and manganese.
- Station 2645+00 to Station 2647+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.
- Station 2657+00 to Station 2659+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron.

- Station 2659+00 to Station 2661+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminants of concern sampling parameters include: TCLP cadmium, TCLP/SPLP lead.
- Station 2661+00 to Station 2665+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: iron, manganese, pH, and TCLP/SPLP lead.
- Station 2675+00 to Station 2677+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron.
- Station 2675+00 to Station 2677+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: chromium, iron.
- Station 2679+00 to Station 2681+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron and manganese.
- Station 2681+00 to Station 2685+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron.
- Station 2681+00 to Station 2685+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron and manganese.
- Station 2687+00 to Station 2689+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron.
- Station 2689+00 to Station 2691+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: benzo(a)pyrene, iron, TCLP cadmium, TCLP/SPLP Lead.
- Station 2689+00 to Station 2691+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.

- Station 2691+00 to Station 2693+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron.
- Station 2697+00 to Station 2699+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.
- Station 2699+00 to Station 2701+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminants of concern sampling parameters include: chromium, iron.
- Station 2701+00 to Station 2703+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: iron.
- Station 2703+00 to Station 2705+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.
- Station 2707+00 to Station 2709+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.
- Station 2709+00 to Station 2711+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminants of concern sampling parameters include: benzo(a)pyrene.
- Station 2711+00 to Station 2713+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminants of concern sampling parameters include: lead.
- Station 2713+00 to Station 2717+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.
- Station 2713+00 to Station 2715+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters include: TCLP/SPLP lead and pH.

- Station 2719+00 to Station 2723+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.
- Station 2719+00 to Station 2721+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(b)(1). Contaminants of concern sampling parameters include: pH.
- Station 2725+00 to Station 2727+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters include: manganese.
- Station 2725+00 to Station 2727+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 5 to 10 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminants of concern sampling parameters include: TCLP/SPLP lead.
- Station 2727+00 to Station 2729+00, 0 to 75 feet RT/LT. The Engineer has determined this material from 0 to 5 feet bgs in the vicinity of the station and off-set meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters include: lead, TCLP cadmium, TCLP lead, and SPLP lead.

Work Zones

Three distinct OSHA HAZWOPER work zones (exclusion, decontamination, and support) shall apply to projects adjacent to or within sites with documented leaking underground storage tank (LUST) incidents, or sites under management in accordance with the requirements of the Site Remediation Program (SRP), Resource Conservation and Recovery Act (RCRA), or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or as deemed necessary. For this project, the work zones apply for the following ISGS PESA Sites:
None

Additional information on the contract specific work areas listed above collected during the regulated substances due-diligence process is available through the District's Environmental Studies Unit (DESU).

CONCRETE FOUNDATIONS

Effective: April 1, 2019

All drilled foundations listed under Class SI concrete in Table 1 of Article 1020.04 shall use Drilled Shaft (DS) concrete mix in lieu of Class SI concrete meeting the requirements of Section 1020 of the Standard Specifications.

GROOVING FOR RECESSED PAVEMENT MARKING, LETTERS AND SYMBOLS

The work shall be completed per Article 780.05, except that the grooving for letters and symbols shall be as close to the shape of the letter or symbol as possible, being a minimum of ½ inch wider on all sides. Excessive boxing out for the letter or symbol shall not be allowed.

This work shall be paid for at the contract unit price per square foot from the table below for GROOVING FOR RECESSED PAVEMENT MARKING, LETTERS AND SYMBOLS.

Grooving Area Chart (Symbols)

SYMBOLS				
Symbol	Pavement Marking Large Size (SF)	Grooving (SF)	Pavement Marking Small Size (SF)	Grooving (SF)
Through Arrow	11.5	12.6	6.5	7.3
Left or Right Arrow	15.6	16.8	8.8	9.8
2 Arrow Combination Left (or Right) and Through	26.0	28.2	14.7	16.2
3 Arrow Combination Left, Right, and Through	38.4	41.3	20.9	23.0
Lane Drop Arrow	41.5	43.5	--	--
Wrong Way Arrow	24.3	27.3	--	--
Railroad "R" 6ft (1.8m)	3.6	5.3	--	--
Railroad "X" 20ft (6.1m)	54.0	57.5	--	--
International Symbol of Accessibility	3.1	4.0	--	--
Bike Symbol	4.7	12.3	--	--
Shared Lane Symbol	8.0	16.7	--	--

ABANDON EXISTING CULVERT

Description. This work shall consist of filling culverts to be abandoned at the locations shown on the plans or as directed by the Engineer. The culverts to be abandoned shall be cleaned and televised prior to filling. If blind-ties or other unknown conditions are noted in the existing culvert, the Engineer shall be notified for further disposition prior to abandoning and filling the existing culvert.

Construction Requirements. The Contractor shall plug the ends of the pipe with Class SI Concrete or brick and suitable mortar to the satisfaction of the Engineer, and fill the remaining length of pipe with Controlled Low-Strength Material (CLSM) or other suitable material, which must meet the material requirements of Article 593.02.

Culverts intended for use to maintain storm water flow during staged construction shall not be abandoned and filled until proposed culvert construction is completed to maintain flow.

Method of Measurement. This work will be measured for payment per foot for the pipe to be abandoned and filled in place.

Basis of Payment. This work will be paid for at the contract unit price per foot for ABANDON EXISTING CULVERT, which price shall include all materials, labor, tools and equipment, and backfilling of any excavation at locations shown in the plans, as specified herein, and as directed by the Engineer.

APPROACH SLAB REMOVAL

Description. This work shall consist of the complete removal of existing approach slabs including bituminous overlays, reinforcing bars, curbs, and sleeper slabs, at locations designated in the plan and as directed by the Engineer and in accordance with the applicable portions of Section 440 and 501 of the Standard Specifications.

The Contractor shall remove the existing approach slabs in a manner so as not to damage the adjacent structures that are to remain.

Method of Measurement. Approach slab removal shall be measured for payment in place and computed in square yards.

Basis of Payment. This work will be paid for at the contract unit price per square yard for APPROACH SLAB REMOVAL, which price shall include all labor and equipment necessary to remove and dispose of the entire approach slab pavement removed.

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

Description. This work shall consist of any excavation needed and the installation of Hot-Mix Asphalt stabilization at steel beam guardrail locations as shown in the Plans.

General. The installation shall conform to the applicable portions of Section 482 and Article 630.06 of the Standard Specifications and Standard 630201.

Debris disposal shall be performed in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement. HOT-MIX ASPHALT STABILIZATION 6" AT STEEL PLATE BEAM GUARD RAIL 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 HOT-MIX ASPHALT STABILIZATION 6" AT STEEL PLATE BEAM GUARD RAIL.

CLEANING EXISTING MANHOLE OR HANDHOLE

Description. This item consists of cleaning an existing handhole, manhole or communications vault for the installation of new conduit(s) and/or cable(s).

General Requirements. General requirements must be in accordance with Section 801 of the Standard Specifications, except as herein modified.

Debris disposal shall be performed in accordance with Article 202.03 of the Standard Specifications.

Installation. Existing cable hooks must be relocated and existing cables must be retrained as required prior to drilling the existing manhole or handhole. Existing and new debris must be removed and disposed of off-site by the Contractor. Existing and new gas and water must be pumped out as directed by the Engineer. Debris removal, de-gassing and water pumping must be included in this item; separate payment will not be made.

The Contractor must furnish and install cable racks and/or cable hooks for new and existing cables in all manholes and handholes as required to facilitate new cable installation. This Work must be included in this item and separate payment will not be made.

Method of Measurement. Each manhole or hand hole that is cleaned (relocating existing cable hooks, installing new cable hooks, retraining cables, removing debris, and pumping out gas and water) as indicated will be counted as a unit for payment. Each handhole, manhole or communications vault will be measured for payment for cleaning and will be measured for cleaning only once.

Basis of Payment. This work will be paid for at the contract unit price each for CLEANING EXISTING MANHOLE OR HANDHOLE, which will be payment in full for performing the work described herein.

STABILIZED CONSTRUCTION ENTRANCE

Description. This work consists of constructing, maintaining and removing a stabilized pad of course aggregate underlain with geotechnical fabric at the locations where construction traffic will be entering and leaving the work zone. The locations of the stabilized pad are subject to the approval of the Engineer. Also included is the removal and satisfactory disposal of the stabilized construction entrance when no longer required. This work shall be performed in accordance with the applicable portions of Sections 202, 210, 1004 and 1080 of the Standard Specifications, the details in the plans or as directed by the Engineer.

Materials. Aggregate shall consist of course aggregate gradations CA-1, CA-2, CA-3, or CA-4 meeting the requirements of Article 1004.04. Aggregate thickness shall be as detailed on the plans.

Geotechnical fabric shall meet the requirements of Article 1080.02.

General. Excess or unsuitable excavated materials shall be disposed of in accordance with Article 202.03.

The course aggregate surface coarse shall be compacted to the satisfaction of the Engineer.

Restoration will be paid for separately under applicable pay items.

Method of Measurement. The stabilized construction entrance will be measured 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 all excavation, except excavation in rock; removal and disposal of excavated materials; geotechnical fabric; furnishing, placing, compacting, and disposing of coarse aggregate; and for all labor, tools and equipment necessary to construct the work as specified.

EMERGENCY DETOUR SIGNING

Description. This work shall consist of furnishing, erecting, maintaining, storing, and ultimately removing Contract needed signs, devices and changeable message signs necessary for the Emergency Detour Route according to the details shown in the plans. This shall include any devices and signs needed to close ramps. This shall also include any devices and signs to place full closures if required.

Signs, devices and changeable message signs for the Emergency Detour Route shall remain in place for the duration of the project. Once notified of the need for Emergency Detour Route by the Engineer or Corridor Manager, the Contractor shall have ten minutes to switch traffic to the active Emergency Detour Route signing by activating the appropriate changeable message sign information. The Contractor has thirty minutes to implement any additional signing or devices required for the Emergency Detour Route.

Changeable message boards shall be used to inform the public of the route change as shown in the plans and as directed by the Engineer. Message boards shall be in caution mode when no emergency is happening.

When the use of the Emergency Detour Route is no longer required for the incident, the Contractor shall have ten minutes to switch appropriate changeable message sign information to caution mode once notified by the Engineer or Corridor Manager. The Contractor then shall have one hour to adjust signing and devices put in place for the Emergency Detour Route. Traffic shall be back in its configuration prior to the Emergency Detour Route implementation within one hour of the Contractor being notified that the route is no longer needed.

If the closure is anticipated to be in place for longer than 12 hours, full closures shall be put in place. Traffic Control and Protection standards 701400, 701401 and District Detail 36.1 should be followed for full closures with the exception of the FLAGGER sign and flaggers.

At each location that could be closed during an emergency the Contractor shall have 20 barrels and 5 Type III barricades. These shall remain at the locations through the duration of the contract.

The Contractor shall be aware that the Emergency Detour Route for this contract (64C24 – Mainline I-39 Reconstruction) will supersede the Emergency Detour Route for a previously let contract (64R71 – Harrison Avenue DDI). Contractors for both 64C24 and 64R71 shall coordinate an agreed date for the transition of Emergency Detour Route from 64R71 to 64C24, such that there is no gap in Emergency Detour Route signing and maintenance.

The Contractor shall supply to the Engineer and Corridor Manager the names and telephone numbers of their representatives on the construction site and their representative responsible for the detour prior to the start of the work.

Method of Measurement. This work will be measured as lump sum.

Basis of Payment. This work shall be paid for at the contract lump sum price for DETOUR SIGNING which shall include the cost of all labor, equipment, signs, devices, changeable message boards, storage, handling, and materials necessary to perform said work. No additional compensation will be allowed.

DRAINAGE & UTILITY STRUCTURES TO BE RECONSTRUCTED

Description. This work shall include all labor, material, and equipment necessary for the reconstruction of the drainage or utility structure/box with their existing frame and grate at locations as directed by the Engineer in the field in accordance with Section 602 of the Standard Specifications and as specified herein.

General. This work shall consist of the reconstruction of an existing drainage or utility structure/box as directed by the Engineer in the field. The existing material surrounding the structure to be reconstructed shall be removed by a means of a straight saw cut and replaced in kind to the limits as directed by the Engineer.

All reconstructions shall be made with existing frame and grates or lids unless otherwise specified or as directed by the Engineer.

Method of Measurement. This work will be measured in place per each for DRAINAGE & UTILITY STRUCTURES TO BE RECONSTRUCTED.

Basis of Payment. This work will be paid for at the Contract unit price per each for DRAINAGE & UTILITY STRUCTURES TO BE RECONSTRUCTED, which price shall be payment in full for all work as specified. The word STRUCTURE shall be understood to mean catch basin, manhole, valve vault, vault, inlet, or handhole.

DRAINAGE STRUCTURES TO BE ADJUSTED

Description. This work shall include all labor, material, and equipment necessary for the adjustment of drainage structure/box at locations shown on the Plans in accordance with Section 602 of the Standard Specifications and as specified herein.

General. This work shall consist of the complete adjustment of an existing drainage structure/box as shown on the Plans. The existing material surrounding the structure to be adjusted shall be removed by a means of a straight saw cut and replaced in kind to the limits as directed by the Engineer.

Method of Measurement. This work will be measured in place per each for DRAINAGE STRUCTURES TO BE ADJUSTED.

Basis of Payment. This work will be paid for at the Contract unit price per each for DRAINAGE STRUCTURES TO BE ADJUSTED, which price shall be payment in full for all work as specified.

DRAINAGE STRUCTURE TO BE REMOVED

Description. This work shall include all labor, material, and equipment necessary for the removal of drainage underdrain structure/headwall outlets at locations shown on the Plans in accordance with Section 602 of the Standard Specifications and as specified herein.

General. This work shall consist of the complete removal of an existing drainage underdrain structure/headwall as shown on the Plans. The Contractor shall completely remove and haul away the existing materials. For locations where the removal is outside of proposed grading, the void left shall be filled with TRENCH BACKFILL, paid for separately.

Debris disposal shall be performed in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement. This work will be measured in place per each for DRAINAGE STRUCTURE TO BE REMOVED.

Basis of Payment. This work will be paid for at the Contract unit price per each for DRAINAGE STRUCTURE TO BE REMOVED, which price shall be payment in full for all work as specified.

SEDIMENT CONTROL, SILT CURTAIN

Description. This work shall consist of furnishing, installing, maintaining, and removing a floating turbidity curtain at the locations specified in the plans to deter silt suspension and the movement of silt particles during construction. The work shall be in accordance with information presented in the plans, requirements included in the Illinois Urban Manual, and as directed by the Engineer.

Materials. The silt curtain should be of appropriate size to perform the required function of isolating the work area from the rest of the stream, with length of the curtain extending at least 1 foot greater than the elevation of water at all locations. The silt curtain assembly shall consist of the silt barrier with flotation segments and weighing devices and all required anchorage devices. The curtain shall be in good working condition and shall meet the approval of the Engineer. The Contractor shall submit additional details on the type of fabric that will be used. Fabric type must be approved by the Engineer.

Construction Method. The silt curtains shall be installed according to the manufacturer specifications, and in a manner approved by the Engineer prior to the start of construction within the body of water. Additional anchorage may be required based on the stream characteristics and manufacture specifications. The silt curtain shall remain in place and be maintained until the water level has zero depth or construction activity is completed. The Contractor shall complete restoration and final stabilization of the sections being constructed and the silt curtain shall be removed as soon as practical after final stabilization is complete.

Requirements. The Contractor shall inspect the work site to review the stream characteristics where the work is to occur. The silt curtain assembly shall be installed in the stream in a configuration that prevents silt from traveling beyond the work area but does not cause flooding upstream of the work area. The isolated area shall be the minimum necessary to complete the work and in no case shall encompass more than 1/3 of the total stream width. Silt curtains shall not be installed at an angle greater than 45° from parallel with the direction of flow. The silt curtain shall not extend across the entire waterway with moving water. The Contractor must perform routine maintenance to ensure a properly working silt curtain is in place. Routine maintenance also includes the regular removal and disposal of excess sediment in contact with either side of the curtain, and as directed by the Engineer.

When final stabilization and construction activities are complete that require use of the silt curtain, excess sediment shall be removed between 48 and 72 hours prior to the removal of the silt curtain. Excess sediment is a sediment depth of four inches or greater. The Contractor shall remove the silt curtain in a manner that will prevent turbidity within the waterway.

Removal of any sediment must be disposed of in accordance with Article 202.03 of the Standard Specifications and as directed by the Engineer.

Method of Measurement. This work will be measured for payment per each turbidity curtain installed.

Basis of Payment. The work will be paid for at the contract unit price per each for SEDIMENT CONTROL, SILT CURTAIN. This price shall be payment in full for all labor, materials, transportation, handling, and related work necessary to furnish, install, maintain, replace, relocate, and remove floatation silt curtain assemblies as required to complete all the contractual work. Due to changing water elevations, the silt curtain may need to be shortened, extended, or removed during dry periods and reinstalled. Work associated with shortening or removing and reinstalling the silt curtain shall be included in the cost of this item.

GEOTECHNICAL REINFORCEMENT

Effective: June 17, 2022

Revised: April 10, 2014

This work consists of furnishing and installing an integrally-formed polypropylene geotechnical grid reinforcement material. The geogrid shall have an aperture, rib and junction cross section sufficient to permit significant mechanical interlock with the material being reinforced. There shall be a high continuity of tensile strength through all ribs and junctions of the grid material to reinforce the subbase or subgrade as shown on the Plans and specifications.

MATERIAL CHARACTERISTICS	TEST METHOD	DATA
polymer type		polypropylene
Ultra violet stability	ASTM D 4355	50%

DIMENSIONAL CHARACTERISTICS	TEST METHOD	UNIT	DATA
open area	CW 02215	%	75 (max.)
unit weight	ASTM D 5261	oz/yd ²	5.0 (min.)

TECHNICAL CHARACTERISTICS	TEST METHOD	UNIT	DATA
junction efficiency	GRI-GG2	%	90 (min.)

The supplier should provide a certification that their product meets the above requirements.

The geotechnical reinforcement shall be placed as described herein or as shown on the typical sections.

Geogrid shall be delivered to the jobsite in such a manner as to facilitate handling and incorporation into the work without damage. Material shall be stored in such a manner as to prevent exposure to direct sunlight and damage by other construction activities.

Prior to the installation of the geogrid, the application surface shall be cleared of debris, sharp objects and trees. Tree stumps shall be cut to the level of the ground surface. If the stumps cannot be cut to the ground level, they shall be completely removed. In the case of subgrades, all wheel tracks or ruts in excess of 3 inches in depth shall be graded smooth or otherwise filled with soil to provide a reasonably smooth surface.

The geotechnical reinforcement shall be placed with the "roll length" parallel to the pavement. Fabric of insufficient width or length to fully cover the specified area shall be lapped a minimum of 24 inches. The geogrid should be secured in place.

Installation: The granular blanket shall be constructed to the width and depth required on the plans. Unless otherwise specified, the material shall be back-dumped on the Geogrid in a sequence of operations beginning at the outer edges of the treatment area with subsequent placement towards the middle.

Placement of material on the Geogrid shall be accomplished by spreading dumped material off of previously placed material with a bulldozer blade or endloader, in such a manner as to prevent tearing or shoving of the Geogrid. Dumping of material directly on the Geogrid will only be permitted to establish an initial working platform. No construction equipment shall be allowed on the Geogrid prior to placement of the subgrade aggregate. If the geogrid develops wrinkles or moves significantly, an alternative method of securing it shall be used.

Unless otherwise specified in the Plans or Special Provisions, the granular material, shall be placed to the full required thickness and compacted to the satisfaction of the Engineer.

Geogrid which is damaged during installation or subsequent placement of granular material, due to failure of the Contractor to comply with these provisions, shall be repaired or replaced at their expense, including costs of removal and replacement of the granular material.

Torn Geogrid may be patched in-place by cutting and placing a piece of the same Geogrid over the tear. The dimensions of the patch shall be at least 2 feet larger than the largest dimension of the tear and it shall be weighted or otherwise secured to prevent the granular material from causing lap separation.

Method of Measurement. Geotechnical Reinforcement will be measured in square yards for the surface area placed. The excavation, replacement and compaction of the granular layer shall be paid for separately.

Basis of Payment. This work will be measured in place and the area computed in square yards. The work will be paid for at the contract unit price per square yard for GEOTECHNICAL REINFORCEMENT.

MAINTENANCE OF LIGHTING SYSTEM

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

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

Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall initiate a request for a maintenance transfer and preconstruction inspection, as specified elsewhere herein, to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of any lighting systems which may be affected by the work. 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 Article 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. The contractor shall locate existing facilities when requested within two working days.

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. The contractor shall locate existing facilities when requested within two working days.

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 Two. 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
Motorist caused damage or leaning light pole 10 degrees or more	1 hour to clear	4 hours	7 Calendar days
Light tower collapse	1 hour	na	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	na	na	7 Calendar days

- **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 to the Contractor.

Damage caused by the Contractor's operations shall be repaired at no additional cost to the Contract.

The Contractor shall be responsible for locating the lighting system when requested.

Operation of Lighting

The lighting shall be operational every night, dusk to dawn. Duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously. Lighting systems shall not be kept in operation during long daytime periods.

Method of Measurement. The Contractor shall demonstrate to the satisfaction of the Engineer that the lighting system is fully operational prior to submitting a pay request. Failure to do so will be grounds for denying the pay request. Months in which the lighting systems are not maintained and not operational will not be paid. Payment shall not be made retroactively for months in which lighting systems were not operational.

Basis of Payment. This work shall be paid for at the contract unit price per calendar month for MAINTENANCE OF LIGHTING SYSTEM.

COMMUNICATIONS VAULT

Description. Work under this item shall consist of constructing a composite concrete handhole and cover, in accordance with the details shown on the Plans and as specified herein.

Materials. The composite concrete handhole and two-piece vault lid shall be constructed of polymer concrete material, and shall be gray in color. The composite concrete handhole shall be 48 inches x 72 inches x 36 inches and shall meet the requirements of Articles 814.02 and 1088.05.

Cover shall contain a cast-in-place legend "IDOT COMMUNICATIONS" or as directed by the Engineer.

The non-reflective warning sign panels shall be no larger than 18" x 18" and shall be in accordance with Sections 1090, 1091, and 1092.

The ground rod shall be 8' x 5/8" copper clad in accordance with 1087.01(b) of the Standard Specifications.

The 2/c #6 and 1/c #6 AWG ground, type XHHW.

Construction Requirements. The installation of the composite fiber optic handhole shall meet the requirements of Articles 814.03 and as directed by the Engineer. A French drain shall be constructed underneath the proposed handhole according to Article 601.06 and per the details in the plans, except the French drain shall be included in the pay item.

Backfilling around the handhole shall meet the requirements of Articles 814.04, as shown on the plans, and as directed by the Engineer.

The vault shall be cleaned per the requirements of Article 814.05.

The handholes shall include fence mounted warning signs and locate markers with test stations installed with each handhole as shown on the plans. The test station shall be connected to the fiber optic cable splice case and grounded to a ground rod as shown on the plans and as directed by the Engineer.

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

Basis of Payment. This work will be paid for at the contract unit price each for COMMUNICATIONS VAULT, which shall be payment in full for all material, labor, and equipment to complete this work including earth excavation and disposal, furnishing and construction of the french drain, ground rod, electric cable, fence mounted signs, locate marker posts with test stations, backfilling, and compaction around the handhole.

ROCK FILL

Effective: May 1, 1995

Revised: August 29, 2013

This work shall consist of placing CS02 at locations shown in the plans, except for the bedding material provided (in Article 540.06) for box culverts or (in Article 542.04(c)) pipe culverts. The granular bedding layer is included in the unit price for Precast Concrete Box Culverts and Pipe Culverts. The 6-inch bedding layer under Cast-in-Place Culverts shall be gradation CA07, and shall be paid for as ROCK FILL.

The CS02 shall consist of crushed gravel, crushed stone, or crushed concrete of sound durable particles, reasonably free of deleterious materials meeting the following gradation:

Grad No.	Sieve Size and Percent Passing		
	6"	4"	2"
CS02	100	80±10	25±15

This work shall be paid for at the contract unit price per ton for ROCK FILL.

TEMPORARY PAVEMENT

This work shall consist of placing a Hot-Mix Asphalt Binder Course or Portland Cement Concrete Pavement (Jointed) with a stabilized subbase and aggregate subgrade improvement to serve as temporary pavement at the locations shown on the Plans. The choice of material to be used for this item is left to the Contractor to choose from the following options:

HOT-MIX ASPHALT OPTION

This work shall consist of placing and compacting 12 inches of Aggregate Subgrade Improvement and constructing 11.75 inches of Hot-Mix Asphalt Binder Course and 1.5 inches of Hot-Mix Asphalt Surface Course to serve as temporary pavement at the locations shown on the Plans.

Temporary shoulders shall be the same materials as the temporary traveled way pavement.

This work shall consist of designing, producing and constructing a HMA Surface and Binder Course on a prepared base, according to Sections 311, 406, 1030 and 1102 of the Standard Specifications, except as follows.

Refer to the plans for mixture requirements.

Required Field Tests. Density Acceptance at 95% - 102% of growth curve at the frequency indicated in Article 1030.05(d)(3).

PORTLAND CEMENT CONCRETE OPTION

This work shall consist of placing and compacting 12 inches of Aggregate Subgrade Improvement, 4 inches of Stabilized Subbase and constructing a 10.75-inch-thick Portland Cement Concrete Base Course to serve as temporary pavement at the locations shown on the Plans. The minimum width shall be 2 feet. This work shall be completed according to Sections 311, 312 and 420 of the Standard Specifications.

Temporary shoulders shall be the same materials as the temporary traveled way pavement.

Welded wire reinforcement shall not be utilized in the base course.

Refer to the plans for stabilized subbase mixture requirements.

The Contractor shall saw longitudinal joints in base courses wider than 16 feet, according to Standard 420001, except that uncoated steel tie bars may be used instead of epoxy coated tie bars. These joints shall not be sealed.

The Contractor shall saw transverse joints in the base course at 20' centers according to the detail for Sawed Construction Joints in Standard 420001, except that dowel bars are not required. These joints shall not be sealed.

HMA and PCC temporary pavement options are not the same total thickness so the necessary final elevation of aggregate subgrade improvement must be evaluated for each option.

Existing sign panels and appurtenances that conflict with temporary pavement construction shall be temporarily relocated as specified in the plans and shall be included in the cost per square yard for TEMPORARY PAVEMENT.

All work, excluding earth excavation, and materials required to complete the work listed above shall be included in the contract unit cost per square yard for TEMPORARY PAVEMENT.

Method of Measurement. TEMPORARY PAVEMENT will be measured in place, and the area computed in square yards.

Basis of Payment. All work as listed above, including tie bars, sawed joints, and all other required materials shall be included in the contract unit price per square yard for TEMPORARY PAVEMENT.

Removal shall be paid for separately under TEMPORARY PAVEMENT REMOVAL.

Earth excavation will be paid for separately under EARTH EXCAVATION. Earth excavation quantities for temporary pavement were calculated using the Portland Cement Concrete option unless stated otherwise above. If the Hot-Mix Asphalt option is used no adjustments will be made to the quantities.

Removal of temporary pavement (variable depth) cost of removal will be included in the TEMPORARY PAVEMENT (VARIABLE DEPTH) pay item.

TEMPORARY PAVEMENT (VARIABLE DEPTH)

Description. This work shall consist of constructing, maintaining, and removing temporary pavement (variable depth) placed over existing pavement as shown in the plans or directed by the Engineer.

General. The Contractor shall use Hot-Mix Asphalt according to Sections 355, 356 and 406 of the Standard Specifications, and other applicable special provisions contained herein. The Hot-Mix Asphalt mixtures to be used shall be as specified in the plans. The thickness of the Temporary Pavement shall be as described in the plans and placed with a minimum lift thickness of 2-1/4" or as directed by the Engineer.

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

The removal of the temporary pavement as required, shall conform to Section 440 of the Standard Specifications.

Method of Measurement. TEMPORARY PAVEMENT (VARIABLE DEPTH) 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 ton for TEMPORARY PAVEMENT (VARIABLE DEPTH).

Removal of temporary pavement (variable depth) cost of removal will be included in the TEMPORARY PAVEMENT (VARIABLE DEPTH) pay item.

SLOTTED DRAIN WITH VARIABLE SLOT

Description. This work consists of furnishing and installing slotted drains at the locations shown in the plans and all accessories (including concrete encasement and aggregate) required for connecting the slotted drain pipes and connections to drainage structures where necessary.

General. Slotted drain shall be corrugated steel pipe conforming with the applicable requirements of Section 542 of the Standard Specifications, the details shown in the plans, and as described herein. The slotted drain must be properly positioned in the trench prior to backfilling. The upper end of the drain shall be capped as directed by the Engineer. Once the slotted drain is backfilled, it should be covered prior to placing the final surfacing.

Method of Measurement. This work will be measured per foot in place.

Basis of Payment. This work will be paid for at the contract unit price per foot for SLOTTED DRAIN WITH VARIABLE SLOT of the size specified.

TEMPORARY SHORING

Description. This work shall consist of the construction, maintenance, and removal of temporary shoring shown on the plans. The Contractor is responsible for the complete design of the temporary shoring and the materials used. The Contractor shall furnish and place all materials and equipment as necessary for safe and proper execution of the work.

Materials. All materials shall be according to Division 1000 of the Standard Specifications, except as modified herein. Used materials, except for anchor bolts and high strength bolts, may be incorporated into the temporary shoring provided those materials are in sound condition and suitable for the purpose intended. All materials shall meet the approval of the Engineer as to quality and suitability for the use intended.

Submittals. The Contractor shall submit details and calculations of his/her proposed temporary shoring plan and sequence of construction for approval by the Engineer before commencing work. The Contractor's temporary shoring plans and procedures shall be designed and sealed by an Illinois Licensed Structural Engineer.

Construction. If unforeseen field conditions preclude the execution of the approved temporary shoring plan, the Engineer may require the Contractor to provide additional supports or measures. All changes to the temporary shoring plan shall be approved by the Structural Engineer that sealed the temporary shoring plan. Neither added precautions nor the failure of the Engineer to

order additional protection will in any way relieve the Contractor of sole responsibility for the safety of lives, equipment, and structure.

Steel shoring shall be according to Section 505 of the Standard Specifications, except no painting of structural steel will be required. Timber construction shall be according to the applicable portions of Section 507. The requirements regarding the use of treated timber shall not apply. Timber shall be either roughened or surfaced. Countersinking will not be required.

Maintenance. The Contractor shall maintain such temporary shoring in good condition. All labor and materials required for such maintenance shall be furnished by the Contractor.

Removal. After the need for the temporary shoring has ceased to exist, it shall be removed and disposed of according to Article 501.04 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price per each for TEMPORARY SHORING. Additional support or measures resulting from unforeseen field conditions will be paid according to Article 109.04 of the Standard Specifications.

TEMPORARY SUPPORT SYSTEM

Description. This work shall consist of the design, fabrication, furnishing, erecting and subsequent removal of temporary support system at the location shown on the plans. The Contractor shall submit complete design details and calculations sealed by an Illinois Licensed Structural Engineer to the Engineer for structural review and approval. Such approval shall in no way relieve the Contractor of responsibility for the safety of workers and the structure. Prior to ordering any materials for construction, the Contractor shall field verify all existing dimensions and elevations as required for the successful installation of the temporary shoring system. After the support system herein specified is no longer required, it shall be completely removed. All materials shall become the property of the Contractor.

Basis of Payment. This work shall be paid for at the contract unit price per each for TEMPORARY SUPPORT SYSTEM which shall include support for both existing box culvert cells at a Stage Line.

CONSTRUCTION LAYOUT SPECIAL UTILIZING GPS EQUIPMENT

Effective: April 1, 2017

If the Contractor opts to utilize GPS equipment for Construction Layout, the Contractor shall be required to complete the following in addition to the requirements of the Recurring Special Provision Check Sheet #9 of the Standard Specifications and as directed by the Engineer.

1. Submit 3D drawings or show the Engineer the digital terrain model (or proof of some type) that the Contractor has generated all proposed information correctly for all parts of the job (mainline, ramps, side roads, entrances, etc.) before starting any grading, structures or paving work. This does not relieve the Contractor of responsibility of any possible errors made in the modeling.

2. The Contractor shall also submit a written QC/QA plan that they must follow to provide quality control on the actual layout and quality assurance checks of the layout during and after construction. This shall be submitted prior to the start of construction and shall meet the approval of the Engineer.
3. The Engineer may perform spot checks of the machine control grading results, surveying calculations, records, field procedures, and actual staking. If the Engineer determines the work is not being performed in a manner that will provide accurate results, the Engineer may order such work to be redone, to the requirements of the contract documents, at no additional cost to the Department.
4. The Contractor shall check and recalibrate their GPS rover system as needed.
5. The Contractor shall establish secondary control points at appropriate intervals and at locations along the length of the project and outside the project limits and/or where work is performed beyond the project limits as required at intervals not to exceed 1000 feet (300 m). Determine the horizontal position of these points using static GPS sessions or by traverse connection from the original baseline control points. Establish the elevation of these control points using differential leveling from the project benchmarks, forming closed loops. Provide a copy of all new control point information to the Engineer prior to construction activities. The Contractor is responsible for all errors resulting from their efforts. Correct all deficiencies to the satisfaction of the Engineer at no additional cost to the Department.
6. The Contractor shall preserve all reference points and monuments that are established by the Engineer within the project limits. Any reference points that have not been preserved shall be reestablished at no additional cost to the Department.

Construction Layout Equipment

General. The Contractor shall furnish articles of survey equipment to be used by the Department for independent monitoring and verification of construction layout stakes, reference points, and any other horizontal and vertical control set by the Contractor. All equipment will be for the exclusive use of the Department throughout the duration of the contract and will be returned to the Contractor at the end of the contract.

Equipment. The equipment to be furnished by the Contractor shall consist of one precision GNSS rover and a secondary GPS handheld controller. The precision GNSS rover must meet or exceed the capabilities of, and be compatible with the Contractor's equipment and meet the approval of the Engineer. The secondary GPS handheld controller shall also meet or exceed the capabilities of, and be compatible with the Contractor's equipment and meet the approval of the Engineer. The equipment provided shall include all software, data and any additional equipment (base station, repeaters, etc.) necessary to find any point on the project in station, offset and elevation with precision. The Contractor will be required to supply the Department Windows-based software capable of downloading project data from the GPS handheld controller. The project data included in the equipment will be consistent with the data used by the Contractor for layout and grading. Any data revisions or software updates to the Contractor's equipment will also be applied to the Department's equipment by the Contractor.

The Contractor will be responsible for providing training for three members of the Department's staff on use of the equipment and software. The Contractor shall provide one person to the Engineer who will be able to answer any questions and offer any necessary technical support at any point of the project.

Method of Measurement. This work will be measured as lump sum.

Basis of Payment. This work shall be paid for at the contract lump sum price for CONSTRUCTION LAYOUT (SPECIAL). If the Contractor elects not to utilize GPS equipment for the use of construction layout then requirements of the Recurring Special Provision Check Sheet #9 shall be followed and will be paid for at the contract lump sum price for CONSTRUCTION LAYOUT (SPECIAL).

CABINET, MODEL 334

Description. Work under this item shall consist of furnishing and installing a model 334 cabinet for field equipment including fiber optic communications, and changeable message signs, as shown on the plans and as hereinafter provided.

Materials

General. Cabinet, model 334 shall be an aluminum durable, weatherproof enclosure, constructed of 3/16 in. thick aluminum that shall be UL listed and tested for UL752 Level 3 with a nominal thickness of 1/2 inch maximum and a nominal weight of 5.0 lbs. per square foot maximum. The cabinet shall have nominal outside dimensions of 66 in high by 24 in wide by 30 in deep. Cabinet, model 334 shall consist of the following components: double door each equipped with a lock for front and rear cabinet entry, housing, mounting cage, service panel, thermostatically controlled fan, all necessary mounting hardware and wiring, and other equipment as shown on the plans and specified in these special provisions.

All bolts, nuts, washers, screws, hinges, and hinge pins that are subject to corrosion shall be stainless steel unless otherwise specified. All equipment under this item shall be in accordance with Section 1074.03 of the Standard Specifications, except as modified herein.

Cabinet Components. The housing and the mounting cage assembly shall conform to those of the model 334 cabinet provisions of the "Traffic Signal Control Equipment Specifications" (TSCES) issued by the state of California's Department of Transportation and to all addenda thereto current at the time of project advertising. The housing shall be rainproof with the top of the enclosure crowned to prevent standing water. All exterior seams for the enclosure and doors shall be continuously welded and shall be smooth. The housing shall have no provisions for a police panel or door.

The cabinet shall have single front and rear doors, each equipped with a lock. The enclosure door frames shall be double flanged out on all four sides and shall have strikers to hold tension on and form a firm seal between the door gasketing and the frame. The front and rear doors shall be provided with catches to hold the door open at both 90° and 180° ±10°. Gasketing shall be provided on all door openings and shall be dust tight. For horizontal support and bolt attachment, cage bottom support mounting angles shall be provided on either side level with the bottom edge of the door.

The latching handles on the doors shall have provisions for padlocking in the closed position. When the door is closed and latched, the door shall be locked. The locks and handles shall be on

the right side of the front door and the left side of the rear door. The lock and lock support shall be rigidly mounted to the door. The locks shall be Corbin #2, and two keys shall be supplied to the Department with each lock. The keys shall be removable in the locked position only.

The front and rear doors shall be provided with louvered vents. A removable and reusable air filter shall be housed behind the door vents. The filter filtration area shall cover the vent opening area. The filter shell shall be provided so that it fits over the filter providing mechanical support for the filter. The shell shall be louvered to direct the incoming air downward.

The intake (including filter with shell) and exhaust areas shall pass a minimum of 60 cubic feet of air per minute for housing #1 and 26 cubic feet of air per minute for housing #2. The thermostatically controlled fan with ball or roller bearings shall be mounted within the housing and vented. The fan shall provide a capacity of at least 150 cubic feet of free air delivery per minute of ventilation. The fan shall be thermostatically controlled and activated when the temperature inside the cabinet exceeds 75°F and shut off when the temperature is less than 64°F. In addition, the fan shall be manually adjustable for automatic turn on and off. The fan circuit shall be protected at 125% of the fan motor ampacity.

The housing shall, also, be equipped with a heating element installed in the bottom front of the cabinet and mounted along the side of the rack. The heating element shall draw 500 watts and have an output of at least 1,700 BTU/hr. The heater shall have a built-in quick response thermostat with sealed contacts that has a temperature control range of 40°F to 100°F and have a built-in thermal cut-off to automatically shut-off the heater in the event of overheating.

All subassemblies shall be mounted in removable 19 in EIA self-standing rack assemblies. The EIA rack portion of the cage shall consist of two pairs of continuous, adjustable equipment mounting angles that comply with Standard EIA RS-310-B. The cage shall be centered within the cabinet and bolted to the cabinet at four points.

Each cabinet shall be equipped with two shelves and one slide out keyboard tray. Shelves shall be the full width of the rack and 12" in. deep. The shelves shall be designed to support a minimum of 50 pounds.

The cabinet shall be equipped with one rack mounted 96 fiber enclosure equipped with 96 single mode ST ferrules.

Each cabinet shall be equipped with one LED lighting fixture mounted to the inside top front portion of the cabinet. The fixture shall operate from a normal power factor, UL listed cold weather ballast. A door-activated switch shall be installed to turn the cabinet light on when the front door is opened. The door switch shall be on a separate circuit by itself and used only to turn on the cabinet light.

Each cabinet shall be supplied with a heavy-duty plastic envelope to store plans, wiring diagrams, schematics, etc. This envelope shall have metal grommets so that it hangs from the door hooks. The envelope shall have minimum dimensions of 10 in x 15 in.

Foundations shall conform to Article 878 of the Standard Specifications and as shown on the plan sheets.

Construction Requirements. The Contractor shall deliver the cabinet mounted on a plywood-shipping pallet that is bolted to the cabinet base. The cabinet shall be enclosed in a slipcover cardboard packaging shell. The housing doors shall be blocked to prevent movement during transportation to the site.

The Contractor shall securely fasten the cabinet on the new concrete foundation at the locations shown on the plans. The Contractor shall confirm the orientation of the cabinet, model 334 installation and its front door side with the Engineer prior to installation. Stainless-steel bolted connections shall be provided with lock-washers, locking nuts, or other approved means to prevent the connection nuts from backing off. Dissimilar materials shall be isolated from one another by stainless-steel fittings.

The Contractor shall make all power connections to the cabinet in accordance with the plans and as required. The neutral bus shall be isolated from the cabinet and equipment ground. It shall terminate at the neutral lug ultimately attached to the meter pedestal. All conductors used in the cabinet wiring shall terminate with properly sized non-insulated (if used, for DC logic only) or clear insulated spring-spade type terminals except when soldered to a through-panel solder lug on the rear side of the terminal block or as specified otherwise. All conductors, except those which can be readily traced, shall be labeled. Labels attached to each end of the conductor shall identify the destination of the other end of the conductor. Cabling shall be routed to prevent conductors from being in contact with metal edges. Cabling shall be arranged so that any removable assembly may be removed without disturbing conductors not associated with that assembly.

Cabinet Acceptance. Test In addition to the environmental and design approval tests specified in the FHWA Type 170 Traffic Signal Control System Hardware Specification, the following water spray test shall be performed for each type of cabinet:

Spray water from a point directly overhead at an angle of 60° from the vertical axis of the cabinet. Repeat for each of eight equally spaced positions around the cabinet for a period of five minutes in each position. The water shall be sprayed using a domestic type sprinkling nozzle at a rate of not less than 10 gal/min minute per square foot of surface area. The cabinet shall then be inspected for leakage. Evidence of water leakage shall be cause for rejection.

Documentation. Shop drawings and wiring showing the proposed layout of each type of cabinet shall be submitted to the Engineer for approval prior to the start of fabrication. Wiring lists for the internal manufacturer cut sheets for all electrical equipment included in each type of cabinet shall be included in the submission.

Four copies of drawings showing the wiring for each cabinet shall be provided. One copy shall be placed in the clear plastic envelope furnished as part of the cabinet. The other three copies shall be delivered to the Engineer.

Warranty. The Contractor shall warranty all materials and workmanship including labor for a period of two years after the completion and acceptance of the installation, unless other warranty requirements prevail. The warranty period shall begin when the Contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. The warranty shall warrant and guarantee repair of the component parts of the Cabinet Model 334 furnished by the Contractor that prove to be defective in workmanship and materials during the first two years of operation as defined and noted above at no additional cost to the Department.

The Engineer will notify the Contractor that a warrantied item needs repair. The Contractor shall acknowledge the notification within 24 hours and replace or correct any part or parts of materials and equipment that are found defective within the two-year in-service warranty period. All items

needing repair shall be returned to the Department in two weeks from the date of receipt at the Contractor's facility or replaced in-kind by the Contractor, and the Contractor shall be responsible for any return shipping costs. No compensation will be made to the Contractor for such replacements or corrections.

The Contractor shall provide a warranty certificate for this item and its related components to the Department. The Department reserves the right to transfer this service to other parties who may be contracted with in order to provide overall maintenance of this item.

Method of Measurement. Cabinet, model 334 will be measured as each unit completely installed and operational.

Basis of Payment. This work shall be paid for at the contract unit price per each for CABINET, MODEL 334, which price shall be payment in full for furnishing, installing, and testing the cabinet and all connections and for all labor, tools, equipment, transportation, and incidentals necessary to complete this item of work.

NOISE ABATEMENT WALL, STRUCTURE MOUNTED

General. This work shall consist of furnishing the design, shop drawings, materials, post anchorage, and construction of structure mounted noise abatement walls (noise walls) according to this Special Provision, the Contract Plans and/or as directed by the Engineer.

The noise abatement wall shall consist of transparent panels spanning between vertical posts attached to/supported by another structure (structure mounted) as shown on the plans. The posts shall be steel, unless otherwise specified on the Contract Plans. The design, material, fabrication and construction shall comply with this Special Provision and the requirements specified by the noise wall supplier selected by the Contractor for use on this project. The walls shall have no omissions or gap except as detailed in the Contract Plans.

The Contractor shall verify the locations for the proposed structure mounted wall for conflicts and inform the Engineer in writing of any conflicts before realigning or redesigning the wall. The Contractor shall realign or redesign the wall to avoid any conflicts.

Wall components shall be fabricated and erected to produce a reflective noise wall system and/or an absorptive noise reduction system at the locations shown in the Contract Plans. The noise reduction system shall satisfy the acoustical requirements as specified on the Contract Plans. An absorptive noise reduction system may be used as an alternate to a reflective noise wall system. Substitution of alternate materials in lieu of transparent panels will not be allowed.

All appurtenances behind, in front of, under, over, mounted upon, or passing through the noise wall, such as drainage structures, fire hydrant access, highway signage, emergency access, utilities, and storm sewers shall be accounted for in design of the wall.

The noise walls shall be designed and constructed to extend to the minimum lines, grades and dimensions of the wall envelope, with no omissions or gaps, as shown on the Contract Plans and as directed by the Engineer.

Submittals. A complete wall design submittal, including design calculations for wall panels, posts, and all connections and shop drawings shall be submitted to the Department for review and

approval no later than 90 days prior to beginning construction of the wall. Approval shall be contingent upon acceptance by the utilities and/or railroad companies involved. The time required for the preparation and review of these submittals shall be charged to the allowable contract time. Delays caused by untimely submittals or insufficient data will not be considered justifications for any time extensions. No additional compensation will be made for any additional material, equipment or other items found necessary to comply with the project specifications as a result of the Engineer's review. The Contractor will be required to submit the necessary shop drawings. All submittals shall be prepared and sealed by an Illinois Licensed Structural Engineer.

Submittals shall include all structural calculations, details, dimensions, quantities and cross sections necessary for the construction of the noise abatement walls including but not be limited to:

- (1) Structural design calculations for all structural members, and connections prepared and sealed by an Illinois Licensed Structural Engineer, and prints of shop drawings on reduced size 11 x 17 in. (275 x 425 mm) sheets. Each sheet shall provide adequate space for review and approval stamps at the lower right-hand corner. Both lettering and details shall ensure legibility for review and reproduction. All drawings shall be completely titled according to the contract plans including structure number, state contract number, route, section, and county, and shall pertain to only one structure.
- (2) A plan view of the wall indicating the stations and offsets required to locate the wall.. Each panel and post shall be numbered and any changes in type or size shall be noted. The centerline of any utilities passing under the wall and locations of expansion joints, access doors, lighting, signing, curb cuts, and drainage structures shall also be shown.
- (3) An elevation view of the wall, indicating the elevations of the top of the posts and panels as well as the elevations of the bottom of the panels, all steps in wall system, the finished grade line, and vertical clearances to existing utilities and storm sewers. Each post size and length, panel type and size, shall be designated.
- (4) A typical cross section(s) that shows the panel, post, and the elevation relationship between the supporting structure and the finished grade as well as slopes adjacent to the wall.
- (5) All general notes required for constructing the wall.
- (6) All details for the steps in the bottom of panels shall be shown. The bottom of the panels shall be located at or below the theoretical bottom of panel line shown on the Contract Plans. The theoretical bottom of panel line is assumed to be at the top of the structure to which it is mounted, unless otherwise shown on the Contract Plans.
- (7) Tops of the panels and posts shall extend to or above the theoretical top of wall line shown on the Contract Plans. All panel tops shall be cast and placed horizontally with any changes in elevation accomplished by stepping adjacent panel sections at posts. Steps shall not exceed 2 ft (300 mm) in height.
- (8) All panel types shall be detailed. The details shall show panel weight, orientation, all dimensions necessary to fabricate each type of panel, and location of post or foundation connection hardware as well as lifting devices attached to the panels. The Noise Reduction Coefficient (NRC) of each panel of the absorptive face shall be noted.

- (9) All post types shall be detailed. The details shall show post weight, orientation, all dimensions necessary to fabricate each type of post, connecting plates, and anchorage details as well as lifting devices attached to the posts. Post spacing for walls shall be limited to a distance that does not over stress the supporting structure.
- (10) Details of wall panels with appurtenances attached to or passing through the wall, as shown on the contract plans, such as utilities, emergency access doors, framed openings, drainage structures, signs, etc. shall be shown. Any modifications to the design or location of these appurtenances to accommodate a particular system shall also be submitted.
- (11) All architectural panel treatment, including color, texture and patterns shall be shown. All joints shall be placed horizontal or vertical and shall be aligned with adjacent panels.
- (12) The details for the connection between panels and posts as well as their connection to the supporting structure shall be shown. Details shall account for the thermal movement of the structure to which the noise wall is mounted.
- (13) Testing, certifications and reports from independent laboratories documenting that the panel's sound Transmission Loss (TL) and NRC for the panel satisfy the criteria shown in the design criteria section of this specification. The testing results for the flame spread, smoke density and freeze-thaw/salt scaling requirements described in the materials section of this specification shall also be submitted. If unable to document panel and post deflections by calculations, reports of full scale testing shall be submitted to demonstrate the deflection criteria have been met.
- (14) Manufacturer recommended installation requirements, a sequence of construction and a detailed bill of materials shall be included.
- (15) The design of the structure mounted noise walls that will interface with ground mounted noise walls shall be coordinated with the ground mounted noise wall supplier. The length of panel at the interface shall be detailed so that the overall wall geometry can be met. All applicable loads that the structure mounted noise wall may impart to the ground mounted noise wall shall be clearly outlined in the structure mounted noise wall calculations and coordinated with the ground mounted noise wall supplier, so that the ground mounted noise wall foundation will be designed to resist these loads.

The Contractor shall deliver to the Department, a 2 ft x 2 ft (600 mm x 600 mm) sample of the wall which contains the colors, textures and patterns proposed for use on the project for approval.

The samples shall be made at the same plant manufacturing the product for the noise walls under this contract, and shall be representative of those which will be tested per this specification. Once the color sample is approved, a batch shall be designated by batch number and date and will remain the standard for the entire project.

The Contractor shall submit site access plans showing access and limits of the work areas for the installation of the wall. Any required traffic controls shall be according to the requirements in the plans or the special provision for TRAFFIC CONTROL PLAN.

The initial wall and anchorage design submittal shall include three (3) sets of shop drawings and calculations. One set of drawings will be returned to the Contractor with any corrections indicated.

The Contractor shall do no work or ordering of materials for the structure until the Engineer has approved the submittal.

Manufacturers/suppliers shall have a minimum 5 year history of providing products that meet this specification.

The manufacturer shall provide facilities and qualified personnel to perform all specification tests and maintain an acceptable quality control program. An acceptable program is one that meets the requirements of QS 9000 and ISO 9002. To ensure total quality, all manufacturers shall provide proof of compliance for the production of noise barrier panels.

Design Criteria. The wall system shall be designed to withstand wind pressure, applied perpendicular to the panels in either direction, according to the AASHTO LRFD Bridge Design Specifications, Chapter 15, for the Design of Sound Barriers. The noise wall design life shall be 75 years unless otherwise noted. The wall system shall be designed to withstand any active earth pressure and live load surcharge at locations indicated on the plans. The contractor shall be responsible for the structural adequacy of the panels, posts, and connections.

The factored Strength III design wind loading shall be as specified on the plans but not less than 35 psf (1.7 kPa). The factored Service I design wind loading shall be as specified on the plans but not less than 15 psf.

The post spacing for structure mounted noise walls shall be as shown on the plans but in no case greater than 11 ft. – 8 in. (3.5 m) center to center.

Posts shall be oversized by 0.0625 in. in each direction to account for corrosion.

The maximum allowable panel deflection shall be no more than the panel length (L) divided by 60 (L/60) under service wind loading and 3 in. under factored wind loading. The maximum post deflection due to post curvature shall be (H/180), where H is the height of the post above the foundation. For noise abatement walls on retaining walls, the maximum total post deflection due to post curvature, retaining wall curvature, and top-of-retaining-wall rotation shall be H/90. When meeting the deflection limits cannot be demonstrated by calculations, a lateral load test and report shall be submitted to the Engineer indicating that the above noted design lateral loads can be applied to the panels and/or posts without exceeding noted deflection tolerance. The test shall apply lateral loads to the panel simulating uniform wind pressure, and earth pressure when present.

The design shall account for the presence of all appurtenances mounted on or passing through the wall such as drainage structures, existing or proposed utilities, emergency access doors and other items.

Corrugations, ribs or battens on the panel shall be oriented vertically when erected. The panels shall be designed to prevent entrapment and ponding of water. The walls shall not have openings allowing the perching or nesting of birds or the collection of dirt, debris or water.

The walls shall not have handholds or grips promoting climbing of the walls. Any bolts or fasteners used to connect material to the supporting panel, posts, or foundations shall be recessed, hidden from view and weather exposure. No external mechanical fastening devices such as frames or clips shall be used for these connections.

The noise abatement material shall be designed to achieve a sound TL equal to or greater than 20 dB in all one-third octave bands from 100 hertz to 5000 hertz, inclusive, when tested according to ASTM E-90. The sound absorptive material shall have a minimum NRC as indicated on the plans. For the side of the walls specified as reflective, no minimum NRC is required.

The NRC shall be determined per ASTM E795, tested according to ASTM C423 (mounting type A). The ratio of noise absorptive material on the panel surface to total wall area (including posts) shall be greater than 90 percent.

The incremental total weight of the system as installed shall not exceed 325 pounds per lineal foot.

Access Doors. All access doors shall be designed to fit within the design of the noise wall as shown on the plans. Doors shall be complete with hardware and locking devices. Each door shall provide a 3 ft (0.9 m) wide by 7 ft (2.1 m) high minimum clear access opening. Both door jambs shall be securely fastened to anchored posts. Front and back face of the installed door shall be flush with the faces of the noise wall.

Perimeter and internal door frames shall consist of welded hot dip galvanized steel channels and miscellaneous angle stiffeners and plates designed to provide support for noise wall panels to match the noise wall material as specified in this special provision. Infill noise panel geometry and color shall match the adjacent noise wall panels. Noise wall panels shall be fastened to steel frames as per panel manufacturer's recommendations.

The door, jambs, head, hinges, door appurtenances, and adjacent ground mounted posts shall be designed to withstand the wind pressure of 30 psf (1.4 kPa) with the door in fully open and fully closed positions and support the weight of the door and a 300 lb (136 kg) vertical load on the non-hinged side of the door. Provide steel bracing as required. Door bottom shall be equipped with drainage holes to avoid accumulation of trapped moisture.

Door jambs and head section shall be hot dip galvanized steel. Door hinges shall be barrel type, edge mount, extra heavy-duty, hot dip galvanized steel or stainless steel. The hinges shall be designed to support the weight of door assembly, wind loads on the open door, and a 300 lb (136 kg) vertical load on the non-hinged side of the door.

Door pulls shall be provided on both sides of access door(s). Door locking hardware shall be hasp-type to be used with a padlock and shall be located according to local fire department or other requirements as applicable. A solid steel emergency access lock box system shall be provided and mounted near the hasp location at the steel post on the locking hardware side of door. The lock box for emergency access doors shall be according to local fire department requirements.

Doors shall be equipped with lifting bolts or beams as required for safe lifting of door units.

Materials. Noise wall materials shall conform to the supplier's standards, AASHTO Specifications for noise walls and the following:

- (a) Noise Barrier Panel:

1. Color and finish: The noise barrier panel shall be transparent with no tint. The paint color for structural steel components shall match those in adjacent ground-mounted noise abatement walls.
2. Dimensions: Dimensions of the noise barrier panel shall be specified by the applicable drawings. Unless otherwise specified, the tolerance on length and width dimensions for the panel shall be -0, +0.125".
3. Impact Resistance: In order to withstand impacts of stones thrown up from the road surface the noise barrier panel shall meet the requirements of EN 1794-1, Appendix C.
4. Danger of Falling Debris: The noise barrier panel shall obtain a Class 4 rating (no fragments) when tested in accordance with EN 1794-2, Annex B.
5. Glazing Requirements: The noise barrier panel shall comply with the requirements of ANSI Z97.1 as a safety glazing material.
6. Resistance to Roadside Chemicals: The noise barrier panel shall be resistant to standard de-ice chemicals such as: calcium chloride, magnesium chloride, potassium acetate, calcium/magnesium acetate and sodium acetate.

Supplier shall show documentation of the chemical resistance properties of the panels. Panels should be able to withstand direct exposure to the chemical for a period of not less than 24 hours. Panels should be exposed to the chemicals at 100 percent (undiluted) strength.

7. Fire Resistance: The noise barrier panel shall be manufactured from fire retardant material that meets state and local requirements. Panels shall have a smoke density rating less than or equal to 20% when tested in accordance with ASTM D2843 and a burning rate less than or equal to 0.8 in/min when tested in accordance with ASTM D635.
8. Resistance to Fungi: The noise barrier panel shall undergo testing in accordance with ASTM G21 and have a zero rating, show no signs of fungi growth, after the standard 28-day test period.
9. Glare: The Supplier shall provide documentation that the panel material does not cause glare to roadway or rail traffic due to sunlight or headlights.
10. UV Resistance: The supplier shall provide documentation confirming that the material used for the noise barrier panels is resistant to ultraviolet deterioration and degradation within the minimum service life.
11. Wildlife Protection: When the specified panel is transparent, the product shall provide for protection against birds inadvertently striking the panels in flight.

The Supplier shall show documentation of the effectiveness of the means for wildlife protection. This shall be a test report or testimonial from an independent authority

including but not limited to a Department or Ministry of Transportation, testing facility or other entity deemed acceptable.

12. Optical Requirements: The noise barrier panels shall have light transmission greater than 90%, haze less than 1.5%, and a yellowness index less than 1 when tested in accordance with ASTM D1003. Following ten years of outdoor weathering or accelerated weathering in accordance with ASTM G155 for a period of 10,000 hours, the panel shall show no evidence of cracking or crazing and have light transmission greater than 90%, haze less than 10%, and a yellowness index less than 7 when tested in accordance with ASTM D1003. In addition, the flexural modulus after weathering shall be greater than 70% of the initial value when testing in accordance with ASTM D790.
- (b) Steel plates and posts shall conform to AASHTO M 270 (M 270 M) Grade 36 (250) or 50 (345). All portions of the post shall be galvanized according to AASHTO M111 and ASTM A385 or primed according to Section 506 of the Standard Specifications. The exposed portions of the steel posts shall be painted according to Section 506 of the Standard Specifications. The adjacent panels shall be protected from over spray. Steel bolts, nuts, and washers shall be galvanized according to AASHTO M232.
- Bolts and washers: ASTM A 325, A 307, A193 Grade B7, or A449
Tube: A 500 Gr. B
- (c) Welding: Welding materials shall be in accordance with the American Welding Society (AWS), structural welding code, D1.1. Welders will be certified in accordance with AWS D1.1.
- (d) Source: Materials will be supplied by one of the following or an approved equal meeting all the requirements of this specification:
- Durisol, 313 Trindale Road, Suite C, Archdale, NC 27263, 1-866-801-0999
- Superior Transparent Noise Barriers LLC, 2206 Horseshoe Pike, Honeybrook, PA 19344, 1-866-611-6044
- (e) Anchor bolts shall conform to ASTM F1554 Grade 55 or 105 and shall be galvanized per AASHTO M232.
- (f) The manufacturer for the noise abatement wall shall provide their quality control plan for testing the product, and test results shall be provided upon request by the Engineer. The panel manufacturer shall warranty the panels for aesthetics and no material failures for a minimum of ten years.
- (g) Non shrink grout shall be according to Section 1024 of the Standard Specifications.

Construction. The Contractor shall obtain technical assistance from the supplier during wall erection to demonstrate proper construction procedures and shall include any costs related to this technical assistance in the contract unit price for Noise Abatement Wall. The instructions provided

by the wall supplier are guidelines and do not relieve the contractor of the responsibility to adhere to contract requirements.

It is recommended that all bottom panels be installed for a length of wall prior to placing middle or top panels. After bottom panels are in-place, finish grading can be accomplished with heavy equipment by reaching over the in-place panels.

The Contractor should consider overhead obstruction such as electric and telephone wires prior to wall erection.

The panels shall be delivered to the project site in full truckload quantities. They may be off-loaded individually or by forklift with a solid steel plate spanning between the forks providing uniform, fully distributed bearing support to the underside of the panels. Units shall be shipped, handled and stored per the manufacturer's recommendations in such a manner as to minimize the danger of staining, chipping, development of cracks, fractures, and excessive bending stresses. Any touch up and repair is at the Contractor's expense and shall be carried out according to the manufacturer's recommendations.

Method of Measurement. Noise abatement walls will be measured in square feet (square meters) from the wall envelope, defined by the theoretical top of wall line to the theoretical bottom of wall line for the length of the wall as shown on the Contract Plans.

Access doors shown on the Contract Plans will not be measured for payment. The presence of access doors will not be used to reduce the area of the noise abatement wall.

Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for NOISE ABATEMENT WALL, STRUCTURE MOUNTED. The costs of aesthetic treatments, noise reduction treatments, access doors, weep holes, or other details within the wall panels will not be paid for separately but will be included in the cost of NOISE ABATEMENT WALL, STRUCTURE MOUNTED.

TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN

Description. This work consists of providing and installing the truss mounted LED dynamic message sign (TMDMS) as described within these special provisions and as directed by the Engineer. Truss mounted dynamic message sign assembly includes the TMDMS enclosure, communication cables, conduits, and associated mounting hardware and software as described in these special provisions and as shown on the contract plans. It also includes operational TMDMS software that remotely provides access to the functionality and performance specified herein.

TMDMS Manufacturer Qualifications. The TMDMS manufacturer shall submit references as specified below. Reference data shall include current name and address of organization and the current name and telephone number of an individual from the organization who can be contacted to verify system operation, as well as date of system installation.

Experience Requirements. The TMDMS manufacturer shall submit at least two references, preferably from other state departments of transportation, that are successfully operating a highway LED full matrix TMDMS system supplied by this manufacturer under the current corporate name which otherwise meets this specification for a period of no less than two years.

The LED TMDMS systems submitted shall be full-matrix and able to display at least three lines of 18 characters per line, 18" characters, and have walk-in access housings.

References. The TMDMS manufacturer shall submit three references, preferably from other state departments of transportation, that are successfully operating a multi-unit, multi-lane state or interstate highway, permanently-mounted overhead dynamic message sign system supplied by this manufacturer under the current corporate name for a period of no less than five years.

Materials

General. The TMDMS shall be a full matrix full color LED display (32,000 distinct colors using red, green, and blue LEDs) in a walk-in weatherproof cabinet. The TMDMS shall provide approaching motorists with a clear readable message in all normally encountered weather and lighting conditions. The TMDMS shall be capable of displaying messages with three lines, 21 characters per line, at an 18-inch character height.

The sign shall be designed for a minimum life of 20 years.

All materials furnished, assembled, fabricated, or installed under this item shall be new, corrosion resistant, and in strict accordance with the details shown in the plans and as detailed in this specification. All details and functionality listed in this specification will be thoroughly inspected and tested by the Department. Failure to meet all details and functionality detailed in this specification shall be grounds for rejection of the equipment.

The equipment design and construction shall utilize the latest available techniques with a minimum number of different parts, subassemblies, circuits, cards, and modules to maximize standardization and commonalty. The equipment shall be designed for ease of maintenance. All component parts shall be readily accessible for inspection and maintenance. Test points shall be provided for checking essential voltages.

The sign shall be designed and constructed to present a clean and neat appearance. All cables shall be securely clamped/tied in the sign housing. No adhesive attachments will be allowed.

The performance of the sign shall not be impaired due to continuous vibration caused by wind, traffic, or other factors. This includes the visibility and legibility of the display.

The TMDMS hardware, along with the sign controller hardware, software, and firmware, shall support all TMDMS functionality described throughout the remaining specification sections.

The TMDMS assembly shall be listed by an accredited 3rd party testing organization for conformance to UL Standards 48 (Standard for Electric Signs) and 1433 (Control Centers for Changing Message Signs). Proof of this conformance shall be provided with submittal materials.

Environmental Requirements. The TMDMS shall withstand the following environmental conditions for 24 hours or more with no functional or performance degradation, permanent deformation, or other damages:

Temperature: -40 to +140°F (-40 to 60°C)

Humidity: 0 to 100 %

Wind: To at least 90 mph with a 30% gust factor

Ice: Front face ice load of 4 pounds per square foot

All field equipment enclosures shall be designed to withstand the effects of sand, dust, and hose-directed water. All connections shall be watertight.

Functional Requirements. The TMDMS shall be capable of accepting commands, displaying messages, and returning status as required by the current version (v2) National Transportation Communications for ITS Protocol (NTCIP) Specifications applicable for TMDMS and as specified in these special provisions. The TMDMS shall communicate without error for all of the applicable NTCIP standards and be compliant with all applicable NTCIP standards for TMDMS. The TMDMS shall support all mandatory objects of all mandatory conformance groups of NTCIP for TMDMS.

The TMDMS shall enable the display of text consisting of a string of alphanumeric and other characters. Each character shall be formed by a matrix of luminous pixels. The matrix of a standard character shall consist of 35 pixels over five columns and seven rows. Each TMDMS shall be minimum 54-pixel high x 250-pixel wide (with pixel pitch range from 20mm to 35mm), full matrix, and capable of displaying three lines of text using a standard 5 wide x 7 high font size. All display elements and modules shall be solid state. No mechanical or electromechanical elements or shutters shall be used.

All characters, symbols, and digits shall be 18" nominal character size and shall be clearly visible and legible at a distance of 1100' within a minimum 30° cone of vision centered around the optical axis of the pixel.

The sign shall be capable of displaying the following:

- A static message
- A flashing message
- Alternating messages, either flashing or static

The changing from one message to another shall be instantaneous.

For message creation, the TMDMS field controller and TMDMS control software shall support the storage and use of a minimum of three alphanumeric character font files comprising the ASCII character set and including eight directional arrows. Software shall provide the ability to create and maintain message libraries containing up to 255 messages.

The sign shall be able to reproduce standard MUTCD colors per 23 CFR 655. These colors include:

- Black (no pixels on)
- White
- Blue
- Brown
- Green
- Light Blue
- Orange
- Purple
- Red
- Yellow
- Fluorescence Pink
- Fluorescence Yellow-Green

Software. The Contractor shall supply three licenses of remote control and sensing software used to control and interrogate the signs. This software shall provide inter-operability with all other signs supplied under this contract and shall be designed to run on a workstation under Windows 10 and Windows Server 2016, either remotely using the communications link connected to the TMDMS or locally from a laptop computer connected to the sign controller communications port. The software shall display the message to be downloaded to operators exactly as it will appear on the destination TMDMS and shall provide verification back to the operators that the actual message has been visibly displayed on the destination TMDMS on an individual pixel basis.

The software shall include functionality for message scheduling (based on date and time), message priority queuing, and DMS diagnostics.

The software shall be capable of sending multiple messages to multiple signs based on a user programmable time schedule. Communications shall be by cellular wireless service. The cellular modem and service will be paid for under a separate pay item.

TMDMS control software shall support the creation of user ID's and passwords for up to 25 potential system users. User creation, as well as individual user access rights, shall be assignable only by a system administrator.

Before a system operator can use the TMDMS control software, the software shall request a username and user password. If the correct username and password are not provided, access to the software shall be declined.

An 8-bit identification code shall be assignable to each controller via switches located inside the controller enclosure. The software shall control a network of at least 250 variable message signs. The software shall have the following functionality:

Display Control:	<ul style="list-style-type: none"> • View, group, and monitor DMS in real time • Controls any NTCIP-compliant DMS (Any DMS configuration, portable NTCIP message displays) • Powerful list view or map view • Pre-schedule event scenarios • Scheduled status polling of DMS
Messaging:	<ul style="list-style-type: none"> • Full suite of message and graphic tools • Message changing depending on time and date • Adjust message duration and priority • Time based scheduled DMS polling
Communications:	<ul style="list-style-type: none"> • Run nearly unlimited signs at once from traffic management centers with client-server architecture • Supports Ethernet and serial (COM Port) connections • Supports modem pools

Diagnostics:	<ul style="list-style-type: none"> • Log events and alert TMC staff via email • Locate pixel failures instantly with an in-software visual representation test • View status, errors, and problem codes of all DMS subsystems • Verify and troubleshoot at the pixel level
Security:	<ul style="list-style-type: none"> • Real-time verification of "on" pixels • Username/password restricted access to functional areas • Built-in security levels for easy setup • Prohibited words list

In the event that the software is not capable of operating on a laptop that is connected directly to the DMS sign, the Contractor shall provide ten additional licenses of software that can be used in the field to manage the DMS and perform sign diagnostics.

The vendor shall furnish updated copies of all software during the warranty period at no charge to the Department.

Software Documentation. Full documentation for all software and associated protocols shall be supplied to the Department electronically. The Department reserves the right to provide this documentation to other parties who may be contracted with in order to provide overall integration or maintenance of this item.

Performance Requirements. TMDMS messages shall be clearly visible and legible from in-vehicle viewing distances between 150 and 1100 feet. While using an 18 in character height, the TMDMS shall be capable of simultaneously displaying up to 18 characters in each of three lines with spaces between characters, using 5 horizontal X 7 vertical (or larger) pixel matrices.

The TMDMS controller shall be capable of storing a minimum of 32 three-line full width messages. The controller shall be capable of downloading a minimum of eight additional messages and commands from the communications interface.

The sign shall provide a RS-232 communications interface in the sign control cabinet suitable for wireless, PSTN, cellular, and fiber optic communications with the sign controller. Additionally, an RS-232 serial port and Ethernet port shall be provided in the control cabinet for full sign operation by means of a laptop computer. Each serial port shall support data rates of 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, and 1200 bps.

Optical Requirements. All mandatory NTCIP sign functions shall be available and message effects shall be visible from the ground-mounted sign control cabinet.

The viewing angle of each discrete LED-formed pixel shall be a minimum cone of 30° around a line normal to the TMDMS viewing surface. The intensity of each pixel shall not decrease more than 30% over the 20-year life of the sign.

If pulse-width modulation is used for intensity control, the sign drive electronics shall use a refresh or repetition rate of 100 Hz or greater.

The TMDMS walk-in cabinet shall mount three or more light sensors, one angled in a northerly direction away from nearby lighting scaled for 100 lux and two normal to the sign face pointing in opposite directions scaled for 100,000 lux. Each sensor shall have an adjustable aiming angle. The TMDMS shall be capable of automatic dimming.

Characters Displayed. The sign shall be capable of displaying ASCII characters 32 through 126 and the following characters at any location in the message line:

- Interstate Shield Symbol
- "A" thru "Z"- All upper case letters.
- "0" thru "9"- All decimal digits.
- Space (i.e., ASCII code 0x20).
- Punctuation marks shown in brackets [., !? - ' ' " " / ()]
- Special characters shown in brackets [# & * +< >]
- 3-pixel wide dash

The separation between the last column of one display module and the first column of the next shall be equal to the horizontal distance between the columns of a single display module.

The characters shall be legible under all light conditions at a distance of 1100' within a 30° cone of vision centered around the optical axis of the pixel.

The sign shall be the proper brightness in all lighting conditions for optimum legibility. It shall be bright enough to have a good target value but not to the point where the pixels bloom, especially in low ambient light level conditions.

The brightness and color of each pixel shall be uniform over the entire face of the sign within the 15° cone of vision from 1100' to 200' in all lighting conditions. Non-uniformity of brightness or color over the face of the sign under these conditions shall be cause for rejection of the sign.

Electronic Materials and Components. All electronic components, except printed circuit boards, shall be commercially available, easily accessible, replaceable, and individually removable using conventional electronics repair methods. All electronic assemblies shall meet or exceed IPC 610A workmanship standards.

Each pixel shall have a device attached to the printed circuit board (PCB) to hold and protect the LEDs. These devices shall:

1. Hold the LEDs perpendicular to the display modules within 0.5°,
2. Prevent the LEDs from being crushed or bent during handling,
3. Protect the LEDs from damage when the display module is laid on the front surface (the side that the LED lamps are located),
4. Not put any stress on the LEDs due to differentials of expansion and contraction between the device and the LEDs over the herein specified temperature range,
5. Not become loose or fall off during handling or due to vibrations,
6. Not block airflow over the leads of the LEDs,
7. Securely hold each LED while allowing a gap between the device and a minimum of 95% of the body of each LED for airflow,
8. Not block the light output of the LEDs at the required viewing angle,

9. Be black in color to maximize contrast.

The LEDs shall be protected from the outside environmental conditions including moisture, snow, ice, wind, dust, dirt, and UV rays.

PCB design shall be such that components may be removed and replaced without damage to boards, traces, or tracks.

Only FR-4, 0.062-inch minimum thickness material shall be used. Intercomponent wiring shall be copper clad track having a minimum weight of 2 ounces per square foot with adequate cross section for current to be carried. Jumper wires will not be permitted except from plated-through holes to component. The maximum number of jumper wires allowed per circuit board is two. All PCBs (except for the power supply PCBs, UPS PCBs, modem PCBs and sign controller PCBs) shall be completely conformal coated with a silicone resin conformal coat.

All PCBs shall be finished with a solder mask and a component identifier silk screen.

Capacitors. The DC and AC voltage ratings, as well as the dissipation factor of a capacitor, shall exceed the worst-case design parameters of the circuitry by 50%.

A capacitor which can be damaged by shock or vibration shall be supported mechanically by a clamp or fastener.

Capacitor encasements shall be resistant to cracking, peeling, and discoloration.

Resistors. Any resistor shall not be operated in excess of 50% of its power rating.

Semiconductor Devices. All transistors, integrated circuits, and diodes shall be a standard type listed by EIA and clearly identifiable.

Connectors. All PCB edge connectors and cable connectors except for those found in the power supply, UPS, modem, and sign controller shall be base plated with nickel and finished with 30 micro-inches of gold.

Mechanical Components. All external screws, nuts, and locking washers shall be stainless steel. No self-tapping external screws shall be used. All parts shall be made of corrosion resistant materials, such as plastic, stainless steel or aluminum. All materials used in construction shall be resistant to fungus growth and moisture deterioration. Dissimilar metals shall be separated by an inert dielectric material.

Main Power Supply and Energy Distribution. The sign and its controller shall be designed for use on the following:

Power line voltage-120/240 VAC nominal, single-phase power, 40 amperes per leg. The system shall operate within a voltage range of 95VAC to 135VAC.

Frequency – 60Hz +/- 3Hz

Under normal operation, the drop in voltage between no load and full load of the sign and its controller shall not exceed 10% of the nominal voltage. The system shall be protected by transient suppression devices, including MOVs, RIS, and spark gap arrestor.

The system shall report any power failures to the main controller when system power returns.

Power protection shall be provided by a thermal magnetic circuit breaker associated with a 5-mA ground fault circuit interruption (GFI) device. A GFI device shall protect all service outlets.

The sign shall have a 40A two-pole (common trip) main, 120/240 VAC, single phase, four wire load center with 20 circuit capability. Each circuit in the sign shall be powered from a separate circuit breaker. The power cables shall be as required by the NEC for acceptable voltage drop to supply AC power to the sign. The power required for sign operation shall not exceed 7000 watts for the sign housing to include fans, heaters, sign controller, communication equipment, and all pixels illuminated at 100% brightness.

Two conduits shall connect the controller cabinet with the walk-in sign display, one for power and one for communications, unless communications between the two is by optical fiber.

The TMDMS manufacturer shall provide two earth ground lugs that are electrically bonded to the TMDMS housing. Lugs shall be installed near the lower left and lower right corners of the TMDMS housing's rear wall. The TMDMS installation contractor shall provide the balance of materials and services needed to properly earth ground the TMDMS to all four ground rods at each site.

The sign and controller shall be equipped with surge suppression circuitry for AC power conductors and external RS-232 data lines to protect them from electrical spikes and transients. The presence of power transients or electromagnetic fields, including those created by any components of the system, shall have no deleterious effect on the performance of the system.

The system shall not conduct or radiate signals which will adversely affect other electrical or electronic equipment, including (but not limited to) other control systems, data processing equipment, audio, radio, and industrial equipment.

Surge Protection. The system power shall be protected by two stages of transient voltage suppression devices including MOVs and spark gap arrestor. Tripping of each stage (or both if tripped simultaneously) of the surge protection shall cause the sign controller to report the error condition to the DMS remote monitoring software.

DMS Power Supplies. TMDMS shall be provided with redundant DC power supplies. These shall be rated for a minimum of 50% spare capacity over that required to light every pixel on a line to full intensity and shall automatically pick up the load if one unit fails while sending an error indication to the TMDMS controller. All electrical components operating on more than 24V shall be UL listed.

The power supplies shall be continuously monitored for proper operation by the sign controller. If the voltage drops below its nominal operating value, an error message shall be generated and transmitted to the DMS client software or laptop computer on site at the local control box location automatically.

Display Modules. Display modules consisting of nominal 18" high characters shall be assembled to form the specified full matrix message configuration. These circuit boards shall be designed

and constructed to allow a single service technician to troubleshoot, isolate, remove, and replace these boards with minimal impact to the overall operation of the sign.

All LED boards shall be fully interchangeable and not require any address switches or adjustment when interchanged or placed in service. Module addressing, where required, shall be accomplished in the connector. The DMS manufacturer shall document all LED testing for color so that replacement LED boards shall match existing color.

Pixel status and diagnostics shall include string failure, pixel failure, and failed pixel location (line, module, row, and column numbers). Replacement of a complete display module shall be possible using only simple hand tools. Interconnection of modules shall be through connectors only. All connectors shall be keyed to preclude improper hookups.

The display modules shall be approximately $\frac{3}{4}$ " behind the lens panel assembly.

LED and Pixel Characteristics. Each pixel shall be a maximum of 1-3/8" in diameter. The LEDs in each pixel shall be clustered to maximize long range visibility. The average light intensity of the LEDs in each pixel shall be 3 candelas minimum. All pixels in the sign shall have equal color and on-axis intensity. All pixels shall have a minimum on-axis intensity of 40 candelas @ 20 mA forward current with an overbright capability of 60 cd.

All pixels in all signs in this project, including the spare parts, shall have equal color and on-axis intensity. The pixel strings shall be powered from a regulated DC power source and the LED current shall be maintained at the LED manufacturer's specified nominal operating current to maximize life of the pixel. The failure of an LED in one string within a pixel shall not affect the operation of any other string or pixel. Pixel power drawn from the DC supplies shall not exceed 1.5 W per pixel, including the driving circuitry.

The LEDs shall be individually mounted directly to a PCB and shall be easily replaceable and individually removable using conventional electronic repair methods.

The LEDs shall be protected from the outside environmental conditions, including (but not limited to) moisture, snow, ice, wind, dust, dirt, and UV rays.

TMDMS pixels shall be constructed with discrete LEDs manufactured by the Toshiba Corporation, Agilent Technologies (formerly known as Hewlett-Packard), or an approved equivalent. Discrete LEDs shall conform to the following specifications:

- LED's shall be non-tinted, non-diffused, high-intensity, solid-state lamps that utilize AlInGAP OR InGaN semiconductor technology.
- LED lenses shall be fabricated from UV light resistant epoxy.
- The LED lens diameter shall be 0.2 inches.
- Red LEDs shall be AlInGAP with a peak wavelength of 626 nm.
- Green LEDs shall be InGaN with a peak wavelength of 525 nm.
- Blue LEDs shall be InGaN with a peak wavelength of 475 nm.
- LEDs shall be obtained from a one-bin luminous intensity sort.
- LEDs shall have a minimum half-power viewing angle of 15°.
- LED package style shall be through-hole flush-mount. LEDs with standoffs and surface mount LEDs will not be accepted.

- All LEDs used in all TMDMS provided for this contract shall be from the same manufacturer and have the same part number.

The sign shall have a minimum intensity of 12,400 cd/m².

All LED display modules, as well as the LED pixel boards and driver circuit boards, shall be identical and interchangeable throughout the TMDMS. LED arrays shall not share a circuit board with the display drive electronics but shall be easily connected and disconnected from the driver board using plugs, sockets, and simple hand tools while excluding soldering operations.

The state of the LEDs (full on or off) in each pixel of the sign shall be read by the sign controller when it is polled or when a message is downloaded from the DMS client software, existing ATMS software, or laptop computer on site at local control box location and shall allow the DMS client software or laptop computer on site at local control box location show the actual message that is visibly displayed on the sign in a WYSIWYG format including any full-out or fully stuck on pixels.

All PCBs, except the LED circuit board, shall be conformal coated. The LED board shall be conformal coated except at the pixels. All PCBs, including the LED circuit board, shall have a solder mask and a component identifier silk screen. The display modules shall be assembled in a full matrix configuration.

LED intensity shall be automatically adjusted to match ambient lighting conditions. This automatic control shall be provided with an override operated through the TMDMS controller communications channel.

Front face panels shall provide a high-contrast background for the TMDMS display matrix. The aluminum portion of each panel shall be painted black and shall contain a circular or square opening for each LED pixel. Openings shall be large enough to not block any portion of the LED-viewing angle.

The front panel shall be heated to prevent fogging and condensation. A minimum of eight watt-per-foot, self-regulating, heat tape shall be provided along the bottom of the message area, between the glazing and the display modules. The TMDMS controller shall control the heat tape. All heat tape terminal blocks shall be covered for safety.

Structural Requirements

Walk-in TMDMS Display Cabinet. The TMDMS display cabinet shall allow replacement of any display component from the walkway within the sign excluding the sign display cover. The removal of any display module shall not reduce the structural integrity of the walk-in cabinet.

The maximum weight of the TMDMS display and walk-in enclosure shall not exceed 4000 lb. and shall conform to the structural loading capabilities of the sign structure. Dimensions of the TMDMS walk-in enclosure shall not exceed 31 feet long by 9 feet high by 3 feet wide (nominal dimensions).

The walk-in housing dimensions and total weight shall be as shown in this specification or in the plans. The walk-in housing shall protect all internal components from rain, ice, dust, and corrosion in accordance with NEMA enclosure Type 3R standards as described in NEMA Standards Publication 2501997, Enclosures for Electrical Equipment (1000 Volts Maximum).

The sign housing shall be engineered and P.E. certified to 2001 AASHTO and NCHRP Report 411 specifications for AASHTO basic wind speeds. The sign housing shall also be engineered and P.E. certified to withstand group loading combinations as outlined in 2001 AASHTO including sign weight, repair personnel and equipment, ice and wind loads, and shall also meet strength requirements for truck-induced gusts as specified in NCHRP Report 412. The sign housing shall be engineered to withstand snow loading (40 PSF) for applicable geographical regions.

The internal structural members shall be extruded aluminum and shall accommodate both display module mounting and air distribution. They shall retain the display modules in a manner to facilitate easy and rapid removal of each display module without disturbing adjacent display modules.

The external fascia panels shall be extruded aluminum and shall be designed to keep heat conduction to a minimum between the exterior surfaces and the interior components. They shall incorporate provisions for retaining and sealing the modular lens panels and have a closed cell resilient gasket. They shall be finished with a matte black KYNAR 500, or approved equal, and be removable from within the main sign housing. The external fascia perimeter panels shall be a minimum of 12" wide. The external fascia panels shall be thermally isolated from the rest of the sign housing. There shall be a minimum amount of metal contact between the external fascia panels and the rest of the sign housing.

The lens panel assembly shall be modular in design, interchangeable without misalignment of the lens panel, and the LED pixels and removable from within the main sign housing.

The lens panel aluminum mask shall be 0.040" minimum thickness and panel interiors contain 0.236-inch-polycarbonate sheeting. It shall be perforated to provide an aperture for each pixel on the display modules. Each aperture shall be as small as possible without blocking the LED light output at the required viewing angle.

The lens panel clear glazing shall be 90% UV opaque, non-breakable, polycarbonate GE LEXAN XL, 1/4" minimum thickness, clear in color, and shall be laminated to the inside surface of the lens panel aluminum mask using an acrylic foam tape joining system, 3M Scotch VHB or approved equal, to form the lens panel assembly.

The face shall be finished with a matte black, factory applied PVDF resin. All other exterior and all interior surfaces shall be a natural aluminum mill finish. No painted surfaces will be allowed.

Inside the sign housing, all 120 VAC service lines shall be independently protected by a thermal magnetic circuit breaker at the housing entry point. All 120 VAC wiring shall be located in conduit, pull boxes, raceways, or control cabinets. No 120 VAC wiring shall be exposed to the inside or outside of the sign housing. The sign housing shall not be considered as a raceway or control cabinet.

The bottom panel of the housing shall have a minimum of four drain holes with replaceable drain filter plug inserts.

A three-point lockable aluminum access door shall be provided at the end of the housing as shown in the plans to enable easy access to the walk-in housing. This access door shall be 6'-8" x 2'-0" minimum. The door shall have a handle-operated locking mechanism, closed cell neoprene gasket, and a stainless-steel hinge. The locking mechanism shall be a heavy-duty, industrial-strength, three-point, dead bolt, center-case lock with a zinc finish. There shall be a handle on

both the inside and the outside of the door. Handles shall be heavy-duty, industrial strength with a zinc finish on the inside handle and a chrome plated finish on the outside handle. The outside handle shall be pad lockable. Included in the door assembly shall be a device to hold the door open at 90°.

For moving and installation purposes, multiple steel lifting eyebolts shall be attached to the top of the TMDMS housing. Eyebolts shall attach directly to the TMDMS housing structural frame and shall be installed at the TMDMS factory. All eyebolt-mounting points shall be sealed to prevent water from entering the TMDMS housing. Lifting eyebolts, as well as the housing frame, shall be designed so that the TMDMS can be shipped and handled without damage or undue stress being applied to the housing prior to or during TMDMS installation on its support structure.

The sign housing shall have a continuous 18-inch-wide walkway extending the full length of the sign. The walkway shall be made of 1/8-inch diamond tread, 6061-T6 or 3003-H22 aluminum. All edges of the walkway grating shall be finished to eliminate sharp edges or protrusions. The walkway shall be capable of supporting a total load of 1000 lb. within any 10 ft section of the walkway.

The sign housing shall be a minimum of 30 inches wide to allow adequate room inside the sign housing for maintenance personnel. There shall be 18 inches of clear area between all equipment along the entire length of the sign housing from the 18-inch walkway and upwards 6 feet.

The sign shall be designed and constructed to present a clean and neat appearance. Poor quality work shall be cause for rejection of the sign. The equipment within the sign housing shall be protected from moisture, dust, dirt, and corrosion. The sign shall be constructed of aluminum alloy 3003-H14, 5052-H32, or an approved equal which shall not be less than 1/8 inch thick. Framing structural members shall be made of aluminum alloy 6061-T6, 6063-T5, or an approved equal.

All welding shall be by an inert gas process in accordance with the American Welding Society (AWS) Standards, ANSI/AWS D1.2-97. The LED TMDMS manufacturer's welders and welding procedures shall be certified by an ANSI/AWS certified welding inspector to the 1997 ANSI/AWS D1.2-97 Structural Welding Code for Aluminum.

The sign enclosures shall be capable of withstanding wind loadings of 120 mph without permanent deformation. The performance of the signs shall not be impaired due to continuous vibration caused by wind, traffic, or other factors. This includes the visibility and legibility of the display.

The ventilation system shall be a positive-pressure, filtered, forced-air system which cools both the display modules and the sign housing interior. The sign housing shall have at least two exhaust ports. Each exhaust port shall be filtered and protected by an aluminum hood assembly.

The ventilation system shall have a minimum of two fans. Air shall be drawn into the sign housing through hoods near the top of the housing and then filtered before reaching the fan units. There shall be one aluminum hood assembly and one inlet filter for each fan.

The filters shall be 1" thick, permanent, reusable, filters. These filters shall be easily removable from within the sign housing without the use of tools. Each sign shall include a complete set of replacement filters.

All duct work that impedes access to any sign components shall be easily removable, without tools, for servicing of these components. Ductwork shall be 0.040 in minimum thickness aluminum and shall be designed for minimal pressure drops throughout the system.

Multiple temperature sensors shall activate the ventilation system. There shall be a minimum of one sensor located near the middle of the sign at the top of the display area. There shall be an additional temperature sensor located to accurately measure the ambient temperature outside the sign housing. The temperature sensors shall have an accuracy of ± 3 °F or better and a range from -40 to +155 °F or greater.

The temperatures from the sensors shall be continuously measured and monitored by the sign controller. A temperature reading greater than a user selectable critical temperature shall cause the sign to go to blank, and the TMDMS controller shall report this error message to the central controller.

The ventilation system shall be equipped with a manual override timer to provide ventilation for service personnel. The timer will have a maximum on time of one hour.

The LED modules and electronic equipment shall be protected by a fail-safe, back-up fan control system in the event of an electronic fan control failure or shutdown of the sign controller.

The sign housing shall be furnished with a minimum of four florescent lights equipped with cold weather ballasts. The lamps shall be spaced evenly above the walkway and shall be fitted with protective guards. The light switch shall be located near the door and shall include a timer to turn off the lights after a specified time period.

The sign housing shall be equipped with two 15-amp 120V ($\pm 10\%$) grounded GFCI protected duplex electrical receptacles to accommodate inspection and maintenance requirements. One of these receptacles shall be located at each end of the sign housing. Additionally, the sign housing shall be equipped with sufficient and readily available power source in order to accommodate a fiber optic modem and all other necessary communications equipment required to transmit data from the sign to nearest controller cabinet with fiber optic communications for the backbone. The sign housing and display panel shall be designed to minimize any visible internal light from the outside of the DMS when the internal DMS lighting is on during nighttime maintenance activities.

An effective, field-proven defogging and anti-condensation system shall be incorporated into the overall functionality of the sign. The face shall be heated to prevent fogging, frost, and condensation.

A humidity sensor shall be provided and monitored by the sign controller from 0 percent to 100 percent relative humidity in 1 percent or fewer increments. The sensor shall operate and survive from 0 percent to 100 percent relative humidity. The sensor shall have an accuracy that is better than ± 5 percent relative humidity.

The sign controller shall read the internal temperature sensors, external ambient temperature sensor, and the humidity sensor. The sign controller shall use these readings in an algorithm that turns on the heater and/or the fans at the appropriate times to reduce both frost on the face of the sign and condensation on the display modules and other electronic circuitry.

Baseboard heaters shall be included in the sign housing. These heaters shall be capable of remote start up in anticipation of winter field service.

The interior of the sign shall include a fold-down shelf for a laptop computer.

Sign Controller. The sign controller shall include a minimum of two serial communications I/O ports, one RS-232 and one RS-485, and one Ethernet port.

The sign controller shall be programmed to receive NTCIP-compliant sign control commands from the central controller (DMS client software) or laptop computer, transmit NTCIP-compliant responses as requested to the central controller (DMS client software or existing ATMS) or laptop computer, and monitor sign and message statuses and control sign operation and message displays.

The controller will have power-up and auto-restart capabilities with a programmable default message (including a blank message) when recovering from a power off condition.

The sign controller shall be programmed to receive sign control commands from the master controller, transmit responses as requested to the master controller, and control sign operation and message displays.

The sign controller shall be able to receive and send messages and data via IEEE 802.3 (Ethernet); fiber optic modem; and cellular CDPD, CDMA, or GSM/GPRS. Transmission speed shall be a minimum of 9.6 kbps. A test pattern shall be provided in the DMS controller.

The sign controller shall be designed for fail-safe prevention of improper information display in the case of a system malfunction. Failure of any sign shall not affect operation of any other sign in the system. The sign controller shall consist, but not be limited to, the following.

Local control panel status indicators, including:

1. Power on/off
2. Communication status with the electronics in the walk-in housing
3. Sign display power supply status
4. Controller address
5. Power supply module
6. Central processor module
7. Input/output circuits

The sign controller shall have power-up and auto-restart capabilities with automatic sign blanking when recovering from a power-off condition. A watch-dog circuit shall be utilized to provide automatic shutdown of the sign in the event of power or sign controller failure.

Connections from the controller shall be accomplished via industry standard, keyed type connectors with a retaining mechanism.

The sign controller shall communicate with the display modules via the system interface circuit consisting of data bus drivers and line address decoders. Communication and control lines between the sign controller and the system interface circuits shall be surge protected.

The sign controller shall be controlled from the DMS client software, existing ATMS software, or the laptop computer which shall specify the appropriate display. The sign controller and its software shall perform the following functions:

1. Display a message, including:

- Static messages
 - Flashing messages
 - Alternating messages
 - Double brush stroke messages for maximum legibility
2. Full-Matrix type displays

It shall be possible to separately vary the flashing and alternating frequency. The flashing and alternating frequencies shall vary between one-half and five seconds in one tenth second increments.

It shall be possible to flash any character or set of characters in a static or alternating message. In the case of an alternating message, the flashing period shall be a submultiple of the alternating on time it is associated with.

The sign controller shall report errors and failures including, but not limited to:

- Data transmission error
- Receipt of invalid data
- Communications failure recovery
- AC power failure
- Power recovery
- Pixel status
- Fan status
- Temperature status
- Power supply status

The sign controller shall issue an SNMP trap under the following conditions:

- Power Supply Failure – when the AC power supply at a DMS has failed.
- Power Restoration - whenever it detects restoration of AC power at the sign controller.
- Temperature Limit – whenever internal DMS temperature initially exceeds a programmed safety limit. A new trap will not be issued until the temperature once again falls below the safety limit and then exceeds it.
- Door Open – whenever the door of the DMS housing or the door of the controller cabinet is opened.

Message and status monitoring. The sign controller shall transmit a return message to the DMS client software and existing ATMS software whenever it receives a valid request for status. The return message shall contain the following:

- Address of the sign controller
- Actual message that is visibly displayed on the sign on an individual pixel basis
- Current sign illumination level
- Error and failure reports
- Temperature readings
- Power supply operational status
- Origin of display message transmission (laptop, manual, central, etc.)
- Beacon status (for possible future enhancement)
- Uninterruptible power supply status

The sign controller shall blank any message displayed in the event of power or sign controller failure.

The sign shall normally display single stroke (5 X 7) characters, compressed (4 X 7), expanded (6 X 7), or double-stroke (7 X 7) character fonts. Each font shall be fully customizable, and modifications to a font may be downloaded to the sign controller from the DMS client software and existing ATMS software or laptop computer at any time without any software or hardware modifications. The sign shall be capable of displaying a different font and character spacing on each line.

The sign controller shall monitor the photocell circuits in the sign and convert the measured light intensity into the desired pixel brightness. The photo circuit readings shall be correlated with a brightness table in the sign controller. The brightness table shall have a minimum of 255 brightness levels. Automatic adjustment of the LED driving waveform duty cycle shall occur in small enough increments so that brightness of the sign changes smoothly with no perceivable brightness change between adjacent levels. The brightness levels shall be adjustable from the DMS client software.

The operational status of each pixel in the sign shall be automatically tested once a day and tested when a pixel test is requested from the DMS client software and existing ATMS software or laptop computer. A list of defective pixels shall then be transmitted to the DMS client software and existing ATMS software or laptop computer and logged into the log file listing pixel status, module number, column number, and pixel number. This pixel status test shall distinguish the difference between full out and fully stuck on pixels. This test shall not affect the displayed message for more than 0.5 seconds.

When the sign controller is polled and when a message is downloaded from the DMS client software and existing ATMS software or laptop computer, each pixel in the sign shall be read, and its current state for the current displayed message shall be returned to the DMS client software and existing ATMS software to show, either on a laptop computer or the controller itself, the actual message that is visibly displayed on the sign on an individual pixel basis in a WYSIWYG format.

The operational status of the fans shall have the ability to be automatically tested once a day and tested on command from the DMS client software and existing ATMS software or laptop computer. Any failure shall cause an error message to be sent to the DMS client software, existing ATMS software, or laptop computer when the sign controller is polled.

Temperature sensors shall be continuously measured and monitored by the sign controller. A temperature greater than a user selectable critical temperature shall cause the sign message to go to blank, and an error message shall be sent to the DMS client software and existing ATMS software or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software, or laptop computer. This user selectable critical temperature shall be capable of being changed by the DMS client software, existing ATMS software (if available), or laptop computer. The DMS client software, existing ATMS software (if available), and laptop computers shall have the ability to read all temperature measurements from the sign controller. When the sign reaches an internal temperature of 130° F, it shall cut the LED intensity to half of its normal brightness to keep the sign from reaching the critical temperature and shutting down.

When the display time of a message has expired, the controller shall set the sign to neutral. A sign is considered to be neutral when the sign is blank.

In the event of a communications failure with the DMS client software or existing ATMS software, the sign controller shall set the sign to neutral after a user-defined number of minutes (1 to 60), unless communications have been restored within this period. This function shall apply only when the sign controller is in the master control mode.

All LED module power supplies shall be continuously monitored by the sign controller. A low voltage reading shall cause an error message to be sent to the DMS client software, existing ATMS software, or laptop computer when the sign controller is polled.

There shall be no perceivable flicker or ghosting of the pixels during sign erasure and writing periods.

Message additions, deletions, and changes in the sign controller shall be made from either the DMS client software, existing ATMS software, or the laptop computer.

In the event of an AC power loss, all non-volatile memory shall be retained for a minimum of 30 days. C power failure shall cause the sign controller to notify the DMS client software and existing ATMS software and display an error message on the DMS client software and existing ATMS software CRT. For cellular operation, the sign controller shall immediately access the modem to notify the DMS client software and existing ATMS of the AC power failure.

Failure of any sign shall not affect the operation of any other sign in the system.

The sign controller internal time clock shall ensure that a message is taken down at the correct time, even in the event of communications loss.

The sign controller shall maintain its internal clock during power outages of less than four hours and display the proper message when power is restored.

The sign controller shall be able to put a self-updating time, temperature, and/or date display on the sign.

Flashing Beacons. The TMDMS shall be equipped with two 12" diameter yellow flashing beacons that can be programmed to operate through the sign controller and remote access software. The beacons shall be located at the top of the sign on each end and shall flash alternately. The beacons shall be equipped with tunnel visors to maximize visibility.

Construction Requirements. Sign construction and installation shall be coordinated with the Engineer. TMDMS shall be transported and erected in a manner recommended by the manufacturer, providing a minimum clearance of 17.5 ft. above the pavement, and a horizontal appearance to motorists once fully installed as shown on the plans.

Technical Assistance. The DMS manufacturer's technical representative shall provide onsite technical assistance in following areas:

1. Sign to structure installation
2. Controller cabinet installation
3. Sign housing to ground control cabinet cable termination
4. Initial sign turn on and stand-alone test

The initial powering up of the signs shall not be executed without the permission of the DMS manufacturer's technical representative.

Any special or proprietary cables shall be provided by the DMS manufacturer to the installation contractor.

Testing. The Contractor shall certify in writing to the Engineer that each TMDMS installation is fully compliant with the NTCIP standards named in the materials section of this special provision. All mandatory objects and the optional objects mentioned above under materials shall be certified for each sign and provided to the Department. Following installation, the Contractor shall perform a site test of each sign, demonstrating the functionality and performance required in the materials section of this special provision to the Engineer. The Contractor shall give the Engineer a minimum of two weeks notice before performing the site test.

Testing Requirements. The Department has the right to require performance testing of materials and equipment not previously tested and approved. If technical data is not considered adequate for approval, samples may be requested for testing.

The DMS Manufacturer shall provide five copies of all factory acceptance tests, stand-alone, system test, and 90-day test procedures and data forms for the Department's approval at least 60 calendar days prior to the day the tests are to begin. The test procedures shall include the sequence in which the tests will be conducted. The test procedures shall have the Department's approval prior to submission of equipment for tests.

The DMS manufacturer shall perform the factory acceptance tests, stand-alone, and system test and shall furnish data forms containing all the data taken, as well as quantitative results for all tests. The data forms shall be signed by an authorized representative (company official) of the equipment manufacturer. At least one copy of the data forms shall be sent to the Department within 14 days of the test's conclusion.

The Department reserves the right to have a representative witness all tests. The results of each test shall be compared with the requirements specified herein. Failure to conform to the requirements of any test shall be counted as a defect, and the equipment shall be subject to rejection by the Department. Rejected equipment may be offered again for a retest, provided that all non-compliances have been corrected and retested by the DMS manufacturer and evidence thereof submitted to the Department.

Each of the tests on all or one type of equipment must be completed within five working days of each other. Any delays in performing all these tests may result in the DMS manufacturer paying the additional costs of providing the Department's representatives for the additional testing time.

Final inspection and acceptance of equipment shall be made after installation at the designated location as shown on the installation plans.

The DMS manufacturer shall be responsible for providing the test fixtures and test instruments for all the tests.

The stand-alone and system tests are separate tests. However, they may be performed by the DMS manufacturer during the same visit.

Consequences of Test Failures. If any unit fails to pass its test, the unit shall be corrected or another unit substituted in its place, and the test successfully repeated.

If a unit has been modified as a result of a test failure, a report shall be prepared and delivered to the Department prior to shipment of the unit. The report shall describe the nature of the failure and the corrective action taken.

If a failure pattern develops, the Department may direct that design and construction modifications be made to all units at no additional cost or extension of the contract period.

Factory Acceptance Tests. The TMDMS Manufacturer shall be responsible for conducting demonstration tests on all units at a TMDMS's Manufacturer's facility. These tests shall be performed on each unit supplied. The Department shall be notified a minimum of 30 calendar days before the start of tests. At a minimum, all equipment shall have passed the following individual tests:

- Examination of Product: Each TMDMS unit shall be examined carefully to verify that the materials, design, construction, markings, and quality of work comply with the requirements of these project specifications.
- Continuity Tests: The wiring shall be checked to determine conformance with the requirements of the appropriate paragraphs in these project specifications.
- Operational Test: Each TMDMS unit shall be operated long enough to permit equipment temperature stabilization and to check and record an adequate number of performance characteristics to ensure compliance with the requirements of these project specifications.
- NTCIP Test: A NTCIP test shall be performed at the TMDMS manufacturer's facility. The Department may elect to perform and/or witness this test. The specifics of this factory acceptance test shall be proposed by the TMDMS manufacturer to the Department for approval.
- Stand-Alone Tests: The TMDMS manufacturer shall conduct an approved stand-alone test of the equipment installation at the field site. The test shall, as a minimum, exercise all stand-alone (non-network) functional operations of the field equipment with all of the equipment installed as per the contract documents.

Approved data forms shall be completed and turned over to the Department as the basis for review and rejection or acceptance. At least 30 working days notice shall be given prior to all tests to permit the Department to observe each test.

System Tests. After the installation of the TMDMS system is completed and the successful completion of the system test, the TMDMS system shall be subjected to one continuous 72-hour full operating test prior to a 90-day test period. The test shall consist primarily of exercising all control, monitor, and communications functions of the field equipment by the central management software.

The 90 days test period shall commence on the first day after the successful completion of the approved 72-hour continuous full operating test period.

During the 90-day test period, downtime due to mechanical, electrical and/or other malfunctions shall not exceed five working days. The Engineer may extend the 90 days test period by a number of days equal to the downtime in excess of five working days.

The Engineer will furnish the TMDMS vendor with a letter of approval stating the first day of the 90 days test period.

Maintenance Services. The installation contractor shall provide complete maintenance services for the entire TMDMS assembly until the final acceptance. All labor, travel, replacement parts, and associated costs necessary to maintain the TMDMS assembly shall be included in the contract at no additional cost to the Department.

The installation contractor shall correct all failures in the TMDMS assembly within 48 hours of notification from the Department until final acceptance. A failure of a sign installation shall be defined as the inability of the sign to function as per these specifications and as the sign becoming unreadable or illegible as determined by the Department.

Final System Acceptance. Final system acceptance will be defined as when all work and materials provided have been furnished and completely installed by the TMDMS manufacturer, and all parts of the work have been approved and accepted by the Department and the DMS system has been operated continuously and successfully for 90 calendar days with no more than 5 calendar days downtime due to mechanical, electrical, and/or other malfunctions, as specified herein.

The warranty period, as specified in herein, will begin upon final acceptance.

Operator's Manuals. A manual containing a general description and detailed operating and installation instructions shall be provided for each different type or model of equipment. One copy of the manual shall be provided and kept in the sign cabinet. An additional ten copies of the manual shall be submitted to the Department for each model of equipment. An additional copy of the manual shall be submitted to the Department electronically for each model of equipment. The manual shall include the following information:

1. A general description of the equipment including all information necessary to describe the basic use or function of the system components. This shall include a general block diagram presentation of the equipment. Where auxiliary equipment is required, tabular charts shall be included, listing such equipment. These charts shall include the nomenclature physical and electrical characteristics and functions of the auxiliary equipment unless such information is contained elsewhere in an associated manual. In the latter case, a reference shall be made to the location of the information pertaining to the auxiliary equipment.
2. The theory of operation of the system components in a clear, concise manner supported by simplified schematics, logic, data flow diagrams, one-function diagrams, etc. Timing and waveform diagrams and voltage levels shall be shown as required. A logical development shall be used starting with a system block level and proceeding to a circuit analysis. Circuit analysis shall be detailed whenever circuits are not normally found in standard textbooks. The application of new theoretical concepts shall be fully described. Where the design allows operation in a number of different modes, an operational description of each mode shall be included.

3. In simple, clear language, the routine of operation from necessary preparations for placing the equipment into operation to securing the equipment after operation. This section shall contain appropriate illustrations with the sequence of operations presented in tabular form wherever feasible. This section shall also contain a list of applicable test instruments, aids, and tools required in the performance of necessary measurements and technique of each system component. In addition, set-up test and calibration procedures shall be described.
4. Schematic diagrams shall be complete and accurate as required to supplement the text material and to allow the books to be a self-contained technical information source. Maximum size of these diagrams should be limited to allow their use in close proximity of the equipment, in the classroom, etc. Part reference symbols, test voltages, waveforms, and other aids to understanding of the circuit's function shall be included on the diagrams. Test voltages, waveforms, and other aids to understanding of the circuit's function may be shown on both the simplified schematics and other drawings (as required in the above sections) on theory of operation or maintenance or on the schematic diagrams required for this section. The overall scope of information shall not be less, however, than that stated for the schematic diagrams.

Software Manuals. The TMDMS manufacturer shall provide manuals and data for the computer software system and components thereof. One copy of the manual shall be provided and kept in the sign cabinet. Ten additional copies of the manual shall be submitted to the Department for each version of the software. One copy of the manual shall be provided electronically. As software is upgraded, updated versions of the manual shall be provided. This submittal shall include the following:

1. Software user's manuals shall be supplied. Include instructions for performing a backup of all software and message libraries.
2. Two copies of source programs for master and sign controller software shall be provided electronically. The Department shall have the right to duplicate the sign controller software as needed for use in controlling signs under its' jurisdiction.
3. The TMDMS manufacturer's NTCIP MIB (management information base) shall be provided to the Department.
4. Warranty information.
5. Preventive maintenance and maintenance information.

Maintenance Manuals. A manual containing a general description and detailed maintenance instructions shall be provided for each different type or model of equipment. One copy of the manual shall be provided and kept in the sign cabinet. An additional ten copies of the manual

shall be submitted to the Department for each model of equipment. One copy of the manual shall be provided electronically. The manual shall include the following information:

1. The manufacturer's recommended procedures and checks necessary for preventive maintenance. This shall be specified for pre-operation, weekly, monthly, quarterly, semi- annual, annual, and "as required" checks as necessary to assure reliable equipment operation. Specifications, including tolerances, for all electrical, mechanical, and other applicable measurement, adjustments, or both shall be listed. The TMDMS manufacturer shall provide the Department with a sample preventive maintenance schedule.
2. Data necessary for isolation and repair of failures or malfunctions, assuming the maintenance technicians to be capable of analytical reasoning using the information provided above. Accuracies, limits, and tolerances for all electrical, physical, or other applicable measurements shall be described. General instructions shall be included for disassembly, overhaul, and reassembly including shop specifications or performance requirements.
3. Detailed instructions shall be given only where failure to follow special procedures would result in damage to the equipment, improper operation, or danger to operating or maintenance personnel.
4. The parts list shall contain all information required to describe the characteristics of the individual parts, as required for identification. It shall include a list of all equipment within a group and list of all assemblies, subassemblies, and replacement parts of units. The tabular arrangement shall be in alphanumerical order of the schematic reference symbols and shall give the associated description, manufacturer's name, and part number. A table of contents or some other convenient means, e.g., appropriate grouping, shall be provided for the purpose of identifying major components, assemblies, etc.

As-Built Documentation. The TMDMS manufacturer shall provide to the Department the following documentation of the complete installed equipment prior to final payment. Sufficient documentation shall be provided to reflect "as-built" conditions and to facilitate operation, maintenance, modification, and expansion of the system or any of its individual components. Manufacturer supplied documentation which covers the intent of this requirement may be used, subject to the approval of the Department:

The TMDMS manufacturer shall prepare and submit the following detailed drawings for each sign:

- TMDMS character set as detailed herein,
- All non-catalog or custom-made components,
- Sign housing assembly details, including the component location details and a layout of all the display elements complete with dimensions,
- Sign housing structural details, including member details, support mechanism details required for installation of the TMDMS onto the sign truss, welding details, and miscellaneous hardware details complete with dimensions and sizes,
- Sign mounting bracket structural details, including miscellaneous members and hardware required to attach the TMDMS to the sign truss complete with dimensions and sizes, and

- Wiring schematics.

Final documentation shall reflect all field changes and software modifications and shall be provided before final payment is made.

The TMDMS manufacturer shall coordinate and take the lead on this effort with the installation contractor.

This documentation shall include drawings of conduit layouts, cable diagrams, wiring lists, cabinet layouts, wiring diagrams, and schematics for all elements of the communications system. This shall also include detailed drawings identifying by cable type, color code and function, and the routing of all conductors (pairs) in the communications system.

Four copies of each as-built installation shall be delivered to the Department with one complete copy to be placed in the equipment cabinet at each TMDMS location. Drawings left in the Truss Mounted LED DMS shall be attached to the door with stainless-steel fasteners and protected from weather with a waterproof enclosure.

Warranty. The Contractor shall warranty all materials and workmanship including labor for a period of two years after the completion and acceptance of the installation unless other warranty requirements prevail. Any parts or equipment found to be defective and/or determined to be a failure in design, materials, and workmanship during the warranty period shall be replaced free of charge. The warranty period shall begin when the Contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. This warranty shall include repair and/or replacement of all failed components via a factory authorized depot repair service. All items sent to the depot for repair shall be returned within two weeks of the date of receipt at the facility. The depot location shall be in the United States. Repairs shall not require more than two weeks from date of receipt, and the provider of the warranty shall be responsible for all return shipping costs. The depot maintainer designated for each component shall be authorized by the original manufacturer to supply this service. A warranty certificate shall be supplied for each component from the designated depot repair site indicating the start and end dates of the warranty. The certificate shall be supplied at the conclusion of the system acceptance test and shall be for a minimum of two years after that point. The certificate shall name the Department as the recipient of the service. Company contact information and warranty dates should be clearly shown on the warranty certificate. The Department shall have the right to transfer this service to other private parties who may be contracted to perform overall maintenance of the facility.

Method of Measurement. Truss mounted changeable message signs shall be measured for payment per each sign complete, in place, tested to assure all functionality and performance required above, and accepted by the Engineer.

Basis of Payment. Payment will be made at the unit price per each for TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN, which shall include all equipment, material, documentation, testing, and labor detailed in the contract documents for this new TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN and associated hardware.

SYSTEM IMPLEMENTATION, EQUIPMENT INTEGRATION AND SUPPORT

The Contractor shall install the ITS components at the locations indicated on the plans.

All ITS components shall be subject to a 30-day burn-in period. During the "burn-in" period, all components shall perform continuously, without any interruption of operation, for a period of 30 days. If there are operational problems during the burn-in period, the burn-in period shall reset back to day one.

The Department will program the ITS components and integrate them into the existing ITS system.

The Contractor shall be responsible for installing the proposed ITS components in accordance with the plans, specifications, and manufacturers recommended practices.

This work will not be paid for separately but shall be included in the contract bid price for TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN.

WASHOUT BASIN

Description. This work shall consist of constructing and maintaining a washout basin for concrete trucks and other construction vehicles per the information shown in the plans. The locations of the washout basins are subject to the approval of the Engineer.

General. This work will be measured for at the contract lump sum price for WASHOUT BASIN which price shall include general maintenance and removal of all construction debris, restoration of the site upon completion, and all incidentals required to complete this item of work.

Method of Measurement. This work will be measured as lump sum.

Basis of Payment. This work will be paid for at the contract unit price per lump sum for WASHOUT BASIN.

MAINTAINING ITS DURING CONSTRUCTION

Description. Intelligent Transportation Systems (ITS) references IDOT and Tollway traffic surveillance infrastructure. These elements include, but are not limited to, the following: closed circuit television cameras, dynamic message signs, 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. This work shall also include the relocation and adjustment of RVSD and wireless detection devices as necessary in coordination with construction staging. 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 for MAINTAINING ITS DURING CONSTRUCTION, which shall include all work as described herein.

POLYETHYLENE DUCT

Description. This item shall consist of furnishing and installing polyethylene duct of the type and size specified, as part of a raceway either laid in trench or bored and pulled in place, including all couplings, junctions, adapters, reducers, condulets and all incidental items necessary to complete the work at the locations indicated on the Plans or directed by the Engineer in accordance with the following requirements.

Materials. The flexible electrical plastic duct shall be manufactured to comply with the American Society for Testing and Materials Standards (latest edition) cited by ASTM Designation D 3485, and to the standards of NEMA Publication No. TC-7.

The duct shall be manufactured from black polyethylene complying with ASTM Designation D1248, Type III, Grade 3, Class C with the following exceptions and additions:

1. The Elongation when tested by the procedure in ASTM Designation D-638 shall be a minimum of 300%.
2. The Brittle Temperature when tested by Procedure A in ASTM Designation D-746 shall be -94 degrees F. (-70 degrees C.) or below.
3. The environmental Stress Crack Resistance when tested in accordance with ASTM Designation D-1693 shall produce not more than 2 failures per 10 specimens after 48 hours.

Construction: The duct shall be manufactured as polyethylene plastic pipe complying with ASTM Designation D-2104 with the following exceptions and additions:

1. The Outside Diameter, minimum wall thickness, and bending radius shall be as follows:

Nominal Size Inches/(mm)	Outside Diameter Inches/(mm)	Minimum Wall Thickness Inches/(mm)	Minimum Bending Radius Inches/(mm)
1-1/4"/(30)	1.660 ± 0.012" (42.16 ± 0.305)	0.106 ± 0.020 2.692 ± 0.508	18 inches (450)
2"/(50)	2.375 ± 0.012" 60.33 ± 0.305	0.158 ± 0.020 4.013 ± 0.508	26 in. (650)
3"/(75))	3.500 ± 0.012" (88.90 ± 0.305)	0.226 ± 0.020 5.740 ± 0.508	40in. (1000)

The duct may be manufactured to the dimensions in the above table, for Schedule 40. The duct must be capable of being bent in the minimum bending radius listed above.

2. When tested in accordance with the procedures and test methods referred to in ASTM Designation D-2104 the test pressures used shall be 75% of the values listed in Tables III, V, VI, VII.

3. The duct shall pass the following tests:

a) Freeze-up test:

A 10 ft (3.0m) length of the duct bent into an upright "U" shape shall be filled with water and then placed in a low temperature cabinet and maintained at -20 degrees C. for twenty-four hours. The duct shall not crack or burst during the test.

b) Compression Test:

The test shall be conducted on three, 6-inch (150.0mm) samples of the duct, using equipment set at 2 in. (50mm) per minute. Samples are placed between 6 in. (150.0 mm) plates and compressed at the rate of 1/2 in. (12.0mm) per minute until the distance between the plates is reduced by 50%, recording the load required to compress the duct. The samples are then removed and allowed to stand for exactly 5 minutes. The load required to compress the sample shall be equal to or greater than that listed below, and the duct shall have returned to not less than 85% of its original diameter at the end of the 5 minutes.

Nominal Size	Load
<u>In. (mm)</u>	<u>lbs (N)</u>
1-1/4"(30.0)	188 lbs (836.26)
2 in. (50.0)	300 lbs (1334.50)
3 in (75.0)	350 lbs (1556.87)

The duct shall be permanently marked at regular intervals on the outside with the manufacturer's name or trademark.

The manufacturer shall certify that these tests were made and the results conform to specifications, using the apparatus and test methods listed above and shall be submitted to the Engineer for approval, prior to installation of duct.

Couplings shall be high density polyethylene or acetyl butyl styrene drive on pipe fittings.

Installation Details. Polyethylene duct will be installed in accordance with Section 810.04 of the Standard Specifications, except as modified herein.

The Contractor shall exercise care in installing the duct to ensure that the completed duct raceway is smooth, free of sharp bends and located in such a manner as will preclude damage from subsequent construction operations. Crushed or deformed polyethylene duct shall not be used or accepted. All joints, including those with galvanized steel conduit, shall be watertight.

Duct which passes through cabinet foundations shall have an upper termination approximately 2 inches (50mm) above the top of the foundation.

Duct terminations shall be temporarily capped to prevent water and other contaminants from entering during construction operations. The duct shall be swabbed and blown clean of any debris

before installation of cable. If, in the opinion of the Engineer, water or any other debris is in the duct after the cable is installed the Contractor shall blow the duct clean and make any repair necessary to stop water leaking or debris entering.

Should damage occur to existing or newly installed polyethylene duct, the Contractor shall locate the damaged area and repair damaged area with new polyethylene duct. All repairs will be inspected by the Engineer. The cost of locating the damaged polyethylene duct shall be incidental to the cost of the new polyethylene duct.

Where new Polyethylene duct connects to existing installations or foundations the Contractor shall do all necessary cutting, fitting and foundation drilling to the existing installation 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. All cutting, fitting and foundation drilling shall be incidental to the cost of the polyethylene duct.

Method of Measurement. The length of measurement shall be the distance along a straight line measured per foot between changes in direction of the polyethylene duct and its connection to terminal structures, galvanized steel conduit or condulets.

Basis of Payment. This item will be paid at the contract unit price per lineal foot of POLYETHYLENE DUCT, for furnishing the specified size duct in place and connected at its terminal.

UNDERPASS LIGHTING REMOVAL

Description. This work shall consist of the removal and disposal of an existing underpass lighting system at the location shown in the plans. All existing components (luminaires, junction boxes, cable, conduit, gas sensors, etc.) of the existing underpass lighting system shall be removed. All removed equipment shall become the property of the Contractor and shall be disposed of offsite, in accordance with Department requirements.

Method of Measurement. This work will be measured as lump sum.

Basis of Payment. This work shall be paid for at the contract unit price of lump sum for UNDERPASS LIGHTING REMOVAL which price included all labor and equipment necessary to complete this work.

DYNAMIC MESSAGE SIGN REMOVAL - IDOT

Description. This work shall consist of removing, protecting, and transporting dynamic message signs (DMS) to an IDOT yard as indicated on the plans.

The existing power and fiber optic communication cables shall be removed from the DMS to the controller cabinet. Existing conduits shall be abandoned in place or reused as shown on the Plans. The existing DMS controller cabinet, foundation, transformer, disconnect switches, above ground conduit, supports, and junction boxes shall be removed at locations shown in the Plans.

Before starting work, the Contractor shall submit a DMS Removal Plan to the Engineer for acceptance detailing the proposed methods of DMS removal and the amount, location(s), and type(s) of equipment to be used.

The Traffic Systems Center (TSC) Engineer will test the DMS prior to removal. The Contractor shall be responsible for the DMS, Sign Structure, Cabinet and Cabinet Equipment until they are transferred to the State.

Removal of the structure will be paid for separately.

Materials. All mounting hardware shall be galvanized or stainless steel.

Construction.

General

It shall be the Contractor's responsibility to contact the TSC Engineer a minimum of 7 working days prior to the DMS removal. The Contractor shall coordinate his work fully with the TSC Engineer both as to the work required and the timing of the removal of the DMS. No additional compensation will be granted under this or any other item for extra work caused by failure to comply with this requirement.

The DMS on the existing structure shall remain operational until it is in conflict with construction operations, or as determined by the Engineer. The new structure shall be erected and prepared for the relocation of the existing DMS prior to removing the DMS from the existing structure to minimize the operational downtime of the DMS.

The Contractor shall provide the Engineer with a DMS Removal and Relocation Plan specific to each DMS location. The plan shall be approved by the Engineer at least two (2) weeks prior to the removal of the DMS.

Removal Inspection

Prior to any work being performed by the Contractor, the Contractor shall (in the presence of the Engineer and the TSC Engineer) conduct an inspection of the DMS sign, sign structure, cabinet and the DMS cables, making note of any parts which are found broken, missing, defective, or malfunctioning.

The TSC Engineer will test the sign as deemed necessary. Any problems will be noted, and/or repaired prior to transfer of maintenance. The Contractor shall assume full responsibility for the DMS, Sign Structure, Cabinet and Cabinet Equipment during removal, transportation, storage and installation. Any damage shall be repaired to the satisfaction of the Engineer, at no additional cost to the State.

This inspection shall be submitted in writing to the Engineer for record. Without such a record, any damage to the DMS, sign structure, cabinet, cabinet equipment, hardware, and/or cables shall be repaired by the Contractor to the full satisfaction of the Engineer at no additional cost to the Department.

DMS Removal Plan

The DMS Removal Plan shall be complete in detail for all phases, stages, and conditions anticipated during the removal.

The DMS Removal Plan and procedures shall provide complete details of the work process including:

- (A) Falsework, struts, bracing, tie cables and other devices, material properties and specifications for temporary works, requirements prior to releasing the DMS and catwalks from the cranes (if required), connection details and attachments to other structure components or objects;
- (B) Procedure and sequence of operations, including a schedule with completion times for work items that comply with the working hour limitations;
- (C) Minimum load chart lift capacity, outrigger size and reactions for each crane;
- (D) Locations of cranes and outriggers relative to other structures, including retaining walls, wingwalls and utilities.
- (E) Calculated loads and lifting weights, lift points, lifting devices, spreaders, and angle of lifting cables.
- (F) Stresses at critical points along the DMS or catwalk length during progressive stages of removal shall be evaluated to assure that the structural integrity and stability is maintained at all times.
- (G) Drawings, notes, catalog data showing the manufacturer's recommendations or performance tests, and calculations clearly showing the above listed details, assumptions, and dimensions.
- (H) Contingency plans detailing what measures the Contractor will take in case of inclement weather (forecast or actual), equipment failure, delivery interruption, and slower than planned production.
- (I) The DMS Removal Plan and procedures shall be submitted to the Engineer for review and acceptance prior to starting the work. Review and acceptance by the Engineer shall not be construed to guarantee the safety and acceptability of the work.
- (J) Any changes to the removal plan must be reviewed and accepted by the Engineer before implementation.
- (K) Pre-Removal Conference
 - A Pre-Removal meeting shall be held at least one week prior to the commencement of the work. The Engineer, Contractor, and the Contractor's Engineer shall attend the meeting. The intent of the meeting is to develop a mutual understanding of the proposed implementation of the Contractor's DMS Removal Plan. Revisions or adjustments to the plan, and potential revisions or adjustment to the implementation of the DMS Removal Plan shall be discussed.
 - Additional Pre-Removal meetings may be required for subsequent phases of construction, or for phases that differ from the original plan, as directed by the Engineer. Additional meetings may also be requested by the Contractor, and approved by the Engineer.

Handling, Storage, Shipment

The Contractor shall handle the DMS in such a manner as to prevent damage. Cracked or damaged materials shall be repaired or replaced at the Contractor's expense. Braces, trusses, chains, cables, or other devices used for handling, storing, and shipping shall be adequately padded at points in contact with the materials to prevent damage of the finished product.

DMS shall be handled, stored, shipped with supports and devices that maintain the product in an upright position.

Dynamic Message Sign Removal

Power to the sign shall be disconnected to the satisfaction of the Engineer and the TSC Engineer prior to any work on the DMS removal. The power and communications cables shall be pulled from the sign to the cabinet and disposed of, to the satisfaction of the Engineer.

Remove the DMS and DMS equipment (controller cabinet, cables, structure mounted conduit, mounting hardware, transformers, and disconnect switches) as shown on the Plans. Remove the existing controller cabinet foundation and restore the site to match existing conditions. All above ground conduit stub-outs shall be removed to a depth of six (6) inches below grade, capped, and abandoned in place.

The Contractor shall only be allowed to take one DMS out of service at a time. After a DMS has been removed, the Contractor shall have seven (7) calendar days to install the replacement DMS. The replacement will only be considered complete when the DMS is operational and can be controlled from the IDOT Traffic Operations Center.

Method of Measurement. This work will be measured for payment per each DMS sign removed and relocated to a new location.

Basis of Payment. This work will be paid for at the contract unit price each for DYNAMIC MESSAGE SIGN REMOVAL - IDOT, which will be payment in full for performing the work described herein.

CONCRETE BARRIER, VERTICAL FACE (SPECIAL)

Description. This work shall consist of constructing a concrete barrier wall with a vertical face as shown 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 noted in the plans.

Method of Measurement. This work will be measured for payment in feet in place, along the centerline of the concrete barrier. Concrete barrier base will be paid for separately.

Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE BARRIER, VERTICAL FACE (SPECIAL). This contract unit price shall include all equipment, labor, and materials necessary to construct the concrete barrier wall.

SEEDING, CLASS 4A AND 5

Issued 1/03/2024

The work shall consist of planting seed by a no till method. No till methods that are acceptable include a seed drill, or hydraulic seeder. The application of the herbicide shall be applied first before planting any permanent seeding. The seed mixture is listed below and should be applied at 14 lbs/acre.

Mixture shall include the following species:

Prairie Bergamot (*Monarda fistulosa*)
Butterfly Milkweed (*Asclepias tuberosa*)
Sky Blue Aster (*Aster azureus*)
Smooth Aster (*Aster laevis*)
New England Aster (*Aster novae-angliae*)
Spiderwort (*Tradescantia Ohiensis*)

Class 4A and Class 5 mixtures shall be used in conjunction on all back slopes and foreslopes within the construction limits and on disturbed soils. Contractor shall abide by the specs in Section 250 on planting and soil preparation. Class 5 Annuals Mixture shall not exceed 20% by weight of any one species. Forb Mixture not exceeding 10% by weight PLS of any one species.

Thirty days prior to the time of seeding, the Contractor shall provide the following.

- a. Name and location of the seed supplier.
- b. Origin and date of harvest of each of the various kinds of seed.
- c. A statement of the purity and germination of the seeds.
- d. The estimated number of seeds/lb of each of the kinds of seed to be furnished.

Site Preparation. Site shall be mowed one or more times to a height of not less than 6 in. prior to planting any permanent seeding. Mowing shall be completed prior to October 10. Planting shall take place between May 15 to June 30 and October 15 to December 1. The equipment required is Article 250.03 (g).

Equipment. The capacity of the equipment shall be sufficient to perform the work and in the time period as specified herein, and as approved by the Engineer.

Method of Measurement. Seeding of the class specified will be measured in acres of surface area seeded or mowed.

Basis of Payment. This work will be paid for at contract unit price per acre for SEEDING, CLASS 4A and SEEDING, CLASS 5.

Mowing will be paid for at the contract unit price per acre for MOWING.

FURNISHED EXCAVATION (SPECIAL)

Description. This work shall consist of excavating, transporting, placing, and compacting suitable material from the existing I-39 stockpile site, for use as embankment in the Contract 64C24 proposed I-39 reconstruction. The existing I-39 stockpile is located at the southwest quadrant of the I-39 and US 20 intersection, and as identified in the plans.

This work shall be done in accordance with Section 204 of the Standard Specifications except as modified herein or as directed by the Engineer.

Per the TRAFFIC CONTROL PLAN Special Provision, access to and from the stockpile site shall only be made to and from EB US 20 shoulder. Access to and from the stockpile is not permitted to or from Linden Rd.

Damages to the US 20 roadway or shoulder during the performance of the work shall be repaired by the Contractor at no additional cost.

Any material excavated from the Stockpile Site shall be placed within the existing state right-of-way within the 64C24 project limits or as directed by the Engineer, and shall not be wasted offsite.

Method of Measurement. This work will be measured by cubic yards in place and compacted within the I-39 mainline and ramp corridor embankment.

Measurement for payment will not be included for material placed within the limits of the stockpile site.

Basis of Payment. This work shall be paid for at the contract unit price per cubic yard for FURNISHED EXCAVATION (SPECIAL) which price shall include all equipment and labor to complete the work.

The work of final grading of the stockpile site at the end of the Contract will be paid for separately under LANDSCAPING (SPECIAL).

Erosion control shall be paid for separately under applicable contract pay items.

MAINTENANCE MOWING

Description. This work shall consist of mowing existing and proposed turf areas within the project limits throughout the duration of the project. The vegetation shall be mowed to obtain a height of no more than 6 inches.

Requirements. The equipment used for mowing shall be capable of completely severing growth at the cutting height and distributing evenly over the mowed area. The cut material shall not be windrowed or left in a lumpy or bunched condition. Subsequently, mowing may be required, as directed by the Engineer, on certain areas in order to disperse the mowed material. The Contractor will not be required to mow continuously wet ditches and drainage ways, slopes steeper than 1:3 (V:H), or other areas which may be designated as not able to be mowed by the Engineer. More than one cycle of mowing may be required during the duration of this contract.

Existing turf shall be mowed a minimum of once per year. Mowing will only be permitted between March 15th and October 10th.

Debris encountered during the mowing operation which hamper the operation or are visible from the roadway shall be removed and disposed of according to Article 202.03. Damage to the right-of-way and turf, such as ruts or wheel tracks more than 2 inches in depth in areas that will not be regraded with the contract, shall be repaired to the satisfaction of the Engineer prior to final inspection.

Method of Measurement. This work will be measured for payment in place and the area computer in acres.

Basis of Payment. This work will be paid for at the contract unit price per acre for MAINTENANCE MOWING.

STREAM MITIGATION BANK CREDITS

The Department is required to obtain 963.42 STREAM MITIGATION BANK CREDITS for impacting 220.45 linear feet of stream on this project. The Department must obtain these credits from a U.S. Army Corps of Engineer (USACOE) approved Stream Mitigation Bank, prior to the Contractor initiating any work on this project. Work shall not proceed prior to the ENGINEER being provided a Certificate of Purchase from the Contractor as proof of the purchase of 963.42 STREAM MITIGATION BANK CREDITS by the Contractor.

If there are any questions, comments or concerns about this Special Provision, please contact the District 2 Environmental Studies Supervisor at 815-284-5460.

Approved Banks in District 2:

Skare Park Stream Mitigation Bank
C/O Land and water resource, Inc.
9575 West Higgins Road, Suite 801
Rosemont, Illinois 60018
(847) 692-7170

Or

Bronzeback Wetland & Stream Mitigation Bank
C/O Wetland Research, Inc.
Bank Sponsor POC
101 Willow Street, Forrester, IL 61030
Email: gwold4@gmail.com
Phone : (815) 275-6166

Basis of Payment. Stream Mitigation Bank Credits will be paid for at the contract unit price per each for STREAM MITIGATION BANK CREDITS purchased.

WETLAND MITIGATION BANK CREDITS

The Department is required to obtain 3.5 acres WETLAND MITIGATION BANK CREDITS for impacting 1.75 acres of wetlands on this project. The Department must obtain these credits from a U.S. Army Corps of Engineer (USACOE) approved Wetland Mitigation Bank, prior to the Contractor initiating any work on this project. Work shall not proceed prior to the ENGINEER being provided a Certificate of Purchase from the Contractor as proof of the purchase of 3.5 acres WETLAND MITIGATION BANK CREDITS by the Contractor.

If there are any questions, comments or concerns about this Special Provision, please contact the District 2 Environmental Studies Supervisor at 815-284-5460.

Approved Banks in District 2:

Bronzeback Wetland & Stream Mitigation Bank
Mr. Guy Groenewold
101 Willow Street
Forreston, IL 61030
(815) 275-6166

Or

Northern Illinois Wetland LLC
Mr. Rick Hoffman
535 Babson Road
Monroe Center, IL 61052
(815) 522-3255

Basis of Payment. Wetland Mitigation Bank Credits will be paid for at the contract unit price per each for WETLAND MITIGATION BANK CREDITS purchased.

LANDSCAPING (SPECIAL)

Description. This work shall consist of the contractor-design for, and final grading of, the existing I-39 stockpile site area, which is located in the southwest quadrant of the I-39 and US 20 interchange, and as identified in the plans.

The grading work shall be done in accordance with Section 204 of the Standard Specifications, except as modified herein or as directed by the Engineer.

The work shall include:

- Collection of existing topography data at the start of Contract 64C24, and as needed for development of final contractor-designed grading plan,
- Preparation and submittal(s) of the stockpile grading plan for review(s) until approval is received from the Engineer,
- Final grading work, and
- Collection of final topography data of the stockpile site, for submittal to the Engineer.

Prior to any excavation work at the start of Contract 64C24, the Contractor shall collect existing ground elevations of the existing stockpile site left in place by the previous I-39 Contract 64B13 Contractor. The data shall be compatible with Microstation software and shall be provided to the District.

At the completion of the Contract 64C24, the existing stockpile site must be regraded and permanent seeding placed. The grading information shown in the plans is illustrative of what would be needed during construction and may change depending on encountered field conditions.

No later than 3 weeks prior to the start of the final stockpile area grading, the Contractor shall develop and submit the final contractor-design Stockpile Site Proposed Grading Plan for review and approval by the Engineer before initiating and completing final grading of the stockpile site. The contractor-design grading plan shall include limits of stockpile disturbance, seeding limits, spot elevations, contours, typical side slopes, and surface reinforcement (if required) to be reviewed and approved by the Engineer.

Once approval is received on the contractor-design grading plan and the final grading performed, the Contractor shall collect final ground elevations of the stockpile site that will remain at the end of Contract 64C24. The data shall be compatible with Microstation software and shall be provided to the District.

Stockpile Site Proposed Grading Plan Requirements.

The Stockpile Site Proposed Grading Plan shall include the following:

- Existing topography prior to commencement of any activities in the stockpile site.
- Existing topography prior to commencement of final stockpile grading activities.
- Erosion control design as required
- The contractor-design grading plan shall include the surface representative of the final condition proposed by the Contractor and the final surface.

The existing topographic work noted above shall consist of utilizing GPS equipment and software and preparing and submitting a 3D surface. Free-standing equipment shall be a minimum of GPS rovers for grading equipment, individual rover, GPS base station and associated GPS software. Construction software for the report shall be compatible with MicroStation software.

The final condition proposed by the Contractor of the Stockpile Site Proposed Grading Plan will be subject to the following design requirements and design restrictions:

- The site will be limited to the outline of the stockpile site depicted in the plans.
- Once final stockpile grading operations begin, earth shall not be brought into, or taken out of, the stockpile limits.
- The maximum height of fill will be 9' above original (Pre Contract 64C24) elevations. The original Pre Contract 64C24 topography will be provided to the awarded Contractor.
- The entire stockpile site will be graded to drain using a minimum grade of 0.3% and a maximum grade of 1:4 (V:H). Any changes in grades shall be gradual and rolling, and not abrupt.
- Ditch grades will be a maximum of 4%.
- No grading may occur within 15' of existing ComEd tower foundations.
- No fill may be placed below the elevations of 822.5.
- The infield will be graded to drain, and shall outlet at the existing culvert on the north side of the stockpile site.
- Surface reinforcement requirements – see calculation procedure defined below
 - Completed Table 1 calculations
 - Summary of surface reinforcement needs based on calculation

Per the TRAFFIC CONTROL PLAN Special Provision, access to and from the stockpile site shall only be made to and from EB US 20 shoulder. Access to and from the stockpile site is not permitted to or from Linden Rd.

Damages to the US 20 roadway or shoulder during the performance of the work shall be repaired by the Contractor at no additional cost.

Surface Reinforcement Requirements

Based on the stockpile grading plan and the final grading in the adjacent vicinity, the Contractor shall determine if turf reinforcement mat (TRM) or other surface reinforcement is needed using the procedure defined herein. This procedure, with all final calculations and information included herein that are to be provided by the Contractor, must be provided with the final stockpile grading plan, and must be approved by the Engineer. There are two options for this procedure:

- Option 1: If the final stockpile grading is similar to the layout shown in the plans (follows slopes and grades), the information in the Preliminary Column of Table 1 must be checked and/or recalculated by the Contractor based on the final stockpile grading plan and the final grading in the adjacent vicinity. The Contractor must populate the Final column in Table 1 with the checked and/or recalculated information.
- Option 2: If the final stockpile grading is largely different than the layout shown in the plans, the Contractor must complete the calculations and populate the Final column in Table 1 based on the final stockpile grading and the final grading in the adjacent vicinity.

All Preliminary information cited in Table 1 is based on the 64C24 contract documents.

Procedure to determine need for Surface Reinforcement

1. Outlet points: Define the locations of Final Outlet Points A and B, and any additional Outlet Points needed as directed by the Engineer
2. Tributary areas
 - a. Define Final Areas A and B, and any additional Final Areas needed as directed by the Engineer
 - b. The Final Areas must be located upstream of the associated Outlet Point
3. Flows: Calculate the Final Flows for Outlet Points determined in Step 1. Flow (Q) shall be calculated using the Rational Method Flow Equation.

$$Q(\text{cubic-feet per second}) = cIA$$

- a. c = runoff coefficient = 0.2
 - b. I (10-year) – 7.2 in/hr
 - c. A = Final Areas as defined in Step 2
4. Ditch Data: Define Final Ditch Data for Outlet Points determined in Step 1.
 - a. Enter ditch geometry at the Outlet Point
 - i. Average side slope H , where H is the width across a 1-ft vertical drop
 - ii. Bottom width, b
 - iii. Longitudinal slope, m
 - b. Calculate flow parameters
 - i. Wetted perimeter, P = bottom width + distance along side slope
 - ii. Flow area, Z (per bottom width and side slopes)
 - iii. Iterate Flow depth to match the Flow calculated in Step 3 using Manning's Channel Flow Equation where $Q = 42.6 * Z * (Z/P)^{2/3} * (m^{0.5})$
 1. FHWA Hyrdraulic Toolbox calculator may be used with approval from the Engineer.

5. Shear Stress
 - a. Calculate Final Shear Stress at Outlet Points determined in Step 1.
 - b. Calculate Shear Stress, $T \text{ (lb/SF)} = 62.4 * m * d$

6. Surface Reinforcement (as described in District 2 Shear Calculations Procedure)
 - a. If Shear Stress ≤ 1.0 , none needed
 - b. If Shear Stress > 1.0 and ≤ 8.0 , use TRM
 - c. If Shear Stress > 8.0 and ≤ 12.0 , use TRM (SPECIAL) and specify minimum required shear stress for the vegetated state \geq calculated shear stress
 - d. If Shear stress > 12.0 , use riprap or TRM (SPECIAL) (with a minimum shear stress \geq calculated shear stress)

Table 1: Shear Stress Calculations

		PRELIMINARY		FINAL	
		A	B	A	B
Outlet Point	Station	1156+14	1153+24		
	Offset (ft)	160 RT	110 RT		
Tributary Area, A (acres)		15.7	2.1		
Rational Flow	c (-)	0.2	0.2	0.2	0.2
	I (in/hr)	7.2	7.2	7.2	7.2
	Q, 10-yr (cfs)	22.6	3.0		
Ditch Data	Avg. Side Slope, H (H:1V)	7.0	3.0		
	Bottom Width, b (ft)	6.0	4.0		
	Ditch Slope, m (ft/ft)	0.023	0.030		
	Wetted Perimeter, P (ft)	14.6	5.5		
	Flow Area, Z	6.192	1.160		
	Flow Depth, d (ft)	0.605	0.245		
	Manning's Q	22.6	3.0		
Shear Stress, T (lb/SF)		0.87	0.46		

Turf Reinforcement Mat (Special)

This work shall consist of installing Geo Cells for slope protection if required per the shear stress calculation. The cell shall have minimum depth of 4 inch and provide adequate friction to hold the soil. TRM (Special) must provide soil stability for a minimum shear stress of 12 pounds per square foot.

Prepare subgrade and install protection system in accordance with manufacturer's recommendations. Excavate or fill foundation soils to the level that top of installed section is flush with or slightly lower than adjacent terrain or final grade. Anchorage requirements for the sections shall be as recommended by the manufacturer or directed by the Engineer. Verify all sections are expanded uniformly to required dimensions and that outer cells of each section are correctly aligned. Interleaf or overlap edges of adjacent sections. Ensure upper surface of adjoining are

flush at joint and adjoining cells are fully aligned at the cell wall slot. Connect the sections and place clean topsoil in expanded cells with suitable material handling equipment, such as backhoe, front-end loader, conveyor, or crane-mounted skip. Limit drop height to a maximum of 3 feet to prevent panel distortion. Fill sections from the crest of the slope to toe or in accordance with Engineer's direction. Evenly spread topsoil and tamp into place.

Method of Measurement. This work will be measured as LUMP SUM.

Basis of Payment. This work shall be paid for at the contract unit LUMP SUM price for LANDSCAPING (SPECIAL) which price shall include all equipment and labor to complete the work.

Seeding and topsoil for the final conditions shall be paid for separately under applicable contract pay items.

If turf reinforcement mat, riprap, or turf reinforcement mat (special) must be used due to shear stress calculations this cost will not be paid for separately and shall be included in the cost of LANDSCAPING (SPECIAL) unless otherwise directed by the Engineer.

TEMPORARY PAVEMENT REMOVAL

This work shall be in accordance with Section 440 of the Standard Specifications and shall consist of removing the previously installed temporary pavement once construction staging allows for traffic to be shifted outside of these areas and the use of the temporary pavement is complete.

The removal of temporary pavement shall include the base course and sub-base.

This work shall also include the restoration of any areas outside of the ultimate pavement limits (outside Project Begins/Ends) as noted in the plans.

Restoration of areas inside the ultimate pavement limits shall be covered under the applicable pay items.

Method of Measurement. TEMPORARY PAVEMENT REMOVAL will be measured for payment in square yards.

Basis of Payment. This work will be paid for at the contract unit price per square yard for TEMPORARY PAVEMENT REMOVAL.

TEMPORARY AGGREGATE WEDGE

Description. This work shall include the installation and removal of aggregate between completed proposed pavement and existing pavement as detailed in the plans, or directed by the Engineer, in accordance with applicable portions of Section 481 of the Standard Specifications. Material shall be selected in accordance with Article 1004.04 (c) Aggregate Shoulders. If the Engineer determines the aggregate shall be wasted, the material shall be removed and disposed of in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement. This work will be measured for payment in tons according to Article 311.08, except payment will not be made for aggregate outside the plan width.

Basis of Payment. This work will be paid for at the contract unit price per ton for TEMPORARY AGGREGATE WEDGE. If removed, the removal and disposal of excess material shall be considered included in the contract unit price for TEMPORARY AGGREGATE WEDGE.

CONCRETE WALL REMOVAL

This work shall consist of removing concrete walls that are located in the area of the existing Madigan Creek culvert as shown in the plans.

Removal of the concrete wall at the face of the Valley Woods Dr culvert shall be removed in such a way as to not damage the existing culvert to remain. Any cracks, spalling or other damage to the existing culvert to remain from the removal of the concrete wall shall be repaired to the satisfaction of the Engineer and at no additional cost.

Disposal of the materials shall be in accordance with Article 202.03 of the Standard Specifications.

Regrading of the areas should be included in other items in the contract.

Method of Measurement. This work will be measured for payment in foot for the concrete wall removed in place.

Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE WALL REMOVAL, which price shall include all materials, labor, tools and equipment, at locations shown in the plans, as specified herein, and as directed by the Engineer.

PEDESTRIAN RAIL (SPECIAL)

Description. This work shall consist of designing, furnishing, erecting, maintaining, and removing a temporary pedestrian railing along the Shared-Use Path adjacent to the Temporary Soil Retention System during construction.

The Contractor shall provide the Engineer with shop drawings and design calculations for review and approval. The drawings and calculations shall be prepared and sealed by an Illinois Licensed Structural Engineer.

The railing shall be designed in accordance with the most restrictive requirements of Articles 13.8 and 13.9 of the AASHTO LRFD Bridge Design Specifications. The Contractor shall inspect the railing a minimum of once per week while it is in service and make any needed repairs.

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

Basis of Payment. This work shall be paid for at the contract unit price per foot of PEDESTRIAN RAIL (SPECIAL).

PIPE CULVERTS, SPECIAL

Description. This work shall include all labor, material, and equipment necessary for the installation of PIPE CULVERTS, SPECIAL, of the size and type specified, at location(s), depth(s), and angle(s) shown on the Engineering Plans, in accordance with applicable portions of Section 550 of the Standard Specifications, as directed by the Engineer, and as specified herein. This work also includes the preparation of design computations and shop drawings.

General. The Contractor shall furnish and place precast or cast-in-place pipe, and all incidental parts meeting the dimensions and angles of the details in the Plans and approved shop drawings.

This work consists of installing concrete storm sewer at depths that may exceed 35', and/or along angles to create curvature along pipe run(s).

The Contractor shall submit design calculations and shop drawings for the concrete pipe for approval by the Department. A total of 4 sets of design calculations and 4 sets of detailed construction drawings, signed and sealed by a Professional Engineer licensed in the State of Illinois, to the Department for approval. Do not begin fabrication of the pipe until receiving approval of the submission from the Department.

Method of Measurement. This work will be measured in place per foot for PIPE CULVERTS, SPECIAL of the size and type specified.

Basis of Payment. This work will be paid for at the contract unit price per foot for PIPE CULVERTS, SPECIAL, of the size and type specified, which price shall be payment in full for all equipment, labor, materials, fabrication, excavation and backfilling, dewatering, bedding, construction and all incidentals required to construct the complete PIPE CULVERTS, SPECIAL, of the size and type specified, to the dimensions and grades shown on the Plans.

ABANDON AND FILL EXISTING STORM SEWER

Description. This work shall consist of filling storm sewers to be abandoned at the locations shown on the plans or as directed by the Engineer, such that the entire pipe is filled without voids. The storm sewers to be abandoned shall be cleaned and televised prior to filling. If blind-ties or other unknown conditions are noted in the existing storm sewer to be abandoned, the Engineer shall be notified for further disposition prior to abandoning and filling the existing storm sewer.

Construction Requirements. The Contractor shall plug the ends of the pipe with Class SI Concrete or brick and suitable mortar to the satisfaction of the Engineer, and fill the remaining length of pipe with Controller Low-Strength Material (CLSM). The CLSM must meet the material requirements of Article 593.02.

Storm sewers intended for use to maintain storm water flow during staged construction shall not be abandoned and filled until proposed storm sewer construction is completed to maintain flow.

Method of Measurement. This work will be measured for payment per foot for the pipe to be abandoned and filled in place.

Basis of Payment. This work will be paid for at the contract unit price per foot for ABANDON AND FILL EXISTING STORM SEWER, which price shall include all materials, labor, tools and equipment, and backfilling of any excavation at locations shown in the plans, as specified herein, and as directed by the Engineer.

Cleaning and televising the storm sewer shall be included in the cost of this item, ABANDON AND FILL EXISTING STORM SEWER.

CONTROL STRUCTURES (SPECIAL)

Description. This work shall include all labor, material, and equipment necessary for the installation of CONTROL STRUCTURES of the number specified and as detailed in the Contract Plans in accordance with Sections 602 & 1006 of the Standard Specifications, as directed by the Engineer, and as specified herein.

General. The Contractor shall furnish and place precast or cast-in-place structures and all incidental parts meeting the dimensions and angles of the details in the Plans.

The Contractor shall submit shop drawings for the CONTROL STRUCTURE of the number specified, for approval by the District. A total of 4 sets of detailed construction drawings and any associated design calculations, signed and sealed by a Professional Engineer licensed in the State of Illinois, are to be submitted to the District for approval. Fabrication of the structure shall not begin until approval of the submitted drawings is approved.

Method of Measurement. This work will be measured in place per each for CONTROL STRUCTURES (SPECIAL), of the number specified.

Basis of Payment. This work will be paid for at the contract unit price per each for CONTROL STRUCTURES (SPECIAL) of the number specified, which price shall be payment in full for all equipment, labor, materials, fabrication, excavation and backfilling, dewatering, bedding, construction and all incidentals required to construct the complete CONTROL STRUCTURES (SPECIAL) of the number specified and to the dimensions and grades shown on the Plans.

TEMPORARY DRAINAGE CONNECTION

Description. This work shall consist of installing and removing or abandoning temporary catch basins, inlets, end sections, manhole structures, or other connections as approved by the Engineer. This work shall also consist of installing and removing or abandoning temporary storm sewer connections, culvert connections, and direct connections at temporary catch basins, inlets and manhole where structures. This work shall also consist of placement of Controlled Low-Strength Material (CLSM) to maintain an exposed excavation in the immediate area of the TEMPORARY DRAINAGE CONNECTION, as directed by the Engineer. All TEMPORARY DRAINAGE CONNECTIONS are meant to maintain existing drainage system functionality as well as flows from ditches, as shown in the plans and in accordance with Section 542, 550 and 602 of the Standard Specifications.

Catch basins, inlets, end sections, and manholes used as drainage structures for proposed temporary connections shall be furnished, installed, and removed as specified in the plans, except that the material for the catch basin, inlet, end section, or manhole need not be new material. Pipe

sections or other types of connectors may be used with the approval of the Engineer, and must be removed or abandoned with the approval of the Engineer and as specified herein. For TEMPORARY DRAINAGE CONNECTION locations that are specified to be abandoned, the Contractor shall plug the ends of the pipe with Class SI Concrete or brick and suitable mortar to the satisfaction of the Engineer, and fill the remaining length of pipe with Controlled Low-Strength Material (CLSM) or other suitable material, which must meet the material requirements of Article 593.02. TEMPORARY DRAINAGE CONNECTION locations that are being used to maintain storm water flow during staged construction shall not be abandoned and filled until proposed culvert construction is completed to maintain flow.

Direct connections will be allowed to or from existing pipes that will be removed in a subsequent construction stage. Temporary catch basins or temporary manholes shall be used for connections at new storm sewer or culvert pipes placed by contract.

After temporary storm sewers, temporary pipes, and temporary structures have been removed they shall become the property of the contractor. Backfill of excavation is included in the cost of this item. Backfill material shall be in accordance with Section 208 or as approved by the Engineer.

Method of Measurement. This work will be measured for payment in units of each.

Basis of Payment. This work shall be paid for at the contract unit price per each TEMPORARY DRAINAGE CONNECTION.

This work shall include the cost of the work noted including plugging and filling of any locations to be abandoned.

CATCH BASIN, TYPE A, 5'-DIAMETER WITH GRATE NO. 1 (SPECIAL)

Description. This work shall include all labor, material, and equipment necessary for the installation of CATCH BASIN, TYPE A, 5'-DIAMETER WITH GRATE NO. 1 (SPECIAL) at locations shown on the Contract Plans, in accordance with IDOT Standard 602001-02, Sections 602 and 604 of the Standard Specifications, as directed by the Engineer, and as specified herein. Grate shall be equivalent to the specifications for a Neenah Grate R-4349-C.

General. The Contractor shall furnish and place precast or cast-in-place structures, frame and grate, and all incidental parts meeting the dimensions and angles of the details in the Plans.

Method of Measurement. This work will be measured in place per each for CATCH BASIN, TYPE A, 5'-DIAMETER WITH GRATE NO. 1 (SPECIAL).

Basis of Payment. This work will be paid for at the contract unit price per each for CATCH BASIN, TYPE A, 5'-DIAMETER WITH GRATE NO. 1 (SPECIAL), which price shall be payment in full for all equipment, labor, materials, fabrication, excavation and backfilling, dewatering, bedding, construction and all incidentals required to construct the complete CATCH BASIN, TYPE A, 5'-DIAMETER WITH GRATE NO. 1 (SPECIAL) to the dimensions and grades shown on the Plans.

MANHOLES, TYPE A, WITH SPECIAL FRAME AND GRATE

Description. This work shall include all labor, material, and equipment necessary for the installation of MANHOLES, TYPE A, WITH SPECIAL FRAME AND GRATE of the diameter specified at locations shown on the Engineering Plans, in accordance with IDOT Standard 602402-03, Sections 602 and 604 of the Standard Specifications, as directed by the Engineer, and as specified herein. Grate shall be equivalent to the specifications for a Neenah Grate R-4349-C.

General. The Contractor shall furnish and place precast or cast-in-place structures, frame and grate, and all incidental parts meeting the dimensions and angles of the details in the Plans.

Method of Measurement. This work will be measured in place per each for MANHOLES, TYPE A, WITH SPECIAL FRAME AND GRATE, of the diameter specified.

Basis of Payment. This work will be paid for at the contract unit price per each for MANHOLES, TYPE A, WITH SPECIAL FRAME AND GRATE, of the diameter specified, which price shall be payment in full for all equipment, labor, materials, fabrication, excavation and backfilling, dewatering, bedding, construction and all incidentals required to construct the complete MANHOLES, TYPE A, WITH SPECIAL FRAME AND GRATE, of the diameter specific, to the dimensions and grades shown on the Plans.

MANHOLES, TYPE A, 10'-DIAMETER (SPECIAL)

Description. This work shall include all labor, material, and equipment necessary for the installation of MANHOLES, TYPE A, 10'-DIAMETER (SPECIAL), in accordance with IDOT Standard 602402, Sections 602 and 604 of the Standard Specifications, as directed by the Engineer, and as specified herein. The 10-ft structure shall extend to a minimum of 2-ft above the outside of the highest pipe elevation, or as specified in the Engineering Plans, and then taper to a 4-ft diameter. The 4-ft diameter portion of the structure shall extend to meet the rim elevation provided in the Engineering Plans. The grate shall be equivalent to the specifications for a Neenah Grate R-4349-C. This work also includes the preparation of design computations and shop drawings.

General. The Contractor shall furnish and place precast or cast-in-place structures, frame and grate, and all incidental parts meeting the dimensions and angles of the details in the Plans and herein.

The Contractor shall submit design calculations and shop drawings for the MANHOLES, TYPE A, 10'-DIAMETER (SPECIAL) for approval by the Department. A total of 4 sets of design calculations and 4 sets of detailed construction drawings, signed and sealed by a Professional Engineer licensed in the State of Illinois, are to be submitted to the Department for approval. Fabrication of the pipe shall not begin until approval of the submission is received from the Department.

Method of Measurement. This work will be measured in place per each for MANHOLES, TYPE A, 10'-DIAMETER (SPECIAL).

Basis of Payment. This work will be paid for at the contract unit price per each for MANHOLES, TYPE A, 10'-DIAMETER (SPECIAL), which price shall be payment in full for all equipment, labor, materials, fabrication, excavation and backfilling, dewatering, bedding, construction and all incidentals required to construct the complete MANHOLES, TYPE A, 10'-DIAMETER (SPECIAL), to the dimensions and grades shown on the Plans.

SANITARY MANHOLE TO BE ADJUSTED

Description. This work shall conform to Four Rivers Sanitation Authority (FRSA) requirements, details, and provisions, and Section 602 of the IDOT Standard Specifications for Road and Bridge Construction, current edition. This work shall include all equipment, materials, labor, transportation, and workmanship to adjust sanitary manholes as shown on the plans.

This work shall be in accordance with the FRSA Standard Detail Sheet.

This work shall consist of removing existing manhole frames and lids, removing all brick/precast adjusting rings, and all other materials, furnishing and installing new adjusting rings as required, furnishing and installing new frames and lids and exterior manhole adjustment seals.

This work shall include all earth excavation, trench backfill and compaction, pavement removal and replacement as required, in accordance with all applicable IDOT provisions and specifications.

This work shall include adjusting manhole frames to finish grade. The frame and lid shall be set 1/4 inch min. to 3/8 inch max. below final grade in pavement and at final grade in turf areas. All proposed rim elevations shall be obtained from the roadway reconstruction plan and profile plan sheets or from the Resident Engineer.

This work shall include the removal of all existing adjustment (whether brick or concrete), and replacement with new adjusting rings. The combination of new adjusting rings shall be such that the minimum number of rings possible are used.

Allowable types of adjusting rings include precast concrete and expanded polypropylene (EPP). These can be used in conjunction with each other, except that a precast concrete ring shall not be placed over an EPP ring.

For precast concrete adjusting rings:

All adjusting ring joints, as well as the joint between the frame and adjustment ring, shall be sealed watertight by means of an all-weather rubber butyl sealant designed for the purpose of sealing concrete structures water-tight. The adjusting ring surface shall be dry and free of foreign material. The surface shall be dried and heated with a weed burner when outside temperatures are less than optimum for adhesion of the sealant to the concrete.

Frames in the roadway shall be pitched to match the slope of pavement. EPP taper rings are required when frames are pitched.

For expanded polypropylene (EPP) adjusting rings:

The use of EPP adjustment rings shall be according to Sections 602 and 1043 of the IDOT Standard Specifications, and Supplemental Specifications & Recurring Special Provisions, most recent edition. The EPP adjustment rings shall be installed according to the manufacturer's

instructions. If the top surface of the manhole is not level, even, or is irregular, a non-shrink grout shall be placed to create a level surface and the first EPP ring shall be bedded and leveled in the non-shrink grout. The joints between the manhole, all adjustment rings, and the frame shall be sealed with the manufacturer's recommended/specified adhesive. The top ring shall be a 'finish ring' when pitching the frame is not necessary.

Frames in the roadway shall be pitched to match the slope of pavement. The top ring shall be a tapered 'adjustment' ring when pitching the frame is required. Shimming is not an acceptable method of pitching when using EPP rings. The upper most ring shall have grooves on the lower surface and a flat upper surface.

External adjustment seals are required, regardless of the type of adjustment rings used. Heat shrinkable adjustment seals shall not be used with EPP rings.

The maximum height of adjustment shall be 12 inches. The distance between the top of the frame to the first manhole step shall be no more than 30 inches. A maximum of one (1) 2 inch adjusting ring will be allowed.

The Contractor shall install an FRSA approved exterior adjustment seal on all manholes as shown on the FRSA Standard Detail sheet.

Materials.

1. Adjusting rings:
 - a. Precast concrete adjusting rings shall be standard reinforced concrete pipe pattern and shall conform to ASTM C478 and ASTM C139. There shall be no spalled edges or cracks. Precast concrete adjusting rings shall be size 4 inch height or greater.
 - b. Expanded polypropylene (EPP) rings shall be in accordance with Section 1043 of the IDOT Standard Specifications.
2. Adjusting ring sealant:
 - a. Precast concrete adjusting ring sealant shall be a flexible rubber butyl pre-formed sealant designed for the purpose of making concrete structure joints water-tight. Material shall conform to ASTM C990.
 - b. EPP ring sealant used for watertight installation of the EPP rings shall meet ASTM C 920, Type S, Grade NS, Class 25, uses NT, T, M, G, A, and O.
3. Manhole exterior adjustment seals (chimney seals) shall be of a rubber compound in accordance with ASTM C-923 and shall have two stainless steel compression bands also in accordance with ASTM C-923.
4. Manhole frames & lids:
 - a. Manhole frames and lids shall be per the approved frames and lids in the table below:

Approved Frames & Lids				
	Neenah Frame	Neenah Lid	East Jordan Frame	East Jordan Lid
Regular	1670-2004	R-1670-0358	00111711	00111732
Low Profile	1670-2008	R-1670-0358	---	---
Bolt Down *	1915JT08		---	---

* For manholes connected to mains 18" diameter or larger, or for manholes located in flood prone areas, frames & lids shall be the bolt down type.

Manhole adjustment insert riser rings are not approved for use.

Required Submittals:

1. Manhole adjustment ring material specifications.
2. Manhole adjustment ring sealant material specifications.
3. Manhole exterior adjustment seal (chimney seal) material specifications.
4. Manhole frame and lid material specifications.

Method of Measurement. This work will be measured in place per each for SANITARY MANHOLES TO BE ADJUSTED WITH NEW TYPE 1 FRAME, CLOSED LID.

Basis of Payment. This work shall be paid for at the contract unit price per each for SANITARY MANHOLES TO BE ADJUSTED WITH NEW TYPE 1 FRAME, CLOSED LID.

SANITARY MANHOLE TO BE RECONSTRUCTED

Description. This work shall conform to Four Rivers Sanitation Authority (FRSA) requirements, details, and provisions, and Section 602 of the IDOT Standard Specifications for Road and Bridge Construction, current edition. This work shall include all equipment, materials, labor, transportation, and workmanship to reconstruct sanitary manholes as shown on the plans.

This work shall be in accordance with the FRSA Standard Detail Sheet.

This work shall consist of removal and disposal of existing manhole frames and lids, all brick/precast adjusting rings, precast cone sections, precast barrel sections and furnishing and installing new precast cone or barrel sections of various diameters, furnishing and installing new adjusting rings as required, furnishing and installing new frames and lids and exterior manhole adjustment seals, and adjustment of sanitary manholes.

All manholes to be reconstructed for this project are existing precast concrete barrel and cone sections. The Contractor shall remove and dispose of manhole frames and lids, all brick/precast manhole adjustment, remove and dispose of existing precast cone and/or precast barrel sections, and furnish and install new precast barrel and/or cone sections. Removal shall stop at a point of sound structure. The Contractor shall be responsible for determining the configuration of new barrel and/or cone sections required to meet the requirements of the FRSA Standard Detail Sheet.

This work shall include all earth excavation, trench backfill and compaction, pavement removal and replacement as required, in accordance with all applicable IDOT provisions and specifications.

Manhole Adjustment.

Manhole adjustment shall consist of removing existing manhole frames and lids, removing all brick/precast adjusting rings, and all other materials, furnishing and installing new adjusting rings as required, furnishing and installing new frames and lids, and furnishing and installing exterior manhole adjustment seals.

This work shall include adjusting manhole frames to finish grade. The frame and lid shall be set 1/4 inch min. to 3/8 inch max. below final grade in pavement and at final grade in turf areas. All proposed rim elevations shall be obtained from the roadway reconstruction plan and profile plan sheets or from the Resident Engineer.

This work shall include the removal of all existing adjustment (whether brick or concrete), and replacement with new adjusting rings. The combination of new adjusting rings shall be such that the minimum number of rings possible are used.

Allowable types of adjusting rings include precast concrete and expanded polypropylene (EPP). These can be used in conjunction with each other, except that a precast concrete ring shall not be placed over an EPP ring.

For precast concrete adjusting rings:

All adjusting ring joints, as well as the joint between the frame and adjustment ring, shall be sealed watertight by means of an all-weather rubber butyl sealant designed for the purpose of sealing concrete structures water-tight. The adjusting ring surface shall be dry and free of foreign material. The surface shall be dried and heated with a weed burner when outside temperatures are less than optimum for adhesion of the sealant to the concrete.

Frames in the roadway shall be pitched to match the slope of pavement. EPP taper rings are required when frames are pitched.

For expanded polypropylene (EPP) adjusting rings:

The use of EPP adjustment rings shall be according to Sections 602 and 1043 of the IDOT Standard Specifications, and Supplemental Specifications & Recurring Special Provisions, most recent edition. The EPP adjustment rings shall be installed according to the manufacturer's instructions. If the top surface of the manhole is not level, even, or is irregular, a non-shrink grout shall be placed to create a level surface and the first EPP ring shall be bedded and leveled in the non-shrink grout. The joints between the manhole, all adjustment rings, and the frame shall be sealed with the manufacturer's recommended/specified adhesive. The top ring shall be a 'finish ring' when pitching the frame is not necessary.

Frames in the roadway shall be pitched to match the slope of pavement. The top ring shall be a tapered 'adjustment' ring when pitching the frame is required. Shimming is not an acceptable method of pitching when using EPP rings. The upper most ring shall have grooves on the lower surface and a flat upper surface.

External adjustment seals are required, regardless of the type of adjustment rings used. Heat shrinkable adjustment seals shall not be used with EPP rings.

The maximum height of adjustment shall be 12 inches. The distance between the top of the frame to the first manhole step shall be no more than 30 inches. A maximum of one (1) 2 inch adjusting ring will be allowed.

The Contractor shall install an FRSA approved exterior adjustment seal on all manholes as shown on the FRSA Standard Detail sheet.

Materials.

1. Adjusting rings:
 - a. Precast concrete adjusting rings shall be standard reinforced concrete pipe pattern and shall conform to ASTM C478 and ASTM C139. There shall be no spalled edges or cracks. Precast concrete adjusting rings shall be size 4 inch height or greater.
 - b. Expanded polypropylene (EPP) rings shall be in accordance with Section 1043 of the IDOT Standard Specifications.
2. Adjusting ring sealant:
 - a. Precast concrete adjusting ring sealant shall be a flexible rubber butyl pre-formed sealant designed for the purpose of making concrete structure joints water-tight. Material shall conform to ASTM C990.
 - b. EPP ring sealant used for watertight installation of the EPP rings shall meet ASTM C 920, Type S, Grade NS, Class 25, uses NT, T, M, G, A, and O.
3. Manhole exterior adjustment seals (chimney seals) shall be of a rubber compound in accordance with ASTM C-923 and shall have two stainless steel compression bands also in accordance with ASTM C-923.
4. Manhole frames & lids:
 - a. Manhole frames and lids shall be per the approved frames and lids in the table below:

Approved Frames & Lids				
	Neenah Frame	Neenah Lid	East Jordan Frame	East Jordan Lid
Regular	1670-2004	R-1670-0358	00111711	00111732
Low Profile	1670-2008	R-1670-0358	---	---
Bolt Down *	1915JT08		---	---

* For manholes connected to mains 18" diameter or larger, or for manholes located in flood prone areas, frames & lids shall be the bolt down type.

5. Precast concrete barrel and cone sections shall conform to ASTM C478 and shall be free of spalling or cracks.
6. Precast concrete barrel and cone joint sealant shall be a flexible rubber butyl pre-formed sealant designed for the purpose of making concrete structure joints water-tight. Material shall conform to ASTM C990.
7. Precast concrete barrel and cone external joint seals shall be a single, full circumference compression band in accordance with ASTM c-877 (Type II); MarMac MacWrap or approved equal.
8. Manhole steps shall be 10 inches long & 12 inches wide in accordance with ASTM C-478; Neenah R-1982-F, M.A. Industries PS-1, or approved equal.

Manhole adjustment insert riser rings are not approved for use.

Required Submittals:

1. Manhole adjustment ring material specifications.
2. Manhole adjustment ring sealant material specifications.
3. Manhole exterior adjustment seal (chimney seal) material specifications.
4. Manhole frame and lid material specifications.
5. Precast concrete barrel and cone section specifications.
6. Manhole barrel and cone joint sealant material specifications.
7. Manhole barrel and cone external joint seal material specifications.
8. Manhole step material specifications.

Method of Measurement. This work will be measured in place per each for SANITARY MANHOLES TO BE RECONSTRUCTED WITH NEW TYPE 1 FRAME, CLOSED LID.

Basis of Payment. This work shall be paid for at the contract unit price per each for SANITARY MANHOLES TO BE RECONSTRUCTED WITH NEW TYPE 1 FRAME, CLOSED LID.

VAULTS TO BE REMOVED

Description. This work shall consist of removing communication vaults, conduit, and appurtenances at locations indicated on the Plans or directed by the Engineer in accordance with the applicable requirements of Section 895.05(b) in the IDOT Standard Specifications for handhole removal and as modified herein:

General Requirements. The Contractor shall completely remove and dispose of the entire concrete vault structure to its full depth. Excavation and disposal of materials shall be included in this work and shall be disposed of per Article 202.03. The remainder of the excavated area shall be backfilled in accordance with Section 208. All work will be included in the cost of the pay item, and no further compensation will be provided.

Method of Measurement. This work shall be measured per each vault to be removed.

Basis of Payment. This work shall be paid for at the contract unit price each for VAULTS TO BE REMOVED which price shall include removing and properly disposing of the existing structure, excavation, backfill, and all labor, equipment, and materials necessary to perform said work. Salvaging and return of any materials shall be included in this pay item.

LINEAR DELINEATOR PANELS, 6 INCH

Description. Linear delineation panels shall be placed 6 inches down from the top of the concrete barrier wall or parapet wall as shown in the contract Plans. These panels shall be white or yellow, matching the color of the adjacent pavement marking edge line. Panels shall be spaced at a maximum spacing of 50 feet horizontally, with the first and last panel located within 20 feet of the end of the barrier or parapet. A minimum of 3 panels will be required along each wall.

Each panel shall be attached/adhered to the wall as per the manufacturer's written instructions, specifications, and/or recommendations.

General Requirements. When attaching linear delineation panels to concrete, the panels shall be secured using an anchor bolt method approved by the Engineer that will anchor the entire panel securely but also facilitate removal of the panel if damaged or weathered in the future. The Contractor shall sufficiently cover the backside of each panel, to the satisfaction of the Engineer, with an adhesive caulking system to aid in the permanent adhesion and alignment of the panel prior to drilling through the pre-drilled linear delineation system holes.

Each panel shall not be less than 36 inches in length and 6 inches in width. The panels shall be constructed of cube-corner retroreflective material in standard highway colors permanently bonded to an aluminum substrate. The lateral edges of each panel shall be hemmed. The panel assembly shall have a repeating raised lateral ridge every 2.25 inches. Each ridge shall be 0.34 inches high with a 45° profile and a 0.28-inch radius top. Each panel shall be attached/adhered to the wall or guardrail as per the manufacturer's written instructions, specifications and/or recommendations except connections that require drilling and anchoring into the concrete barrier shall not be allowed. Cleaning of the protective coat (boiled linseed oil) on the surfaces of the concrete barrier shall be required per the adhesive manufacturer's written instructions. The cleaned surfaces shall receive a primer that is specifically recommended by the adhesive manufacturer. The panel product data sheets, material certifications, test results, and construction type and details shall be submitted to the Engineer for approval a minimum of 30 days prior to proposed use.

Daytime color requirements shall be determined from measurement of the retroreflective sheeting applied to aluminum test panels. Daytime color shall be measured instrumentally using a spectrophotometer employing annular 45/0 (or equivalent 0/45) illuminating and viewing geometry measurements shall be made in accordance with ASTM E1164 for ordinary colors or ASTM E2153 for fluorescent colors. Chromaticity coordinates shall be calculated for CIE Illuminant D65 and the CIE 1931 (2o) Standard Colorimetric Observer in accordance with ASTM E308 for ordinary colors or ASTM E2152 for fluorescent colors.

Chromaticity Limits for White

	x	y	x	y	x	y	x	y	Limit Y (%)	
									Min	Max
White	0.303	0.287	0.368	0.353	0.340	0.380	0.274	0.316	40	-

Chromaticity Limits for Fluorescent Yellow

	x	y	x	y	x	y	x	y	Total Luminance Factor Y (%)
									Min
Fluor. Yellow	0.498	0.412	0.557	0.442	0.479	0.520	0.438	0.572	24

The manufacturer shall provide a certification letter that states the materials supplied to this Contract Number project meets the physical properties of this special provision and shall attach test results that demonstrate compliance. The manufacturer shall certify by letter that the adhesive and all recommended concrete surface preparation materials and instructions used to adhere the panels to the concrete and guardrail surfaces are specifically recommended for typical Illinois outdoor weather and highway related exposures.

The Resident Engineer will sample one panel at random per unique lot of component materials for acceptance testing by Illinois Department of Transportation.

Method of Measurement. This work will be measured for payment per each.

Basis of Payment. This work shall be paid for at the contract unit price per each for LINEAR DELINEATOR PANELS, 6 INCH.

SHOULDER RUMBLE STRIP REMOVAL

Description. This work shall consist of the milling of existing shoulder rumble strips constructed in hot-mix asphalt shoulders, and the furnishing and placement of hot-mix asphalt in the milled area, prior to placing traffic onto the shoulder in a construction stage. This work shall take place per the limits shown on the Plans and/or as directed by the Engineer.

Construction Requirements. The nominal depth of milling of the hot-mix asphalt shoulders shall be 2 inches. Unless otherwise shown in the Plans, the width of milling shall be four (4) feet, measured from the mainline pavement longitudinal joint between the mainline pavement and the adjoining shoulder. After removing all millings from the milled limits, the surface shall be primed in accordance with Article 406.05(b) of the Standard Specifications. The milled area shall then be filled with hot-mix asphalt surface course and compacted flush with the adjoining pavement and shoulder surfaces. The mix to be used for this item shall be the IDOT Hot Mix Asphalt Surface Course, Mix D, N70, unless otherwise specified in the Contract.

Debris disposal shall be performed in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement. SHOULDER RUMBLE STRIP REMOVAL will be measured for payment in square yards. Any portion of this work constructed outside the dimensions shown on the Plans or as directed by the Engineer will not be measured for payment.

Basis of Payment. This work will be paid at the contract unit price per square yard for SHOULDER RUMBLE STRIP REMOVAL, which payment shall constitute full compensation for milling the designated portion of hot-mix asphalt shoulder; cleaning the milled area and removing all debris; applying tack coat, furnishing, placing and compacting hot-mix asphalt surface mix; and for all labor, equipment, tools and incidental necessary to complete the work as specified.

REMOVE IMPACT ATTENUATORS, NO SALVAGE

Description. This work shall consist of removing and disposing existing impact attenuators as shown on the plans. The work shall be completed in accordance with the applicable portions of Section 440. This work shall be coordinated with the traffic control plan for this project. Disposal shall be performed in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement. This work will be measured for payment per each.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE IMPACT ATTENUATORS, NO SALVAGE, which price shall include removal of the impact attenuators and the satisfactory disposal of all materials.

REMOVE ATTENUATOR BASE

Description. This work shall consist of the removal and disposal of existing base pavements that are supporting and located at existing impact attenuator locations shown on the plans and as directed by the Engineer. The attenuators can consist of sand barrels or other types of attenuators. All work necessary shall be done in accordance with Section 440 of the Standard Specifications. Disposal shall be performed in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement. Each base for each attenuator will be measured per each as a separate attenuator base. A grouping of sand barrels on a base shall consist of one attenuator base. The entire base and any connections, bars or other similar material shall be removed and disposed of by the Contractor.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE ATTENUATOR BASE, which price shall include removal of attenuator bases and the satisfactory disposal of all materials.

FENCE REMOVAL

Description. This work shall consist of the complete removal and disposal of existing fence in locations as shown on the Plans or as directed by the Engineer from the project site regardless of the fence type.

General. The Contractor shall remove all components of the existing fence including any concrete used to anchor fence posts, bracing guy wires, posts, and/or gates. All removed materials shall be disposed of outside the limits of the right-of-way according to Article 202.03.

Fence sections to remain in place shall be left in a sound stable condition. The Contractor shall replace any fence sections to remain damaged during the removal process without additional payment.

This work also includes restoration of holes and surfaces disturbed during removal.

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

Basis of Payment. This work will be paid for at the contract unit price per foot for FENCE REMOVAL. The unit price shall include all equipment, materials and labor required to remove and dispose of the fence and restore the affected area.

INLET MARKER

Description. This work shall consist of furnishing and installing an INLET MARKER at the locations specified in the plans and noted herein.

General. Inlet markers shall be installed at the locations shown on the plans to delineate the location of inlets in the median.

The markers shall be placed on top of the barrier wall at each location.

The marker shall be equivalent to the specifications for a Valtir Safe-Hit Glarescreen.

Method of Measurement. This work will be measured in place per each for INLET MARKER.

Basis of Payment. This work will be paid for at the contract unit price per each for INLET MARKER, which price shall include all materials, labor, tools and equipment required to place an INLET MARKER, as specified herein, and as directed by the Engineer.

ENGINEER'S FIELD OFFICE, TYPE A (SPECIAL)

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 5000 square feet with a minimum of five 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. Solid waste disposal consisting of ten 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 Article 670.02(a) through 670.02(r) to read:

- (a) Four desks with minimum working surface 42-inch x 30 inch each and four non-folding office chairs with upholstered seats, backs and will have wheels.
- (b) Nine desks with minimum working surface 72 inch x 36 inch each and nine non-folding office chairs with upholstered seats, backs and will have wheels.
- (c) Two four-post drafting tables with minimum top size of 37-½ inch x 48 inch.
- (d) Eight free standing four-drawer legal size file cabinets with lock and an underwriters' laboratories insulated file device 350 degrees one hour rating.
- (e) Twenty folding chairs and four conference tables with minimum top size of 44 inch x 96 inch.
- (f) Six 6 ft folding tables.
- (g) One refrigerator with a minimum size of 25 cu ft with separate freezer unit. The refrigerator shall be self defrosting.
- (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.
- (i) A minimum of two communication paths. The configuration shall include:
 - (1) Internet Connection. An internet service connection using telephone DSL, or cable Broadband, with Business Class Support. Minimum speeds shall be 75Mbps download and 20Mbps upload. The internet service shall be provided with a Static IP address. Additionally, a wireless router shall be provided for the exclusive use of the Engineer. The router shall support wireless standards 802.11 b/g/n capable, have a minimum of four (4) gigabit ports and have VPN capability. The Engineer shall approve the service and equipment prior to installation.
 - (2) Telephones lines. Three 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. The phone lines shall have unpublished numbers.
- (j) Two plain paper color laser copiers with automatic feed and sorter/stapler (including maintenance agreement, software and all operating supplies). The units shall be capable of copying field books, 8-1/2" x 11", 8-1/2" x 14" and 11" x 17" size paper. The copiers shall have the capability to be networked and be able to copy, print and scan color prints up to 11"x17". The machines shall also be capable of a minimum of 30 ppm and have multiple 500 sheet storage trays and include one high capacity storage tray of 2000 sheets minimum. The machines shall be equipped to handle a minimum of 3 separate paper paths.

The Engineer shall approve the equipment prior to installation.

- (k) One plain paper fax machine including maintenance and supplies.
- (l) Six two-line telephones, with touch tone, and two digital answering machines, for exclusive use by the Engineer.
- (m) One electric water cooler dispenser including water service.
- (n) Three 4-foot x 6-foot dry erase boards.
- (o) One 4-foot x 6-foot framed cork board.
- (p) One first-aid cabinet fully equipped.
- (q) Two electric paper shredders.
- (r) One microwave oven (minimum 1000 watt) with a turntable and 1 cu ft minimum capacity

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).

REMOVE TEMPORARY CONCRETE BARRIER, STATE OWNED

Description. This work shall consist of the complete removal, transportation and unloading of existing temporary concrete barrier state owned to the following location:

IDOT Rockford Maintenance Yard
4109 11th Street
Rockford, IL 61109

Yard hours are 7 AM to 3 PM Monday through Friday.

The Contractor shall contact the Maintenance Yard at least 48 hours prior to delivery.

Method of Measurement. This work will be paid for payment in foot, in place and standing prior to removal.

Basis of Payment. Concrete barrier and base removal will be paid for at the contract unit price per foot for REMOVE TEMPORARY CONCRETE BARRIER, STATE OWNED, which price shall include all labor, equipment, and materials necessary to remove, transport, and unload the temporary barrier wall.

REMOVE TEMPORARY IMPACT ATTENUATORS, STATE OWNED

IDOT currently has approximately four (4) impact attenuators on site to protect temporary concrete barrier, double face barrier and bridge piers. After construction begins and locations are protected by other measures and as directed by the Engineer the Contractor should return the impact attenuators to:

IDOT Rockford Maintenance Yard
4109 11th Street
Rockford, IL 61109

Yard hours are 7 AM to 3 PM Monday through Friday.

The Contractor shall contact the Maintenance Yard at least 48 hours prior to delivery.

Method of Measurement. This work will be measured for payment per each temporary impact attenuator removed, owned by the state.

Basis of Payment. This work will be paid for at the contract unit price per each REMOVE TEMPORARY IMPACT ATTENUATORS, STATE OWNED, which price shall include all labor, equipment, and materials necessary to remove, transport, and unload the temporary impact attenuators.

REMOVE AND REINSTALL SIGN PANEL

Description. This work shall consist of removal and storage of existing sign panels, posts, hardware and appurtenances and reinstallation of each at the completion of construction. This work shall be performed in accordance with the applicable Articles of Section 723 of the Standard Specifications, and as described herein.

General Requirements. The Contractor shall remove and store each sign panel, posts, mounting hardware and all other appurtenances and reinstall each upon completion of the project. Care shall be taken to preserve the condition of the sign, post, hardware and appurtenances. Damaged signs, posts shall be replaced by the Contractor at their expense. The signs will be reinstalled at the locations shown in the plans and as directed by the Engineer.

Method of Measurement. REMOVE AND REINSTALL SIGN PANEL will be measured for payment in square foot.

Basis of Payment. This work will be paid at the contract unit price per square foot for REMOVE AND REINSTALL SIGN PANEL, which includes all equipment and labor required to remove, store and reinstall sign panels.

UNDERPASS LUMINAIRE (SPECIAL)

Description. This work shall consist of furnishing and installing an underpass luminaires for the Cherry Valley Pedestrian Tunnel under I-39 at locations shown on the Plans in accordance with Section 821 of the Standard Specifications and as specified herein.

Materials. All materials shall be in accordance with the contract plan drawings and applicable portions of Sections 1065, 1066, and 1067.

The luminaire shall be Lithonia Lighting model VG04C-40LED-MVOLT-DNAT-TRS-BAA-LPI or approved equal by the Engineer and the Village of Cherry Valley.

Method of Measurement. This work will be measured in units of each, completed in place and accepted.

Basis of Payment. This work shall be paid for at the contract unit price per each for UNDERPASS LUMINAIRE (SPECIAL).

REMOVAL OF TEMPORARY WOOD POLES AND FIBER OPTIC CABLE

Description. The Contractor shall remove the wood poles, FOC, and hardware once the permanent FOC is spliced.

The wood poles, fiber optic cable, and associated hardware and appurtenances shall become the property of the Contractor and shall be properly disposed of according to Article 202.03.

Method of Measurement. This item shall be measured by the removal of all wood poles, fiber optic cable, and associated hardware and appurtenances from the job site.

Basis of Payment. This item shall be paid as a lump sum for REMOVAL OF TEMPORARY WOOD POLES AND FIBER OPTIC CABLE which shall include all labor, equipment, materials, and all incidentals to remove and dispose of the wood poles, fiber optic cable, and hardware.

TEMPORARY WOOD POLE

Description. This work shall be performed in accordance with Section 830 of the Standard Specifications insofar as applicable and as detailed on the Plans, except as modified herein.

Materials. Temporary wood poles shall be in accordance with Section 1069.04 of the Standard Specification.

Mast arms for temporary wood poles with mast arm shall be in accordance with 1069.03(a).

Method of Measurement. This work will be measured per each.

Basis of Payment. This work will be paid for at the contract unit price per each for TEMPORARY WOOD POLE, of the type, size, and class specified, which price shall be payment-in-full for all labor, equipment, materials, and incidental expenses as necessary to furnish and install the temporary wood pole including, grounding, luminaire arm, bolts, nuts, and washers, etc.

MAINTENANCE OF EXISTING FIBER OPTIC CABLE (FOC) NETWORK

Description. This work shall consist of maintaining the fiber optic cable network within the project limits during construction.

Procedure. 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 the fiber optic cable network through until final acceptance or as otherwise determined by the Engineer.

Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall initiate a request for a maintenance transfer and preconstruction inspection, as specified elsewhere herein, to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of the IDOT District 2 fiber optic network 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 801.13d. 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 Article 109.04.

Existing fiber optic networks, 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 Fiber Optic Networks

This Special Provision includes the following maintenance services/activities to be rendered by the Contractor to ensure the continuous operation of the FOC Network within the limits of the project and other remote locations where construction activities are in support of the project.

1. Prior approval for all repair/restoration or replacement work on the government FOC network is required before work shall commence. Coordinate with the Engineer for inspection and approval of all repairs prior to placing the network back online.
2. All materials necessary for repair/restoration and replacement of any portion of the network within the project limits shall be approved by the Engineer prior to installation and shall be inspected & approved upon completion of the work.
3. All work shall comply with current laws, regulations, rules, etc. controlling said work.
4. Cleaning and dewatering of manholes directly impacted from construction activities (If applicable).

5. Qualified manpower, tools, equipment, vehicles, facilities, and materials are available within 4 hours of notification for immediate response in case of network failure.
6. Refer to the Maintenance, repair/restoration, and replacement responsibilities in Division 800 of the current "Standard Specifications for Road and Bridge Construction" for additional information.

Extent of Maintenance.

Fiber Optic Cable network (FOCN) outages that may require repair/restoration and/or replacement include some (not limited to this list) of the following:

1. Site survey, locating services, and damage assessment.
2. Installation & Splicing of Distribution Points (setting –up, installation of bridle ring, DP, closing splice, & installation of cable tie).
3. FOC cabling or releasing of Cable (unlashing of cable, installation of lashing wire, cable lashing clamp, tie-cable support and accessories).
4. Repair/restoration, or replacement of fiber optic cable, hardware, and ancillary equipment (aerial/underground) located within the construction limits damaged from construction activities.
5. Replacement of damaged FOC runs.
6. Splicing of FOC.
7. Repair/restoration and replacement of existing materials, connections, or hardware, etc. damaged from construction activities.
8. FOC Testing Activity (OTDR, Power Rating, VSL, FOC inventory, Results Documentation) and other activities necessary for the complete restoration and operation of the FOC when damage is located within the project limits or resulting from construction activity. Coordinate with the Engineer regarding any necessary testing requirements.
9. Refer to the Maintenance, repair/restoration, and replacement responsibilities in Division 800 of the current "Standard Specifications for Road and Bridge Construction" for additional information.

Response and Report Time Target.

The Contractor shall consider all interruptions in service as urgent priority. Expected response and restoration time are given in the table below:

INCIDENT OR PROBLEM	SERVICE RESPONSE TIME	SERVICE RESTORATION TIME
Reported Outage	4 hours	12 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.

Failure to provide this service will result in liquidated damages of \$1,500 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 State's 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 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.

Manpower Work Requirements. The Contractor shall supply the needed manpower capable of delivering the needed services on a moment's notice. Manpower should be technically trained not only in fiber optic technology but also knowledgeable in networking, communicate effectively, and capable of troubleshooting and repair work.

Any untoward incidents and/or accidents that may happen to contractor's manpower or any third party shall be the sole responsibilities of the contractor.

Method of Measurement. The Contractor shall demonstrate to the satisfaction of the Engineer that the fiber optic network 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 fiber optic networks are not maintained and not operational will not be paid. Payment shall not be made retroactively for months in which fiber optic networks were not operational.

Basis of Payment. Maintenance of fiber optic cable networks shall be paid for at the contract unit price per calendar month for MAINTENANCE OF EXISTING FIBER OPTIC CABLE (FOC) NETWORK.

FIBER OPTIC CABLE, SINGLE MODE

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 ± 0.7
Core-to-Cladding Concentricity		(μm)	≤ 0.5
Cladding Non-Circularity			$\leq 0.7 \%$
Mode Field Diameter	1310 nm	(μm)	9.2 ± 0.4
	1550 nm		10.4 ± 0.5
Coating Diameter		(μm)	245 ± 5
Colored Fiber Nominal Diameter		(μm)	253 - 259
Fiber Curl radius of curvature		(m)	$> 4.0 \text{ m}$

Optical Characteristics				
Requirement			Units	Value
Cabled Fiber Attenuation		1310 nm	(dB/km)	≤ 0.4
		1550 nm		≤ 0.3
Point discontinuity		1310 nm	(dB)	≤ 0.1
		1550 nm		≤ 0.1
Macrobend Attenuation	Turns	Mandrel OD	(dB)	
	1	32 ± 2 mm		< 0.05 at 1550 nm
	100	50 ± 2 mm		< 0.05 at 1310 nm
	100	50 ± 2 mm		< 0.10 at 1550 nm
	100	60 ± 2 mm		< 0.05 at 1550 nm
	100	60 ± 2 mm		< 0.05 at 1625 nm
Cable Cutoff Wavelength (λ _{ccf})			(nm)	< 1260
Zero Dispersion Wavelength (λ _o)			(nm)	1302 ≤ λ _o ≤ 1322
Zero Dispersion Slope (S _o)			(ps/(nm²•km))	≤ 0.089
Total Dispersion	1550 nm		(ps/(nm•km))	≤ 3.5
	1285-1330 nm			≤ 17.5
	1625 nm			≤ 21.5
Cabled Polarization Mode Dispersion			(ps/km ⁻²)	≤ 0.2
IEEE 802.3 GbE - 1300 nm Laser Distance			(m)	up to 5000
Water Peak Attenuation: 1383 ± 3 nm			(dB/km)	≤ 0.4

Cable Construction.

The number of fibers in each cable shall be as specified on the Plans.

Optical fibers shall be placed inside a loose buffer tube. The nominal outer diameter of the buffer tube shall be 3.0 mm. Each buffer tube shall contain up to 12 fibers. The fibers shall not adhere to the inside of the buffer tube.

Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." The fibers shall be colored with ultraviolet (UV) curable inks.

Buffer tubes containing fibers shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." Buffer tube colored stripes shall be inlaid in the tube by means of co-extrusion when required. The nominal stripe width shall be 1 mm.

For cables containing more than 12 buffer tubes, standard colors are used for tubes 1 through 12 and stripes are used to denote tubes 13 through 24. The color sequence applies to tubes containing fibers only, and shall begin with the first tube. If fillers are required, they shall be placed in the inner layer of the cable. The tube color sequence shall start from the inside layer and progress outward.

In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and shall not be subject to fading or smearing onto each other. Colors shall not cause fibers to stick together.

The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrinkback requirements of 7 CFR 1755.900.

Fillers may be included in the cable core to lend symmetry to the cable cross-section where needed. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer.

The central member shall consist of a dielectric, glass reinforced plastic (GRP) rod (optional steel central member). The purpose of the central member is to provide tensile strength and prevent buckling. The central member shall be overcoated with a thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.

Each buffer tube shall contain a water-swellaable yarn for water-blocking protection. The water-swellaable yarn shall be non-nutritive to fungus, electrically non-conductive, and homogeneous. It shall also be free from dirt or foreign matter. This yarn will preclude the need for other water-blocking material; the buffer-tube shall be gel-free. The optical fibers shall not require cleaning before placement into a splice tray or fan-out kit.

Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process.

Water swellaable yarn(s) shall be applied longitudinally along the central member during stranding.

Two polyester yarn binders shall be applied contrahelically with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking, and dielectric with low shrinkage.

For single layer cables, a water swellaable tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The water swellaable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

For dual layer cables, a second (outer) layer of buffer tubes shall be stranded over the original core to form a two-layer core. A water swellaable tape shall be applied longitudinally over both the inner and outer layer. The water swellaable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

The cables shall contain one ripcord under the sheath for easy sheath removal.

Tensile strength shall be provided by the central member, and additional dielectric yarns as required.

The dielectric yarns shall be helically stranded evenly around the cable core.

The cables shall be sheathed with medium density polyethylene (MDPE). The minimum nominal jacket thickness shall be 1.4 mm. Jacketing material shall be applied directly over the tensile strength members (as required) and water swellable tape. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The MDPE jacket material shall be as defined by ASTM D1248, Type II, Class C, Category 4 and Grades J4, E7 and E8.

The jacket or sheath shall be free of holes, splits, and blisters.

The cable jacket shall contain no metal elements and shall be of a consistent thickness.

Cable jackets shall be marked with the manufacturer's name, month and year of manufacture, sequential meter or foot markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code (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 > 3,200 feet 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 reach 90°F or more.

Where cable is to be pulled through existing conduit which contains existing cables, optical or other, the existing cables shall be removed and reinstalled with the fiber optic cable as indicated on the Plans. The removal of the cable(s) shall be paid for separately. Reinstallation of the existing cables, if indicated on the Plans, along with the fiber optic cable shall be included in this item for payment.

Tracer Wire:

A tracer wire shall be installed with all fiber optic cable runs. One tracer wire shall be installed along with the fiber optic cable in each raceway. If a raceway has more than one fiber optic cable, only one tracer wire per raceway is required. If there are parallel raceways, a tracer wire is required in each raceway that contains a fiber optic cable. Tracer wire shall be installed in raceway segments which are metallic to provide a continuous tracer wire system.

The tracer wire shall be a direct burial rated, number 12 AWG (minimum) solid (.0808" diameter), steel core soft drawn high strength tracer wire. The wire shall have a minimum of 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 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 (electronically) shall be submitted on the same day of the test. Hardcopies shall be submitted as described herein with copies electronically.

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 an electronic copy 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.

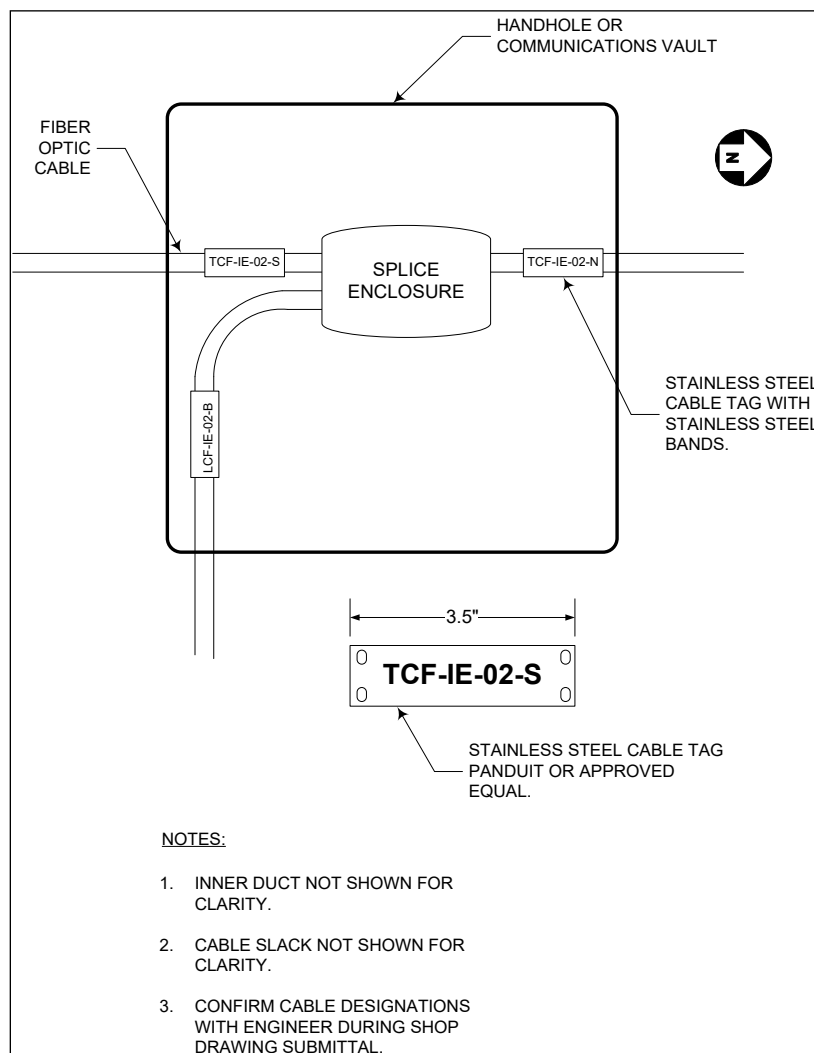
Splicing Requirements:

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 IN CONDUIT, 12 FIBERS, SINGLE MODE or FIBER OPTIC CABLE IN CONDUIT, 96 FIBERS, SINGLE MODE. Payment shall not be made until the cable is installed, spliced and tested in compliance with these special provisions.

FIBER OPTIC SPLICE

Description. The Contractor will splice optical fibers from different cable sheaths and protect them with a splice closure at the locations shown on the Plans. Fiber splicing consists of in-line fusion splices for all fibers described in the cable Plan at the particular location.

Two splices are identified. A mainline splice includes all fibers in the cable sheath. In a lateral splice, the buffer tubes in the mainline cable are dressed out and those fibers identified on the Plans are accessed in and spliced to lateral cables.

Materials.

Splice Closures. Splice Closures shall be designed for use under the most severe conditions such as moisture, vibration, impact, cable stress and flex temperature extremes as demonstrated by successfully passing the factory test procedures and minimum specifications listed below:

Physical Requirements. The closures shall provide ingress for up to four cables in a butt configuration. The closure shall prevent the intrusion of water without the use of encapsulates.

The closure shall be capable of accommodating splice organizer trays that accept mechanical, or fusion splices. The splice closure shall have provisions for storing fiber splices in an orderly manner, mountings for splice organizer assemblies, and space for excess or un-spliced fiber. Splice organizers shall be re-enterable. The splice case shall be UL rated.

Closure re-entry and subsequent reassembly shall not require specialized tools or equipment. Further, these operations shall not require the use of additional parts.

The splice closure shall have provisions for controlling the bend radius of individual fibers to a minimum of 38 mm (1.5 in.).

Factory Testing.

Compression Test. The closure shall not deform more than 10% in its largest cross-sectional dimension when subjected to a uniformly distributed load of 1335 N at temperatures of -18 and 38 degrees Celsius (0 and 100 degrees Fahrenheit). The test shall be performed after stabilizing at the required temperature for a minimum of two hours. It shall consist of placing an assembled closure between two flat parallel surfaces, with the longest closure dimension parallel to the surfaces. The weight shall be placed on the upper surface for a minimum of 15 minutes. The measurement shall then be taken with weight in place.

Impact Test. The assembled closure shall be capable of withstanding an impact of 28 N-M at temperatures of -18 and 38 degrees Celsius (0 and 100 degrees Fahrenheit). The test shall be performed after stabilizing the closure at the required temperature for a minimum of 2 hours. The test fixture shall consist of 9 kg (20 lb.) cylindrical steel impacting head with a 50 mm (2 in.) spherical radius at the point where it contacts the closure. It shall be dropped from a height of 305 mm (12 in.). The closure shall not exhibit any cracks or fractures to the housing that would preclude it from passing the water immersion test. There shall be no permanent deformation to the original diameter or characteristic vertical dimension by more than 5%.

Cable Gripping and Sealing Testing. The cable gripping and sealing hardware shall not cause an increase in fiber attenuation in excess of 0.05 dB/fiber @ 1550 nm when attached to the cables and the closure assembly. The test shall consist of measurements from six fibers, one from each buffer tube or channel, or randomly selected in the case of a single fiber bundle. The measurements shall be taken from the test fibers before and after assembly to determine the effects of the cable gripping and sealing hardware on the optical transmission of the fibers.

Vibration Test. The splice organizers shall securely hold the fiber splices and store the excess fiber. The fiber splice organizers and splice retaining hardware shall be tested per EIA Standard FOTP-II, Test Condition 1. The individual fibers shall not show an increase in attenuation in excess of 0.1 dB/fiber.

Water Immersion Test. The closure shall be capable of preventing a 3 m (10 ft) water head from intruding into the splice compartment for a period of 7 days. Testing of the splice closure is to be accomplished by the placing of the closure into a pressure vessel and filling the vessel with tap water to cover the closure. Apply continuous pressure to the vessel to maintain a hydrostatic head equivalent 3 m (10 ft) on the closure and cable. This process shall be continued for 30 days. Remove the closure and open to check for the presence of water. Any intrusion of water in the compartment containing the splices constitutes a failure.

Certification. It is the responsibility of the Contractor to insure that either the manufacturer, or an independent testing laboratory has performed all of the above tests, and the appropriate documentation has been submitted to the Department. Manufacturer certification is required for the model(s) of closure supplied. It is not necessary to subject each supplied closure to the actual tests described herein.

Construction Requirements

The closure shall be installed according to the manufacturer's recommended guidelines. For mainline splices, the cables shall be fusion spliced. 45 days prior to start of the fiber optic cabling installation, the Contractor shall submit the proposed locations of the mainline splice points for review by the Department.

The Contractor shall prepare the cables and fibers in accordance with the closure and cable manufacturers' installation practices. A copy of these practices shall be provided to the Engineer 21 days prior to splicing operations.

Using a fusion splicer, the Contractor shall optimize the alignment of the fibers and fuse them together. The Contractor shall recoat the fused fibers and install mechanical protection over them.

Upon completing all splicing operations for a cable span, the Contractor shall measure the mean bi-directional loss at each splice using an Optical Time Domain Reflectometer. This loss shall not exceed 0.1 dB.

The Contractor shall measure the end-to-end attenuation of each fiber, from connector to connector, using an optical power meter and source. This loss shall be measured at from both directions and shall not exceed 0.5 dB per installed kilometer of single mode cable. Measurements shall be made at both 1300 and 1550 nm for single mode cable. For multimode cable, power meter measurements shall be made at 850 and 1300 nm. The end-to-end attenuation shall not exceed 3.8 dB/installed kilometers at 850nm or 1.8 dB per installed kilometer at 1300nm for multimode fibers.

As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice not satisfying the required objectives.

The Contractor shall secure the Splice Closure to the side of the splice facility using cable support brackets. All cables shall be properly dressed and secured to rails or racks within the manhole. No cables or enclosures will be permitted to lie on the floor of the splice facility. Cables that are spliced inside a building will be secured to the equipment racks or walls as appropriate and indicated on the Plans.

Method of Measurement. Fiber optic splice of the type specified will be measured as each, completely installed and tested with all necessary splices completed within the enclosure, and the enclosure secured to the wall of the splice facility.

Basis of Payment. This work shall be paid at the contract unit price each for FIBER OPTIC CABLE SPLICE – MAINLINE or FIBER OPTIC CABLE SPLICE - LATERAL which shall be payment in full for the work, complete, as specified herein.

FIBER OPTIC UTILITY MARKER

Description. This work shall consist of marking of the fiber optic in-ground conduit runs and shall be done to prevent future damage to the fiber backbone. The markers shall be placed every 300 feet along the fiber run and at other important junctions, turns, or other areas as specified by the Engineer.

Materials. The markers shall adhere to the following minimum specifications:

- The marker shall be a cylindrical marker mounted on a 3.5" O.D. post.
- The marker shall be comprised of polymer materials which are resistant to impact, ultraviolet light, ozone, or hydrocarbon damage. The post and marker shall remain impact resistant in temperatures of -20° to 140° F.
- The marker shall incorporate a cylindrical tube construction. It shall be capable of permanent or temporary installation on a 3.5" O.D. tube and shall utilize an anchor barb below ground level to prevent rotation and removal. The marker shall have an outside diameter of 3.82 inches. The nominal wall thickness shall be 0.13 inches, and the overall length shall be 18 inches.

- The marker shall be colored red on top of orange. Red shall be from the top to halfway down the marker (9 inches) and then orange the remaining 9 inches. The marker shall be pigmented throughout its entire cross section and shall incorporate UV resistant materials to prevent fading or cracking in outdoor environments. The marker graphics shall include the following:
- On the red portion of the marker in the vertical direction, it shall say "Buried Cables" above the symbol for "no digging". It shall have the same verbiage on the opposite side (180° away). Ninety degrees from this, on both sides, shall be the verbiage "Danger", also in the vertical direction.
- The orange portion of the marker, in the horizontal direction and on two sides of the marker, shall incorporate the IDOT logo and the words "Illinois Department of Transportation". Directly below this, it shall say, "Intelligent Transportation System". Below this, it shall say "Before digging, trenching, or pushing pipe in this vicinity, call 618-346-3233. Failure to comply will result in Legal Action." Directly below this, a horizontal line and then "MARKER ID NUMBER" with a blank space for the marker ID number to be inserted in the field. The Contractor shall be responsible for adding the MARKER ID NUMBER based on the following template:

25507.60.01F

Where:

255 = Interstate Designation

07.60 = Milepost number to nearest hundredth of mile 01 = Marker number

F = Fiber Marker

Directly below this again include the symbol for "no digging" and the words "Buried Cable". All graphics shall consist of a solvent-based ink that is abrasive and UV resistant.

- The marker shall exhibit good workmanship and shall be free of burns, discoloration, and other objectionable marks or defects which affect appearance or serviceability.
- The marker shall have a minimum tensile strength of 2700 pounds per square inch as measured by ASTM D638 (specimen Type I with separation rate of 2 inches per minute). The marker tensile strength shall not deviate more than 10 percent from the standard room temperature result when tested at both 140° and -20° F after a minimum of two hours conditioning at the respective temperature.
- The marker shall be a 6-foot post with an 18" marker attached and installed to a 2 foot burial depth. It shall be capable of withstanding at least one vehicle impact at 35 mph. The marker shall return upright within 15° of vertical position within a maximum of 30 seconds from the time of impact. The warning legend shall be retained on the marker after each impact.

Installation. Locate markers with test stations shall be installed at each handhole as shown on the plans. The test station shall be connected to the fiber optic cable splice case and grounded to a ground rod as shown on the plans and as directed by the Engineer.

GPS coordinates for every line marker placed shall be measured. The coordinates shall be measured in geographic decimal degrees and recorded in a table provided to IDOT in both electronic and hard copy format. GPS coordinate data collection shall continue to fiber termination points at controller cabinets and to the TMC, so all conduit and fiber runs are clearly identified. The conduit, fiber markers, and controller cabinets shall be located with an accuracy level of 18 inches. The fiber optic utility markers, conduit, and controller cabinets shall be distinguishable in the GPS locator device as they are collected, so they are clearly identified in the table provided to the Department.

Method of Measurement. Fiber optic utility marker will be measured as each, completely installed.

Basis of Payment. This work will be paid for at the contract unit price per each for FIBER OPTIC UTILITY MARKER.

REMOVE FIBER OPTIC CABLE FROM CONDUIT

Description. This work shall consist of removing a portion of the existing fiber optic interconnect cable from conduit as shown on the plans.

Construction. The existing fiber optic cable shall be disconnected from the communications end equipment and fiber enclosures and removed from the existing conduits. Removal of the fiber optic cable shall prevent damage to end equipment from the cable being tugged. The existing fiber optic cable shall not be disconnected and removed until the temporary equipment and communications are installed in advance and operating to the satisfaction of the Engineer. Cables shall be taken off-site for proper disposal.

Disposal shall be performed in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement. Removal of all cables installed in an existing conduit will be measured for payment per foot. Multiple cables in conduit shall not be paid to be removed separately. The length of measurement shall be the horizontal distance measured between points of connection and shall not include vertical lengths and slack.

Basis of Payment. This work will be paid for at the contract unit price per foot for REMOVE FIBER OPTIC CABLE FROM CONDUIT which price shall be payment in full for disconnecting the existing fiber optic cable from the end locations and removing the existing fiber optic cable from the existing conduits.

GENERAL RAILROAD SUBMITTAL REQUIREMENTS

It is the responsibility of the Contractor to coordinate with, and be familiar with the submittal requirements of, each of the railroad entities involved on this contract in order to prevent delays to the contract.

It is recommended that the Contractor initiate coordination with each railroad entity immediately upon execution of the contract.

The following plan submittal requirements are the MINIMUM submittal timeframes, and shall be superseded by any specific submittal requirements required by the individual railroad entity if the railroad entity requires additional lead beyond the timeframes listed below:

- Within 30 days of Notice to Proceed, Contractor shall submit a complete Stage 1 demolition plan to be routed for railroad approval.
- Within 60 days of Notice to Proceed, Contractor shall submit all remaining Stage 1 work plans, including work plans for pile driving, pier construction, girder erection, and all other construction activities that require railroad approval.
- Within 21 days of Contractor receipt of formal review comments, Contractor shall submit a complete re-submittal to be routed for railroad approval.
- For subsequent project stages, initial submittals to the railroad shall be made at least 180 days in advance of anticipated construction.

Adherence to these submittal timeframes does NOT substitute for the direct coordination with each railroad entity to confirm submittal timeframes required by each railroad entity.

Each of the submitted plans shall meet all requirements and include all applicable details as set forth in the governing railroad documents.

COORDINATION WITH UNION PACIFIC RAILROAD (UPRR)

For construction on or adjacent to Union Pacific Railroad (UPRR) property, the Contractor will be required to contact the UPRR, as listed below, to secure necessary permits and obtain written authorization to occupy or otherwise use the property.

The Contractor is responsible for meeting all requirements of the Union Pacific Railroad in connection therewith and for verifying all information as it is subject to change at any time.

Mr. Chris Keckeisen
Sr. Manager Industry and Public Projects
Union Pacific Railroad
1400 Douglas St STOP 0910
Omaha, NE 68179
Phone: (402) 544-5131

Information regarding Right of Entry applications, processing and approvals may be directed to:

Mr. Jason M. Murray
Union Pacific Railroad
1400 Douglas Street
Omaha, Nebraska 68179
Phone: (402) 544-2623

Additional information has been provided for convenience; however, the Contractor shall be responsible to verify the accuracy of the information by checking the Union Pacific Railroad website at the following link: <http://www.uprr.com/reus/tempuse/index.shtml>.

The Contractor shall note the following Right of Entry (ROE) fees:

Application Fee: \$1,045.00
Administrative Fee for Contractor of the Licensee: \$500 License
Fee: Fee provided after review and approval
Expedited Processing of ROE Application - \$5,055.00 or \$10,055.00

The Contractor shall be aware that an additional fee will be required, after processing of the application, to be submitted with the signed Right of Entry Agreement for the actual temporary use of the Railroad property. This fee cannot be estimated until the application is processed. It may exceed \$5,000.00. The Contractor shall request expedited processing of the ROE Application and shall have included the cost, \$10,055.00, in the bid proposal which shall be considered as included in the prices for the various pay items of the Contract and no extra compensation will be allowed.

Normal Flagging Day - \$1,500/8 hours
Estimated overtime, night, weekend, and holiday work at \$250/hour.

It should be noted that the flagging services require one hour of set-up and one hour of take down every day in addition to the Contractor's work time.

Railroad Crossing Identification Information (SNs 101-0210/0211)

DOT/AAR Crossing #: 174659X
Mile Post: 85.41
RR Division: Chicago
RR Subdivision: Rockford Ind Ld
City/County/State: Cherry Valley, Winnebago, Illinois

UNION PACIFIC RAILROAD REQUIREMENTS

Description. This work shall consist of providing all labor, materials, and equipment necessary to meet the Railroad requirements for construction of the bridge carrying I-39/U.S. Route 20 over the Union Pacific Railroad (UPRR).

General Requirements.

1. Prior to the Contractor beginning any work activities on the Railroad right-of-way a Right of Entry permit and Railroad Protective Liability Insurance, as outlined elsewhere within these Special Provisions must be obtained and copies provided to the Engineer.
2. The Contractor shall comply with the Railroad requirements as stated in the Construction and Maintenance Agreement prior to the commencement of any construction within the Railroad right-of-way. A copy of the Construction and Maintenance agreement will be provided to the successful bidder.
3. The Contractor shall meet all safety standards as defined by the Railroad, Federal Railroad Administration (FRA), OSHA, Local, State and Federal Governments and the State Railroad Regulatory Body.
4. The Contractor shall secure the services of a flagger, through the Railroad when construction activities take place within 25 feet of the track.

5. The Railroad's Local Representative will be on hand at the preconstruction meeting to discuss specific coordination issues and Railroad requirements.

Submittals

The Contractor shall be required, through the Engineer, to make the following submittals for review and approval by the Railroad:

1. Shoring
2. Falsework
3. Demolition Plans
4. Erection Plans
5. Erosion Control Plans
6. Construction Phasing Plans

Construction Requirements

1. The Contractor shall comply with the temporary horizontal and vertical construction clearances shown on the plans.
2. The Railroad will conduct on-site observations of construction activities at significant points during construction including, but not limited to, temporary earth retention along tracks, demolition activities, falsework, erection activities over tracks and final observation and acceptance.
3. The Contractor shall provide the Railroad through its Local Representative with a construction schedule. The schedule should be updated monthly and show the major activities outline in item 2.

Method of Measurement. This work will not be measured for payment.

Basis of Payment. This work will not be paid for separately but shall be considered as included in the cost of the various items of work included in the contract and no additional compensation shall be allowed.



Temporary Use of Railroad Property - Procedures

The permitting process for seismic and vibrosis survey requests, movie productions, and other projects involving temporary use of railroad property is as follows:

1. A non-refundable application fee in the amount of \$545.00 must accompany your completed Application for Right of Entry form sent to the appropriate Real Estate Manager [http://www.uprr.com/reus/contacts/mgrcontacts/index.cfm?MGR_FUNC=Land%20Leases%20and%20Sales]. Please make payable to Union Pacific Railroad Company, with the Federal Tax Identification No. 94-6001323. Please be aware that a licensee fee will be charged on top of the application fee. The manager will only be able to provide you with fee information after your application has been reviewed and approved.
2. If possible, please provide a city, county or topographical map of the area, showing the proposed installation. If you require a railroad right of way map to locate your right of way use location, such a map may be obtained (a fee may be required) from:
 - › Engineering Map Area
Union Pacific Railroad Company
Phone: (402) 501-4941
Fax: (402) 501-4932
3. When using a street name on the application, which has been changed, please include the current name as well as any previous name. Many of the old railroad company maps do not reflect these name changes.
4. Please refer to the information on Fixed Object Identity for examples to assist you in locating "fixed objects."
5. The information on Identifying Railroad Mile Post Locations will assist in locating mile post markers, which are helpful in establishing the location of the proposed site or installation.
6. Union Pacific's Real Estate Department is the initial contact for all right of entry requests. Applications should be submitted by U.S. mail, or express mail to the Pipeline, Wireline, Right of Entry and Drainage Contacts [http://www.uprr.com/reus/contacts/mgrcontacts/index.cfm?MGR_FUNC=Wire,%20Pipe,%20and%20Roadway].
7. The application should be accompanied by all of the items listed in the Temporary Use Checklist before your request can be given an initial review. Incomplete applications will halt processing.
8. The normal turn-around time for processing applications is now running between 30-45 days. Please allow sufficient time for the handling of your request. Please do not call within the initial 30 days of receipt of your request for the status of your application. Time in answering your phone calls only delays the processing of your request as well as all other requests from other applicants.
9. **Rush Handling:** If you require rush handling of your application, please complete and return the right of entry application form, the Rush Handling form found elsewhere in this section, and a check in the amount of \$545 plus the appropriate RUSH fee, and enclose all in an envelope labeled "RUSH." Please note that not all projects are eligible for Rush Handling.
10. Before you enter the railroad company's right of way, the following must be completed:
 - › All agreements must be executed by the applicant and the railroad company. A copy of the executed agreement must be within the applicant's possession before entering the railroad company's right of way.
 - › Verbal Authorizations will not be permitted or granted. Generally, a minimum of 48 hours' advance notice after execution of an agreement will be required prior to entry.
 - › License fees and insurance certificates, if required, must be submitted at the time you execute and return the agreement.
 - › Clearance and approval from the railroad company's Fiber Optic Cable Hotline (800) 336-9193.
 - › Arrangements must have been made with the railroad company's local manager of track maintenance, as listed in the agreement, for flagging protection (if required).
 - › You will be required to obtain Railroad Protective Liability Insurance. This may be purchased from an insurance agent of your choice, or you may be eligible for inclusion in UPRR's Railroad Protective Liability Insurance program.
 - › If a Contractor is employed by the Licensee to perform any of the agreed to activities under the Right of Entry Agreement, that Party will need to complete and return the Contractor's Endorsement Form and submit along with a \$500 Administrative Fee and a copy of their General Liability Insurance certificate meeting the specified coverages as shown in the License Agreement. A Railroad Protective Liability Insurance policy must be in procured by the Licensee OR its Contractor.
11. The terms of the railroad company's standard agreements are non-negotiable. Please do not attempt to make any changes to the agreement or request alteration to any of the terms and/or provisions to the agreement.

APPLICATION – RIGHT OF ENTRY

(Please allow 30-45 days for processing)

1. Name of Licensee _____
(Exact Name of the Owner of the Utility)

State of Incorporation _____; if not incorporated, please list entity's legal status

2. Address, email, phone and Fax number of Licensee

Email _____ Phone _____ Fax _____
3. Name, address and phone number of individual to whom agreement is to be mailed
if different than Item 2.

4. Contact information for individual to contact in the event of questions.

Email _____ Phone _____ Fax _____
5. Project site location:

(City, County and State)
6. Railroad site location information:

(Railroad Mile Post, Subdivision, or any other pertinent location detail.)
7. Time period for your project use of Railroad Company's property:

Start Date: _____ Stop Date: _____
8. Will there be any activity or equipment within 25 feet of a Railroad track in
connection with this property?
() No () Yes (If Yes, a Flagman will be required on site at your cost.)
9. Will there be any excavation involved?
() No () Yes (If Yes, include shoring plans within Railroad standards.)

10. Purpose of your request:
(This must be detailed & complete; attach engineering plans, shoring plans and any pertinent supporting details, including maps or prints.)

- Additional Fees and charges may be applicable to your request. These changes cannot be determined until your project is approved.

UNION PACIFIC RAILROAD
1400 DOUGLAS STREET MS 1690
OMAHA NE 68179

COORDINATION WITH CN RAILROAD

For construction on or adjacent to CN Railroad property, the Contractor will be required to contact CN Railroad, to secure necessary permits and obtain written authorization to occupy or otherwise use the property. The information and documents below are for information only. The Contractor must contact CN for the most current and applicable information.

Right of Entry Information

Cost is \$1000.00 per Application

Railroad Company requires everyone (contractor, consultants, etc.) working on Railroad Company property to have a Right-of-Entry (ROE) License Agreement. ROE license agreement applications are handled by email. Once Railroad Company receives the information requested below, and if application is approved, Railroad Company will draw up a ROE License Agreement, and will forward electronic copy by email for applicant's execution. ROE License Agreement will be delayed if Railroad Company receives the required documents separately, incomplete, or inaccurate. Railroad Company will return a fully executed digital copy of the ROE License Agreement by email for Applicant's files and records. No work may occur on Railroad Company property nor will flagging protection be provided until ROE License Agreement has been fully executed by both parties and returned. Please contact Railroad Company a minimum of three (3) weeks prior to the project start date.

Please use this form and return by email to submit application request for a Right of Entry agreement.

***Please Include a map showing the project location**

- Legal Name of contractor -
 - Contact name –
 - Contact email –
 - Street Address –
 - City, State, Zip –
 - Telephone –
-
- Reason for ROE –
 - Duration of ROE (Include start and finish dates) –
 - Exact Location of project (Exact Address, City, State) -
 - Nearest railroad milepost AND crossing id number –

- Will there be subcontractors on this project (list all subs) –
- Does your work require a traffic shift in opposing lane over a railroad at-grade crossing -

Email the completed form to: Angelique.Cope@cn.ca

Note: Fully executed ROE may take up to 3+ weeks to obtain

Safety Training Required

ALL contractor personal will have to comply with CN safety requirements including and before entering upon the property of the Railroad for performance of any work, secure permission from the Engineering Superintendent of the Railroad Company or his authorized representative for the occupancy and use of the Railroad's property and shall confer with the Railroad relative to requirements for railroad clearances, operation and general safety regulations. Outside contractors and subs, who are not employed by CN or doing work for CN, are required to register with www.contractororientation.com and complete the basic safety and security tests. Contractor Orientation provides the basic safety, security and PPE requirements for CN. You may find more information on registering with contractor orientation on the contractor orientation website. Once you register, follow the CN links and you will be required to take the course labeled [CN Contractor Security](#) / [Safety Course](#).

EXCEPTION: CN has exempted those it classifies as "Delivery Persons" from this training. This will include contractors such as UPS, FedEx, trucking companies, etc. who merely access the property to supply materials or equipment.

Insurance Requirements

Railroad Company allows outside parties to come onto Railroad Company property to perform work, such as survey or inspection work, installation of pipelines and wirelines, and other work for projects necessitating the occupancy of Railroad Company. Before commencing work, and until the license of allowing such occupancy ends or is terminated, outside parties shall provide and maintain the following insurance in form and amount with companies satisfactory to and as approved by Railroad Company.

1. Minimum insurance required of outside party:
 - A. Statutory Workers Compensation and Employer's Liability Insurance.
 - B. Automobile Liability Insurance in an amount not less than \$1,000,000 combined single limit.
 - C. Commercial General Liability Insurance (Occurrence Form) in an amount not less than \$5,000,000 per occurrence, with an aggregate limit of not less than \$10,000,000. The policy must name Railroad Company and its parents as additional insureds in the following form:

Chicago, Central & Pacific Railroad Company and its Parents
17641 S Ashland Ave
Homewood IL, 60430
715.332-3557 (office)
Diane.Lewis@cn.ca

The policy must not contain any provisions excluding coverage for injury, loss or damage arising out of or resulting from doing business or undertaking construction or demolition on, near, or adjacent to railroad track or facilities, and using endorsement CG 2417 10 01 or equivalent approved by Railroad Company.

- D. When outside party is required by Railroad Company or Governing Authority to purchase Railroad Protective Liability Insurance to cover work on, near or adjacent to railroad track or facilities, and outside party is not being hired for this project by Railroad Company, outside party must procure Railroad Protective Liability Insurance in the following form;

This coverage shall be written on an Occurrence Form with limits of not less than \$5,000,000 per occurrence for Bodily Injury, Personal Injury and Physical Damage to Property, with an aggregate limit of not less than \$10,000,000. The policy must name:

Chicago, Central & Pacific Railroad Company and its Parents
17641 S Ashland Ave
Homewood IL, 60430
715.332-3557 (office)
Diane.Lewis@cn.ca

- E. Pollution Insurance – AS REQUIRED AND DETERMINED BY PROJECT.

- F. All policies described above must include description of operations, Railroad Company milepost, highway or street name, city and state of location, project number, and Railroad Company contact person on the certificate.

2. Before commencing work, outside party shall deliver to Railroad Company a certificate of insurance evidencing the foregoing coverages and, if requested by Railroad Company, true and complete copies of the policies described above. If the policy is being issued in conjunction with, or as a result of, a city, county or state contract, the policy should be initially submitted to the respective city, county or state agency that will review it first and then forward it to Railroad Company.
3. Common Policy Provisions. Each policy described in paragraph 1, parts A through E above, must include the following provisions:

CN 24-Hour Emergency Contact Number:

1-800-465-9239

Cable Locates:

CN utilities are not part of Digger's Hotline. **Please request a cable locate by using the Flagging - Cable Locate Form. \$975 Fee.**

Flagging Protection:

Rates: \$2,500 for each basic day (up to 8 hours, includes 3 hours to set up flags)

\$275.00 for each overtime hour

Weekend or Holiday work is \$275.00 per hour with an 8 hour minimum or \$2,200.00 plus any overtime.

Flagging must be **prepaid** based on the estimated number of days needed.

Usually only one flagman is required at the work site.

Flagman protection is required when there is any work being done within 25 feet of the centerline of the closest rail, but if you will be using cranes with booms larger than 25' but are working away from the ROW, flagman protection will be required, just in case a crane topples over and violates that 25' rule.

CN's US Flagging group is the contact for arranging flagman protection on your upcoming project. CN requires at least a ten business day notice prior to the start of work, so arrangements can be made through our flagging contractor. Please complete the attached form and send to the address below along with prepayment. The sooner the form is sent to CN, the more likely you will get a flagger for the days you request.

CN
17641 S. Ashland Ave
Homewood, IL 60430
Phone: (248) 914-9695
Email: Flagging_US@cn.ca

—

US

Flagging

CN Request for Flagging Services and Cable Location

Project Information:	
Please fill in each cell for processing	
Is this a new project?	
List CN Project # (Example SO# 123456, Network# R1234, PSC-132):	
Contractor's Right of Entry (ROE), License, Permit #:	
Date of Agreement for ROE, License or Permit:	
Termination Date of Agreement for ROE, License or Permit (If Applicable):	
Does the scope of work include underground, piling, excavation or other activities which would require a Railroad Cable Locate? Note: railroad cables and fibers are not part of any state utility locate programs. If a contractor shows up on site to perform work that requires a cable locate and it was not requested, the flagger will shut down the project	
Does your project require vehicular traffic to be shifted out of its intended lane against the current of traffic at a railroad grade crossing?	
Railroad Subsidiary (listed on your agreement):	
Licensee and/or their contractor shall request, prepay, and secure Railroad Company signal facility locates by written notice to Railroad Company along with submission of CN's "Request for Flagging Services" form at least, 10 business days in advance of proposed performance of any work or access to Railroad Company property. Notice to Railroad Company does not fulfill or satisfy any other notification requirements for utility locates for non-railroad facilities. You must have an agreement with a CN railroad subsidiary, such as a Right of Entry, Permit, License or Formal Agreement in addition to any necessary flagging before you may enter CN property.	
Flagging Protection Schedule:	
Requested Dates for Flagger Protection: Dates requested are subject to Flagging Co. availability and any project needing a cable locate will need 10 days minimum advance notice. This should be considered when requesting dates for flagging.	
Estimated Duration (in days) for Flagger:	
Estimated Work Schedule (example Mon. – Sat.)	
Daily Start Time / End Time (example 0700 to 1700 etc.): (Flagger start and end time may vary based on type of protection required)	
Flagging Protection Location:	
Railroad Mile Post (MP):	
Railroad Subdivision:	
Project's Location (Street location/intersection):	
Project - City / State:	
Project Description (example HDD, Jack and Bore, Encroachment, Underground or Overhead Pipeline / Wireline crossing, etc.):	
Location for flagger to report:	
Field Contact Person(s):	1 st Alternate
Mobile Phone Number(s):	1 st Alternate
Email Address(s):	

CN REQUEST FOR FLAGGING SERVICES AND CABLE LOCATION			
Billing Information:			
Company Name:			
Contact Name:			
E-Mail:			
Billing Address:			
City/State:			
ZIP Code:			
Company Phone:			
Electronic Payment Instructions		Payment Information	
Financial Institution	HARRIS TRUST AND SAVINGS BANK 311 WEST MONROE, CHICAGO, IL	Customer Number (if available)	
Account Name	Grand Trunk Western	CN Contact	
Account	274-733-5	Service Requested (Flagging MP, Request Date)	
US ROUTING (ABA)	071 000 288		
Remittance Details	nfcashmanagement@cn.ca	Prepayment Amount	
Please send payment remittance details and copy of this flagging request to nfcashmanagement@cn.ca			

Before Flagging Service is provided:
CN required online training must be completed before Flagging Protection will be scheduled.
Prepayment must be received before Flagging Protection will be scheduled.
There is an 8-hour minimum per day. The base rate for Flagging Protection is \$2,500.00 for 10 hours: this includes 2 overtime hours for flagger to set up/take down protection if needed. Additional overtime hour must be prepaid at the rate of \$275.00.00 per hour. Weekends and Holidays must be prepaid at the overtime rate with a \$3,025.00 / 10 hour minimum. (Rates Effective October 1st, 2023.) *****New Rates effective March 10, 2025 below***** A fixed rate of \$2,900 per flagging day (12-hour day) (\$3,300 on Weekends and Holidays) for flagging protection and it needs to be prepaid. Railroad Cable Locate must be prepaid at \$1,025. Fixed fees prepaid for full unused days will be refunded. For greater clarity, if a customer prepaid for 5 flagging days and used 3 days, CN will refund 2 days.
If additional days of flagging protection are required, they must be prepaid in advance.
Any prepayment not used can be refunded.
Railroad Cable Location must be prepaid, the cost is \$9750.00 per locate. ***New rate effective March 10, 2025*** \$1,025 per locate.

This completed form must be sent with a map, confirmation of electronic prepayment, and proof of insurance to US_Flagging@cn.ca

FAI Route 39 (I-39) & FAP Route 301 (US 20)
Project NHPP-5F4Z(497)
Section (201-3)R & (4-1,5)R
Winnebago County
Contract No. 64C24

CN Flagging Department

US Flagging
T: **248-914-9695**
17641 South Ashland Ave.
Homewood, IL 60430
[US Flagging@cn.ca](mailto:USFlagging@cn.ca)

I, _____, agree to pay for flagging and/or cable locate services as requested _____
Print Name Signature

RAILROAD PROTECTIVE LIABILITY INSURANCE (BDE)

Effective: December 1, 1986

Revised: January 1, 2022

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

OFNAMED INSURED & ADDRESS	NUMBER & SPEED OF PASSENGER TRAINS	NUMBER & SPEED FREIGHT TRAINS
Chicago, Central & Pacific Railroad Company and its Parents 17641 South Ashland Avenue Homewood, Illinois 60430	0	11 per day at 50 MPH
Class 1 RR (Y or N): Yes DOT/AAR No.: 289988S RR Division: Iowa	RR Mile Post: 79.40 RR Sub-Division: Freeport	
For Freight/Passenger Information Contact:	Garrett Miller	Phone: (715) 496-0014
For Insurance Information Contact:	Angelique Cope	Phone: (773) 405-0863 angelique.cope@cn.ca
	Diane Lewis	Phone: (708) 332-3557 diane.lewis@cn.ca
Union Pacific Railroad Company 1400 Douglas Street Omaha, NE 68179-1870	0	1 per day at 10 mph
Class 1 RR (Y or N): Yes DOT/AAR No.: 174659X RR Division: Great Lakes	RR Mile Post: 85.41 RR Sub-Division: Rockford Ind. Lead	
For Freight/Passenger Information Contact:	Brian Dyer	Phone: (815)739-6003
For Insurance Information Contact:	Matt Hertel at Marsh	Phone: (630)524-8438 Matt.Hertel@marsh.com

Comments: Railroad flaggers are required if working within 25 feet, horizontally, of the tracks or whenever working over the tracks.

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 PROTECTIVELIABILITY INSURANCE.

SIGN STRUCTURE WALKWAY (ILLINOIS TOLLWAY)

This work shall be completed in accordance with Section 733 of the Illinois Tollway Supplemental Specifications.

This applies to the sign structure associated with the Tollway DMS sign.

OVERHEAD SIGN STRUCTURE (ILLINOIS TOLLWAY)

This work shall be completed in accordance with Section 733 of the Illinois Tollway Supplemental Specifications.

This applies to the sign structure associated with the Tollway DMS sign.

FOUNDATIONS FOR OVERHEAD SIGN STRUCTURE (ILLINOIS TOLLWAY)

This work shall be completed in accordance with Section 734 of the Illinois Tollway Supplemental Specifications.

This applies to the sign structure associated with the Tollway DMS sign.

UNDERGROUND CONDUIT, GALVANIZED STEEL (ILLINOIS TOLLWAY)

This work shall be completed in accordance with Section 810 of the Illinois Tollway Supplemental Specifications.

This applies to the conduit associated with the Tollway DMS sign.

ELECTRIC CABLE IN CONDUIT, 600V (XLP-TYPE USE) 1/C (ILLINOIS TOLLWAY)

This work shall be completed in accordance with Section 817 of the Illinois Tollway Supplemental Specifications.

This applies to electrical cable work associated with the Tollway DMS sign.

DYNAMIC MESSAGE SIGN – WALK-IN (ILLINOIS TOLLWAY)

Effective: January 20, 2014

Revised: March 1, 2022

Description. The work shall consist of furnishing, fabricating, manufacturing, transporting, delivery to site, installing, commissioning, testing, training, warranty, controller, controller cabinet and foundation, power and all incidentals necessary to provide a fully operational Dynamic Message Sign (DMS), of the type specified, per the contract plans and as directed by the Engineer, and as part of a fully functional ITS site.

- DMS – Type 1 shall be a walk-in type, full matrix, full color, high resolution, light emitting diode (LED) sign capable of displaying 3 lines of 21 characters of 18-inch high characters.
- DMS – Type 2W shall be a walk-in type, full matrix, full color, high resolution, light emitting diode (LED) sign or capable of displaying 3 lines of 18 characters of 18-inch high characters.

The work under this special provision shall be in association with the installation of the related DMS structure, electrical service, grounding, and communications.

Materials. The main components of the system are as described below. All other ancillary connection cables, brackets, and other items required for the installation of a fully functional DMS assembly are included under this provision.

- Dynamic Message Sign
- Associated DMS cabling
- Surge Protection Device (SPD)

The following are the specific materials required for the major system component of the DMS:

Sign Housing

- A. The walk-in sign housing shall be designed to comply with NEMA Type 4X enclosure criteria. The DMS housing structural frame shall consist of aluminum extrusions made from 6061-T6 and/or 6063-T6 aluminum alloy. All sides of the DMS housing exterior, except the front, shall be covered with 0.125 inch thick aluminum sheets made from 5052-H32 aluminum alloy. This external aluminum skin shall be attached to the structural framework using a proven method of attachment. DMS structural assembly hardware (nuts, bolts, washers, and direct tension indicators) shall be stainless steel or galvanized A325 high-strength steel and shall be appropriately sized for the application.
- B. Sign housing, including the framing, face and all mounting components, shall be designed to withstand a wind velocity of 120 MPH with a gust factor as specified in NCHRP Report 412, minimum wind pressure of 60 psf, in accordance with AASHTO's "LRFD Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals" and certified by a Structural Engineer licensed in the State of Illinois. Design ice loading shall be a minimum of 3 psf per the above AASHTO

requirements. The vendor shall submit the following shop drawing information for approval by the Engineer:

1. Calculations showing wind load applied horizontally over the sign face and various combinations of vertical loads including dead load, ice load, and truck generated wind load (updraft).
2. Details of walkway, hangers and handrails for walkway that are externally mounted to DMS.
3. Static weights and center of gravity of the DMS.
4. Weld design computations showing all loads and stresses.
5. Structural Engineer certified fatigue resistance compliant with N.C.H.R.P., Report 412.

The manufacturer shall certify that all structural attachments satisfy the above criteria and are adequate to support the loads indicated. As required by the Illinois Tollway, this certification shall include the signature and seal of a Structural Engineer licensed in the State of Illinois. Certify the structural adequacy of all sign and device mounting brackets.

- C. The DMS front face shall provide a built-in 3-degree downward tilt. The front face shall be constructed with multiple rigid panels, each of which supports and protects a full-height section of the LED display matrix. The panels shall be fabricated using aluminum sheeting on the exterior and polycarbonate sheeting on the interior of the panel. Front face panels shall provide a high-contrast background for the DMS display matrix. The aluminum mask of each panel shall be painted black and shall contain an opening for each pixel. Openings shall be large enough to not block any portion of the viewing cones of the LEDs. Face panels shall be attached to each other using stainless steel hardware. Seams that separate adjacent panels shall be sealed. Panels shall not be welded or otherwise permanently mounted to the DMS housing.

Each panel shall have a single polycarbonate sheet attached securely to the inside of the aluminum panel. The polycarbonate sheet shall cover all of the pixel openings. The polycarbonate shall be sealed to prevent water and other elements from entering the DMS. The polycarbonate shall contain UV inhibitors that protect the LED display matrix from the effects of ultraviolet light exposure and prevent premature aging of the polycarbonate itself.

LED display modules shall mount to the inside of the DMS front face panels. No tools shall be needed for removal and replacement of LED display modules. DMS front face borders (top, bottom, left side, and right side), which surround the front face panels and LED display matrix, shall be painted black to maximize display contrast and legibility.

- D. The face shall be heated (only if the manufacturer requires) to prevent fogging, frost and condensation. A self-regulating, heat tape shall be provided along the bottom of each message line, between the glazing and the display modules. The heat tape shall be controlled by the DMS Controller.
- E. DMS front face panels and front face border pieces shall be coated with semi-gloss black polyvinylidene fluoride (PVDF) applied in accordance to American Architectural Manufacturers Association (AAMA 2605) which

has an expected outdoor service life of 10 to 15 years. All other DMS housing surfaces, including the access doors and DMS mounting brackets, shall be natural mill-finish aluminum.

- F. Sign housing bottom panel shall contain a minimum of four small weep holes for draining moisture accumulations in the sign for condensation. Weep holes shall be designed to protect against entry of insects using non-corrosive materials. With the exception of weep hole and air in-take and exhaust openings the sign housing shall be watertight.
- G. DMS and DMS Controller components shall operate in a minimum temperature range of -29°F to +165°F and a relative humidity range of 0 to 99%, non-condensing.
- H. External DMS component hardware (nuts, bolts, screws, standoffs, rivets, fasteners, etc.) shall be fabricated from stainless steel in accordance with Article 733.02 of the Illinois Tollway Supplemental Specifications.
- I. Multiple mounting brackets in the form of Z-bar extrusions shall be bolted to the DMS housing exterior rear wall to facilitate attachment of the DMS to the support structure. Mounting brackets shall be:
 - 1. Extruded from 6061-T6 aluminum.
 - 2. Attached to the DMS structural frame members, not just the exterior sheet metal.
 - 3. Installed at the DMS manufacturer's factory.
 - 4. Attached to the DMS using stainless steel bolts.
 - 5. Attached to the DMS using direct tension indicators to verify that mounting hardware is tightened with the proper amount of force.
 - 6. Installed such that all bracket-to-DMS attachment points are sealed and water-tight.
 - 7. Designed and fabricated such that the installing contractor can drill into them without penetrating the DMS housing and compromising the housing's ability to shed water.
- J. For moving and installation purposes, multiple galvanized steel (or approved equivalent) lifting eyebolts shall be attached to the top of the DMS housing. Eyebolt hardware shall attach directly to the DMS housing structural frame and be installed at the DMS factory. All mounting points for eyebolts shall be sealed to prevent water from entering the DMS housing.
- K. One (1) vertically hinged door shall be located on each end (left and right side) of the DMS housing. Each access door shall be mounted to an integral doorframe. A vertical stainless steel hinge shall support each door, and all doors shall open outward. In the closed position, each door shall latch to its frame with a three-point draw-roller mechanism. The latching mechanism shall include an internal handle and release lever. Door release levers shall be located so that a person with no key and no tools cannot become trapped inside the housing. Each door shall be furnished with a lock that is keyed to a Corbin #2 lock.

Doorframes shall be double flanged on all sides to shed water. Each door shall close around its flanged frame and compress against a closed-cell foam gasket, which adheres to the door. All doors shall contain a stop that retains the door in a 90-degree open position.

For DMS – Type 2W, the outer door facing away from the access walkway shall be tack welded closed, 2 per unhinged side, from the interior of the DMS housing.

- L. Minimum headroom of 72 inches shall be provided inside the walk-in DMS housing. A level aluminum walkway shall be installed in the bottom of the DMS housing. The walkway shall be a minimum of 24 inches wide, and it shall run the entire length of the housing, from access door to access door. The walkway's top surface shall be non-slip and shall be free of obstructions that could trip service personnel. The walkway shall support a load of 300 pounds per linear foot, and it shall be constructed of multiple aluminum removable panels.
- M. The DMS must be equipped with an OSHA compliant safety rail assembly, which prevents service personnel from falling out of the DMS when closed across an open access door. A rail assembly must be provided for each door in the display. The safety rail shall consist of a top rail that extends 42 inches above the interior walkway, and a mid-rail that extends 21 inches above the interior walkway. The rail assembly shall require no tools to open and close.
- N. The DMS housing shall be equipped with an OSHA compliant anchor point at each entrance location for the connection of a personal fall arrest system. These anchorages integrated to the support structure must be strong enough to withstand a force of 5,000 pounds as required by OSHA. The anchorages must be located such that they will not allow a person to free-fall for more than 6 feet when a 6-foot lifeline is used. The anchorages must be located just inside each access door within easy reach from the outside.
- O. All DMS equipment, assemblies and components shall be modular and capable of removal and replacement by a single technician within the door opening and interior space provided. The housing shall have non-corrosive, metal cage support frames to mount the LED display modules/driver boards. Plug-in, locking connectors shall be provided on each driver board for all connections. The cage support frame shall be designed to minimize and withstand vibration or movement of the display and/or electronics.
- P. A folding, fiberglass, Class I, 24-inch high step stool shall be provided in the housing. The legs of the stool shall be equipped with rubber tread safety shoes. A wall rack shall be provided to securely store the folded stool.
- Q. A collapsible or hinged flat working surface sized to fully support a portable computer or a typical technician's tool case when in a horizontal position shall be installed in the approximate center of the housing at an

ergonomically correct height for a technician 70 inches tall. A duplex receptacle shall be located within five feet of this working surface.

- R. The sign housing shall include a minimum of four compact fluorescent lamps (CFL) to provide uniform lighting within the sign housing interior for maintenance activities. Each lamp shall be rated for at least 10,000 hours of operation, have a minimum 30-watt rating, be self-ballasted, and be rated for cold weather. The light fixtures shall have a die-cast aluminum housing, a porcelain socket and a gasketed globe with a twist-on guard or wire cage to protect the lamp. The lighting circuit shall include timer switches located near each cabinet access door. Each timer switch shall be adjustable from 15-minutes to 4-hours of on time. Three 15 amp 120 VAC GFCI duplex outlets shall be installed at two feet from the door, minimum of two feet above the walkway surface.
- S. A positive pressure ventilation system shall be installed to cool both the display modules and the sign-housing interior. The housing system shall include a minimum of two thermostatically controlled fans with sealed ball bearing motors and fan bearings. Fan assemblies shall be replaceable from the interior of the sign housing with hand tools within 15 minutes. The sign housing shall provide filtered and weatherproof protected exhaust ports and filtered and weatherproof protected intake ports. The exhaust ports shall be located near the top of the enclosure. Filters shall be capable of trapping airborne particle sizes 10 μ m and larger. The two fans shall be capable of providing a minimum of two housing volume changes per minute. Additional thermostatically controlled fans shall be provided, as needed, to direct airflow uniformly to the back of each of the display modules, either directly or by ducts. Any ductwork that blocks access to any sign component shall be removable without tools to gain access to the affected components. Time for removal and replacement of duct work and any other obstruction to a failed item shall be included in the total Mean Time to Repair (MTTR) of the failed item. Interior temperature sensors shall be installed to monitor the temperature within the housing and the air surrounding at least two representative display modules. The sensors shall be connected to the DMS controller for continuous monitoring. The DMS Controller shall report to the Illinois Tollway Traffic Information Management System (TIMS) Central Controller operated from the Illinois Tollway Central Administration Building and blank the sign if configurable temperatures are equaled or exceeded. The TIMS Central Controller or laptop computer shall have the ability to change this user selectable threshold and access temperature measurement from the DMS Controller. The ventilation system shall be equipped with a manual one hour override timer to allow ventilation when the DMS is being serviced.
- T. The DMS housing shall be equipped with surge protection devices (SPD). The system power and communication lines shall be protected by two stages of surge protection devices including MOV's and spark gap arrestors. Tripping of each stage (or both if tripped simultaneously) of the surge protection shall cause the DMS Controller or other cabinet equipment to report the error condition to the Traffic Operations Center

(TOC) immediately or on the next poll.

- U. The DMS shall be equipped with grounding and neutral bus bars. The grounding bus bar shall be of solid copper construction with a bare tinned stranded #2/0 copper grounding conductor for connection to a ground rod at the base of the overhead sign structure support. The bus bar shall be approximately 24" in length, 4" in height, and 1/4" in depth. The bus bar shall be provided with pre-drilled holes arranged to accept #6 AWG wire two-hole lugs and an additional pre-drilled hole arranged to accept a #2/0 AWG wire two-hole lug. All equipment grounds in the DMS shall be connected to this bus. See the Illinois Tollway special provision "ITS ELEMENT SITE GROUNDING".
- V. The Contractor shall install a single mode fiber patch panel (Fiber Connections Gator Patch model G6#0#012LAB-XXX-0, substituting # with material per DMS manufacturer requirements and substituting "XXX" with the appropriate length of pigtail in meters) with six duplex connectors. The pigtail length shall be of a sufficient length as scheduled on the plans, 328 feet (100 meters) minimum, or as directed by the Engineer to accommodate slack requirements to properly splice and store the cable. The Contractor shall procure and install two 6.5-foot (2-meter) long FO jumper cables of the type and connection per the DMS manufacturer (to connect the DMS control board to the fiber patch panel). Depending upon which DMS vendor requirements, the Contractor shall terminate the pigtail cable from the DMS housing within the DMS controller cabinet at the rack mounted fiber patch panel.

LED Display Modules

The DMS shall contain LED display modules that include an LED pixel array, LED driver circuitry, and mounting hardware. These modules shall be mounted adjacently in a two-dimensional array to form a continuous LED pixel matrix. Each LED display module shall be constructed as follows:

- A. Each LED display module shall consist of one or two laminated fiberglass printed circuit boards. If two boards are used, they shall be mounted physically to each other using durable non-corrosive hardware. They shall be electrically connected via one or more header-type connectors. The header connectors shall be keyed such that the boards cannot be connected incorrectly.
- B. Each LED display module shall be mounted to the rear of the display's front face panels using durable non-corrosive hardware. No tools shall be required for module removal and replacement. The modules shall be mounted such that the LEDs emit light through the face panel's pixel holes and such that the face panel does not block any part of the viewing cone of any of the LEDs in any pixels. It shall not be possible to mount an LED display module upside-down or in an otherwise incorrect position within the DMS display matrix.
- C. LED display module power and signal connections shall be a quick-disconnect locking connector type. Removal of a display module from the DMS, or a pixel board or driver circuit board from its display module, shall

not require a soldering operation. Hardened power supplies shall be wired in a redundant configuration that uses multiple supplies for the DMS display matrix.

- D. All LED display module and line replaceable unit (LRU) failure modes shall be diagnosed by remote diagnostic software. Any failed module shall be replaced such that the maximum mean time to repair (MTTR) the DMS is 15 minutes or less from the time the sign is turned off for servicing and the time the sign is turned back on after the module has been successfully replaced. The DMS enclosure shall not be opened or closed with its display power turned on.
- E. All exposed metal on both sides of each printed circuit board, except connector contacts, shall be protected from water and humidity exposure by a thorough application of conformal coating. Bench level repair of individual components, including discrete LED replacement and conformal coating repair, shall be possible.
- F. Individual addressing of each LED display module shall be configured via the communication wiring harness and connector or by inserting an addressing module into the LED driver board.
- G. Removal or failure of any LED module shall not affect the operation of any other LED module or sign component. Removal of one or more LED modules shall not affect the structural integrity of any part of the sign.
- H. All LED display modules, as well as the LED pixel boards and driver circuit boards, shall be identical and interchangeable throughout the DMS.

Light Emitting Diodes (LED)

Each LED module shall contain a printed circuit board to which LED pixels are soldered. The LED pixel matrix shall conform to the following specifications:

- A. Each LED module shall contain a minimum of 256 LED pixels configured in a two dimensional array. The pixel array shall be a minimum of 16 pixels high by 16 pixels wide. The distance from the center of one pixel to the center of all adjacent pixels, both horizontally and vertically, shall be 0.81-inch.
- B. Each pixel shall consist of a minimum of one (1) independent string of discrete LEDs for each color. All pixels shall contain an equal quantity of LED strings. The failure of an LED string or pixel shall not cause the failure of any other LED string or pixel in the DMS.
- C. Each pixel shall contain the quantity of discrete LEDs needed to output white colored light at a minimum luminous intensity of 1,152 candelas per square foot when measured using a photometric meter through the DMS front face panel assembly.
- D. Each pixel shall also be capable of displaying amber colored light with a

minimum luminous intensity of 692 candelas per square foot when measured using a photometric meter through the DMS front face panel assembly.

Pixels

DMS pixels shall be constructed with discrete LEDs manufactured by Avago Technologies, CREE, Toshiba Corporation, Nichia Corporation, OSRAM, EOI, or approved equal. Discrete LEDs shall be fabricated from UV light resistant epoxy and conform to the following specifications:

- A. All LEDs shall have a nominal viewing cone of 30-degrees with a half-power angle of 15-degrees measured from the longitudinal axis of the LED. Viewing cone tolerances shall be as specified in the LED manufacturer's product specifications and shall not exceed +/- 5 degrees.
- B. Red LEDs shall utilize AlInGaP semiconductor technology and shall emit red light that has a peak wavelength of 618-630nm.
- C. Green LEDs shall utilize InGaP semiconductor technology and shall emit green light that has a peak wavelength of 519-539nm.
- D. Blue LEDs shall utilize InGaP semiconductor technology and shall emit blue light that has a peak wavelength of 460-480nm.
- E. The LED manufacturer shall perform intensity sorting of the bins. LEDs shall be obtained from no more than two (2) consecutive luminous intensity "bins" as defined by the LED manufacturer. The LED manufacturer shall perform color sorting of the bins. Each color of LEDs shall be obtained from no more than two (2) consecutive color "bins" as defined by the LED manufacturer. The various LED color and intensity bins shall be distributed evenly throughout the sign and shall be consistent from pixel to pixel. Random distribution of the LED bins shall not be accepted. The LED manufacturer shall assure color uniformity and consistency on the LED display face within the 30-degree cone of vision. Inconsistent color shifts or intensity will be cause for rejection.
- F. All LEDs used in all DMS provided for this contract shall be from the same manufacturer and of the same part number, except for the variations in the part number due to the intensity and color.
- G. The LEDs shall be rated by the LED manufacturer to have a minimum lifetime of 100,000 hours of continuous operation while maintaining a minimum of 70% of the original brightness.
- H. The LED driver board shall contain a seven segment numeric LED display that indicates the functional status of the LED pixel display module. At a minimum, it shall indicate error states of the LED pixels and communication network. The indicator shall be positioned such that a maintenance technician can easily view the status code for diagnostic purposes. The LED display module shall report status, including pixel errors, voltage levels, etc. to the DMS Controller upon request.

Regulated DC Power Supplies

- A. The LED pixel display modules shall be powered with auto-ranging regulated switching power supplies that convert the incoming AC to DC at a nominal voltage of 24 volts DC. Power supplies shall be wired in a redundant parallel configuration that uses multiple supplies for the DMS display matrix.
- B. Power supplies shall be redundant and rated such that if one supply fails, the remaining supply(s) shall be able to operate 100% of the pixels in that display region at 100% brightness when the internal DMS air temperature is 140°F or less.
- C. Each power supply shall receive 120VAC power from separate circuits on separate circuit breakers, such that a single tripped breaker will not disconnect power from more than one supply.
- D. The power supplies shall be sufficient to maintain the appropriate LED display intensity throughout the entire operating input voltage range.
- E. The output of each power supply shall be connected to multiple circuits that provide power to the LED modules. Each output circuit shall be fused.
- F. Each power supply shall be monitored by a microprocessor-controlled circuit. This circuit shall monitor the voltage of each power supply. The power supply voltages shall be reported to the DMS Controller upon request. The power supplies used to power the LED pixel modules shall be identical and interchangeable throughout the DMS. The failure of any single regulated DC power supply or common power supply module shall be reported to the TOC by the DMS Controller on the next poll.
- G. Regulated DC power supplies shall conform to the following specifications:
 - 1. Nominal output voltage of 24 VDC +/- 10%
 - 2. Nominal maximum output power rating of 1000 watts
 - 3. Operating input voltage range shall be a minimum of 90 to 260 VAC
 - 4. Operating temperature range shall be a minimum of -30°F to +165°F
 - 5. Maximum output power rating shall be maintained over a minimum temperature range of -30°F to +140°F
 - 6. Power supply efficiency shall be a minimum of 80%
 - 7. Power factor rating shall be a minimum of 0.95
 - 8. Power supply input circuit shall be fused
 - 9. Automatic output shut down and restart if the power supply overheats or one of the following output faults occurs: over-voltage, short circuit, or over-current
 - 10. Power supplies shall be UL listed
 - 11. Printed circuit boards shall be protected by an acrylic conformal coating.

Displays

- A. A full-matrix display shall be provided, each consisting of identical LED pixels as per the requirements stated herein.
- B. For DMS – Type 1 The full-matrix display shall incorporate a pixel matrix that is 96 pixels tall by 400 pixels wide and be capable of displaying a three-line message consisting of up to twenty-one (21) full-width 23x15 alphanumeric characters with a minimum of four (4) blank columns

between 23x15 characters per line, with each character nominally 18 inches high. The full-matrix display shall also be capable of displaying messages with characters nominally 12, 9 and 6 inches high.

For DMS – Type 2W the full-matrix display shall incorporate a pixel matrix that is 96 pixels tall by 368 pixels wide and be capable of displaying a three-line message consisting of up to eighteen (18) full-width 23x15 alphanumeric characters with a minimum of four (4) blank columns between 23x15 characters per line, with each character nominally 18 inches high. The full-matrix display shall also be capable of displaying messages with characters nominally 12, 9 and 6 inches high.

- C. The full-matrix display shall be capable of displaying other size characters and other numbers of lines depending on the height of characters utilized. The display shall be designed to provide proper spacing between lines of text when displaying characters and lines of text as indicated herein. The display shall also be capable of displaying graphics as programmed via TIMS software, via the remote computer or directly via the DMS Controller.
- D. The signs shall have sufficient borders on all four sides for display clarity and background contrast and shall be legible from a distance of 1000 feet with an 18 inch character height, 600 feet with a 12 inch character height, 450 feet with a 9-inch character height, and 300 feet with a 6-inch character height, within a minimum 30-degree cone of vision centered about the centerline perpendicular to the width of the sign.

Photoelectric Sensor Devices and Brightness Control

- A. Three photoelectric sensor devices shall be provided on top of the sign with one facing the direction of travel, one facing the opposite direction of travel and one positioned to detect ambient lighting to use in performing automatic dimming and brightening the display to correspond to light conditions. The DMS Controller shall be capable of reading a minimum of 256 light levels from each photocell. Photocell failures shall be detected and remotely reported.
- B. Automatic adjustment of the LED brightness shall occur in small enough increments so that the brightness of the sign changes smoothly, with no perceivable brightness change between adjacent levels. Provisions, such as a moving average of measured brightness, shall be made to prevent brightening of the sign due to stray headlights shining upon the photo sensors at night.
- C. Levels of brightness, as related to ambient light, shall be operator-selectable at the DMS Controller and from TIMS Central Controller. The range of operator control over brightness shall be a minimum of 100 increments between fully dimmed and full brightness. Brightness control shall be able to be returned to automatic from the sign controller front panel and from the central computer overriding local manual control.

DMS Controller Hardware

- A. The DMS Controller shall include one (1) Ethernet port, two (2) serial communication I/O ports and two (2) fiber ports to accommodate both local and remote communications. The local communications port shall be easily reached when the cabinet is opened from the front and shall be a DB 9 connector configured as a Data Communication Equipment connection. Access to the DMS Controller through the local communications port and user interface shall be protected by a password. A second security level password shall be required to edit messages.
- B. The DMS Controller shall be mountable in an EIA standard 19-inch rack. The DMS Controller shall be mounted inside the local controller cabinet along with the fiber optic equipment. An auxiliary control panel shall also be provided inside the sign housing. The auxiliary control panel shall completely mimic the DMS Controller and have a rugged Display and a Keypad.
- C. A unique logical address shall be assigned to the DMS Controller consisting of an 8 byte ID code. The DMS Controller address shall be readily changeable through jumpers, dip switches or plug-in modules.
- D. The DMS Controller shall be capable of storing a minimum of thirty-two display messages in non-volatile programmable read only memory (PROM) and a minimum of twenty (20) display messages in battery backed random access memory (RAM). The DMS Controller shall be capable of storing a minimum of twenty (20) preset message display schedules in non-volatile read and write memory. The DMS Controller shall allow schedule entries to be either a date and time (i.e., month/day/year, hour/minutes) or by a weekday and time. The DMS Controller shall store all configuration variables in non-volatile read and write memory.
- E. The front panel of the DMS Controller shall contain the following features:
 - 1. On/Off switch controlling power to the DMS Controller.
 - 2. Local/Remote switch (implemented in hardware or software) permitting control from the DMS Controller or from an external unit such as a remote computer or a TIMS workstation.
 - 3. Keypad or switches permitting selection of one of the 25 non-volatile messages stored in the DMS Controller or permitting the DMS to be blanked.
 - 4. Diagnostic mode switch or software function accessible from the keypad permitting selection of built-in diagnostic routines and individually testing LED pixels and display support step-by-step troubleshooting from the display and keypad.
 - 5. A display capable of showing graphics and text as they would appear on the DMS.
 - 6. A keypad providing keys for entry of zero through nine, four direction navigation, page-up and page down, home, delete, enter, and execute.

7. Interior temperature and humidity sensor monitored by the DMS Controller.
- F. The DMS Controller shall contain a computer readable time-of-year clock with a lithium battery backup. The battery shall keep the clock operating for at least three years and have a ten (10) year life expectancy. The clock shall automatically adjust for daylight savings time and leap year and shall be accurate to within one minute per year. The controller shall also support Network Time Protocol Time Synchronization.
- G. The DMS Controller shall have a hardware watchdog, which shall reset the DMS in case of software failure and/or DMS Controller lock-up. A counter shall be provided to count the quantity of reset events using the Watchdog Failure Count parameter as defined by NTCIP 1203v3.
- H. The Contractor shall submit with the shop drawings for approval by Engineer or their representative, a subsystem analysis of the DMS Controller that includes the mean time between failure (MTBF) of all hardware components, the source of the MTBF values (i.e., testing, historical tracking, generally accepted values used in the industry) and the mean time to repair/restore (MTTR) values used in the calculation. If tracking data is unavailable the MTBF and MTTR shall be estimated based on prior product experience.

DMS Local Controller Cabinet

- A. A pad mounted weatherproof NEMA 4X roadside cabinets shall be furnished and installed for the DMS Controller near each dynamic message sign location. The cabinet shall have separate sections for power and communications equipment. The power and communication sections shall be accessible from two different doors. The cabinet power section shall house all power related equipment and the communications section shall house all communications related equipment as listed herein this special provision. The cabinet shall utilize EIA-standard 19-inch racks and be designed with front and rear lockable waterproof access doors. Each door shall be furnished with a lock that is keyed to a Corbin #2 lock. The cabinet doors shall include permanent, fixed position non-corrosive handles. Furnish door handles which provide for positive latching of the door at three points as viewed when facing the door – top, bottom and left side. Provide a pin tumbler type lock which serves to secure the door handles, thereby locking the cabinet doors. The cabinet shall be sized to accommodate the DMS Controller, power conditioning, communications equipment, including fiber terminations and distribution, UPS, IP relay, Cisco switch, control equipment, batteries, rack mounts, shelving, and breaker panel. All communication and control section equipment shall be rack mounted, including all DIN rail mounted items. Final design of the cabinet including sizing and equipment layout shall be done by the Contractor. Shop drawings for the cabinet and equipment layout shall be submitted to the Engineer for review and acceptance before any fabrication is started.

B. The local control cabinet shall contain the following assemblies:

1. Power-on indicator
2. Local control LED switch
3. IP communication (Ethernet) connection to field Cisco switch or for local testing with portable laptop computer with a Cat 6e cable (laptop by others).
4. One Quad NEMA 5-15R-equipment receptacle with two GFCI outlets and two non-GFCI outlets.
5. UL Listed appropriately sized Power Supply Module (+24 VDC) and socket.
6. The UPS shall be internal to the control cabinet and shall be as specified herein. The UPS shall be Alpha Technologies model number FXM 1100 (or approved equal). The UPS shall have the capacity to operate the DMS Controller and network switches for 10 minutes to allow the DMS Controller to notify the TIMS Central Controller when an improper power condition exists for longer than a user selectable power loss time. The UPS shall have a network interface module for communicating UPS status to the Cisco field switch described below. The UPS shall meet the following minimum specifications:
 - a. Safety Compliance: UL listed to UA1778
 - b. Efficiency:>95% on line
 - c. Voltage Nominal: 120 VAC
 - d. Voltage Range: 100-142 VAC
 - e. Typical run time (minutes): Full load: 10 minutes.
 - f. Transfer time: 4 ms typical
 - g. Battery: Sealed, maintenance-free, valve regulated.
 - h. Battery recharge time (to 95% of capacity): 8 hours with output fully loaded
 - i. Over current protection (on line): circuit breaker
 - j. Operating temperature: Range minimum -10°F - +140°F
 - k. Humidity: 5% - 95% RH (non-condensing)

The UPS and its batteries shall be installed in the Power Section of the DMS Controller cabinet.

Submit calculation sheets, accompanied by manufacturer's data sheet listing the power requirement of critical components, as support materials for justifying the UPS sizing choices. Use worst-case power-load data for the calculations.

7. A Cisco Ethernet switch shall be provided inside the DMS local control cabinet. The Ethernet switch shall be a Cisco IE-4000-8T4G-E switch with a PWR-IE170W- PC-AC= power supply. The contractor shall install the proposed Ethernet switch in accordance

with these specifications, in accordance with manufacturer's recommendations and as directed by the Engineer. The contractor shall connect the field switch to the ITS Distribution FO cable by furnishing and installing two Cisco SFP modules (part # GLC-LX-SM-RGD) in the switch. The contractor shall procure and deliver to the Illinois Tollway an L-IE4000-RTU= IP services license for each switch.

8. The Contractor shall install a 2U Corning model CCU-02U Closet Connector Housing (CCH) fiber patch panel with single mode adapters and DMS manufacturer required fiber optic adapters. The Corning model CCH-CP12-59 CCH panel SC adapter shall be utilized for the SMF interface while a CCH compatible panel adapter (meeting DMS manufacturer requirements) shall be utilized for the DMS sign interface. The Contractor shall procure and install two 6.5-foot (2-meter) long SM FO jumper cables with duplex LC-SC connectors (to connect the SFPs in the Cisco switch to the CCH-CP12-59). Depending upon DMS manufacturer requirements, the Contractor shall procure and install two 6.5-foot long (2-meter) SMFO or MMFO jumper cables to connect the DMS controller to the CCH fiber patch panel adapter. The Contractor shall also procure and install the 12F armored SM fiber cable between the CCH-CP12-59 and the nearby ITS Distribution cable. The Contractor shall terminate both the SMF and DMS sign pigtail cable at the rear of the CCH-CP12-59 and the CCH panel adapter. The 12F armored SM cable shall be pulled into the nearest communications handhole and coiled as required in the plans, to be spliced into the ITS Distribution cable by others.
9. A Digital Loggers IP Relay (DIN 4) unit shall be installed in the DMS Controller cabinet and wired as specified in the wiring diagram.
10. Within 2 weeks of starting the ITS element installation work, the Contractor shall deliver the Cisco IE-4000-8T4G-E switch with L-IE4000-RTU= IP services license to the Illinois Tollway ITS Network Integrator at the Illinois Tollway Central Administration Building for configuration. The Illinois Tollway ITS Network Integrator will have one week to configure the equipment and notify the Contractor of the completion of its configuration.
11. The Contractor shall submit an RFI requesting configuration details for the UPS network interface and shall configure this equipment themselves.
12. A foldout and or hinged aluminum work surface to fully support a portable computer or technician's tool case shall be installed at an ergonomically correct height for a technician 70 inches tall. The foldout surface shall be mounted inside the front access door and shall be flat and sturdy when folded out with a portable computer

placed on the surface. The foldout surface shall be secured with appropriate hardware against the inside of the front access door when not in use.

13. Ground bus bar and neutral bus bar.
14. The DMS Controller Enclosure shall be equipped with an intelligent primary surge protection device (SPD). The primary SPD shall be MTL Zone Defender Pro Series, Model ZD16100. The primary SPD should have local visual indicators that allow a service technician to determine the operational status of the SPD and determine whether the SPD should be replaced immediately or monitored for later replacement. The DMS Controller cabinet shall also be equipped with secondary surge protection devices to protect the equipment within the enclosure. For details related to site grounding, see the Illinois Tollway special provision "ITS ELEMENT SITE GROUNDING".
15. The cabinet shall have a Magnecraft power relay model 199X-12. The power relay shall be connected to the digital loggers IP relay.
16. The cabinet shall include a Meanwell power supply model MDR-10-12. The power supply shall be DIN rail mounted within the DMS cabinet.
17. The surge protection equipment shall conform to the requirements indicated in the Illinois Tollway special provision "ITS ELEMENT SITE GROUNDING".
18. The cabinet shall have a sliding rack shelf (Great Lakes QGL-7206-FRSLA300) to house the batteries and UPS.
19. A 100 amp, single phase, 3 wire 120/240 VAC electrical service distribution panel with a 12 circuit capacity shall be located in the DMS cabinet. The panel shall include a 60 amp two-pole main breaker. Separate circuits with a properly sized breaker shall be provided for the DMS controller cabinet, as per the plan. All circuit breakers shall be thermomagnetic, quick-break, 60 VAC, UL listed, and properly labeled on the panel door.
20. As noted in the section above, the sign control and data cable from the DMS controller to the sign shall be armored multi-mode or single-mode fiber optic cable and include interface modules as required per the manufacturer's recommendations.
21. The Contractor shall procure and install a cabinet heater that is sized accordingly for this application. The Contractor shall submit heat-load calculation sheets, accompanied by related manufacturer's data sheets, as support materials for justifying the heating/cooling sizing choices. Use worst-case heat-load data of the energized devices for the calculations. The heater must be

able to endure continuous operation for 60 contiguous days in the winter months. The heater shall be controlled via a standalone thermostat and have a high temperature alarm output.

22. The main power shall be connected through a main disconnect and dry type transformer located on the overhead sign structure support. See the Illinois Tollway special provision "DMS ELECTRICAL WORK" for additional information.
23. When all equipment is installed and connected, the Contractor shall test and demonstrate the performance of the installed Dynamic Message Sign and DMS Controller. This test shall ensure that communication is provided to and from the Illinois Tollway Traffic Operations Center (TOC). The Contractor shall provide all ancillary equipment, fiber patch panels, patch cables (fiber and copper), IP relay, Cisco ethernet switch, and surge protectors required for connections between internal cabinet components and external devices and power connections. All cables shall be properly labeled with printed cable tags. Each internal device shall be permanently and securely mounted inside the cabinet back panel or DIN rail. All power and data cables shall be securely fastened to the cabinet back panel and shall be neatly dressed. Tie wraps shall not be used for data cables, whether fiber or copper. Instead cables shall be secured per BICSI best practices which recommend the use of Velcro straps for cable management. All equipment, components, wire, patch cords, cables, racks, and panels (shelves) installed as part of this work shall be labeled per ANSI/EIA/TIA-606-B and Illinois Tollway Labeling Guide. The Contractor shall follow the Illinois Tollway ITS Labeling Guide found on the Illinois Tollway's website. Labeling and documentation shall be incidental to this work.
24. Insert a block diagram of all components illustrating all connectors and connections used to interconnect the components, wiring diagrams and schematic drawings of all circuits in a re-sealable weather-resistant pocket that is permanently mounted on the inside of an accessible door in the controller cabinet.
25. The Contractor shall create a mock-up of the cabinet for review and approval by the Engineer before assembling other cabinets, or before delivering to the field. No cabinet shall be installed before the Engineer's approval.

Each DMS shall be connected from the field cabinet controller to the sign controller utilizing the manufacturer's recommended outdoor rated cable.

The Contractor shall submit to the Engineer a request for variance when changing equipment provided on the Checklist provided within this special provision. The variance shall be the formal request of an approval of an equal or better substitute for a specified part by providing justification and supporting manufacturer's specifications and other relevant documentation.

Functionalities

System Description

- A. Communications shall comply with the referenced National Transportation Communications for ITS Protocol (NTCIP) profiles and the software data dictionaries shall comply with NTCIP information profile level.
- B. It is the Contractor's responsibility to provide a fully functional communication path as specified herein and as shown on the plans. All of the material described below shall be procured and installed by the Contractor. The DMS shall be controllable by the Illinois Tollway Traffic Information Management System (TIMS) operated from the Illinois Tollway Central Administration Building through its fiber optic network, as well as locally from a portable computer through the computer's Ethernet 10/100Base-T TIA/EIA-568-B interface. The interface between the DMS controller and TIMS shall be an Ethernet 10/100Base-T TIA/EIA-568-B RJ45 interface with an outdoor temperature rated Cat 6e patch cable connected to a 10/100 copper switch port in a Cisco IE-4000-8T4G-E field switch mounted inside the DMS Controller cabinet. The portable computer, when present, (not provided by the Contractor) shall connect to the DMS Controller through a different 10/100Base-T copper switch port or directly into the DMS Controller's Ethernet port. The Cisco switch shall be connected to the Illinois Tollway SM fiber optic network with Two (2) Cisco Gigabit Ethernet SMF SFP modules with LC connector, LH (1Gbps Single Mode) transceivers Model GLC-LX-SM-RGD, and one FOC patch panel with six duplex connectors for SM FOC and two 6.5foot (2-meter) long SMF LC-SC jumper cables. The Contractor shall install an armored, outdoor rated 12 strand SM fiber stub cable between the DMS Controller cabinet (Fiber Optic patch panel) and the nearby ITS SM FO Distribution Cable handhole where it will be spliced into the Illinois Tollway SM Distribution cable by the Illinois Tollway's Fiber Optic System Contractor. The Contractor shall provide 3 business days' notice of its readiness for splicing by the Illinois Tollway's Fiber Optic System Contractor by email to the Engineer and the Illinois Tollway's Fiber Optic System Contractor. Depending upon the DMS vendor specifications, the DMS shall connect to the DMS Controller through either SM or MM fiber optic cable. The Contractor shall install and terminate an armored, outdoor rated 12 strand SM or MM fiber cable from the DMS to the DMS Controller within the cabinet.
- C. The Illinois Tollway is responsible for integrating the DMS into the existing central control software. The Contractor shall provide the required assistance to enable the integration. This assistance shall include providing a DMS Controller to the Illinois Tollway's software integrator for software integration testing at least 90 days prior to the installation date of the first DMS for any manufacturer and/or model number not previously integrated by the Illinois Tollway. The DMS Controller will be returned to the Contractor when software integration has been completed, and then can be installed in the field as a component of a final delivered DMS system.

Sign Display Messages

- A. For DMS – Type 1 The DMS system shall be full matrix, full color, high resolution, light emitting diode (LED) sign capable of displaying 3 lines of 21 characters at 18-inches per character.

For DMS – Type 2W the DMS system shall be full matrix, full color, high resolution, light emitting diode (LED) sign capable of displaying 3 lines of 18 characters at 18-inches per character.

- B. Each message shall include a minimum of three (3) display frames (pages). This function shall be achieved by implementing the “np” MULTI Tag as specified in NTCIP 1203v3.
- C. The time each message frame (page) is displayed shall be independently configured. This function shall be achieved by implementing the “pt” MULTI Tag as specified in NTCIP 1203v3.
- D. Each message frame (page) ON time shall have a minimum range from 2 seconds to 10 seconds in 0.5-second intervals and is adjustable in increments of 0.1 second. This function shall be achieved by implementing the “ptxoy” MULTI Tag as specified in NTCIP 1203v3.
- E. The DMS Controller shall display characters using proportional spacing. Spacing options for the pixel columns shall be variable.
- F. A currently displayed message shall not be affected as the DMS Controller performs other functions, except when displaying a new message or when blanking the DMS.
- G. When flashing a message frame or displaying a message with two or more frames, the DMS Controller shall blank, change, or update the DMS display within 0.1 second. The flash rate shall be user programmable in increments of 0.1 second.
- H. The DMS Controller shall contain the following minimum sets of fonts (height x width, line width, fixed width) using the Font tag and Default Font Definition object as specified in NTCIP 1203v3:
- 7 x 4, 1, variable
 - 7 x 5, 1, fixed
 - 7 x 6, 1, variable
 - 7 x 6, 2, variable
 - 7 x 8, 3, variable
 - 8 x 4, 1, variable
 - 8 x 5, 1, fixed
 - 8 x 6, 2, variable
 - 8 x 8, 3, variable
 - 9 x 5, 1, variable
 - 9 x 6, 2, variable
 - 9 x 8, 3, variable
 - 11 x 7, 2 fixed
 - 11 x 7, 2, variable
 - 11 x 9, 3, variable
 - 12 x 18, 2, variable

- 14 x 8, 2, fixed
- 14 x 8, 2, variable
- 14 x 10, 3, variable
- 15 x 10, 2, variable
- 16 x 8, 2, variable
- 16 x 10, 3, variable
- 23 x 15, 3, variable

I. Each alphanumeric font shall include the following characters as a minimum:

- a. "A" through "Z" All upper case
- b. "0" through "9" All decimal digits
- c. A blank or space
- d. Special characters: , / ! ? ; ' : " , . @ # & + () [] < > * - +
 ⇐ ⇒ ⇅ ⇆ ↺ ↻ ↷

Display of Graphic Images

- A. The DMS control software shall support the inclusion of graphics in messages according to NTCIP 1203v3 standards. The vendor shall also support graphics using the Manual on Uniform Traffic Control Devices (MUTCD) symbols, clip art, shapes, free form creations, manufacturer-specific objects, and MULTI tags. Packs of graphics and MUTCD symbols shall be included with the software.

Electrical Requirements

The electrical work for the DMS shall be in accordance with the applicable portions of Division 800 of the Standard Specifications as modified or supplemented by the Illinois Tollway Supplemental Specifications, the Illinois Tollway special provision "DMS Electrical Work", and the NEC.

DMS Controller

- A. The DMS Controller shall be able to perform all sign control functions and to enact locally selected functions via an external laptop computer or remotely selected from workstations connected through the TIMS communication server located at the Illinois Tollway's Central Administration building. Communications between the DMS Controller and these computers shall use the NTCIP standards. The DMS Controller shall process requests and messages from the TIMS (via the Ethernet port), and maintenance laptop (via the local Ethernet port). These requests shall be as defined in NTCIP 1203v3.
- B. The DMS Control Cabinet shall be remotely monitored through 2 TCP/IP Ethernet outdoor rated Cat 6 connections to the Cisco switch. One Ethernet connection shall be from the SNMP module in the UPS to the switch. The other Ethernet connection shall be from a DIN rail mounted Digi serial to Ethernet module to the switch. Monitored points such as cabinet temperature alarm, door open alarm, and primary and secondary surge protection device status shall be connected to the Digi module with appropriate interface components.

- C. The DMS Controller shall monitor the temperature values (minimum and maximum) within the Controller cabinet, sign housing and the sign exterior ambient temperature using the objects defined under the temperature status configuration group as defined in NTCIP 1203v3. A temperature greater than a user selectable critical temperature shall cause the sign message to go to blank and the DMS Controller shall report this error message to the TIMS. This temperature shall be selectable both locally and remotely from a TIMS workstation by an authorized user.
- D. The DMS Controller shall monitor the photocell circuits in the sign and convert the measured light intensity into the desired pixel brightness using a look-up table. The DMS Controller shall be capable of an automatic, incremental, and smooth adjustment of the LED brightness. The pixel light shall be initially set to an output level that is twice as bright as the highest light level measured from the three photocells mounted to the sign. The brightness table shall be adjustable from a TIMS workstation. This function shall be achieved by implementing the Illumination/Brightness Conformance Group as specified in NTCIP 1203v3.
- E. The DMS Controller shall continuously monitor the voltages of all LED display module power supplies. When the voltage drops below a configurable value, the under voltage shall be reported to the TIMS and any locally connected laptop computer. All LED power supply failures shall be detected and reported to the TIMS and any locally connected laptop computer.
- F. The DMS Controller shall allow editing of the fonts and graphics using the objects defined in NTCIP 1203v3.
- G. Once per day upon command from either the TIMS or a locally connected computer, the DMS Controller shall test the operational status of each LED pixel. Any defective pixels, identified by display module number, column number and pixel number shall be reported to the TIMS and any locally connected computer. Defective states shall include half-failed off, full-failed off, half-failed on and full failed-on. This test shall not affect the displayed message for more than 0.5 second.
- H. Two separate types of pixel status feedback shall be provided to the TIMS Central Controller from the DMS Controller. These include a pixel test and a pixel read:
 - 1. Pixel Test: The DMS Controller shall be able to perform the pixel text from the TIMS Central Controller on command and automatically on an operator selected schedule. During a pixel test, the full operational status of each string of LEDs in each pixel shall be tested and then transmitted to the TIMS Central Controller or laptop computer. This pixel status test shall distinguish the difference between half out, full out, half stuck-on and fully stuck-on pixels. A list of defective pixels shall be provided, listing pixel status, line number, module number, column number and row number for each defective pixel. The pixel test may briefly disturb the displayed

message for less than 0.5 second.

2. Pixel Read: The DMS Controller shall be able to perform the pixel test during both message downloads and during every sign poll from the TIMS Central Controller or laptop computer. The pixel read shall perform a real-time read of the displayed message and shall return the state of each pixel to the TIMS Central Controller as it is currently displayed to the motorist, including any errors. This shall allow the TIMS Central Controller operator to see what is visibly displayed to the motorist on an individual pixel basis. During a pixel read, the state of each pixel (full-on, half-on or off) in the sign shall be read by the DMS Controller to allow the TIMS Central Controller or laptop computer to show the actual message, including static flashing and alternating messages, that is visibly displayed on the sign in a WYSIWYG format. This pixel reading shall take place while a message is displayed on the sign without disturbing the message in any way. Any flashing, flickering, blinking, dimming, or other disturbance of the message during this pixel read shall be cause for rejection of the sign.

The pixel read shall be an actual real-time read of the current flowing through each string of LEDs at the time of the associated sign poll or message download and shall not be accomplished by simulating errors based on the last pixel test.

- I. SNMP V2: Power supply, photocell and pixel failures and test results shall be retrievable through the Ethernet management interface using the SNMP V2 protocol to the Illinois Tollway TCP/IP network and identifiable down to the Line Replaceable Unit level.
- J. The communication through the local fiber optic network switch, DMS, and DMS Controller shall be completed by the Contractor for communication to TIMS.
- K. Support of the secure shell (SSH) security feature.

DMS Controller Software

- A. The DMS Controller software shall comply with NTCIP Standards, as defined in greater detail below. The software shall comply with the version of the relevant NTCIP standards and all related amendments and errata sheets that are current on the advertised date of bid submittal.
- B. *Application Level* - The software shall comply with the NTCIP 2301v2-Simple Transportation Management Framework (STMF) Application Profile as a Managed Agent and shall meet the requirement for Conformance Level 1.

An NTCIP component may support additional Application Profiles at the manufacturer's option. Responses shall use the same Application Profile used by the request, thereby requiring coordination with the TIMS System Integrator. Each NTCIP Component shall support the receipt of Application data packets at any time allowed by the subject standards.

- C. *Transport Level* - The software shall support NTCIP 2201, 2202, and the UDP/IP option defined by the standard. The DMS system shall support

the receipt of datagrams conforming to any of the identified Transport profiles at any time. Response datagrams shall use the same Transport Profile used in the request, thereby requiring coordination with the TIMS System Integrator.

- D. *Subnet Level* – The communications link between the DMS Controller and the TIMS communication server shall be Ethernet connection. The IP Communication physical layer interface used by each NTCIP component shall conform to NTCIP 2104.
- E. *Information Level* – The software shall implement all objects of all the conformance groups as defined in NTCIP 1201v3-Global Object Definitions. The software shall implement all objects of all conformance groups as defined in NTCIP 1203v3 – Object Definitions for Dynamic Message Signs (DMS).
- F. The software shall implement the tags (opening and closing where defined) of the MULTI language as defined in NTCIP 1203v3. The DMS shall support any valid MULTI string containing any subset of those MULTI tags.

DMS Controller Diagnostics and Error Reporting

- A. The DMS Controller shall log all errors, all failures, and all warnings by implementing all of the objects under the Report Parameter Node as defined by NTCIP 1201v3, the Validate Message Error Parameter, Activate Message Error Parameter and all objects of Multi Error Conformance group as defined by NTCIP 1203v3.
- B. The error and failure log shall incorporate a time and date stamp. All DMS errors, failures, and warnings shall immediately be logged by the DMS Controller and reported to the TIMS and the local communication port.
- C. The DMS Controller shall incorporate a Communication Time Out Error by implementing the Communication Loss Time Definition Parameter as defined by NTCIP 1203v3.
- D. The DMS Controller shall use the Description of Other MULTI Error Parameter as defined by NTCIP 1203v3 when implementing manufacturer-specific error message descriptions.
- E. The DMS Controller shall sense a Communication Error when it receives a message that cannot be processed using the Short Error Status Parameter as defined by NTCIP 1203v3.
- F. The DMS Controller shall track Controller errors by implementing the Controller Error Status Parameter as defined by NTCIP 1203v3.
- G. The DMS Controller shall continuously monitor, detect, and locate any pixel failure (single or multiple pixels) by implementing the Pixel Failure

Table Parameter as specified in NTCIP 1203v3.

- H. The Pixel Failure monitor and detection functionality shall be implemented by using the parameters as specified in NTCIP 1203v3.
- I. At a minimum, the DMS Controller shall have the following display test patterns for visual inspection of DMS pixels. The Contractor may submit alternative test sequences for approval by the Engineer:
 - 1. SET TEST: All pixels are on.
 - 2. RESET TEST: All pixels are off.
 - 3. SET RESET TEST: Set and resets all pixels continuously.
 - 4. COLUMN TEST: Walking set column.
 - 5. ROW TEST: Scrolling set row.

AC Power

- A. Maximum AC power shall not exceed 5800 watts, when the following circuits are operational and fully loaded:
 - 1. Full operation of the display modules with 100% of the pixels operating at maximum possible drive current.
 - 2. DMS environmental control system in full operation.
 - 3. DMS Controller cabinet and all components
 - 4. Utility outlet circuit
- B. The DMS shall operate from an electrical service providing 120/240 VAC, 60 Hz Single phase, three wire plus ground. Power and signal cables shall be installed in separate conduits.

Conduit and Ducts

- A. See DMS plan sheets for individual site conduit size and routing requirements. The typical DMS site shall have the following conduit and duct routes:
 - 1. Between the DMS structure foundation and the DMS controller cabinet:
 - a. Unit duct trenched conduit for DMS power supply. PVC coated Rigid Galvanized Steel (PGRS) sleeve shall be utilized to transition from underground to the sign truss.
 - b. Unit duct trenched conduit for DMS communication (fiber). A PGRS sleeve shall be utilized to transition from underground to the sign truss
 - 2. From the power source to the DMS Controller cabinet is a PGRS trenched conduit for site power or overhead lines as shown on plans.
 - 3. From the fiber trunk handhole to the handhole near the DMS controller cabinet is a directional bored cable duct for single-

mode fiber. All conduit and cable for installation of single mode fiber shall be procured and installed by the Contractor.

- B. All ground ring connectors shall be directly buried bare stranded copper cable except for where the conductor goes up to the Master Grounding Bus Bar (MGB). At that point the grounding conductor shall be routed in Schedule 80 PVC from MGB (4'-0") above finished grade down to a 90-degree bend that terminates at a depth of 40 inches below finished grade (conduit size as shown on the plans). See the Illinois Tollway special provisions "DMS ELECTRICAL WORK" and "ITS ELEMENT SITE GROUNDING" for more details.
- C. The size and material of the conduit shall comply with all applicable NEC, Standard Specifications, and Illinois Tollway special provision "DMS ELECTRICAL WORK".
- D. The Contractor shall provide a junction box at the base of each of the two roadside vertical supports of the sign structure or at the base of the steel pole mount support for cantilever/butterfly sign structures. Flexible liquid tight conduit shall connect the junction box to metallic conduit used to route power and communication wiring to the DMS by attachment to the sign support structure. The diameter/size and material specifications of the metallic conduit, connectors and fittings shall comply with all applicable NEC and Standard Specification requirements, as modified or supplemented by the Illinois Tollway Supplemental Specifications.

Construction Requirements

The Contractor shall closely coordinate with the Engineer. This includes, but is not limited to, the following:

Pre-Procurement Meeting and Documentation Approval

- Within 10 business days from Notice to Proceed, the Contractor shall submit for approval to the Engineer, a detailed schedule showing dates for: product submittals and approvals; testing; device configuration by the Illinois Tollway; construction/installation; burn-in period; and warranty of each DMS. This detailed schedule shall be included in the project schedule, as required per Illinois Tollway Supplemental Specifications Article 108.02. Schedules for each DMS to be deployed within the larger construction contract and shall be staggered based on resources to be employed.
- Within 10 business days from Notice to Proceed, the Contractor shall submit a completed Contractor Submittal Checklist attached to this special provision and associated submittals for review and approval by the Engineer.

The Contractor shall make all submissions through the Illinois Tollway's Web Based Program Management (WBPM) system to the Engineer, and shall include:

The Contractor must obtain approval of the schedule, catalog cut sheets, cabinet wiring diagrams, and calculations from the Engineer prior to purchasing any equipment and subsequently performing the installation per the approved documents, contract plans, and specifications.

Pre-Installation Requirements

- The Contractor shall coordinate with the Engineer to determine the DMS Controller cabinet components to be configured by the Illinois Tollway. Thirty (30) days prior to the scheduled field installation of each DMS, the Contractor shall notify the Engineer of the anticipated delivery date of any DMS Controller cabinet components to the Illinois Tollway Central Administration (CA) Building for configuration and labeling prior to installation by the Contractor.
 - The Contractor shall provide a form to the Illinois Tollway during acceptance of the equipment at CA showing the equipment, each equipment specific serial number, and the field location of the each piece of equipment. This form will be signed by both the Engineer and the Contractor.
 - The Illinois Tollway shall have a minimum of 10 working days to configure ten (10) or more device(s). More than ten (10) devices, the Illinois Tollway requires 20 working days to configure.
 - The Contractor shall take possession of the devices from the Illinois Tollway upon notification by the Engineer of configuration and labeling completion.

DMS Installation

- The Contractor shall install the DMS on the mounting structure, as noted on the plans or as per the manufacture's recommendations, including the rotation away from the mounting structure for DMS legibility.
 - The material for attaching the DMS to the mounting structure shall include all mounting hardware, conduit, and cable from the DMS Controller cabinet up to the DMS.
 - The DMS shall be aligned such that the DMS message can be legible from a minimum of 1000 feet.
 - All associated conduit, wire, circuit breakers, brackets, etc. as shown on the contract plans, and all items and workmanship required to successfully pass the Site Test stated within this specification, shall be the sole responsibility of the Contractor.
- The Contractor shall have the DMS manufacturer commission the DMS per manufacturer's recommendation.

Submittals. The Contractor shall submit a package of product data sheets, drawings and other documents that demonstrate that the proposed DMS meets or exceeds all performance and environmental requirements specified in this Special Provision and other contract documents. The submittal package shall be organized as follows:

The Contractor shall submit a completed copy of the Contractor Submittal Checklist and shall number all pages of the submittal package of product data sheets and other documents and highlight or circle those product options or product performance features corresponding with the item descriptions on the submittal checklist. The Contractor shall enter the relevant submittal package page numbers in the "Submittal" section of the submittal checklist. If the Contractor wishes to propose an equivalent item, the item information should be listed in the "Approved Equivalent Details" columns. The Engineer will verify that documentation of compliance with each requirement is in the submittal package by checking it off in the "INCLUDED" column. The Contractor must provide an explanation approved by the Engineer for any requirement in the checklist which has no corresponding product data sheet submittal page by adding a note to the "Notes" column.

The Contractor shall request that the DMS manufacturer prepare and submit (via the Illinois Tollway's WBPM system), for approval by the Engineer, a Test Requirements Traceability Matrix (TRTM). The TRTM shall be provided by the DMS manufacturer, along with the DMS submittal package and shall list in matrix form requirements of the special provision for the DMS in the exact order found in the contract documents and in the approved product submittal. In addition, the TRTM shall include a column illustrating the testing phase (Factory Acceptance Test, Site Test, System Tests) each requirement shall be met. The contractor shall indicate with the words "Analysis", "Demonstration", or "Inspection" in each row of the matrix exactly how the Contractor proposes to validate that the requirement on that row has actually been met by the manufactured product. Each choice of validation method is subject to the approval of the Engineer before formal testing can begin. If a third party test is proposed, then the contractor shall enter the name of the test in the Design Approval test column on the appropriate row.

Testing. The Contractor shall be required to perform the following tests after the installation of the DMS. The Contractor shall use the test plans within this special provision to conduct the following tests in the presence of the Engineer.

- Factory Acceptance Test
 - Site Test
 - System Test
 - 30-Day Burn-in Period
 - Final System Acceptance and Training

Factory Acceptance Test. The DMS vendor shall be responsible for conducting Factory Acceptance Tests on all units at the DMS vendor's manufacturing facility. The DMS vendor shall provide five (5) copies of all Factory Acceptance Test procedure for the Engineer's approval (via Illinois Tollway's WBPM system) at least sixty (60) days prior to the day the tests are to begin. The test procedures shall include the sequence in which the tests will be conducted. The test procedures shall have the Engineer's approval (via the Illinois Tollway's WBPM system) prior to submission of equipment for tests. The DMS vendor shall furnish data forms containing all of the data taken, as well as quantitative results for all tests. The data forms shall be signed by an authorized representative (company official) of the equipment manufacturer. At least one copy of the data forms shall be sent to the Engineer. The DMS vendor shall be responsible for providing the test fixtures and test instruments for all of the tests.

The Engineer or his/her designee (along with Illinois Tollway personnel) reserves the right to witness the Factory Demonstration Tests at the vendor's manufacturing facility. All tests shall be conducted in accordance with the approved test procedures. All equipment shall pass the following individual tests:

- A. Examination Tests: All equipment shall be examined carefully to verify that the materials, design, construction, markings and workmanship comply with the requirements of this Specification.
- B. Continuity Tests: The wiring shall be checked to determine conformity with the requirements of the appropriate paragraphs in this Specification.
- C. Operational Test: All equipment shall be operated long enough to permit equipment temperature stabilization, and to check and record an adequate number of performance characteristics to ensure compliance with the

requirements of this Specification.

- D. Consequences of Factory Acceptance Test Failure: If any unit fails to pass the Factory Acceptance Test, the unit(s) shall be corrected, and the test successfully repeated. Should the Engineer or his/her designee (or Illinois Tollway representative) have to return to the manufacturer's facility to witness tests following corrective actions by the manufacturer, the manufacturer shall be responsible for all travel, lodging and meal costs associated with the entire trip.

In lieu of the Factory Visual Inspection, the Contractor can obtain from the manufacturer a product validation certification illustrating that the manufacturer has followed their quality processes and verifies that the unit meets the specifications for operations. This certificate must be submitted to the Engineer for review and approval.

Qualification Tests

During the Factory Acceptance Test, the DMS manufacturer shall provide documentation indicating that each proposed DMS product has been tested in conformance with all applicable NEMA, Underwriters Laboratories (UL), and NTCIP Standards listed below under Third Party Testing. It shall be acceptable with prior Engineer approval for portions of the testing to be performed on scale-sized versions of the actual DMS provided that the test unit is functionally and structurally equivalent to the full size DMS.

Third Party Testing

The following testing shall be performed by a "Third Party", defined as an independent testing facility not associated with the DMS manufacturer or Contractor. During the Factory Acceptance Test, the DMS manufacturer shall supply the following Third Party test reports:

- NEMA Standards Publication TS4, Hardware Standards for Dynamic Message Signs (DMS), with NTCIP Requirements – Section 2, Environmental Requirements. Test report shall detail results of mechanical vibration and shock, electrical noise and immunity, temperature, and humidity.
- Underwriters Laboratories (UL), UL 48 Standard for Electric Signs, UL 50 Enclosures for Electrical Equipment, and UL 1433 Standard for Control Centers for Changing Message Type Electric Signs. The UL report number(s) for all DMS and control equipment manufactured by the DMS manufacturer shall be submitted and the products shall bear the UL mark.

Third party test reports shall be submitted for testing of the following (or the latest versions of) National Transportation Communication for ITS Protocol (NTCIP) standards:

- NTCIP 1201:2011, NTCIP Global Object Definitions (version 3)
- NTCIP 1203:2011, Object Definitions for Dynamic Message Signs (version 3)
- NTCIP 2101:2001, Point to Multi-Point Protocol Using RS-232 Subnetwork Profile.
- NTCIP 2103:2008, Point-to-Point Protocol Over RS-232 Subnetwork Profile (version 2).
- NTCIP 2104:2003, V01.11 Ethernet Subnetwork Profile
- NTCIP 2201:2003, V01.15 Transportation Transport Profile
- NTCIP 2202:2001, V01.05 Internet TCP/IP and UDP/IP Transport Profile

- NTCIP 2301 V02.19: Simple Transportation Management Framework (STMF) Application Profile

The NTCIP testing shall be completed using industry accepted test tools such as the NTCIP Exerciser, Trevilon's NTester, Intelligent Devices' Device Tester, and/or Frontline's FTS for NTCIP. The NTCIP test report(s) shall include testing of sub-network communications functionality, all mandatory objects in all mandatory conformance groups, and a subset of the remaining objects.

The Contractor shall submit third party test report(s) to the Engineer for review and approval.

Site Testing. The purpose of the Site Test is to have the Contractor/DMS Vendor exercise all stand-alone (non-network) functional operations of the field equipment with all of the equipment installed as per the plans, or as directed by the Engineer. This installation shall result in the successfully completed commissioning (per manufacturer's specification) at the site before being connected to the Illinois Tollway switch and communications system.

If any unit fails to pass its site test, the unit shall be corrected or another unit substituted in its place and the test successfully repeated. If a unit has been modified as a result of a test failure, a report shall be prepared and delivered to the Engineer, Illinois Tollway ITS Unit, and DMS manufacturer prior to the re-testing of the unit. The report shall describe the nature of the failure and the corrective action taken. If a failure pattern develops in multiple DMS (defined as the lessor of 20% of the contract quantity or 10 units), the Illinois Tollway may direct that design and construction modifications be made to all units without additional cost to the Illinois Tollway or extension of the contract period.

For the Site Test to be accepted, the Contractor shall demonstrate that:

- The Illinois Tollway font library has been successfully loaded into the DMS controller and properly displayed on the DMS.
- The installation has been performed as per contract plans and as per the manufacturer's recommendations.
- All connections are tight and cannot be dislodged by incidental contact from the Engineer.
- All DMS equipment inside the control cabinet and sign shall be properly labeled as per the ITS Labeling Guide (located on the Illinois Tollway website).
- The DMS has been commissioned by the manufacturer's representative in the presence of the Engineer.
 - A completed commissioning form, provided by the DMS manufacturer and approved by the Engineer, has been fully completed, signed by the Engineer and provided to the Illinois Tollway TOC Manager via the Illinois Tollway's WBPM system.

System Test. The Engineer shall notify the Contractor, via the Illinois Tollway's WBPM system, if the System Test is not required. The System Test will be conducted by the Illinois Tollway to validate that the field devices can be operated at the TOC utilizing the Traffic Information Management System (TIMS) software. The test shall remotely exercise all functions and display the return status codes from the DMS Controller.

If any component fails to pass its system test, the unit shall be corrected or another unit substituted in its place and the test successfully repeated. If a component has been modified or replaced as a result of a test failure, a report shall be prepared and delivered to the Engineer, Illinois Tollway ITS Unit, and DMS manufacturer prior to the re-testing of the unit, without additional cost to the Illinois Tollway or extension of the contract period.

For the System Test to begin the Contractor shall provide documentation via the Illinois Tollway's WBPM system that DMS site has been successfully commissioned and site tested. The Contractor shall request that the Engineer notify the Illinois Tollway TOC Operations Manager when the DMS is ready to System Test.

For the System Test of the DMS to be accepted, the Contractor shall demonstrate to the Engineer that:

- Project pre-final walk-through has been successfully completed by the Illinois Tollway's ITS General Engineering Consultant (GEC) on all the contract ITS equipment.
- Contact the TOC Operations Manager to request that the DMS site within the project is integrated and tested for:
 - Communications connectivity from TIMS to the DMS.
 - Accurate data transmission from the DMS site to TIMS.
 - Accurate message display at the DMS.
- Receive written approval (via email) from the TOC Operations Manager verifying the communications connectivity and data transmission are within the Illinois Tollway requirements.

Notify the Contractor in writing (via the Illinois Tollway's WBPM system) that the System Test has passed and the 30-Day Burn-In Period has immediately started. The Illinois Tollway will be responsible for conducting the 30-Day Burn-in Test.

The Illinois Tollway will complete the System Test within 2 weeks of notification from the Engineer requesting the DMS site be tested.

30-Day Burn-in Period. The purpose of the 30-Day Burn-in Period demonstrates that the DMS communicates 100% of the time to the TIMS software, that accurate messages are displayed, and accurate error reporting provided during the duration of the test.

For everyone (1) day the Contractor is required to mitigate/fix a problem, an additional one (1) day per testing will be added to the 30-Day test.

The TOC Operations Manager will provide written approval upon successful completion of the 30-Day Burn-In period. The TOC Manager will provide the Engineer with a Burn-in Test Log at the end of successful completion.

Final System Acceptance and Training. The final inspection of the DMS will be performed by the Engineer in the presence of a representative of the Contractor. Final acceptance of the all work performed under this special provision will be made after:

- Successful completion of the project final walk-through by the Illinois Tollway's ITS GEC.
- Submission (via the Illinois Tollway's WBPM system) and written approval by the Engineer of all Record Drawings and Warranty documents including an electronic computer file (Microstation and PDF) including a sketch of each ITS element assembly,

user/operator manuals, listing each device's location, identification number, wireless channel information and GPS coordinates to the Engineer.

- The Contractor shall provide three hard and three electronic (PDF) copies of each of the operation and maintenance manuals to the Engineer for approval.
- Notification of Final Acceptance will be sent in writing (via the Illinois Tollway's WBPM system) by the Engineer.

Training

General

- A. The Contractor shall supply training for maintenance personnel in the operation and maintenance of all field equipment prior to any equipment's being made operational in the field. These personnel shall be designated from the Illinois Tollway. Training shall be conducted prior to System Acceptance.
- B. Training shall be provided by DMS manufacturer representative(s) thoroughly familiar with the equipment operation. A complete course outline and summary of the experience and qualifications of the instructional personnel shall be submitted and approved by the Illinois Tollway prior to the start of training. Training sessions may be combined and/or shortened with the agreement of the Illinois Tollway and the Contractor.
- C. Recommended test equipment, literature and drawings for the classes shall be furnished by the Contractor. At the conclusion of classes all items furnished which are not currently owned by the Illinois Tollway shall become the property of the Illinois Tollway.

Maintenance Personnel Training

- A. Training for maintenance personnel shall consist of two separate and identical courses of 2 sessions of 8 hours of classroom and system demonstration. Training shall be as follows:
- B. Part 1 – 8 hours. The objective of Part 1 is to provide operational description, troubleshooting procedures, and recommendations for test equipment, test equipment use, repair procedures, design data and drawing for DMSs furnished as part of this project. This training shall be provided before the first DMS is delivered.
- C. Part 2 – 8 hours. The objective of Part 2 is to provide "hands on" experience with trouble shooting software, manuals, drawings and test equipment for all LED type DMS equipment furnished as part of this project. This training shall be conducted on site at a contract DMS location.
- D. All training class time (indoors or outdoors) shall be videotaped by the Contractor on DVD(s). The DVD(s) shall become the property of the Illinois Tollway.

SPARE PARTS. One set of spare parts shall be provided as noted in the list below. The following spare parts are intended to cover all DMS delivered and accepted:

- A. Ten (10) LED display modules (for every sign).
- B. Two (2) LED driver boards (for every sign).
- C. Two (2) Power supplies (for every 5 signs or less).
- D. One (1) Photo sensor (for every 5 signs or less).
- E. One (1) Temperature sensor (for every 5 signs or less).
- F. One (1) Signal (logic control) interface board (for every 5 signs or less).
- G. One (1) DMS Controller (for every 5 signs or less).
- H. One (1) Surge suppressor
- I. One (1) Fan of each type
- J. One (1) Fan control unit
- K. Two (2) Sets of filters (for every sign).
- L. Two (2) Sets of filters (for every DMS controller cabinet).

Documentation

- A. The Contractor shall furnish the following shop drawing submittals for approval before the delivery of any DMS:
 - 1. LED manufacturer's data sheet, stating that make and model of LED to be used, the luminance of LED at a stated current, the maximum/minimum operating temperatures and other pertinent information.
 - 2. Pixel Design – include a detail drawing of the physical layout of the pixel, including the pixel size, number of LED's board detail, operation voltage and current, method of weather protection, orientation of the individual LED's and the calculated luminance at the following points:
 - 15 degrees right and left of the vertical geometric center.
 - 90 degrees perpendicular to the pixel.
 - 15 degrees below the horizontal geometric center of the sign.
 - 3. The module design, including mounting detail.
 - 4. The cabinet design and installation details of equipment in the cabinet.
 - 5. Cabinet shop drawings.
 - 6. Air pre-cleaner and filter design.
 - 7. Control cabinet/panel drawings.
 - 8. A demonstration electronically of the software to be used for local operation and troubleshooting. This shall be capable of running in the latest Windows environment.
 - 9. Copy of the company's ISO 9001 certification or other Quality Management System (QMS) in place.
 - 10. Pixel Module Shop Drawings
 - 11. Wiring Diagrams
 - 12. Water Test Certification
 - 13. Full Electrical Schematics of all circuits with component values, operating voltages, operating current, etc.
 - 14. Troubleshooting software

15. Maintenance and Troubleshooting Manuals to include, but not limited to:

- a. Maintenance Schedules
- b. Maintenance Instructions
- c. Troubleshooting guide
- d. Repair and disassembly procedures
- e. Decision Tree type of structure
- f. Step by step guidance

B. Contractor shall supply complete as-built drawings of all associated equipment and site work.

WARRANTY. All DMS and associated components shall be warranted and guaranteed against defects and/or failure in design, materials, and workmanship within the warranty period. The Contractor shall submit the warranty terms as part of each material item's shop drawing submittal for approval.

The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be replaced with a new component by the manufacturer or his/her representative.

Any system component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as an unsuitable system and shall require the entire system be replaced by the device manufacturer or representative with a new system of the same type at no additional cost to the Illinois Tollway. The unsuitable system shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards at the time of original construction.

All manufacturer's equipment guarantees, or warranties shall be included in the maintenance manuals for the subject equipment.

Method of measurement. This work will be measured for payment, complete in place and accepted, in units as specified herein:

DYNAMIC MESSAGE SIGN, of the type specified, will be measured for payment in units of each.

DYNAMIC MESSAGE SIGN, of the type specified, (TRAINING) will not be measured for payment.

DYNAMIC MESSAGE SIGN, of the type specified, (SPARE PARTS) will be measured in units of each, for each spare part set.

Basis of payment. This work will be paid at the contract unit price per each for DYNAMIC MESSAGE SIGN of the type specified, complete in place and accepted.

The payment to the Contractor will adhere to the following schedule:

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of all product submittal documentation, shop drawings, Test Requirements Traceability Matrix, and Factory Acceptance Test results.

Eighty percent (80%) of the contract unit price will be paid by the Engineer at full completion of the requirements listed under the Site Test of the DMS location. Written (via the Illinois Tollway's WBPM system) approval from the Engineer of acceptance of the Site Test is required before payment is released.

Ten percent (10%) of the contract unit price will be paid after the acceptance of the 30-Day Burn-In period, Final System Acceptance, and Training by the Contractor's Vendor in the presence of the Engineer. Written (via the Illinois Tollway's WBPM system) approval from the Engineer of Final Acceptance is required before payment is released.

Payment for DYNAMIC MESSAGE SIGN, of the type specified, (TRAINING) will be made at the contract lump sum price, which includes all activities above at the completion of the training and acceptance of all materials specified herein.

Payments for DYNAMIC MESSAGE SIGN, of the type specified, (SPARE PARTS) will be made at the contract unit price per each spare part set, upon furnishing and acceptance of all materials specified herein.

DYNAMIC MESSAGE SIGN - TYPE 1 SUBMITTAL CHECKLIST

PAY ITEM #
 JT132040

Contract #
 e-Builder Submittal Package #:

e-Builder Submittal Date:
 Reviewed By (CM Staff Name):

Review Date:

SUBMITTAL STATUS
 APPROVED ☐
 APPROVED AS NOTED ☐
 REJECTED ☐

LOCATION OF REFERENCE	DETAIL SHEET ITEM	ITEM DESCRIPTION	APPROVED MANUFACTURER	APPROVED MODEL No.	SUBMITTED AS SPECIFIED?	MANUFACTURER	MODEL No.	NOTES
DMS MATERIALS AND COMPONENTS								
SPEC. PROV.		SIGN HOUSING (COMPLY WITH NEMA TYPE 4X)						
SPEC. PROV.		DMS FRONT FACE						
SPEC. PROV.		LED DISPLAY MODULES						
SPEC. PROV.		LIGHT EMITTING DIODES (LED)						
SPEC. PROV.		PIXELS						
SPEC. PROV.		REGULATED DC POWER SUPPLIES						
SPEC. PROV.		DISPLAYS						
SPEC. PROV.		PHOTOELECTRIC SENSOR - BRIGHTNESS CONTROL						
SPEC. PROV.		DMS CONTROLLER HARDWARE						
SPEC. PROV.		DMS CONTROLLER SOFTWARE						
SPEC. PROV.		DMS NEMA 4X LOCAL CONTROLLER CABINET						
LOCAL CONTROLLER CABINET								
SPEC. PROV.		SLIDING RACK SHELF (1)	GREAT LAKES	QGL-7206-FRSLA300				
SPEC. PROV.		SLIDING RACK SHELF (3)						
SPEC. PROV.		500 WATT AXIAL HEATER						
SPEC. PROV.	AJ	TERMINAL BLOCKS	ALLEN BRADLEY	1492-CD8				
SPEC. PROV.	D	TWO GROUNDING BAR SYSTEM (GROUND & NEUTRAL)	HOFFMAN	PGS2K				
SPEC. PROV.	F	(1) GFCI RECEPTACLE	HUBBELL	GF5362SG				
SPEC. PROV.		(1) STANDARD RECEPTACLE	HUBBELL	BR20WR				
SPEC. PROV.		DUCT SEAL PUTTY	RAINBOW TECHNOLOGIES					
SPEC. PROV.		DIN RAIL 35 mm (MINIMUM OF 36")						
IP ADDRESSABLE RELAY								
SPEC. PROV.		IP ADDRESSABLE RELAY 8-CHANNEL	DIGITAL LOGGERS	DIN4				
CISCO FIELD SWITCH AND ASSOCIATED DEVICES								
SPEC. PROV.	J	ETHERNET SWITCH	CISCO	IE-4000-8T4G-E				
SPEC. PROV.	K	ETHERNET SWITCH POWER SUPPLY	CISCO	PWR-IE170W-PC-AC=				
SPEC. PROV.		IP SERVICES LICENSE	CISCO	L-IE4000-RTU=				
SPEC. PROV.	Y	(2) 1 Gbps SM SFP FIBER MODULE	CISCO	GLC-LX-SM-RGD=				
SPEC. PROV.		CONTACT CLOSURE TO ETHERNET MODULE						
FIBER OPTIC CABLE / PATCH PANEL TO INCLUDE FURNISH, INSTALL, & TESTING								
SPEC. PROV.	O	FIBER PATCH PANEL WITH SM CONNECTORS (length per plans)	GATOR PATCH	G420U008LAN-XXX-0 ("XXX" length per plans, 100M min)				
SPEC. PROV.	M	2METER SMFO DUPLEX LC-SC JUMPERS (2)	CORNING	047202R512002M				
SPEC. PROV.		ADAPTER PANEL S (DMS VENDOR SPECIFIC)	CORNING	CCHCP12-59 CCH SC ADAPTER				
SPEC. PROV.	AQ	12F OUTDOOR RATED ARMORED SMFO CABLE						

DYNAMIC MESSAGE SIGN - TYPE 1 SUBMITTAL CHECKLIST

PAY ITEM # JT132040
Contract #
e-Builder Submittal Package #:
e-Builder Submittal Date:
Reviewed By (CM Staff Name):
Review Date:

SUBMITTAL STATUS
 APPROVED ☐
 APPROVED AS NOTED ☐
 REJECTED ☐

LOCATION OF DETAIL SHEET REFERENCE	ITEM	ITEM DESCRIPTION	APPROVED MANUFACTURER	APPROVED MODEL No.	SUBMITTED AS SPECIFIED?	MANUFACTURER	MODEL No.	NOTES
CONCRETE SERVICE PAD								
SPEC. PROV.		CONCRETE SERVICE PAD 4' X 4' X 6"						
GROUNDING MATERIAL: SEE "ITS ELEMENT SITE GROUNDING" FOR DETAILS								
REFER TO "ITS ELEMENT SITE GROUNDING" CHECKLIST								
CONDUIT AND JUNCTION BOXES								
		PULL BOXES & JUNCTION BOXES (PER SECTION 1088)	APPLETON/AUSTIN, CURLEE MANF. CROUSE- HINDS, HOFFMAN, KEYSTONE, OZ-GEDNEY					
SPEC. PROV.		CONDUIT						
SPEC. PROV.		FLEXIBLE LIQUID TIGHT						
SPEC. PROV.		CONNECTORS, BUSHINGS	APPLETON, OZ/GEDNEY OR APPROVED EQ.					
POWER DISTRIBUTION EQUIPMENT								
SPEC. PROV.	AS	UNINTERRUPTIBLE POWER SUPPLY (include sealed batteries)	ALPHA TECHNOLOGIES	FXM 1100				
SPEC. PROV.		INTELLIGENT TVSS (DMS MANUFACTURER)						
SPEC. PROV.		UTILITY PANEL (12 CIRCUIT CAPACITY)	SQUARE D	QO12M100RB				
SPEC. PROV.		CIRCUIT BREAKERS / PANEL 60 AMP, 2P						
SPEC. PROV.		CIRCUIT BREAKERS / PANEL 40 AMP, 2P						
SPEC. PROV.		CIRCUIT BREAKERS / PANEL 20AMP	SQUARE D	M8U21120				
SPEC. PROV.		CIRCUIT BREAKERS / PANEL 15 AMP	SQUARE D	MGN61510				
SPEC. PROV.		SURGE PROTECTION DEVICE IN SIGN (DMS MANUFACTURER)						
SPEC. PROV.	AW	INTELLIGENT SURGE PROTECTION DEVICE	MTL ZONE DEFENDER	MODEL ZD16100				
SPEC. PROV.	AX	LOAD SHEDDING RELAY WITH COVER	MAGNECRAFT	W199X-12				
SPEC. PROV.	AT	OUTLET STRIP						
SPEC. PROV.	P	120 VAC SURGE SUPPRESSOR	COOPER CROUSE HINDS	MA15/D17/SI OR APPROVED EQUAL				
SPEC. PROV.	U	5A CIRCUIT BREAKER (2)	ALLEN BRADLEY	1492-SPM1B050				
SPEC. PROV.	AI	2A CIRCUIT BREAKER (5)	ALLEN BRADLEY	1492-SPM1B020				
SPEC. PROV.	AJ	TERMINAL BLOCKS	ALLEN BRADLEY	1492-CD8				
TESTING - TEST REQUIREMENTS TRACEABILITY MATRIX (TRTM)								
SPEC. PROV.		FACTORY ACCEPTANCE TESTS (FAT)						
SPEC. PROV.		FACTORY DEMONSTRATION TESTS (FDT)						
SPEC. PROV.		SITE TEST						
SPEC. PROV.		SYSTEMS TEST						
SPEC. PROV.		30 DAY BURN-IN TEST						

DYNAMIC MESSAGE SIGN - TYPE 1 SUBMITTAL CHECKLIST

PAY ITEM #

JT132040

Contract #

e-Builder Submittal Package #:

e-Builder Submittal Date:

Reviewed By (CM Staff Name):

Review Date:

SUBMITTAL STATUS

APPROVED

☐

APPROVED AS NOTED

☐

REJECTED

☐

LOCATION OF REFERENCE	DETAIL SHEET ITEM	ITEM DESCRIPTION	APPROVED MANUFACTURER	APPROVED MODEL No.	SUBMITTED AS SPECIFIED?	MANUFACTURER	PROPOSED EQUIVALENT DETAILS MODEL No.	NOTES
DOCUMENTATION								
SPEC. PROV.		LED MANUFACTURER'S DATA SHEET, PIXEL DESIGN, MODULE DESIGN.						
SPEC. PROV.		CABINET DESIGN - EQUIPMENT LAYOUT						
SPEC. PROV.		CABINET SHOP/PANEL DRAWINGS, FILTER DESIGN						
SPEC. PROV.		FULL ELECTRICAL SCHEMATICS TO INCLUDE CIRCUITS, COMPONENTS, VOLTAGES, OPERATING CURRENT						
SPEC. PROV.		DEMONSTRATION DISK OF OPERATING SOFTWARE						
SPEC. PROV.		MANUFACTURER, ISO 9001 CERT / QMS						
SPEC. PROV.		WIRING DIAGRAMS						
SPEC. PROV.		WATER TEST CERTIFICATION						
SPEC. PROV.		MAINTENANCE & TROUBLESHOOTING MANUALS						
SPEC. PROV.		WEIGHT & CENTER OF GRAVITY LOCATION FOR DMS						
SPEC. PROV.		AS BUILTS OF ALL EQUIPMENT AND SITE WORK						

DYNAMIC MESSAGE SIGN - TYPE 1 (TRAINING) SUBMITTAL CHECKLIST

PAY ITEM # JT132050

SUBMITTAL STATUS

APPROVED

APPROVED AS NOTED

REJECTED

Contract #

e-Builder Submittal Package #:

e-Builder Submittal Date:

Reviewed By (CM Staff Name):

Review Date:

LOCATION OF REFERENCE	DETAIL SHEET ITEM	ITEM DESCRIPTION	APPROVED MANUFACTURER	APPROVED MODEL No.	SUBMITTED AS SPECIFIED?	MANUFACTURER	MODEL No.	NOTES
TRAINING (TWO IDENTICAL CLASSES OF 16 HOURS EACH, 10 PERSON MAX PER CLASS)								
SPEC. PROV.		RECOMMENDED TEST EQUIPMENT						
SPEC. PROV.		LITERATURE						
SPEC. PROV.		DRAWINGS						
		(PART-1) 8 HOURS: OPERATIONS, TROUBLESHOOTING, TEST EQUIPMENT & USE, REPAIR, DESIGN/DRAWINGS THIS TRAINING IS TO BE PROVIDED BEFORE THE FIRST DIMS SIGN IS DELIVERED						
SPEC. PROV.		(PART-2) 8 HOURS: "HANDS ON" TROUBLESHOOTING, SOFTWARE, MANUALS, DRAWINGS, TEST EQUIPMENT						
SPEC. PROV.		CONTRACTOR TO VIDEO RECORD THE TRAINING ON DVD AND SHALL BECOME THE PROPERTY OF THE TOLLWAY						
SPEC. PROV.								

DYNAMIC MESSAGE SIGN - TYPE 1 (SPARE PARTS) SUBMITTAL CHECKLIST

PAY ITEM # JT132060 **SUBMITTAL STATUS**
 Contract # ☐ APPROVED
 e-Builder Submittal Package #: ☐ APPROVED AS NOTED
 e-Builder Submittal Date: ☐ REJECTED
 Reviewed By (CM Staff Name):
 Review Date:

LOCATION OF REFERENCE	DETAIL SHEET ITEM	ITEM DESCRIPTION	APPROVED MANUFACTURER	APPROVED MODEL No.	SUBMITTED AS SPECIFIED?	MANUFACTURER	PROPOSED EQUIVALENT DETAILS MODEL No.	NOTES
SPARE PARTS								
SPEC. PROV.		(10) LED DISPLAY MODULES PER SIGN						
SPEC. PROV.		(2) LED DRIVER BOARDS PER SIGN						
SPEC. PROV.		(2) POWER SUPPLIES PER EVERY 5 SIGNS						
SPEC. PROV.		(1) PHOTO SENSOR PER EVERY 5 SIGNS						
SPEC. PROV.		(1) TEMP. SENSOR PER EVERY 5 SIGNS						
SPEC. PROV.		(1) SIGNAL (LOGIC CONTROL) INTERFACE BOARD PER EVERY 5 SIGNS						
SPEC. PROV.		(1) DMS CONTROLLER PER EVERY 5 SIGNS						
SPEC. PROV.		(1) SURGE SUPPRESSOR						
SPEC. PROV.		(1) FAN OF EACH TYPE						
SPEC. PROV.		(1) FAN CONTROL UNIT						
SPEC. PROV.		(2) SETS OF FILTERS PER SIGN						
SPEC. PROV.		(2) SETS OF FILTERS PER EVERY DMS CABINET						

MAINTAIN INTELLIGENT TRANSPORTATION SYSTEMS (ILLINOIS TOLLWAY)

Effective: March 1, 2019

Revised: March 1, 2022

Description. This work shall consist of furnishing all labor, equipment, and incidental materials for maintaining roadway ITS systems, including but not limited to data and power cabling, renewable power sources, and wireless devices for communication, as shown on the contract plans and as stated herein, until the proposed new systems are installed, energized, tested and accepted for operation by the Illinois Tollway.

This work does not include maintenance of Portable Changeable Message Signs (PCMS) installed by the Contractor and existing Illinois Tollway owned fiber backbone and related equipment that are maintained by the Illinois Tollway's fiber maintenance contractor.

The work shall include maintenance of existing Dynamic Message Signs (DMS) and controllers, CCTV, MVDS, CCTV/MVDS co-located units, Bluetooth detection units, Wireless Traffic Detection Systems including access points and repeaters, Roadway Weather Information Systems (RWIS), Weigh-In-Motion (WIM), and all associated enclosures/cabinets including equipment/devices inside the enclosures/cabinets. Also included are poles, pole foundations and other support equipment and equipment grounding.

Existing ITS systems include all permanent or temporary ITS system or part of a permanent or temporary ITS system in service prior to the contract that may be affected by the work of the contract as shown on the plans. It remains the Contractor's responsibility to visit the site and 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.

Materials. All materials required for maintenance shall be furnished and delivered by the Contractor to the jobsite at no additional cost to the Illinois Tollway. All materials furnished by the Contractor for maintenance of the system shall meet the requirements of the Illinois Tollway special provisions for new work of the same or similar function. All materials furnished and installed by the Contractor during maintenance of the system shall become the property of the Illinois Tollway at the conclusion of the Contract. (During the Preconstruction Conference and prior to the Contractor accepting maintenance responsibility, any materials with long lead times shall be identified jointly between the Contractor and Engineer.

CONSTRUCTION REQUIREMENTS

Effective the date of the maintenance transfer, the Contractor shall be responsible for the proper operation and maintenance of all existing ITS Systems until contract completions. Operation and maintenance of existing ITS equipment that is relocated becomes the responsibility of the Contractor that relocates the said equipment until the end of the contract.

Temporary wiring/F.O.C. Temporary wiring/F.O.C suspended between poles, if any, shall be installed a minimum of 20' above finished grade. Temporary wiring/F.O.C. shall not be wrapped around the pole, connected through the pole handhole, or routed under the base of the pole. All pole handhole covers must always be securely installed for the duration of the contract.

Temporary wiring shall be limited to one aerial power cable and one SM fiber optic cable attached to an existing light pole with prior approval of the Illinois Tollway.

Marking of existing cable systems. The parties having jurisdiction and/or maintenance responsibilities over any existing ITS systems within the project limits shall, at the Contractor's request, mark and/or stake, once per location, all underground cable routes owned or maintained by the respective party. A project may involve multiple "locations" where separate ITS electrical/communication systems are involved.

The markings shall be taken to have a horizontal tolerance of at 18 inches to either side of the marking. The request for the cable locations and marking shall be made 48 hours in advance of the request for the maintenance transfer and preconstruction inspection to allow the locates to be completed before the preconstruction site inspection date.

The Contractor shall exercise extreme caution where existing underground utilities and cable runs are identified. 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.

Maintenance Transfer. Upon received of the Notice to Proceed, the Contractor shall initiate an inspections and maintenance transfer request, as specified below. A subsequent inspection and maintenance transfer to the Illinois Tollway is required at the conclusion of the Contract. All issues identified by the Illinois Tollway during inspection must be repaired by the Contractor prior to the Illinois Tollway accepting the maintenance transfer.

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 ITS systems which may be affected by the work. The request for the maintenance transfer and preconstruction inspection shall be made no less than seven (7) calendar days prior to the desired inspection date. The maintenance transfer and preconstruction inspection shall:

- Complete the transfer checklist.
- Establish the approximate location and existing operating condition of ITS systems which may be affected by the work.
- Establish the condition of ITS systems which may be affected by the work.

The Contractor shall conduct an inventory of all existing ITS 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. 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 of proposed ITS systems.

Extent of maintenance. The Contractor shall maintain all existing ITS equipment, enclosures (including all equipment/devices within the enclosure), structural supports, grounding for all equipment, ITS disconnect switch, and all circuits/fiber connected to the enclosures, as well as all equipment within the enclosures affected by the contract. This may include enclosures and circuits/fiber and equipment e.g. Switches that extend outside the nominal contract limits identified

in the contract documents, but are essential to operation of the ITS equipment within the contract limits. There is no "Partial Maintenance" of Illinois Tollway ITS system/equipment. An anti-static electric safety device will be utilized when doing maintenance of ITS Enclosures and for DMS cabinets.

Maintenance responsibility. The Contractor shall be fully responsible for maintenance of all existing and proposed ITS systems 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, or other means.

The Contractor's responsibility shall include the maintenance of ITS equipment units (including enclosures), cable/fiber runs and equipment inside enclosures. In the case of a pole knockdown or equipment damage caused by normal vehicular traffic, the Contractor shall promptly clear the equipment and circuit/fiber discontinuity and restore the system to service.

The Engineer will identify non-functioning ITS equipment and systems and notify the Contractor. Deficiencies will be corrected within the time frame given in the following chart. 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 ITS system equipment.

INCIDENT OR PROBLEM	SERVICE RESPONSE TIME	SERVICE RESTORATION TIME
Control cabinet out	24 hours	72 hours
Motorist caused knockdown, damaged or leaning ITS pole (10) degrees or more	1 hour to clear	72 hours
Circuit out — Needs to reset breaker	24 hours	-
Circuit out — Cable trouble	24 hours	72 hours
Switch out — Needs to reset Switch	24 hours	-
Fiber Out — Cable trouble	24 hours	72 hours

Service Response Time — amount of time from the initial notification to the Contractor until a repair technician 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).

Liquidated damages

Non-Compliance. The Contractor will be subject to liquidated damages of \$1,000.00 per incident, per day, to be deducted from next pay estimate, for each occurrence when Engineer determines that Contractor or his Subcontractor is not in full compliance within the **MAINTENANCE RESPONSIBILITY** timetable chart.

Failure to Respond. The Contractor is required to respond in accordance with the requirements of Maintenance Responsibility. Failure by the Contractor to so respond shall be grounds for liquidated damages of \$1,000.00 for each occurrence, to be deducted from next pay estimate due within the **MAINTENANCE RESPONSIBILITY** timetable chart.

Damage caused by the Contractor's operations shall be repaired at no additional cost to Illinois Tollway.

Spare Parts. The Contractor shall maintain an inventory for spare parts for ITS maintenance. The below list shall be followed:

CCTV assembly	10% of the quantity within contract limits, minimum of 1
MVDS assembly	5% of the quantity within contract limits, minimum of 1
Bluetooth VDS assembly	5% of the quantity within contract limits, minimum of 1
ITS Cabinet	1
ITS Pole	1

For material details, see Tollway ITS Special Provisions

- SP_Tollway_CCTV Camera ITS Assembly
- SP_Tollway_MVDS ITS Assembly
- SP_Tollway_BlueTooth Vehicle Detection System
- SP_Tollway_ITS Pole Mounted Enclosure
- SP_Tollway_Ground Mounted Light Pole Galvanized Steel Without Mass Arm

Operation of ITS systems. The ITS Systems shall be in proper working and operational condition 24 hours per day, seven days per week. Failure of repairing any ITS device under the Contractor's maintenance within the response time stated above will be subject to Liquidated Damages.

Method of Measurement. This Work will be measured for payment in calendar months or fraction thereof.

Basis of Payment. This work will be paid for at the contract unit price per calendar month for MAINTAIN INTELLIGENT TRANSPORTATION SYSTEMS. The contractor shall demonstrate to the satisfaction of the Engineer that the ITS system is operational prior to submitting a pay request. Failure to do so will be grounds for denying the pay request.

REMOVE DYNAMIC MESSAGE SIGN (ILLINOIS TOLLWAY)

Effective: March 1, 2022

Revised: March 1, 2024

Description. This work shall consist of disconnecting and removing a dynamic message sign (DMS), modifying a catwalk (if present) and removing a DMS cabinet. The existing power cable and fiber optic communication cable shall be removed from the DMS sign to the DMS cabinet, and from the DMS cabinet to the power handhole and communication handhole. The underground conduits can be abandoned in place after their cables have been removed. The existing DMS cabinet, foundation, transformer, disconnect switches, above ground conduit attached to the sign structure, supports, and junction boxes shall be removed at locations shown in the Plans.

Before starting work, the Contractor shall submit a DMS Removal Plan to the Engineer for acceptance detailing the proposed methods of DMS removal and the amount, location(s), and type(s) of equipment to be used.

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate with the Engineer. This includes, but is not limited to, the following:

Notification. Disconnection of the existing DMS sign shall be coordinated with the Engineer. The Engineer shall be notified two (2) weeks prior to any disconnection of any DMS sign, (one) 1 day prior to the start of the work, as well as one hour before taking any element out of service. At least one week prior to beginning construction, the contractor shall conduct a maintenance transfer inspection with the Engineer, at which time any existing deficiencies will be noted. In case the contractor fails to conduct a maintenance transfer inspection, the contractor shall be held responsible for all deficiencies at the completion of transportation to the maintenance facility.

The Contractor shall provide the Engineer with a DMS Removal Plan specific to each DMS location. The plan shall be approved by the Engineer at least two (2) weeks prior to the removal of the DMS.

Removal plans and procedures. The Demolition Contractor shall retain the services of an Illinois Licensed Structural Engineer, experienced in the analysis and preparation of demolition plans, for the completion of a project-specific demolition plan. The Structural Engineer shall sign and seal the demolition plan, drawings, and calculations for the proposed demolition.

The Demolition Plan and Procedures shall be completed in detail for all phases, stages, and conditions anticipated during demolition. The demolition plan shall include structural calculations and supporting documentation necessary to completely describe and document the means, methods, sequence, temporary support, and loads necessary to safely remove the DMS sign, catwalk structure and the removal of the DMS cabinet. The removal of the DMS sign, modification to the catwalk and the DMS cabinet shall be in conformance with the contract documents and as outlined herein. The demolition plans shall include an assessment of the existing structure

condition and an evaluation of the capacity and stability of the existing DMS sign, catwalk structure and DMS cabinet during removal. Any deterioration observed in the condition assessment shall be accounted for in the evaluation. The strength and stability of the existing DMS sign structure and catwalk or portions of the structure shall be always maintained during the proposed removal.

Lane closures required for the removal of the existing DMS sign, catwalk and DMS cabinet shall be completed in accordance with allowable hours contained in the Maintenance of Traffic special provision. Complete closure of the expressway or any crossroad below the DMS sign structure for the demolition, or partial demolition, of the existing structure shall be completed in accordance with Section 701 of the Supplemental Specifications. Detailed information should be submitted as part of Demolition Plans and Procedures.

Illinois Tollway Base Sheet M-BRG-526 is available for use as a guide in preparation of a demolition plans.

The Demolition Plans and Procedures shall provide complete details of the removal of the DMS sign catwalk removal or modification and DMS cabinet process including but not limited to:

- (a) **Plan of Work Area:** a plan of work area showing the existing DMS Sign, catwalk and DMS cabinet, the existing DMS sign support structure, overhead and underground utilities (include voltage information if power lines); nearby structures and conditions that may limit access; staging or material storage areas; right-of-way and easement lines; identification of any Federal Aviation Administration (FAA) restrictions; site ground suitability for crane operation; any other information that may be pertinent to the removal of the DMS sign, catwalk and DMS cabinet.
- (b) **Maintenance of Traffic:** Information on the location and numbers of lanes being closed, duration of closures, proposed lanes widths of remaining lanes, information on any complete road closures. Procedure and sequence of operations, including a schedule that address work items that need to comply with specific working hour limitations.
- (c) **Removal or Demolition Sequence:** The Demolition Plans and Procedures shall indicate the demolition sequence for the DMS sign, catwalk structure on the sign truss and DMS cabinet, noting the use of temporary support conditions, such as (but not limited to) holding crane positions and temporary supports. The demolition sequence shall be shown in an illustrative plan view of the DMS sign to be removed from the truss structure, catwalk structure and the removal of the DMS cabinet, their weights and center of gravity locations, lifting crane locations, and any temporary support conditions that are necessary during the particular stage. The illustrative plan view shall be accompanied with a written narrative of the procedure to be followed by the demolition contractor, which shall state items such as components to be removed and use of temporary supports.
- (d) **Crane Information:** The Demolition Plans and Procedures shall show the location of each crane to be used (if more than one crane is required to remove the DMS sign or catwalk) for each component pick and removal, the crane type, crane pick radius, the crane support methods (crane mats, work trestles, etc.). The submittal shall include capacity charts or tables that address, and demonstrate the adequacy

of, each crane configuration, boom length, counterweight configuration, outrigger configuration, and pick weight required to do the proposed work. The Demolition Plans and Procedures shall also indicate any potential above or below-ground obstructions or restrictions to crane operations (such as existing structures, utilities, etc.). When cranes are required to be placed on existing structures (bridges, culverts, etc.), the structure shall be evaluated to ensure it has adequate capacity to withstand crane loading. Calculations that show the structure can withstand the loads without damage shall be provided.

- (e) **Lifting Devices and Special Procedures:** The Demolition Plans and Procedures shall include the details, weight, capacity, and arrangement of all DMS Sign, catwalk and mounting support and DMS cabinet to be removed. The Demolition Plans and Procedures shall also specify details for rigging or lifting devices bolted to existing component which are to remain. Stresses at lift points induced because of lifting shall be evaluated and if required, adequate bracing provided as indicated by the analysis. The strength and stability of the existing structure or portions of the structure shall always be maintained during the proposed crane operations. The Demolition Plans and Procedures shall also include the approximate center of gravity locations for the DMS sign structure picks of non-symmetric component.
- (f) **Load Restrictions:** Restrictions regarding wind loading and construction dead and live loadings, and any other applicable loading restrictions, shall be included on the Demolition Plans and Procedures as necessary.
- (g) **Temporary Supports:** The Demolition Plans and Procedures shall include the location of any temporary support structures and bracing, as well as details of the temporary support structure itself. If the temporary support is to be constructed by the Contractor on site, a complete design with full details, including member sizes, connections, and bracing elements, shall be provided in the Demolition Plans and Procedures.
- (h) **Load combinations:** When required, load combinations shall be in accordance with AASHTO LRFD Bridge Design Specifications, latest Edition unless otherwise in the contract documents.
- (i) **Crane Lift Plan:** The crane lift plan and procedures shall meet all applicable Occupational Safety and Health Administration (OSHA) requirements. Cranes shall not be operated when wind speeds at the site attain the maximum wind velocity based on the surface/load ratio recommendations of the manufacturer: At winds greater than 20 mph, the operator, rigger, and lift supervisor shall cease all crane operations, evaluate conditions and determine if the lift shall proceed. This determination shall be based on wind calculations per the crane manufacturer's recommendations.

Pre-Removal Conference. A Pre-Removal meeting shall be held at least one week prior to the commencement of the work. The intent of the meeting is to develop a mutual understanding of the proposed implementation of the Contractor's DMS Sign, catwalk and DMS cabinet Removal Plan. Revisions or adjustments to the plan, and potential revisions or adjustment to the implementation of the DMS Removal Plan shall be discussed.

Dynamic Message Sign Removal. The Contractor shall disconnect the existing DMS and controller cabinet from all cables and conduit prior to removing the DMS from the existing sign structure. Remove the DMS and DMS equipment (controller cabinet, cables, structure mounted conduit, mounting hardware, transformers, and disconnect switches) as shown on the Plans. Once the existing DMS cabinet foundation has been removed the hole shall be backfilled with suitable material approved by the Engineer. The surface of the filled hole shall be treated to match the surrounding area. Seeding Class 2E Salt tolerant Roadside Mix shall be place across all disturbed areas. Concrete foundation for the DMS cabinet shall be removed within five calendar days after the removal of the DMS cabinet. All above ground conduit stub-outs shall be removed to a depth of six (6) inches below grade, capped, and abandoned in place.

Delivery to the Illinois Tollway. The Contractor shall deliver the DMS sign housing, DMS cabinet, and all internal equipment to an Illinois Tollway facility as directed by the Engineer. Special care shall be given to the removal and salvage of the Cisco switch and UPS batteries in the DMS cabinet to be returned to the Illinois Tollway. All equipment shall be logged by inventory (M tag) number via the Illinois Tollway's A-14 inventory form and then delivered and unloaded at the facility.

The mounting hardware, conduit, cable, catwalk structure and any other equipment removed shall be disposed of by the Contractor in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement. REMOVE DYNAMIC MESSAGE SIGN, of the type specified will be measured for payment in units of each.

REMOVE DYNAMIC MESSAGE SIGN CONTROLLER FOUNDATION will be measured for payment in units of each.

Placement of backfill material and seeding will not be measured for payment.

Basis of Payment. REMOVE DYNAMIC MESSAGE SIGN, of the type specified will be paid for at the contract unit price per each which price shall include removal of the DMS sign housing, controller cabinet, conduits, cabling, electrical transformers, disconnect switches, excavation and backfill, landscaping, structure mounted junction boxes, and demolition plans associated with a DMS site.

REMOVE DYNAMIC MESSAGE SIGN CONTROLLER FOUNDATION will be paid for at the contract unit price per each which price shall include all excavation, backfill and landscaping.

Excavation in rock will be paid for according to Article 502.13

Removal and disposal of unstable or unsuitable material below plan grade will be paid for according to Article 502.13.

DYNAMIC MESSAGE SIGNS ELECTRICAL WORK (ILLINOIS TOLLWAY)

Effective: September 24, 2014

Revised: March 12, 2024

Description. This work shall consist of furnishing, installing, testing, commissioning, and field configuring the electrical work for Dynamic Message Signs (DMS), of the Type specified, as shown on the Plans, hereinafter specified, complete in every respect unless specifically exempted herein. The work shall also consist of furnishing and installing electrical cables, power conduits, fiber optic conduits and transformers, equipment grounding conductors and any other related grounding work for a properly grounded system. Procurement and installation of SMF and power for any Closed Circuit Television (CCTV) camera shown on the plans to connect to the DMS Controller Cabinet shall be included in this work.

The Contractor shall provide operation and maintenance manuals, as available from the manufacturer, of any equipment specified hereinafter.

The Contractor shall have at least 5 years of successful installation experience with projects utilizing CCTV & DMS system equipment & fiber optic equipment similar to that required for this project. The Contractor must have qualified personnel permanently located within 2 hours of project site.

Unless specifically defined on the Plans as a unit cost Pay Item, all electrical work at the DMS sites, related CCTV camera sites, plaza buildings, or equipment shelters to incorporate the new DMS equipment and CCTV camera connections is included in this work.

Labeling of various equipment/enclosures/cables/conduit, as per the Illinois Tollway ITS Labeling Guidelines Manual and/or other referenced standards, is included in this work.

Should there be any discrepancies or a question of intent, the Contractor shall refer the matter to the Engineer for decision before ordering any equipment, materials or before starting any related work.

Materials. Materials and equipment shall be new, UL or CSA labeled and shall bear the manufacturer's name, model number and other identification markings. Materials and equipment shall be the standard product of a manufacturer regularly engaged in the production of the required type of material or equipment for at least five years (unless specifically exempted by the Illinois Tollway) and shall be the manufacturer's latest design with published properties. Equipment and materials shall be of the same manufacturer throughout the project to provide uniform appearance, operation and maintenance. Equipment and materials shall be without blemish or defect and shall not be used for temporary light or power purposes, including lamps, without the Engineer's written authorization.

The main components of the DMS electrical work are as described below. All other ancillary connection cables, brackets, and other items required to have a complete installation are included under this pay item.

- Enclosures for Electrical Equipment
- Conduits, Fittings, and Bushings
- Pull and Junction Boxes

- Wires and Cables-600 Volt
- Power Distribution Equipment
- Power and Communication Lines Surge Protection Devices (SPDs)
- Special Cables

The following are the specific materials for the major system component described above:

- Enclosures for Electrical Equipment. Enclosures for electrical equipment shall conform to the area classification described below or unless otherwise noted on the plans. NEMA Type 4 enclosures shall be used in buildings, and NEMA Type 3R 316 Stainless Steel enclosures shall be used in outdoor areas.
- Conduits, Fittings, and Bushings. Material for all conduits and fitting shall be in conformance with the following requirements:

Galvanized Rigid Steel Conduit:

- Galvanized Rigid Steel (GRS) conduit and fittings shall be installed in all above ground areas of this Project except as indicated on the plans and/or noted herein.
- GRS conduit shall be heavy wall type, hot-dipped galvanized with zinc-coated threads, and Underwriters' Laboratory labeled.
- GRS conduit and couplings shall be threaded, rigid steel, hot-dipped galvanized after fabrication and shall be in accordance with UL 6.
- All GRS conduit shall meet the requirements of the Section 1088 of the Illinois Tollway Supplemental Specifications.
- The minimum size conduit shall be ¾ inch, unless otherwise noted.
- Acceptable conduit manufacturers shall be Allied Tube and Conduit Corp, Wheatland Tube Company, Steel Duct Conduit Products, or approved equal.
- Acceptable conduit fitting manufacturers shall be American Fittings, Appleton, Killark, OZ/Gedney, or approved equal.
- Intermediate Metal Conduit (IMC) and Electrical Metallic Tubing (EMT) are not acceptable.

PVC Coated GRS Conduit:

- PVC coated rigid steel conduit (PGRS), including elbows and couplings shall be made with GRS conduit, conforming to the GRS specifications above, to which is bonded a Polyvinyl chloride 40 mils (PVC) coating for the protection of the conduit.
- PVC coated GRS conduit shall also be used for other installations as shown on the Plans.
- PVC coated GRS conduit shall meet the requirements of the Section 1088 of the Illinois

Tollway Supplemental Specifications.

- Acceptable PVC coated manufacturers shall be Thomas & Betts, Robroy Industries, or approved equal. All couplings, conduit bodies, etc. must be provided by same manufacturer as the conduit.
- The minimum size conduit shall be 1 inch unless otherwise indicated.
- Only PVC coated GRS in colors that are UL listed are acceptable.
- All conduit fittings shall be of the types specified, shall be in accordance with UL 514B for normal application.
- Any conduit that shows corrosion within the one-year guarantee/warranty period shall be replaced at no additional cost to the Illinois Tollway.

PVC Conduit:

- Non-metallic conduit must be PVC Schedule 40 or PVC Schedule 80 as shown on Drawings.
- PVC conduit, including elbows and couplings, must meet the requirements of NEMA Standard TC2 (latest edition), UL Standard 641, Federal Specifications WC-1094A and must be UL rated and listed for use with 90 degrees C rated conductors in compliance with Article 347 of the NEC. Materials must have a minimum strength of 7,000 psi, flexural strength of 11,000 psi, and compressive strength of 8,600 psi, all at an ambient temperature of 23 degrees C.
- The conduit must be manufactured from virgin PVC compound that must meet the applicable requirements of ASTM D1784.
- PVC conduit fittings must meet with the requirements of NEMA Standard TC3 (latest edition), UL Standard 514 supplement and Federal Specification WC-1094A.
- Standard fittings and cement must be obtained from the conduit manufacturer. Assembly of the PVC conduit system must be in strict accordance with the manufacturer's instructions.
- Acceptable PVC conduit manufacturers shall be National Pipe, Carlon (Lamson and Sessions), Cantex, and IPEX.

Coilable Nonmetallic Conduit:

Coilable Nonmetallic Conduit (polyethylene duct) shall comply with the requirements of the special provision "UNDERGROUND CONDUIT, COILABLE NONMETALLIC SDR 11 CONDUIT".

Flexible Conduit and Fittings:

- Conduits installed in dry locations requiring moveable connection for adjustment or vibration isolated shall be provided with an 18-inch minimum length of flexible

galvanized steel conduit.

- Flexible conduit installed in wet locations, exterior locations, and at motors shall be liquid-tight type.
- Flexible liquid-tight conduit shall be galvanized steel with a UL listed moisture and oil-proof plastic coated jacket.
- Connectors shall be malleable iron or steel squeeze-type, with annular gripping rib and insulated throat. Particular attention shall be given to maintaining ground bond through flexible connections.
- Plastic-coated, flexible metal conduit shall be in accordance with UL 360, type UA with PVC outer jacket and integral ground conductor as manufactured by Anamet, Electro Flex, International Metal Hose Company, or approved equal.

Bushings:

- Conduit bushings shall be malleable iron body with 150°C plastic insulating ring. Insulating material shall be self-extinguishing, shall be locked in place, and shall be non-removable.
- Acceptable manufacturers shall be Appleton Catalog Series BU751, OZ/Gedney Catalog Series IBC, or approved equal.

Pull and Junction Boxes:

- Pull boxes and junction boxes shall meet the requirements of the Section 1088 of the Illinois Tollway Supplement Specifications, except as modified on the Plans and as required by this Special Provision.
 - Pull boxes and junction boxes shall be provided and sized in accordance with the requirements of the National Electrical Code, as shown on the Plans, and as required by this Special Provision.
 - Pull boxes and junction boxes located outdoors shall be NEMA Type 4X, 16-gauge minimum, 316 stainless steel with stainless steel hinged cover and fasteners, unless noted otherwise on the Plans.
 - Pull boxes and junction boxes located indoors shall be NEMA Type 1, gasketed, 14 gauge, continuously welded seam, galvanized box and cover. Each cover shall be secured with round, recessed, pan head, or flat head stainless steel screws.
 - Pull boxes and junction boxes of the proper size and shape shall be provided. Where suitable, standard outlet boxes shall be used as pull boxes and junction boxes.
 - Where required by building or plaza construction, special pull boxes or junction boxes shall be provided in sizes and shapes determined from field

measurements as required making a neat and workmanlike installation.

- Acceptable manufacturers shall be Appleton Electric, Austin, Curlee Manufacturing Co., Crouse-Hinds, Hoffman, Keystone, OZ/Gedney, or approved equal.

Wires and Cables - 600 Volt:

- Wire and cable shall be delivered to the job site in original packing or on factory reels. All wire and cable shall bear tagging or marking on the finish at regular intervals and consisting of manufacturer's name as well as the insulation type, voltage rating, UL listing and date of manufacture.
 - Wire and cable shall be soft copper, properly refined, and shall have minimum conductivity of 98%. Aluminum conductors are not acceptable.
 - Wire and cable shall have factory color-coded insulation and shall be installed and connected as follows:
 - Color coding for voltage systems of 250 volts and less shall be:
 - "A" Phase – Black
 - "B" Phase – Red
 - Neutral – White
 - Ground – Green
 - Green shall be used for grounding only.
 - Color coding for voltage systems of greater than 250 volts shall be in accordance with the applicable electrical code sections. Phase legs shall be identified on the wire markers: see Section 1066 of the Illinois Tollway Supplemental Specifications.
 - The insulation shall be applied tightly to the conductor and shall be free stripping.
 - Power cables shall be insulated with XLP insulation over the conductor with a minimum average thickness as indicated in the table in Article 1066.03(a) of the Standard Specifications. Cable shall be rated USE-2.
 - If any of the cable types are modified by the Plans, the Plans shall be followed.
 - Ground cable shall be soft drawn copper, annealed, stranded copper with green insulation in required sizes and quantities for all equipment grounding.
 - The 600-Volt insulated wires and cables shall be factory tested prior to shipment in accordance with ICEA standards for the insulation specified.
 - Acceptable cable manufacturers for 600 volt rated cable shall be American Insulated Wire Corp., Cablec, Okonite, Prysmian, Southwire, or approved equal.

- Splices shall be made with UL approved, self-fusing jacketing tape, resistant to weather, oils, water and chemicals. The color shall be as required. Acceptable manufacturers shall be equal to 3M – Scotch 33 plus, or approved equal.
- Where necessary to use a lubricant for pulling wires, the compound shall be listed by Underwriters Laboratories. Cleaning agents or lubricants that have a deleterious effect on conductor covering shall not be used. Acceptable manufacturers shall be Polywater LZ High Performance Cable Lubricant or approved equal.

Power Distribution Equipment. Transformers and Disconnect Switches shall comply with the following requirements:

- Transformers:
 - Enclosures for Electrical Equipment
 - Transformers shall be outdoor single phase dry-type transformers of the two-winding type, self-cooled, with ratings and voltages as indicated on the Drawings.
 - Transformers must be designed for continuous operation at rated KVA, for 24 hours a day, 365 days a year operation, with normal life expectancy as defined in ANSI C57.96.
 - The core and coil assembly must be completely encapsulated in a proportioned mixture of resin and aggregate to provide a moisture-proof, shock resistant seal.
 - The enclosure construction must be totally enclosed, non-ventilated, NEMA 4X, with lifting eyes.
 - Each transformer shall be mounted to a structure using proper anchors and support materials. In no case shall the conduit be the support. The Contractor shall build any rack type support necessary for the mounting of this equipment as shown on the plans. Each rack must be solidly constructed and firmly anchored to the sign structure.
 - Transformer enclosure shall be made of heavy gauge steel and shall be degreased, cleaned, primed and finished with ANSI 61 grey weather-resistant enamel. The transformer enclosure shall be sized to properly accept the conduit size shown on the plans and/or specified herein, from the base of the enclosure, or as approved by the Engineer. The shop drawing submittal shall include the physical dimensions and layout of the conduits and enclosures.
 - Install transformers as indicated, complying with manufacturer's written instructions, applicable requirements of NEC, NESC, NEMA, ANSI, IEEE and in accordance with recognized industry practices to ensure that products fulfill requirements.
 - All transformers shall be UL listed.
 - Each transformer must be provided with a suitable terminal compartment to

accommodate the required primary and secondary wiring connections and side or bottom conduit entrance.

- Acceptable manufacturers are Cutler Hammer, General Electric, Square D, and ITE/Siemens.
- Prior to energizing, check for the following:
 - Electrical continuity
 - Short circuits
 - Improper grounds
 - Compliance with manufacturer's torque tightening specifications.
- Disconnect Switches:
 - Disconnect switches shall be rated at 600 Volts for use on 480 VAC circuits. Disconnect switches shall be rated 240 VAC for use on 240, 208, and 120 Volt circuits.
 - Each disconnect switch and circuit breaker must have an external handle that can be padlocked in the "ON and OFF" position. The padlocking provision must be capable of providing for at least three (3) padlocks. The handle operation must be non-teasable, quick make - quick break.
 - Each disconnect switch shall be heavy duty, fusible or non-fusible as shown on the Drawings. When fusible disconnect switches are required they shall be complete with the required fuses.
 - Each disconnect switch must be properly and effectively grounded. An individual ground conductor must be provided for each such disconnect.
 - Disconnect switches shall be mounted such that center line of the operating handle is 5' - 0" above finished grade.
 - Each transformer and disconnect switch shall be mounted to a structure using proper anchors and support materials. In no case shall the conduit be the support. Where required the Contractor shall build any rack type support necessary for the mounting of this equipment. Each rack must be solidly constructed and firmly anchored to the sign structure.
 - Transformer and disconnect switch enclosures shall be made of heavy gauge steel and shall be degreased, cleaned, primed and finished with ANSI 61 grey weather-resistant enamel.
 - Install transformers and disconnect switches as indicated, complying with manufacturer's written instructions, applicable requirements of NEC, NESC, NEMA, ANSI, IEEE and in accordance with recognized industry practices to ensure that products fulfill requirements.
 - All transformers and disconnect switches shall be UL listed.

- Disconnect switches shall be Eaton Model DH362NWK or approved equal.

Power and Communication Lines Surge Protection Devices (SPDs). Each DMS enclosure shall be equipped with a Primary Surge Protection Device (SPD). The primary SPD shall be MTL Zone Defender Pro Series, Model ZD16100. The primary SPD shall have local visual indicators that allow a service technician to determine the operational status of the SPD and determine whether the SPD should be replaced immediately or monitored for later replacement. Each DMS with AC power lines longer than 30 feet shall also be equipped with a Secondary SPD.

- All Primary and Secondary Surge Protection Devices must meet the following criteria:
 - UL 1449 tested.
 - Listed by UL.
 - Meet or exceed ANSI/IEEE C62.45 and ANSI/IEEE C62.41
 - Provide L-L, L-G, L-N, & N-G protection modes
 - Shall be of the Metal Oxide Varistor (MOV) or the Silicon Avalanche Diode (SAD) type.
- Primary Surge Protection Devices shall have the following additional requirements:
 - The Surge Protection Device shall be connected on the load side of the main circuit breaker and in parallel with the load.
 - The Surge Protection Devices must be listed for lightning protection.
 - Surge current capacity of 80 kA per phase or greater.
 - Light emitting diode (LED) indicating light for system status indication and failure indication.
 - Conduit nipple connected.
 - NEMA 1 enclosure if being installed inside another enclosed rated NEMA 4X.
 - Let-thru-voltage (LTV) performance measured outside the unit:
 - 3kA 8/20 u/s pulse =< 450volts
 - 10kA 8/20 u/s pulse =< 750volts
- Secondary SPDs shall have the following additional requirements:
 - SPD shall be connected to the AC power distribution side of the cabinet either hardwired into the load center, plugged into a non-GFCI outlet, or plugged into the load side of the UPS, where installed.
 - Surge current capacity of 50 kA or greater.
 - LED indicating light for power ON and failure indication.

- Plug in power outlet strip design with at least seven (7) power distribution outlets.
- Enclosure shall be NEMA 1.
- LTV performance measured outside the unit.
 - 2kA 8/20 u/s pulse = <300volts
 - 3kA 8/20 u/s pulse = <350volts
- All Signal, Data and communication lines shall be protected with Surge Protection Devices with the following requirements:
 - Surge current capacity of 10kA
 - All solutions shall be in accordance with UL 452, UL 497, and UL 497C as applicable.
 - All circuits must be protected at both ends with SPD ground reference established at the point of use.
- Special Cables
 - 1. General:
 - The Contractor shall furnish and install the shielded control cable, shielded power cable, shielded data cable, and Outdoor Rated 4 Pair 23 AWG 1000BASE-T CAT6 Ethernet cable as shown on the Plans.
 - 2. Cable Identification:
 - All cables shall be identified at both ends per the Illinois Tollway ITS Labeling Guide (found on the Illinois Tollway main website under Contractor Manuals).
 - In the event a DMS sign needs to be replaced, all fiber optic cable between the DMS enclosure and DMS sign needs to be replaced as well as the conduit attached to the sign truss.
 - 3. Data and Communication Cable:
 - All outdoor data and communication cable shall be plenum rated cable.
 - Multimode or single mode fiber optic cables shall be utilized for communications to the DMS in accordance with DMS manufacturer

Product delivery, storage, and handling. Equipment and materials shall be delivered to the site and stored in the original containers, suitably sheltered from the elements and mechanical injury, but readily accessible for inspection until installed. Manufacturer's directions shall be followed in the delivery, handling, storage (in dry, heated spaces for moisture sensitive items), protection, installation and operation of all equipment and materials.

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate his work and submittals with the Engineer. This includes, but not limited to, the following:

Pre-Procurement Documentation Approval

- Within 10 business days from the Notice to Proceed (NTP), the Contractor shall submit for approval to the Engineer a detailed schedule showing dates for: product submittals and approvals; construction/installation; testing; and applicable warranty information. This detailed schedule shall be included in the project schedule, as required per Illinois Tollway Supplemental Specifications Article 108.02.
- Within 10 business days from the NTP, the Contractor shall submit for approval to the Engineer a completed Contractor Submittal Checklist, attached to this special provision, and associated submittals.

The Contractor shall make all submissions to the Engineer through the Illinois Tollway's Web Based Program Management (WBPM) system to the Engineer, and shall obtain approval of the schedule, catalog cut sheets, cabinet wiring diagrams, and any required calculations from the Engineer prior to purchasing any equipment and subsequently, performing the installation per the approved documents, contract plans, and specifications.

Pre-Installation Requirements

The location of the electrical conduit, enclosures, service disconnects, etc., shall be staked in the field by the Contractor for approval by the Engineer.

Quality Assurance

- Materials and installation shall conform to the applicable Codes and Standards.
- After all equipment, devices and raceways are installed and wires and cables are in place and connected to devices and equipment, the Contractor shall test the system for continuity, proper phase rotation, short circuit, improper grounds, and other defects. If any defective conditions are present, the Contractor shall make all necessary corrections and retest for compliance.
- Each major component of equipment shall have the manufacturer's name, address, model number, and rating on the manufacturer's nameplate securely affixed in a conspicuous place.
- Code ratings, labels or other data, including any that are die-stamped into the surface of the equipment, shall be in a visible location.

Codes and Standards

- Materials and installation shall comply with codes, laws and ordinances of Federal, State, and Local governing bodies having jurisdiction.
- In every installation where regulations of electric utility and telephone companies apply, conformance with their regulations shall be mandatory and any costs incurred shall be

included in the Contract.

- In case of differences between building codes, State and Federal laws, local ordinances, utility company regulations and the Contract Documents, the most stringent shall govern.
- All equipment and materials purchased for this Project shall conform to any acts, laws, rules, and regulations of the following organizations:
 1. National Electrical Code (NFPA70).
 2. National Electrical Safety Code (NESC-ANSI C2)
 3. American National Standards Institution (ANSI)
 4. National Fire Protection Association (NFPA)
 5. Institute of Electrical and Electronics Engineers (IEEE).
 6. Insulated Cable Engineers Association (ICEA)
 7. National Electrical Manufacturers Association (NEMA)
 8. Illuminating Engineers Society (IES)
 9. Underwriters Laboratories, Inc. (UL).
 10. Canadian Standards Association (CSA)
 11. American Association of State Highway and Transportation Officials (AASHTO)
 12. Occupational Safety and Health Administration (OSHA)
- For installations in locations under the jurisdiction of Illinois Department of Transportation (IDOT), equipment and materials shall also conform to their requirements.
- Should Work be performed which does not comply with the requirements of the applicable building codes, State and Federal laws, local ordinances, industry standards and utility company regulations, changes for compliance shall be done at no additional cost to the Illinois Tollway.
- The Contractor shall submit to governmental agencies and utility companies any shop drawings for equipment, which are required by these agencies, for their approval.
- The Contractor shall notify the Engineer of any proposed materials or apparatus believed to be inadequate, unsuitable, in violation of laws, ordinances, rules or regulations of authorities having jurisdiction.

Permits and Fees

- The Contractor shall obtain and pay for all permits and make all deposits necessary for the installation of the electrical system as herein specified.

INSTALLATION

General

- The Contractor shall perform all Work with trained staff of the particular trade involved in a neat and workmanlike manner as approved by the Engineer.
- The Contractor shall perform all Work in cooperation with other trades and schedule to allow speedy and efficient completion of the project.

- The Contractor shall furnish other trades with advance information on locations and sizes of frames, boxes, sleeves and openings needed for the Work and also furnish information and shop drawings necessary to permit trades affected to install their work properly and without delay.
- Where there is evidence that work of one trade will interfere with the work of other trades, all trades shall assist in working out space conditions to make satisfactory adjustments and shall be prepared to submit and revise coordinated shop drawings and installation drawings.
- With the approval of the Engineer and without additional cost to the Illinois Tollway, the Contractor shall make minor modifications in the work as required by structural interferences, by interferences with work of other trades or for proper execution of the Work.
- Work installed before coordinating with other trades so as to cause interferences with the work of such other trades shall be changed as directed by the Engineer to correct such condition without additional cost to the Illinois Tollway.
- Minor changes in the locations of outlets, fixtures and equipment shall be made prior to rough-in at the direction of the Engineer and at no additional cost to the Illinois Tollway.
- The Contractor shall cooperate with other trades and coordinate the Work to eliminate conflicts with other work.
- The equipment shall be installed with ample space allowed for removal, repair or changes to equipment. Ready accessibility to removable parts of equipment and to wiring shall be provided without moving other equipment, which is to be installed or which is in place.
- The Contractor shall compare the Plans and Specifications, checking all measurements to determine the intent of the Contract Documents. Any discrepancies shall be brought to the Engineer's attention for interpretation.
- Locations of electrical outlets, panels, cabinets, equipment, etc. are approximate and exact locations shall be determined by the Contractor and approved by the Engineer at the Project site.
- The Contractor shall refer to Contract Documents for details and large scale Plans.
- The Contractor shall protect the materials and work of other trades from damage during installation of the Work provided under this Contract.
- Electrical equipment, conduit, and fittings shall not be mounted to or supported by elements subject to vibration except by methods, which shall prevent transmission thereof.
- Where flexible conduit lengths are utilized as a means of isolating equipment and minimizing conduit systems vibration, care shall be exercised to assure continuity of

ground throughout. Flexible conduit lengths shall be kept to a minimum.

- The Contractor shall protect conduit and cable tray openings against the entrance of foreign matter by means of plugs or caps.
- The Contractor shall cover fixtures, materials, equipment and devices furnished or installed under this Contract or otherwise protect against damage, before, during, and after installation.
- Fixtures, materials, equipment, or devices damaged prior to final acceptance of the Work shall be restored to their original condition or replaced.
- The Contractor shall protect conduits and any enclosures from entry by rodents and insects. Cabinets that are pad mounted shall be sealed and caulked around the bottom to make the installation of the cabinet to the concrete pad water tight.
 - Location of conduits, fixtures and equipment shall be adjusted and supported to accommodate field conditions encountered, including any potential interferences with other construction or equipment to be installed.
 - The Contractor shall determine the exact route and location of each duct bank and electrical raceway prior to fabrication.
 - The Work shall be installed to permit removal (without damage to other parts) of parts requiring periodic replacement or maintenance.
 - Exterior Wall Openings:
 - a) Openings in exterior walls shall be kept properly plugged and always caulked to prevent the possibility of flooding due to storms or other causes.
 - b) After completion of work, openings shall be permanently sealed and caulked so as to provide leak-proof conditions.

Conduit Installation

- The conduit system shall be installed complete with all accessories, fittings, and boxes, in an approved and workmanlike manner to provide proper raceways for electrical conductors. Conduit shall be installed concealed or exposed as shown.
- All underground conduit runs shall be Coilable Non-metallic Conduit (CNC). PVC conduit is allowed in open trench and in concrete.
- Exposed conduit runs shall be installed true, plumb, parallel with or at right angles to adjacent structural members, and must present an orderly, neat and workmanlike appearance.
- Field bends shall be carefully made to prevent conduit damage or reduction in internal areas. Field bends shall be made with proper tools for the size and type of conduit being used. The bending radius shall be not less than six times the nominal diameter of the

conduit, with carefully matched bends on parallel runs to present a neat appearance. The number of crossovers shall be kept to a minimum.

- All conduits cut on the job shall be carefully reamed after threading, to remove burrs. All field cut threads shall be tapered. No running threads will be permitted. All field cut threads on steel conduit shall be given a coat of zinc dust in oil, or other approved compound.
- All threaded joints shall be watertight and ensure a low resistance ground path in the conduit system.
- All conduits shall be carefully cleaned before and after installation and all inside surfaces shall be free of imperfections likely to injure the cable. After installation of complete runs, all conduits shall be snaked with an approved tube cleaner equipped with an approved cylindrical mandrel of a diameter not less than 85 percent of the nominal diameter of the conduit. Any conduits through which the mandrel will not pass shall be removed and replaced. After snaking, the ends of the dead-ended conduits shall be protected with standard malleable metal caps to prevent the entrance of water or other foreign matter.
- Lines of nylon or polypropylene, propelled by carbon dioxide or compressed air, shall be used to snake or pull wire and cable into conduits. Flat steel tapes or sparks tapes may be used where GRS conduit runs are shorter than 50 feet. Steel cables are NOT acceptable.
- Where conduits are connected to boxes or equipment enclosures, drilled holes or full size knockout openings shall provide electrical continuity for grounding and shall be assured by the use of bonding type locknuts. Where connections are at eccentric knockouts, jumper type grounding bushings and wire jumpers shall be installed.
- At pull boxes and junction boxes that have any box dimension in excess of 18 inches and having a total of more than four conduit terminations, jumper-type grounding bushings shall be installed on conduit ends and jumper wires shall be installed to bond all conduits and to bond conduits to boxes.
- Coring handholes as necessary to facilitate installation of conduits.
- Conduit bends which are crushed or deformed in any way shall not be installed.
- Conduit systems shall be installed, with fittings, double locknuts and bushings, and made up tight to ensure ground continuity throughout the system.
- Conduit connections to NEMA Type 4X enclosures shall terminate in a threaded hub with an insulated throat to provide a positive seal, an electrical ground, and a water tight connection. Each hub shall be OZ/Gedney Type CH-T, or approved equal. Hubs for PVC coated GRS conduit shall be provided by Rob Roy, or approved equal.
- As far as practicable, conduit shall be pitched slightly to drain to the outlet boxes, or otherwise installed to avoid trapping of condensate. Where necessary to secure drainage, a breather-drain fitting shall be installed in the boxes or fittings at low points.

Each breather drain fitting shall be manufactured by Crouse-Hinds Co., Appleton Electric Co., or approved equal.

- Conduit shall not run through columns or beams unless so specifically detailed on the installation drawings.

1. Conduit Installed In Concrete Building Slab or Islands:

- Where installed in concrete islands the conduit shall be placed in the locations shown on the Plans.
- Joints for conduit installed in concrete slabs and islands shall be made watertight. Tape is NOT acceptable.
- Conduit openings shall be temporarily plugged with metal caps to exclude water, concrete, plaster, and other foreign material.
- Conduits embedded in concrete shall be blocked and braced in place by use of adequate conduit separators to prevent displacement during the placing of concrete. The Contractor shall be held responsible for proper position of conduits and shall rearrange any conduit that may be displaced while concrete is placed.
- The number of 90-degree bends shall be limited to 4 or a total of 360 degrees including all off-sets, sweeps, kicks, etc. This shall be between Panel boards, switchboards, pull boxes, outlet boxes, fittings, or between outlets to fitting including bends located immediately adjacent to outlet or fittings. The maximum run without pull boxes shall be 150 feet.
- All wiring systems shall be "pullable" and use of "BX" is prohibited.
- Conduits entering freestanding panels, and free standing control cubicles shall be fitted with jumper type insulated grounding bushings, bonded together and to the structure of the enclosure by a continuous bonding wire.
- Conduits and concrete type boxes, masonry boxes, and other flush mounted boxes shall be installed concealed in masonry walls, plaster walls, dry wall and concrete walls.
- All concealed conduits shall be placed in walls, floors, or islands at the proper time, in accordance with the progress of the structural work.
- Heavy-wall conduits with chemically bonded, 40 mils PVC coating shall be installed as noted on the Plans. When PVC coated GRS is called for, the entire conduit run, including all elbows, couplings, and bushings shall be PVC coated.
- When Work is not in progress, open ends of conduit and fittings shall be securely closed so that no water, earth or other substance will enter.

2. Conduit Connections to Equipment:

- The conduit system shall be terminated at the conduit connection points of electric devices and equipment. Terminations of conduits at such locations shall permit direct wire connections to the electrical devices or other equipment.
- Conduit connections shall be made with rigid conduit if the equipment is fixed and not subject to adjustment, mechanical movement, or vibration. Rigid conduit connections shall have union fittings, to permit removal of equipment without cutting or breaking the conduit.
- Conduit connections shall be made with approved flexible metallic conduit if the equipment is subject to adjustment, mechanical movement, or vibration. Flexible conduit connections shall be watertight.

Pull Box and Junction Box Installation

- Pull boxes and junction boxes shall be installed where shown, where necessary to insure that finished cable will not be damaged, and in accordance with code requirements.
- Pull boxes and junction boxes shall be supported independently from the conduit system.
- The Contractor shall add pull boxes where needed even though not shown on the Plans.

Wire and Cable Installation- 600 Volt

- All cable and wire shall be installed in conduit or cable tray. Exposed conduits shall be installed parallel or at right angles to building walls.
- All conduits shall be swabbed to remove any debris or accumulated moisture before cables or wires are pulled in.
- No splices will be permitted between terminals, except at approved junction or terminal box points, as required by Code for pull lengths. Cable and wire runs shall be looped through pull boxes without cutting and splicing where possible.
- Proper termination of conduits and wires at motors, control panels or other equipment items shall be provided.
- Where more than one cable will be installed in a duct or conduit, all shall be pulled at the same time.
- The ends of all cables shall be sealed with Scotch Number 88 tape or with 3M PST cable and sealing caps or approved equal before pulling into conduits or ducts and shall be left so sealed until ready for termination.

- All cables within the DMS Control Cabinet shall be tied off in such a way that prevents them from being pinched by any moving components, such as doors or sliding shelves.

Splices and Terminations – 600 Volt Cable

- No splicing will be permitted except in junction boxes.
 - All splices and pigtail connections for indoor lighting and receptacle wire for cable sizes Number 10 AWG and smaller may be made up with pre-insulated spring connectors, 3M Company “Scotchlock,” Ideal Industries, Inc., wire nuts, or approved equal.
 - For connectors to bus bars, use copper compression connectors. Connectors must be crimp type. All connectors must be copper. Copper compression connectors must be long barrel, tin plated, closed end compression type. The barrel for each cable lug must be sized for the exact cable size specified. Copper-Aluminum connectors are not acceptable.
 - Splices and terminations in wire/cable larger than 8 AWG must be made with compression type connectors and lugs. The tools used must provide a UL certification connection. Indenter or set screw type compression fittings are not acceptable. Lugs must be one (1) or two (2)-hole, color keyed. Lug bolting must include a flat washer, Belleville washer and a locknut.
- a) Conductors No. 2 AWG and larger must terminate in two-hole solder less lugs.
 - b) Conductors No. 8 AWG and No. 4 AWG, inclusive, must terminate in one (1)-hole lug.
 - c) Multiple-hole lugs must have NEMA spacing.
 - d) Acceptable connector manufacturers are Burndy Type YA, Anderson Type VHCL, Thomas & Betts Co., Series 54800 and 54900 or Panduit Series LCB.
- Outdoor splices of conductors must be made using heat shrink products which, when properly installed, will produce a completely sealed covering over the connectors or lugs. The tube or jacket must be completely coated with mastic to insure a 100 percent seal to the conductor jacket. The splice, when completed, must be watertight. An acceptable manufacturer of this type product is Raychem.

Electrical Hardware Installation

1. Locations:

- Anchor bolts, sleeves, inserts, hangers and supports required for the Work shall be furnished and installed by the Contractor.

- Any expense resulting from improper location or installation shall be paid for by the Contractor at no additional cost to the Illinois Tollway.

2. Conduit Supports:

- Exposed conduits shall be supported in an approved manner. Conduits shall not be fastened to or come in contact with any mechanical system pipes, ducts, or equipment of other trades, except as approved. In all exposed conduit work, approval channel, racks, one-hole straps, or a combination thereof shall be used as supports.
- Where conduits are supported with one-hole straps, spacers shall be used to provide ¼-inch minimum clearance between the conduits and supporting surfaces.
- All hangers, racks, and straps shall be galvanized steel for GRS conduits.
- All hangers, racks, rods, straps, bolts and mounting hardware shall be PVC coated hot dipped galvanized steel for PVC coated GRS conduits.
- Perforated straphangers are not acceptable.
- Hanger rods for trapeze type hangers shall be made from high tensile strength carbon steel not less than ½ inch diameter. The rods shall have free-runner, burr-free Unified National Course threads, with an electrogalvanized finish.
- Conduit supports shall not exceed 5 feet, or as approved by the Engineer due to specific job site conditions. All conduits shall be supported within 3 feet of a conduit run termination.
- Conduits shall be securely fastened to each support with U-bolts, straps, or clamps. Conduit supports shall be manufactured by B-Line, OZ/Gedney, Unistrut Corp. or approved equal. Supports shall be held to concrete walls and ceilings by power-driven fasteners or electrogalvanized steel inserts as manufactured by B-Line, Ramset, Power Struts, Unistrut Corp., or approved equal.

3. Hangers:

- The Contractor shall provide adequate supports for all equipment, either suspended from the construction above, or by means of struts to the construction below.
- The Contractor shall provide straps, clamps, threaded rods, turnbuckles and anchors and all miscellaneous specialties for the attachment of hangers and supports to the structure.
- Conduit hangers for single conduit threaded rod supports shall be a

maximum of 7 feet long. Threaded rod supports shall be sized in accordance with the hanger manufacturer's requirements.

4. Painting:

- All electrical equipment not specified for factory finish painting under other Special Provision Items shall be painted.
- All exposed GRS conduit, conduit supports, pull boxes, junction boxes, and other electrical equipment attached to the ramp canopies shall be thoroughly cleaned and treated against rust and corrosion with a rust-inhibiting phosphatized coating and finished with two coats of ANSI-61 grey paint, or painted to match the color of existing conduits and supports. PVC coated GRS conduit shall not be painted.

5. Cleaning:

- All rubbish and debris resulting from the Work shall be collected, removed from the site and disposed of legally on a daily basis.
- All floors shall be kept in a broom clean condition.
- In addition to using preventative measures, such as, keeping conduits capped, keeping gaskets clean and intact, keeping covers/doors closed on boxes and enclosures, and covering equipment as needed; the Contractor shall clean inside of the conduits as before pulling wires and cables. The Contractor shall clean the interiors of equipment enclosures, lighting fixtures, light standards and panels as needed before installing field mounted equipment and devices. The Contractor shall clean the interiors and exteriors of all enclosures, fixtures, and panels as needed or as directed by the Engineer.
- After completion of the electrical installations, the entire system shall be thoroughly cleaned to remove all foreign materials from the conduits, boxes and enclosures, equipment, lighting fixtures, and panels as needed or as directed by the Engineer.
- Cleaned shall mean the thorough removal of, but not limited to, dust, dirt, oil, grease, cement, plaster, welding splatters, and paint splatters.
- All cleaning agents and methods shall be in accordance with the electrical equipment manufacturers' recommendations and subject to approval of the Engineer.

Power and Communication Lines Surge Protection Devices (SPDs)

- The grounding conductor connecting the SPD to the ground bar/rod must be as short and direct a run as practicable.
- One primary SPD shall be connected in parallel to the load side of the service disconnect overcurrent protection device (OCPD) with a circuit breaker. One or

more secondary SPD shall be installed on the load side of the OCPD but shall be connected in series with the load.

- All conductors entering or leaving an enclosure shall be protected with surge protection devices.

Special Cable

- The Contractor shall uncoil, feed, grip, pull, and terminate the cable using equipment as recommended by the manufacturer.
- Cable pull lengths shall not exceed the maximum pull tensions as recommended by the manufacturer or 200 pounds maximum, whichever is less.
- Sufficient slack/loops shall be left in pull boxes and hand holes to allow for thermal expansion and contraction.
- The Contractor shall purchase and use the proper specialization tools for stripping jackets, coring and assembling the cable connectors and splice connectors. After all Work has been completed, tested and accepted by the Engineer, one complete set of these tools shall become property of the Illinois Tollway.
- All cables shall be installed without splices from the field equipment to the termination points. Three feet of cable shall be left at the equipment housing end. If the cable cannot be coiled in the housing, the end shall be sealed with a shrink wrap end cap and left exposed.
- Shielded Cable Grounding:
 - Shielded control and data cables shall have the shields grounded at one end. The shield shall be insulated from the conductors with an insulation that is equal to that of the original cable insulation at each splice and termination.
 - Shielded power cables shall have shields grounded at the load ends. Shielded data cables shall have shields grounded at the Data Cabinet or source ends. Shields shall be insulated from the conductors.

Wiring Devices:

- The Contractor shall furnish and install wiring devices as shown on Plans and as required by this Special Provision.
- The Contractor shall install equipment in strict accordance with approved shop drawings and equipment manufacturer's recommendations.
- The Contractor shall adjust the location of equipment to accommodate Work in accordance with field conditions encountered.
- The Contractor shall install each convenience receptacle with grounding pole on bottom when mounted vertically or on right when mounted horizontally.

- The Contractor shall install plates on all switch and receptacle outlets and shall install blank plates on all boxes without wiring devices.
- The Contractor shall install devices and plates level.
- The Contractor shall test complete wiring device installations to assure proper operation.

Grounding

- All grounding materials and associated work shall be in accordance with the requirements of the special provision "ITS ELEMENT SITE GROUNDING".

Electrical Identification

- The Contractor shall furnish and install all electrical identification and labeling as shown on Plans and as required by this special provision.

Equipment Identification

- The Contractor shall provide white with black core laminated phenolic nameplates with 3/8-inch lettering etched through outer covering. Each nameplate shall be fastened with stainless steel screws to each piece of equipment.
- Embossed self-adhering plastic tape labels shall not be accepted.

Wire Identification

- Cable/Wire markers shall be installed on both ends of all conductors.
- All wire and feeder cables shall be labeled with wire markers in all junction boxes, pull boxes, control panels, panel boards, switchboards, etc.
- Wire and cable markers shall be self-adhesive, self-laminating mechanically printed with a clear protective laminating over wrap or mechanically printed heat shrink tubing.
- Cable and wire markers shall be per EIA/TIA Standard TIA-606-B Standard for labeling telecommunication equipment and be approved by the Engineer. The markers shall be attached to all cable where entering or leaving a conduit run. Cable designation and circuit use shall appear on the tag.
- Acceptable manufacturers shall be Brady, Panduit, 3-M, Thomas and Betts, or approved equal.

Plaza Building Communication System Installation

- Install fiber optic communication devices and jumpers in plazas or equipment shelters to provide a fully operational communication system.
- Install all required fiber optic cable jumpers from fiber patch panel inside the Plazas or equipment shelters to equipment to provide a fully operational communication system.
- It shall be the contractor's responsibility to provide all necessary interconnection materials at the Plaza building communication room or equipment shelters for a fully operational communication system.

Electrical testing

- The complete installation shall be tested in accordance with Section 801 of the Illinois Tollway Supplemental Specifications, except as modified by this or other related special provisions.
- This work covers the tests and checks that shall be made on all electrical equipment and wiring to ensure compliance with the applicable codes and standards and with the Plans and Special Provisions. Whenever possible, all checks and tests shall be made just prior to energizing the equipment or circuits and shall be coordinated with the field schedule and field conditions.
- Before testing and energizing a system, all necessary precautions shall be taken to ensure the safety of personnel and equipment. All conductors and all electrical equipment shall be properly insulated and enclosed. All enclosures for conductors and equipment shall be properly grounded. Insulation resistance measurements must have been made and approved on all conductors and energized parts of electrical equipment.
- The following tests are required, in addition to testing requirements listed in the plans or specified elsewhere. All required tests shall be supervised and witnessed by the Engineer. Contractor shall provide 48 hour notice prior to initiating testing procedures.
 - Short circuits.
 - Improper grounds.
 - Power and control electrical circuits for circuit continuity and function.
- The Contractor shall furnish all calibrated meters, instruments, cable connections, equipment or apparatus necessary for making all tests.
- After wires and cables are in place and connected to devices and equipment, the system shall be tested for short circuits, improper grounds, and other faults. If fault condition is present, the trouble shall be rectified, and the wiring system shall be retested.
- Conductors, if shorted, grounded or at fault shall be removed, shall be replaced and the wiring system shall be retested.
- Any wiring device, electrical apparatus, or lighting fixture grounded or shorted on any integral "live" part, shall be removed and the trouble rectified by replacing the defective parts or materials.
- Upon completion of the electrical work, the Contractor shall place the entire installation in operation, test for proper function, and show systems and equipment to be free of defects.
- The Illinois Tollway will conduct from time to time such tests as may be required to any part of the equipment to determine if it is installed in accordance with these special provisions. The Contractor shall extend to the Illinois Tollway all facilities to this end and shall furnish required labor. All tests shall be witnessed by the Engineer and three copies of the verified test results shall be given to the Engineer promptly upon completion of a test.

- The Contractor shall provide assistance to the various equipment manufacturers' field Engineers as required in the testing and adjusting of the electrical power and control equipment. Cooperation of the Contractor shall be such that a minimum of time is required for equipment testing.
- A log shall be maintained for all tests. This log shall be certified before completion of the job, both as to test value and date of test.
- Any faults in the work performed by the Contractor or in materials or equipment furnished by the Contractor shall be corrected or replaced promptly by the Contractor at no additional cost to the Illinois Tollway.
- Any faults in materials or equipment furnished by the Contractor which are the results of careless, incompetent or improper handling or installation by the Contractor, shall be corrected or replaced promptly by the Contractor at no additional cost to the Illinois Tollway.
- All tests shall be made by the Contractor and certification of the tests shall be submitted to the Engineer through the WBPM system. If any failures occur during the tests, the Contractor shall replace the faulty item.
- All data and communication cable tests shall be recorded on the following forms:

Form Number	Description
FORM 1306-ET - 1	MULTIPLE CONDUCTOR CABLE MEGGER TEST, 300 VOLTS & LESS.
FORM 1306-ET - 2	SINGLE AND MULTIPLE CONDUCTOR POWER CABLE MEGGER TEST, 600 VOLTS & LESS.

FORM 1306-ET – 1

MULTIPLE CONDUCTOR CABLE MEGGER TEST, 300 VOLTS & LESS

Testing shall be performed before connecting the cables to the terminals at either end. Continuity of each conductor shall be checked at this time.

Each conductor shall be checked with a 500-volt Megger to ground, with all other conductors in the cable and shield, grounded. The minimum acceptable Megger resistance shall be 50 megaohms for each conductor to ground.

DATE						
PROJECT NAME						
FEEDER NUMBER				LOCATION		
FROM MANHOLE				TO MANHOLE		
CABLE SIZE				CABLE LENGTH		
NUMBER OF CONDUCTORS				INSULATION TYPE		
MANUFACTURER				LINE VOLTAGE		
TEMPERATURE				HUMIDITY		
MEGGER TYPE				SERIAL NUMBER		
TEST VOLTAGE				MULTIPLIER		
REMARKS						

CONDUCTOR NO.	MEGAOHMS		CONTINUITY		CONDUCTOR NO.	MEGAOHMS		CONTINUITY	
	C/C	C/S	PASS	FAIL		C/C	C/S	PASS	FAIL

TEST PERFORMED BY: _____
 SIGNATURE Date

TEST WITNESSED BY: _____
 SIGNATURE Date

FORM 1306-ET – 2

SINGLE & MULTIPLE CONDUCTOR POWER CABLE MEGGER TEST, 600 VOLTS & LESS

WIRING – FEEDER CIRCUITS

Testing shall be performed before connecting the cable to the terminals at either end. Continuity of each conductor shall be checked at this time.

Each conductor shall be checked with a 1000-volt Megger to ground, with all other conductors in the cable and shield, grounded. The minimum acceptable Megger resistance shall be 250 megohms per 1000 feet for each conductor to ground.

DATE			
PROJECT NAME			
FEEDER NUMBER		LOCATION	
FROM		TO	
CABLE SIZE		CABLE LENGTH	
NUMBER OF CONDUCTORS		INSULATION TYPE	
MANUFACTURER		LINE VOLTAGE	
TEMPERATURE		HUMIDITY	
MEGGER TYPE		SERIAL NUMBER	
TEST VOLTAGE		MULTIPLIER	
REMARKS			

If applicable, All Shields Must Be Properly Grounded Prior to Testing.

Cable No.	MEGAOHMS Phase A	MEGAOHMS Phase B	MEGAOHMS Phase C

TEST PERFORMED
BY:

SIGNATURE

Date

TEST WITNESSED
BY:

SIGNATURE

Date

Final System Acceptance

Final acceptance of the DMS Electrical Work installation will be made after satisfactory completion of the required Electrical Testing. The final inspection of the entire system will be performed by

the Engineer in the presence of a representative of the Contractor. Final acceptance of the all work performed under this special provision will be made after:

- Successful completion of the project final walk-through by the Illinois Tollway's ITS GEC.
- Submission (via the Illinois Tollway's WBPM system) and written approval by the Engineer of all Record Drawings, Warranty documents, and required user/operator manuals.
 - i. The Contractor shall provide three hard and three electronic (PDF) copies of each of the operation and maintenance manuals of any installed equipment to the Engineer for approval.
 - ii. At the conclusion of the work, the Contractor shall demonstrate and explain to the Engineer and Illinois Tollway Maintenance Representative(s) the function, operation and maintenance of all equipment installed.

Notification of Final Acceptance will be sent to the Contractor in writing (via the Illinois Tollway's WBPM system) by the Engineer.

WARRANTY

All DMS electrical work and associated components shall be warranted and guaranteed against defects and/or failure in design, materials, and workmanship within the warranty period. The Contractor shall submit the warranty terms as part of each material item's shop drawing submittal for approval.

The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be replaced with a new component by the manufacturer or his/her representative. The Contractor shall make good, repair, or replace at no additional cost to the Illinois Tollway, any defect which in the opinion of the Engineer is due to imperfections in material, design or workmanship, if defect shows itself to be defective within the warranty period stated elsewhere in this special provision.

Any system component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as an unsuitable system and shall require the entire system be replaced by the device manufacturer or representative with a new system of the same type at no additional cost to the Illinois Tollway. The unsuitable system shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards at the time of original construction.

All manufacturer's equipment guarantees or warranties shall be included in the maintenance manuals for the subject equipment.

The Contractor shall be responsible for protecting all equipment and systems against harmful exposures to, or accumulations of dust and moisture, flooding, corrosion, or other forms of damage and shall clean and restore damaged finishes as required to place installations in a "like new" condition before warranty repairs are accepted.

The manufacturer's warranty shall be in accordance with the contract special provision "WARRANTY (Illinois Tollway)".

Method of Measurement

This work will be measured for payment in units of each.

Basis of Payment

This work will be paid for at the contract unit price per each for DMS ELECTRICAL WORK, of the type specified.

Except as specified herein for associated CCTV camera connecting to the DMS Controller Cabinet, single mode fiber optic (SMF) cables, multimode fiber optic (MMF) cables, SMF and MMF patch panels, and FOC jumpers shall be paid for under DYNAMIC MESSAGE SIGN, of the type specified.

The payment to the Contractor will adhere to the following schedule:

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of all product submittal documentation, shop drawings, and electrical test results.

Ninety percent (90%) of the contract unit price will be paid after the Final System Acceptance. Written (via the Illinois Tollway's WBPM system) approval from the Engineer of Final Acceptance is required before payment is released.

REMOVE ITS ENCLOSURE (ILLINOIS TOLLWAY)

Effective: March 1, 2019

Revised: March 1, 2020

DESCRIPTION. This work shall consist of removal of an ITS enclosure from an ITS pole or sign structure at locations shown on the Plans.

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate with the Engineer. This includes, but is not limited to, the following:

EQUIPMENT REMOVAL. The Contractor shall remove the ITS enclosure, associated cabling, conduit, and mounting hardware as shown on the Plans. Upon removal of the ITS enclosure, the Contractor shall seal any openings in the pole or sign structure that were created for mounting brackets or conduit/cable access that are not to be reused. The openings shall be sealed with a material, approved by the Engineer, which prevents entry by water or animals.

DELIVERY TO THE ILLINOIS TOLLWAY. The Contractor shall remove any Ethernet switches, video encoders, IP relays, and MVDS components from the ITS enclosure and deliver them to the Illinois Tollway at the M-14 Maintenance Yard. All salvaged equipment shall be logged by inventory (M tag) number via the Illinois Tollway's A-14 inventory form and then delivered and unloaded at the M-14 building.

The ITS enclosure and any mounting hardware removed from the site shall be disposed of by the Contractor in accordance with Article 202.03 of the Standard Specifications.

METHOD OF MEASUREMENT

This work will be measured in units of each ITS enclosure removed.

BASIS OF PAYMENT

This work will be paid for at the contract unit price per each for REMOVE ITS POLE MOUNTED ENCLOSURE.

ITS POLE MOUNTED ENCLOSURE, ITS ASSEMBLY (CCTV OR MVDS) (ILLINOIS TOLLWAY)

Effective: January 15, 2015

Revised: March 1, 2024

Description. This work shall consist of furnishing, installing, calibrating and testing of the ITS Pole Mounted Enclosure (CCTV or MVDS) per the contract plans and as directed by the Engineer, and as part of a fully functional ITS site.

The work under this specification shall be in association with the installation of an ITS device pole, electrical service, grounding, CCTV Camera ITS Assembly, Microwave Vehicle Detection Assembly, and communications.

Materials. The main components of the system are as described below. All other ancillary connection cables, circuit breakers, brackets, and all other items required for the installation of a fully functional ITS Pole Mounted Enclosure, as shown on drawing(s).

- Enclosure
 - Enclosure Cabinet
 - Control Power Transformer
 - Grounding Bar System
 - Cisco Switch with Power Supply and software license (JT132810 only)
 - Surge Suppressors
 - Ethernet Relay
 - Single Mode Fiber Small Form-Factor Plug (SFP) Module (JT132810 only)
 - 24 VDC Power Supply
- Grounding System

The following are the specific materials for the system component described above:

- Enclosure. The Enclosure Cabinet shall be a NEMA 4X Stainless Steel, 36" H x 30" W x 12" D enclosure manufactured by Hoffman, model A36H3012SS6LP. The enclosure shall be ordered with a 33" x 27" panel manufactured by Hoffman, model A36P30.
 - The enclosure shall be mounted using a threaded U-bolt and C-channel as shown on the drawing.
 - The access door shall have its hinge installed vertically and on the left side of the enclosure so the door can open from right to left while facing the enclosure.
 - The Control Power Transformer shall be a 1000 VA from a 208/240/480 to 120 volt power transformer manufactured by Square D model 9070 Type T1000D95 or equivalent.
 - The Grounding Bar System shall be a Hoffman model PGS2K or equivalent
 - The Cisco Switch with Power Supply shall be a Cisco IE-4000-8T4G-E switch with

- PWR-IE170W-PC- AC= power supply and L-IE4000-RTU= IP services license (omit for ITS POLE MOUNTED ENCLOSURE, WITHOUT SWITCH)
- The 120 VAC Surge Suppressor shall be manufactured by Cooper Crouse Hinds model MA15/D/1/SI.
 - The Power Controller, 8-Channel DIN Ethernet Relay shall be a Digital Loggers model DIN 4
 - A terminal block manufactured by Allen Bradley, model 1492-CD8
 - The Single Mode Fiber Small Form-Factor Plug (SFP) Module shall be a Cisco 1Gbps transceivers Model GLC-LX-SM-RGD (omit for ITS POLE MOUNTED ENCLOSURE, WITHOUT SWITCH).
 - The 24 VDC Power Supply shall be a Click 204 AC/DC power supply manufactured by Wavetronix or Lambda DSP100-24.
- All work associated with the external ground system and connections made internally to the ITS Pole Mounted Enclosure (CCTV or MVDS) shall be according to the special provision "ITS ELEMENT SITE GROUNDING".

The Contractor shall submit to the Engineer a request for variance when changing equipment provided on the Submittal ITS POLE MOUNTED ENCLOSURE (CCTV OR MVDS) attached to this special provision. The variance shall be the formal request of an approval of an equal or better substitute for a specified part by providing justification and supporting manufacturer's specifications and other relevant documentation.

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate with the Engineer. This includes, but is not limited to, the following:

Pre-Procurement Documentation Approval

- The Contractor shall submit for approval to the Engineer, within 10 business days from NTP, a detailed schedule showing dates for: product submittals and approvals; device configuration by the Illinois Tollway; construction/installation; calibration; testing; burn-in period; and warranty of each ITS Pole Mounted Enclosure (CCTV or MVDS). This detailed schedule shall be included in the project schedule, as required per Illinois Tollway Supplemental Specifications Article 108.02. Schedules for each ITS Pole Mounted Enclosure (CCTV or MVDS) to be deployed within the larger construction contract and shall be staggered based on resources to be employed.
 - If this installation is part of a larger ITS deployment or construction project, then the furnishing, installation, calibration and testing of the ITS Pole Mounted Enclosure (CCTV or MVDS) site(s), shall be specifically noted in the overall project schedule.
- The Contractor shall submit for approval to the Engineer, within 10 business days from NTP, a completed Contractor ITS POLE MOUNTED ENCLOSURE (CCTV OR MVDS) Checklist and associated submittals.

The Contractor shall make all submissions to the Engineer through the Illinois Tollway's Web Based Project Management (WBPM) system.

The Contractor must obtain approval of the schedule, catalog cut sheets, cabinet wiring diagrams, and calculations from the Engineer prior to purchasing any equipment and subsequently performing the installation per the approved documents, contract plans, and specifications.

Pre-Installation Requirements. When there are less than 5 Cisco switches and less than 5 IP relays, the Illinois Tollway will elect to have the contractor deliver the switches and relays to the Illinois Tollway's Central Administration (CA) Building for configuration and labeling prior to installation by the Contractor. The contractor shall deliver the switches and relays at least thirty (30) days prior to the scheduled field installation. The Contractor shall provide an A-14 form to the Engineer during acceptance of the switch at CA showing the equipment, each equipment specific serial number, and the field location of each piece of equipment. This form will be signed by both the Engineer and the Contractor. The Contractor shall take possession of the devices from the Illinois Tollway upon notification by the Engineer of configuration and labeling completion.

When 5 or more switches or relays need programming, the Illinois Tollway will program all ITS elements within that system (Switch, CCTV(s), IP Relay, and MVDS(s)) at a location determined by the contractor. At least thirty (30) days prior to the scheduled field installation, the contractor shall provide notice to the Tollway to schedule the programming. The contractor shall have all units ready for programming at the same time.

ITS Pole Mounted Enclosure (CCTV or MVDS) Installation

- The Contractor shall install the ITS Pole Mounted Enclosure (CCTV and MVDS) on a pole and foundations that are installed outside the clear zone or in areas shielded by guardrail.
 - The ITS Pole Mounted Enclosure (CCTV and MVDS) shall be oriented on the pole perpendicular to the roadway, such that a worker who faces an opened cabinet is also facing the direction of approaching traffic.
 - The Contractor shall locate the ITS pole in an area where the CCTV or MVDS when mounted on the ITS pole can be safely accessible by a bucket truck while parked on the shoulder of the road during maintenance.
 - The ground rod shall be connected to the exterior of the ITS Pole Mounted Enclosure (CCTV or MVDS) pole at the Master Ground Busbar (MGB).
 - All associated conduit, wire, power service feeds, circuit breakers, brackets, etc. as shown on the contract plans, and all items and workmanship required to successfully pass the Site Test stated within this specification, will be the sole responsibility of the Contractor and incidental to this pay item.
- The Contractor shall follow the Illinois Tollway ITS Labeling Guide Manual for all labeling of components. This shall include a label on the IP relay showing the last two octets of the relay's IP address. The manual can be found on the Illinois Tollway's website.

Testing. The Contractor shall be required to perform testing according to the special provision ITS Device Testing Requirements using the attached checklists and as modified below.

Modifications to First Unit Factory Visual Inspection. The Contractor (or the Contractor's equipment fabricator) shall completely assemble for inspection an ITS Pole Mounted Enclosure unit of each configuration specified in the plans which includes the cabinet, all equipment, modules, components and complete all internal wiring (including labeling). The Contractor shall have one set of contract plans and two sets of shop drawings on site to be redlined with any discrepancies noted. One set of redlines will be retained by the Illinois Tollway. The Contractor may optionally perform an AC power test in the shop following successful completion of the Factory Visual Inspection. When a First Unit Factory Inspection is scheduled, all components shall be present in the ITS Enclosure except for the communication switch. First Unit Factory Inspection shall be conducted on the first ITS Enclosure of each model specified in the contract.

Modifications to Site Testing. The Engineer shall attach to the Site Test Report photos of the assembly showing:

- The interior of the cabinet, framing all components together as closely as possible
- The cabinet mounting arrangement attaching it to the pole

Warranty. All ITS Pole Mounted Enclosure (CCTV or MVDS) shall be warranted and guaranteed against defects and/or failure in design, materials, and workmanship within the warranty period. The Contractor shall submit the warranty terms as part of each material item's shop drawing submittal for approval.

The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be replaced with a new component by the manufacturer or his/her representative.

Any system component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as an unsuitable system and shall require the entire system be replaced by the device manufacturer or representative with a new system of the same type at no additional cost to the Illinois Tollway. The unsuitable system shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards at the time of original construction.

All manufacturer's equipment guarantees, or warranties shall be included in the maintenance manuals for the subject equipment.

Method of measurement. This work will be measured in units of each.

Basis of payment. This work will be paid for at the contract unit price per each for ITS POLE MOUNTED ENCLOSURE (CCTV or MVDS).

The payment to the Contractor will adhere to the following schedule:

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of all product submittal documentation, shop drawings, and calculations.

Eighty percent (80%) of the contract unit price will be paid at completion of the local field test acceptance by the Engineer. Written approval from the Engineer that all local field tests have been accepted is required before payment is released.

The final ten percent (10%) of the contract unit price will be paid after Final System Acceptance. The final inspection of the entire system will be performed by the Engineer in the presence of a representative of the Contractor. Written approval from the Engineer that Final Acceptance has been granted is required before payment is released.

The installation and testing of the ITS Pole Mounted Enclosure (CCTV or MVDS), ITS device pole, electrical service, grounding, MVDS ITS Assembly, CCTV Camera ITS Assembly, and communications shall be paid for under separate items.

DISCONNECT SWITCH ASSEMBLY (ILLINOIS TOLLWAY)

Effective: June 30, 2017

Revised: March 1, 2023

Description. This work shall consist of furnishing and installing a standalone non-fusible disconnect switch in a NEMA 4X housing mounted on steel support posts with concrete foundations for ITS sites as shown on the plans, as directed by the Engineer. See plans for details.

Materials. The disconnect switch shall be non-fusible, 2 pole, 600 volt, 30 ampere, lockable, with a NEMA 4X rating. Acceptable manufacturers are Square D, Eaton, Siemens, or approved equal.

The disconnect switch shall be mounted across two PVC coated galvanized steel conduit posts or on a steel I-beam as shown on the plans. The preferred option is the I-beam design since it can be assembled at the contractor facility then dropped in place at site. If the contractor chooses to galvanized steel conduit posts option then the conduit posts shall have steel caps with anti-corrosion paint, color matching the posts. Horizontal support hardware used to attach the disconnect switch to the conduits shall be stainless steel.

Concrete used for the mounting post foundation shall conform to Section 1020 of the Standard Specifications.

CONSTRUCTION REQUIREMENTS

Installation of the concrete foundations shall conform to the applicable requirements of Section 836 of the Illinois Tollway Supplemental Specifications. Horizontal supports shall be sized to allow conduits to vertically drop without bends as shown in the plans.

The disconnect switch enclosure and door shall be bonded to ground.

Warranty. The ITS Disconnect Switch Assembly shall be warranted and guaranteed against defects and/or failure in design, materials, and workmanship within the warranty period. The Contractor shall submit the warranty terms as part of each material item's shop drawing submittal for approval.

The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be replaced with a new component by the manufacturer or his/her representative.

Any system component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as an unsuitable system and shall require the entire system be replaced by the device manufacturer or representative with a new system of the same type at no additional cost to the Illinois Tollway. The unsuitable system shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards at the time of original construction.

All manufacturer's equipment guarantees or warranties shall be included in the maintenance manuals for the subject equipment.

Method of measurement. This work will be measured in units of each.

Basis of payment. This work will be paid for at the contract unit price per each for ITS DISCONNECT SWITCH ASSEMBLY.

CLOSED CIRCUIT TELEVISION (CCTV) CAMERA, ITS ASSEMBLY (ILLINOIS TOLLWAY)

Effective: August 15, 2014

Revised: March 1, 2024

Description. This work shall consist of furnishing, installing, calibrating and testing a Closed Circuit Television (CCTV) camera per the plans and as directed by the Engineer, and as part of a fully functional ITS site. The work under this special provision shall be in association with the installation of an ITS Pole Mounted Enclosure (CCTV or MVDS), ITS device pole, electrical service, grounding, MVDS ITS Assembly, and communications.

Materials. The main components of the system are as described below. All other ancillary connection cables, brackets, and other items required for the installation of a fully functional CCTV camera assembly are included under this specification.

Digital Dome HD IP Camera. The CCTV camera shall be the following approved model:

- Axis (Model Q6315-LE) – 60 W Midspans PoE(with 512 GB SD card)
- Axis (Model Q6318-LE) – 60 W Midspans PoE (with 512 GB SD card)

Mounting Hardware. Axis cameras shall be pole mounted with an Axis T91L61 (part# 5801-721) mounting arm.

Cabling. For CCTV camera mounted on a 50 foot ITS pole, all camera models shall be furnished with a 60-foot long Outdoor Rated 4 Pair 23 AWG 1000BASE-T CAT6 Cable, manufactured by Belden, model number 7953A.

In the case where a CCTV camera needs to be installed on an ITS pole, monotube or on an Illinois Tollway building, the length of the Outdoor Rated 4 Pair 23 AWG 1000BASE-T CAT6 Cable shall be per plans but shall not exceed 300 feet from the communication switch.

In the case where the length of the ethernet cable is greater than 300 feet but does not exceed 500 feet then use the Extended Range Ethernet Cable that is specified in Illinois Tollway Extended Range Ethernet Cable Special Provision.

When the distance is greater than 500 feet the Contractor shall install a Video Power Junction Box Model B NEMA 4X (with communication switch) and a fiber optic cable from the Video Power Junction Box to the switch in the communication room.

A 60-foot long Outdoor Rated #14 AWG 3/C power cable, manufactured by Belden, model number 1034A shall be installed in the camera pole and left capped on both ends in the case of additional ITS devices requiring power be installed on the same ITS pole.

Power Injectors. PoE model CCTV cameras shall be furnished with an Industrial Temperature rated PoE injector (Axis T8144) recommended by the CCTV manufacturer. See the attached

checklist for approved model numbers including PoE Injector power supplies for Axis PoE Cameras (Wavetronix Click 204 or Lambda DSP100-24).

If the manufacturer provides a PoE injector included with the camera (e.g., Axis T8134 or other models) that differs from the model to be installed, the contractor shall provide this spare PoE injector to the Illinois Tollway as stock.

If the CCTV camera is mounted to a building and the PoE injector is installed in a Video Power Junction Box (either Model A or Model B) then use PoE model Axis T8154 60W Midspan 120 VAC. If the CCTV is installed on an ITS pole and connected to the ITS Enclosure, then use PoE model Axis T8144 24 VDC.

Surge Suppression. PoE CCTV camera models shall be furnished with a CAT6 Surge Protection Device (SPD) to protect against power surges in the communication cable. For Axis cameras, the surge suppression device shall be by Axis model number T8061.

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate the proposed work prescribed under this special provision with the Engineer. This includes, but is not limited to, the following:

Pre-Procurement Documentation Approval. The Contractor shall submit for approval to the Engineer, within 10 business days from Notice to Proceed (NTP), a detailed schedule showing dates for: product submittals and approvals; device configuration by the Illinois Tollway; construction/installation; calibration; testing; burn-in period; and warranty of each CCTV camera. This detailed schedule shall be included in the project schedule, as required per Illinois Tollway Supplemental Specifications Article 108.02. Schedules for each CCTV camera to be deployed within the larger construction contract shall be staggered based on resources to be employed.

The Contractor shall submit for approval to the Engineer, within 10 business days from NTP, a completed Contractor Submittal Checklist and associated submittals.

The Contractor shall make all submissions to the Engineer through the Illinois Tollway Web Based Program Management (WBPM) system.

The Contractor must obtain approval of the schedule, catalog cut sheets, cabinet wiring diagrams, and calculations from the Engineer prior to purchasing any equipment and subsequently performing the installation per the approved documents, contract plans, and specifications.

Pre-Installation Requirements. Thirty (30) days prior to the scheduled field installation of each CCTV camera, the Contractor shall provide a form to the Engineer listing the specific serial number and field location of each camera. This form shall be signed by both the Engineer and the Contractor.

When there are less than 5 units requiring programming, the Illinois Tollway will elect to have the contractor deliver the CCTV(s) to the Illinois Tollway's Central Administration (CA) Building for configuration and labeling prior to installation by the Contractor. The contractor shall deliver the cameras at least thirty (30) days prior to the scheduled field installation. The Contractor shall provide an A-14 form to the Engineer during acceptance of the cameras at CA showing the equipment, each equipment specific serial number, and the field location of each piece of equipment. This form will be signed by both the Engineer and the Contractor. The Contractor shall

take possession of the devices from the Illinois Tollway upon notification by the Engineer of configuration and labeling completion.

When 5 or more units need programming, the Illinois Tollway will program the cameras at a location determined by the contractor. At least thirty (30) days prior to the scheduled field installation, the contractor shall provide notice to the Tollway to schedule the programming. The contractor shall have all units ready for programming at the same time.

CCTV Camera Installation. The Contractor shall install the CCTV camera on the mounting arm and adaptor, as noted on the plans or as per the manufacturers' recommendations, including the mounting height and orientation/aiming. The CCTV camera shall be aligned such that there are no obstructed views of the Illinois Tollway mainline roadway, ramps, or plazas.

All camera materials, conduit, wire, circuit breakers, brackets, etc. shall be installed as shown on the plans, per manufacturer recommendation, and as directed by the Engineer. This includes all items and workmanship required to successfully pass the Site Test stated within this special provision.

The Contractor shall follow the Illinois Tollway ITS Labeling Guidelines Manual for all labeling of components. This shall include a label on the PoE injector showing the last two octets of the camera's IP address. The manual can be found on the Illinois Tollway's website.

The ground terminals of the CCTV SPDs shall be grounded.

Testing. The Contractor shall be required to perform testing according to the special provision ITS Device Testing Requirements using the attached checklists and as modified below.

Modifications to First Unit Factory Visual Inspection. A First Unit Factory Visual Inspection is required for the CCTV camera assembly only when the submitted device differs from the models specified.

Modifications to Site Testing. This installation shall result in the reviewing of accurate (per manufacturers specification) video and camera control at the site before being connected to the Illinois Tollway switch and communications system.

For the Site Test to be accepted, the Contractor shall demonstrate to the Engineer that all camera(s) have been tested in the presence of the Engineer to verify that a clear (no visible distortion) camera video stream can be viewed, that the camera can be panned, tilted and zoomed, and that the 256 GB SD card is detected and can record a one minute test video. The Contractor records the cameras performance on the CCTV Camera Site Acceptance Test form attached to this special provision. The form is signed by the Engineer.

Modifications to System Test. System Acceptance of the CCTV:

- Contact the ITS Integrator, after the 5-Day request from above, to request that the CCTV camera site is tested for:
 - Clear video without any distortion and interference/noise.
 - Pan, Tilt, Zoom, automatic/manual iris, automatic/manual focus, and camera pre-set capabilities.
 - Accurate CCTV camera data transmission from the CCTV camera site to TIMS.

Warranty. All CCTV camera and associated components shall be warranted and guaranteed against defects and/or failure in design, materials, and workmanship within the warranty period. The Contractor shall submit the warranty terms as part of each material item's shop drawing submittal for approval.

The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be replaced with a new component by the manufacturer or his/her representative.

Any system component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as an unsuitable system and shall require the entire system be replaced by the device manufacturer or representative with a new system of the same type at no additional cost to the Illinois Tollway. The unsuitable system shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards at the time of original construction.

All manufacturer's equipment warranties shall be included in the maintenance manuals for the subject equipment. The manufacturer's warranty shall be in accordance with the contract special provision "WARRANTY (Illinois Tollway)".

Method of Measurement. This work will be measured in units of each.

Basis of Payment. This work will be paid for at the contract unit price per each for CCTV CAMERA, ITS ASSEMBLY.

The payment to the Contractor will adhere to the following schedule:

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of all product submittal documentation, calculations, and shop drawings.

Eighty percent (80%) of the contract unit price will be paid by the Engineer at completion of the Site Test of the CCTV camera location. Written (via the WBPM system) approval from the Engineer of acceptance of the Site Test is required before payment is released.

Ten percent (10%) of the contract unit price will be paid after the acceptance of the Final System Acceptance and Training by the Engineer in the presence of the Contractor as defined in the special provision ITS Device Testing Requirements. Written (via the WBPM system) approval from the Engineer that Final Acceptance is required before payment is released.

FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY (ILLINOIS TOLLWAY)

Effective: January 15, 2015

Revised: March 1, 2022

Description. This work shall consist of furnishing, installing, and testing a Fiber Optic Communications, ITS Assembly per the contract plans and as directed by the Engineer and as part of a fully functional ITS site.

The work under this specification shall be in association with the installation of an ITS Pole Mounted Enclosure (CCTV or MVDS), ITS device pole, electrical service, grounding, and ITS device (CCTV or MVDS).

Materials. The main components of the system are as described below. All other ancillary connection cables, brackets, and other items required for the installation of a fully functional Fiber Optic Communications, ITS Assembly are included in this work.

- Fiber patch panel
- Fiber optic cable
- Associated splice material/jumper cables/connectors/patch cords

The following are the specific materials for the major system component described above:

- The pre-terminated fiber optic patch panel shall have six duplex LC connectors with a factory attached 12 fiber single-mode fiber optic cable (SMFOC). The following approved products may be utilized: Fiber Connections model G620U012LAB-XXX-0 Gator Patch (substituting "XXX" with the appropriate length of pigtail, in meters) or Multilink model SLTP12LCUOSPASM-YYY (substituting the "YYY" with the appropriate length of pigtail, in feet). The pigtail length shall be of a sufficient length as scheduled on the plans, 100 meters (328 feet) minimum, or as directed by the Engineer to accommodate slack requirements to properly splice and store the cable.
- The fiber optic cable shall:
 - Be armored, dry-filled, loose-tube, dispersion-unshifted, single-mode fiber (SMF) with low water peak, gel free, and suitable for underground (i.e., in conduit) and aerial outside plant installation.
 - Meet or exceed the Telecommunications Industry Association (TIA) and Electronic Industries Alliance (EIA) TIA/EIA-492-CAAB specification, the U.S. Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900, Telcordia GR-20 standards, International Electrotechnical Commission (IEC) 60793-2-50 Type B1.3, and International Telecommunication Union ITU-T G.652.D requirements.
 - Be splice-compatible with the Illinois Tollway's existing SMF and require no electronic equipment for dispersion compensation between new and existing fiber.
 - Be continuous and be of the same material.
 - Be in buffer tubes and shall be usable at attenuation of:
 - 1,310 nm, ≤ 0.4 dB/km loss
 - 1,550 nm, ≤ 0.3 dB/km loss
 - The fiber shall be free of surface imperfections and inclusions.
 - Only commercial off the shelf materials, equipment and components shall be furnished.
 - All fiber optic core glass shall be from the same manufacturer.
- The fiber optic jumper cables and connectors shall be compliant with the TIA/EIA-568-A and TIA/EIA-604 standards, as applicable, and shall be tested according to the Telcordia/Bellcore GR-326-CORE standard. When tested according to the TIA and EIA's Fiber Optic Test Procedure (FOTP)-171 (TIA/EIA-455-171), the connectors shall test to an average insertion loss of 0.4 decibel and a maximum loss of 0.75 decibel. The connectors shall be tested as detailed in FOTP-107 (TIA/EIA-455-107) to reflectance values of -50 decibels.
 - The fiber optic jumpers shall be two 6.5 foot (2 meter) SMFO duplex LC-LC jumper cables manufactured by Corning, model number 040402R5Z20002M

- The Contractor shall install the armored, outdoor rated 12 strand SM fiber drop cable as indicated on the plans.

The Contractor shall submit to the Engineer a request for variance when changing equipment prescribed on the FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY CHECKLIST attached to this special provision. The variance shall be the formal request of an approval of an equal or better substitute for a specified part by providing justification and supporting manufacturer's specifications and other relevant documentation.

Ball Markers. Ball markers shall be installed inside of handholes containing a splice case at locations shown on the plans or as directed by the Engineer. There shall be one ball marker per handhole. The ball markers shall be 3M model number EMS Ball Marker 1401-XR, or approved equal.

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate with the Engineer. This includes, but is not limited to, the following:

Pre-Procurement Meeting and Documentation Approval

- The Contractor shall submit for approval to the Engineer, within 10 business days from Notice to Proceed (NTP), a detailed schedule showing dates for: product submittals and approvals; device configuration by the Illinois Tollway; construction/installation; calibration; testing; and warranty of the fiber optic cable, fiber optic patch panel, and fiber optic jumper cable. This detailed schedule shall be included in the project schedule, as required per Illinois Tollway Supplemental Specifications Article 108.02. Schedules for fiber optic cable to be deployed within the larger construction contracts shall be staggered based on resources to be employed.
 - If this installation is part of a larger ITS deployment or construction project, then the furnishing, installation, and testing of the fiber optic cable, fiber optic patch panel, and fiber optic jumper cables, shall be specifically noted in the overall project schedule.

The Contractor shall submit for approval to the Engineer, within 10 business days from NTP, a completed Contractor FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY CHECKLIST and associated submittals.

The Contractor shall make all submissions to the Engineer through the Illinois Tollway Web Based Program Management (WBPM) system.

The Contractor must obtain approval of the schedule, catalog cut sheets, cabinet wiring diagrams, and calculations from the Engineer prior to purchasing any equipment and subsequently performing the installation per the approved documents, contract plans, and specifications.

Pre-Installation Requirements

- Upon receipt of the fiber optic cable (excluding the jumper cables) within this specification, the Contractor shall:
 - Perform an end-to-end attenuation test of the fiber optic cable.
 - All fibers shall be tested to ensure that no discontinuities greater than 0.2 decibel per 300 feet exist.
 - The power meter/light source shall be a calibrated pair that is portable and battery operated.
 - The power meter/light source shall operate at selectable

wavelengths of 1,310/1,550 nanometers.

- The power meter shall have a decibel milliwatt measurement scale with a range of +3 to -45 decibel milliwatts for SMF operation and an accuracy of 0.5 decibel or better.
 - The Contractor shall replace any pre-terminated fiber optic patch panel assemblies exceeding allowable attenuation.
- Label the pre-terminated fiber optic patch panel in accordance with the Illinois Tollway ITS Labeling Guide.

Fiber Optic Installation

- The Contractor shall install the 12 strand Single Mode Fiber optic cable where as noted on the plans and as per the manufactures installation procedures and recommendations, industry accepted installation standards, codes, practices; or as directed by the Engineer.
 - All associated fiber optic cable fusion splices, terminations, and connectors required to connect, but not limited to any existing Illinois Tollway fiber, existing or proposed fiber optic patch panels, fiber optic modems, small-form factor plug (SFPs), or any other terminals, along with all workmanship required to successfully pass the Site Test stated within this special provision.
 - The Contractor shall coordinate all work with the Illinois Tollway Fiber Optic Maintenance Provider on bringing the drop cable into the nearest splice handhole.
 - The Contractor shall use additional care during splicing into the existing fiber system to not interrupt these existing installations. All splicing within the existing fiber optic handholes at the junction of the drop cable and the IT or ITS distribution cable shall be performed by the Illinois Tollway Fiber Optic Maintenance Provider under a separate contract.

Testing. The following tests are required after the installation of the fiber optic cable, fiber optic patch panel, and fiber optic jumper cable. The Contractor shall use the test plans within this special provision to conduct the following tests in the presence of the Engineer.

- First Unit Factory Visual Inspection (If required)
 - Site Test
 - System Test
 - Final System Acceptance and Training

Site Testing

The purpose of the Site Test is to have the Contractor demonstrate to the Engineer that all fiber optic cable, fiber optic patch panel, and fiber optic jumper cable components have been installed, connected, labeled, and configured correctly as per contract plans and as per the manufacturer's requirements, utilizing quality workmanship. This installation shall result in accurate data transmission of the contractor installed fiber before being connected to the Illinois Tollway switch and communications system.

The Site Test shall be performed in conjunction with all associated equipment installed at a common site, including but not limited to the following elements. A Site Test shall not be performed at the element or component level. Site Tests shall be performed for all relevant elements at a common site, meeting any Site Test requirements specified for each element.

- CLOSED CIRCUIT TELEVISION (CCTV) CAMERA, ITS ASSEMBLY
- MICROWAVE VEHICLE DETECTION SYSTEM (MVDS), ITS ASSEMBLY

- ITS POLE MOUNTED ENCLOSURE, ITS ASSEMBLY (CCTV or MVDS)
- FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY
- STATIC SIGN FLASHING BEACON ASSEMBLY INSTALLATION
- SOLAR POWERED GENERATOR ASSEMBLY
- CO-LOCATED SOLAR POWERED GENERATOR ASSEMBLY
- ITS ELEMENT SITE GROUNDING
- MONOPOLE CLOSED CIRCUIT TELEVISION (CCTV) CAMERA TOWER ASSEMBLY

For the Site Test to be accepted, the Contractor shall demonstrate to the Engineer that:

- The installation has been performed as per contract plans and as per the manufacturer's recommendations.
- All connections are tight and cannot be dislodged by incidental contact from the Engineer.
- All fiber optic cable, fiber optic patch panel, and fiber optic jumper cable equipment inside the enclosure shall be properly labeled as per the ITS Labeling Guide (located on the Illinois Tollway website).
- The Contractor has conducted and successfully passed in the presence of the Engineer an end-to-end, Optical Time Domain Reflectometer (OTDR), splice loss and connector loss tests, as described in this special provision

End-to-End Attenuation Testing

All fibers shall be tested to ensure that no discontinuities greater than 0.2 decibel per 300 feet (2.2 decibels per kilometer) exist. Testing shall be conducted and documented and performed bi-directionally at both 1,310/1,550 nanometers. The Contractor shall repair or replace cable sections exceeding allowable attenuation. The power meter/light source shall be a calibrated pair that is portable and battery operated. The power meter/light source shall operate at selectable wavelengths of 1,310/1,550 nanometers. The power meter shall have a decibel milliwatt measurement scale with a range of +3 to -45 decibel milliwatts for SMF operation and an accuracy of 0.5 decibel or better.

OTDR Tracing

The OTDR test shall be performed if the Scope of Work includes splicing of one or more of the 12 fibers of the pre-terminated fiber optic patch panel. All fibers shall be tested from both cable end points with an OTDR at wavelengths of 1310 and 1550 nm. The fibers that are not terminated at the time of installation shall be tested using a bare fiber adapter. The results of the OTDR testing (i.e., traces for each fiber) and a loss table showing details for each splice or termination tested shall be submitted to the Engineer in an approved electronic format. All OTDR testing shall comply with the EIA/TIA-455-61 standard.

Splice Loss Testing

The Splice Loss test shall be performed if the Scope of Work includes splicing of one or more of the 12 fibers of the pre-terminated fiber optic patch panel. The splice loss for a SMF fusion splice shall not exceed a maximum bidirectional average of 0.1 decibel per splice. The Contractor shall repair or replace splices that exceed allowable attenuation at no additional cost to the Illinois Tollway.

System Test. The System Test shall be conducted by the Illinois Tollway. The System Test demonstrates that the fiber optic cable, fiber optic patch panel, and fiber optic jumper cable provides reliable transportation of the optical signal from attached equipment without any impediment.

If any component fails to pass its System Test, the unit shall be corrected or another unit substituted in its place and the test successfully repeated. If a component has been modified or replaced as a result of a test failure, a report shall be prepared and delivered to the Engineer and Illinois Tollway prior to the retesting of the unit.

For the System Test to begin, the Contractor shall notify the Engineer in writing (via the WBPM system), within 5-Days prior to the start of System Testing, stating that all project sites utilizing the newly installed fiber optic cable, fiber optic patch panel, and fiber optic jumper cable are ready for System Testing.

System Test Acceptance:

- Project pre-final walk-through has been successfully completed by the Illinois Tollway's ITS General Engineering Consultant (GEC).
- Contact the Illinois Tollway Traffic Operations Center (TOC) Manager, after the 5-Day request from above, to request that all aforementioned sites within the project are tested for:
 - Communications connectivity from the Traffic Information Management System (TIMS) to each device site is established.
 - Accurate data transmission and full operational control from each site to TIMS.
- Receive written approval (via the WBPM system) from the Engineer and the TOC Manager verifying the communications connectivity and data transmission are within the Illinois Tollway requirements, and that the System Test has passed.

The Illinois Tollway ITS unit will complete the System Test within 2 weeks of notification from the Engineer requesting that all sites be tested.

Final System Acceptance. Final acceptance of the all work associated with this pay item will be made after:

- Successful completion of the project final walk-through by the Illinois Tollway's ITS GEC.
- Submission (via the WBPM system) to the Engineer of all Record Drawings, Warranty documents, user, operator, and maintenance manuals and electronic computer files (MicroStation, PDF, Word and/or Excel) that include completed test reports, a sketch of each ITS element assembly, a listing of each device's location, and identification number.
- Notification of Final Acceptance will be sent in writing (via the WBPM system) by the Engineer.

Warranty. All fiber optic cable, fiber optic patch panel, and fiber optic jumper cable and associated components shall be warranted and guaranteed against defects and/or failure in design, materials, and workmanship within the one (1) warranty period. The Contractor shall submit the warranty terms as part of each material item's shop drawing submittal for approval.

The warranty shall provide that, in the event of a malfunction during the warranty period, the defective system component shall be replaced with a new component by the manufacturer or his/her representative.

Any system component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as an unsuitable system and shall require the entire system be replaced by the device manufacturer or representative with a new system of the same

type at no additional cost to the Illinois Tollway. The unsuitable system shall be permanently removed from the project. A failure shall also be defined as the field device becoming unable to comply with all applicable standards at the time of original construction.

All manufacturer's equipment guarantees, or warranties shall be included in the maintenance manuals for the subject equipment.

Method of measurement. This work will be measured in units of each.

Basis of payment. This work will be paid for at the contract unit price per each for FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY.

The payment to the Contractor will adhere to the following schedule:

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of all product submittal documentation, shop drawings, and calculations.

Eighty percent (80%) of the contract unit price will be paid at completion of the local field test acceptance by the Engineer at all locations. Written approval from the Engineer that all local field tests have been accepted is required before payment is released.

The final ten percent (10%) of the contract unit price will be paid after Final System Acceptance at all locations. The final inspection of the entire system will be performed by the Engineer in the presence of a representative of the Contractor. Written approval from the Engineer that Final Acceptance has been granted is required before payment is released.

The ITS Pole Mounted Enclosure (CCTV or MVDS), ITS device pole, electrical service, grounding, and ITS device (CCTV or MVDS) will be paid separately.

ITS ELEMENT SITE GROUNDING (ILLINOIS TOLLWAY)

Effective: January 20, 2014

Revised: March 1, 2024

Description. This work shall consist of furnishing and installing an ITS element site grounding system in place as shown in the Plans and in accordance with the Special Provisions. This work shall also include the performance of Three-Point, Fall-of-Potential grounding electrode earth resistance test which shall be performed for the Contractor by an independent professional testing service that is equipped and qualified to perform the test and certify the test results. The Three-Point, Fall-of-Potential grounding electrode earth resistance test shall be performed on both new work and on existing installations involved with the work.

Codes and standards. This special provision was developed in accordance with the applicable chapters of the Motorola Standards and Guidelines for Communications Sites (R56).

Also incorporated are the applicable elements of the following standards:

1. ANSI/TIA-222, Section 10.0 – Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, Protective Grounding
2. Illinois Tollway Supplemental Specifications, Section 806 – Grounding

3. NFPA 70 – National Electric Code (NEC)
4. NFPA 780 – Standard for the Installation of Lightning Protection Systems
5. UL 96A – Standard for Installation Requirements for Lightning Protection Systems

Where there are conflicts found between the above standards, the more stringent standard shall govern. Government and local codes shall take precedence over the requirements of this special provision.

Soil analysis. The Contractor shall perform a soil analysis to determine the acidity (pH) and the porosity (aeration) of the soil. The analysis shall also test for the presence of organic acids in the soil commonly associated with poorly drained or poorly aerated soils. Test reports for each ITS Element site shall be provided. In acidic soils with a pH of 5 or lower and in soils where organic acids are found to be present, the ground rod shall be encased as specified elsewhere herein.

General grounding material requirements. Within 10 business days from Notice to Proceed, the Contractor shall submit via the Illinois Tollway's Web Based Program Management (WBPM) system a completed ITS ELEMENT SITE GROUNDING CHECKLIST (ILLINOIS TOLLWAY), (attached to this special provision), and associated submittals for review and approval by the Engineer. The Contractor shall submit to the Engineer a request for variance when changing equipment prescribed on the ITS ELEMENT SITE GROUNDING CHECKLIST (ILLINOIS TOLLWAY). The variance shall be the formal request of an approval of an equal or better substitute for a specified part by providing justification and supporting manufacturer's specifications and other relevant documentation.

- a) All grounding materials shall be listed for the intended application.
- b) Ground rods shall be per Section 806 of the Illinois Tollway supplemental specifications.
- c) Aluminum or copper-clad aluminum grounding conductors **SHALL NOT** be used.
- d) All grounding electrode conductors shall be 1/C, bare, stranded, soft drawn, tinned copper unless otherwise specified herein. Grounding electrode conductors shall be per ASTM B 8 for stranded conductors and ASTM B 33 for tinned conductors.
- e) All grounding hardware, except ground busses and conductors, must be stainless steel or galvanized rigid steel. (See installation requirements pertaining to dissimilar metals.)
- f) Groundings bushings shall be malleable iron, threaded, with insulated liner and solderless lug.
- g) Unless otherwise noted, busbars must be solid annealed copper and be equipped with insulating mounting supports. Busbars must be pre-drilled with holes suitably sized for terminating up to No. 2/0 AWG grounding conductors with two-hole lugs.
- h) Copper or copper-clad ground rods shall not be used in soils where organic acids are present unless protective measures are taken, such as encasing the ground rods in a grounding enhancement material.
- i) Grounding Enhancement Material (GEM) shall absorb water from surrounding

soil and have hydrogen and water retention properties. The suggested grounding electrode encasement (backfill) material shall be a mixture of 75% gypsum, 20% bentonite clay and 5% sodium sulfate.

General grounding installation requirements.

- a) An ITS Element site shall include but is not limited to a Dynamic Message Signs (DMS) (any type), a DMS Control Cabinet, electrical work for a DMS (any type), an overhead sign structure, a Closed Circuit Television (CCTV) camera (pole mounted, tower mounted, or otherwise), Microwave Vehicle Detector System (MVDS), In-Pavement Vehicle Detection System, Roadway Weather Information System (RWIS), Weigh In Motion (WIM) system, Flashing Beacon Assembly, ITS Pole Mounted Enclosure, and Solar Powered Generator Assembly.
- b) The ITS Element site grounding electrode system shall be provided at all ITS Element site locations as indicated in the Plans.
- c) A bonding jumper between the neutral and grounding busbars shall be installed at the electrical service entrance panel or enclosure ONLY unless a separately derived system is identified as defined by the National Electric Code (NEC). For example, if a transformer is utilized (unless it is an autotransformer) there exists no direct electrical connection between the primary and secondary sides. In this case, a bonding jumper between the neutral and grounding busbars on the secondary side would be required.
- d) All metallic members either attached to the ITS Element supporting structure and those which comprise the supporting structure shall be bonded together by means of copper bonding jumpers as specified herein to create a continuous low impedance path to the ITS Element site grounding electrode system.
- e) All metallic housings with energized components or metallic structures which may become energized under fault conditions shall be bonded to the ITS Element site grounding electrode system.
- f) All grounded metal objects within 25 feet of a component of the ITS Element site must be tied into the ITS Element site grounding electrode system using approved grounding electrode conductors, bonding conductors and connection methods as described herein and/or shown in the Plans, or as directed by the Engineer.
- g) All equipment bonds must be made to bare metal surfaces as specified herein.
- h) All ground rods shall include a ground test well (access well) to allow inspection of connections to the ground rod with exception of any ground rods which are installed beneath roadway shoulder pavement.
- i) Exothermic welded joints on galvanized material shall be coated as specified herein to prevent corrosion.
- j) Copper/Aluminum joints shall be avoided wherever possible. In cases where this cannot be avoided, the connections shall be as specified herein.
- k) Bare copper shall not come in contact with galvanized steel. However, a connection of copper and stainless steel, and a connection of tinned copper and galvanized steel are acceptable.

- l) There shall be no coils of power cables internal to any enclosure containing electronic equipment.
- m) Contractor shall provide all necessary materials and labor even if not shown specifically on the Plans or specified herein to provide an ITS Element site grounding system in accordance with NEC and Motorola R56 requirements.

ITS element site components.

a) Grounding/Bonding Conductors

- 1. To prevent arcing, all grounding/bonding conductors shall be as short, straight, and with as few kinks as possible. A minimum bending radius of 8 inches shall be maintained. "U" shaped bonding jumpers may be utilized for the bonding of doors and gates only.
- 2. A UL listed, lightning protection T-splice is an acceptable means of installing grounding/bonding conductors with 90 degree angles provided it can withstand a 200 pound pull test. The T-splice must be listed for use with a 1/C No. 2/0 AWG conductor.
- 3. All bare copper conductors must be tinned. All copper used for lightning protection or equipment bonding must have 95% conductivity when annealed. See Article 1066.02(a) of the Standard Specifications for additional requirements.
- 4. Care shall be exercised during the installation of tinned conductors to ensure surfaces are not damaged. Any tinned conductors damaged during installation shall be replaced at no additional cost to the Illinois Tollway.
- 5. Any above grade grounding/bonding conductor which is not in conduit shall be supported by a UL listed connector a minimum of every 3 feet.
- 6. If grounding/bonding conductors are routed in a continuous run of metallic conduit, the conduit system shall be provided with properly installed grounding bushings. Both ends of a metallic conduit containing a grounding conductor must be bonded with a listed grounding bushing.

b) Equipment Grounding Conductor.

- 1. In all cases, equipment grounding conductors originating at the electrical service entrance shall be provided. This equipment grounding conductor shall be bonded to the service reference ground system. The equipment grounding conductor shall be a 1/C copper sized as shown on the plans but at a minimum shall meet the requirements of the NEC Table 250.122.D.
- 2. Power conductors routed between structures must include an equipment grounding conductor as shown on the plans. This equipment grounding conductor shall be bonded to the site ground by means of direct copper connection to either a grounding bus bar or to the grounding electrode conductor.
- 3. If conductors are routed in a continuous run of metallic conduit, an equipment grounding conductor shall be provided and the conduit system shall be provided with properly

installed grounding bushings. Both ends of a metallic conduit containing a grounding conductor must be bonded with a listed grounding bushing.

c) Bonding Jumper

1. All bonding jumpers shall be 1/C No. 2/0 AWG tinned copper minimum or as required by the NEC Article 250 and as specified herein.
2. At the electrical service entrance, a bonding jumper shall be provided between the neutral and grounding bus bar.
3. At any separately derived system as defined by the NEC, a bonding jumper shall be provided between the neutral and grounding busbars of the separately derived system. The grounding bus bar of the separately derived system shall also be connected to the overall system ground by direct copper conductor connection.
4. A bonding jumper shall be provided for all metallic enclosures containing electrical conductors or components including but not limited to service entrance panels, disconnect switches, and junction boxes. Any metallic lids and/or doors of said enclosures shall also be bonded by means of a bonding jumper between the main enclosure and the lid and/or door. This bonding jumper shall not impede the function of opening the door or removing the lid for service.
5. When an ITS element is mounted to a metallic structure , all metallic members either attached to the structure and those which comprise the structure shall be bonded together as shown on the plans to create a continuous low impedance path to the ITS element site grounding electrode system. All conductors for the bonding of metallic members either attached to the structure and/or those which comprise the structure shall be a stranded tinned-copper bonding jumper, minimum No. 2/0 AWG in size

d) Grounding Electrode Conductors.

1. All grounding electrode conductors terminating on a ground rod shall be a 1/C, stranded, soft drawn, tinned-copper, minimum No. 2/0 AWG in size, or as specified in the Plans.
2. Grounding electrode conductors shall be installed without any splices.
3. All grounding electrode conductors must be individually run to a ground bus bar or ground rod. The only exception to this "no-daisy chaining" rule is when joining two ground rods together in order to obtain 5 ohms or less.
4. Grounding electrode conductors shall not be run through concrete structure foundations.

e) Ground Well.

1. Ground well shall be Neenah Foundry model number R7506-E 10" or approved equal.
2. Each ground well shall have concrete surrounding the access well and shall be of Class SI.
3. The stone shall be CA-6.

f) Grounding/Bonding Connections.

1. All connectors shall be rated for both the intended use and the surface upon which it to be

installed.

2. Grounding clamps and bushings, wherein specified, must be galvanized steel or a high copper content alloy. For applications involving Dynamic Message Signs (DMS), aluminum bonding plates attached with four screws shall be used in the grounding of the DMS aluminum chassis.
3. Insulation piercing connections shall not be used in the installation of conductor lugs. Only connection devices which require the complete removal of the conductor jacket and which provide a complete connection between the inside of the lug and the outer circumference of the grounding wire shall be permissible.
4. A UL listed, irreversible, pressure-typed crimp connection shall be used to connect a ground rod connected grounding conductor to an internal grounding bus bar. All other internal connections to a bus bar by conductors larger than No. 6 AWG must be made by two-hole lugs.
5. No more than one connection shall be made at each bus bar position unless the connector is listed for multiple conductors.
6. All external and underground connections shall be by exothermic welding.
7. Exothermically welded connections to metal surfaces must be completed with a weld area roughly twice the diameter of the conductor. The area of the connection must first be sanded or filled to expose the bare metal prior to the exothermic weld being performed.
8. Exothermically welded connections to galvanized material shall be coated with a zinc-enriched paint to prevent corrosion.
9. Where copper/aluminum connections cannot be avoided, the connections shall be exothermically welded using an aluminum/copper listed bimetallic transition connector and a listed conductive anti-oxidant compound on all metallic connections.
10. For all mechanical connections, a listed conductive anti-oxidant compound shall be applied between the two metals.

ITS Element Site Master Grounding Bus Bar (MGB).

1. Each ITS Element shall have a Master Grounding Bus Bar (MGB) made of solid annealed copper installed in a specific location as shown in the Plans. For example, a pole mounted CCTV camera shall have the MGB attached to the pole below the enclosure. For applications involving DMS, the MGB shall be approximately 12 inches long, 4 inches tall, and ¼ inches thick, and shall be mounted in a NEMA 4X enclosure on the galvanized steel panel as shown on the Plans. The bus bar mounts shall provide electrical isolation from the steel panel.
2. The MGB hole pattern shall permit connecting two-hole lugs for up to No. 2/0 AWG grounding conductors.
3. The MGB shall be provided with a bare tinned-copper 1/C No. 2/0 AWG conductor which shall be connected via an exothermic weld to an ITS Element site ground triad/halo electrode system ground rod located below the MGB in a grounding well.

g) ITS Element Site Grounding Electrode System.

1. In the case when a DMS or any other ITS element is installed on an overhead sign structure (cantilever or span type), the overhead sign structure shall be provided with a site grounding electrode system to provide a single ground reference. This grounding electrode system shall consist of ground rods installed in ground wells and oriented around the concrete foundation(s) of the overhead sign structure as shown on the Plans (grounding halo). The ground rods within the grounding halo(s) shall be connected to each other by a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor. The grounding halo(s) shall also be bonded to the MGB as specified elsewhere herein.
2. Where a span type overhead sign structure is specified including concrete foundations, grounding halos shall be provided oriented around both concrete foundations as shown on the Plans. Where the distance between the two grounding halos is less than 200 feet, the grounding halos shall be bonded together at no less than two separate points on each by a stranded 1/C No. 2/0 AWG bare tinned-copper conductor installed a minimum of 30 inches below grade or at the frost line, whichever is deeper.
3. All ground rods shall be installed such that the top of the ground rod is accessible inside the ground well. All ground rods installed beneath a paved roadway shoulder (void of a ground access well) shall be installed such that the top of the ground rod is a minimum of 30 inches below grade or at the frost line, whichever is deeper.
4. Whenever possible, ground rods shall be installed a nominal distance of 1.1 times the length of a rod and a minimum of 36 inches from all foundations or other underground structures. In no case shall a ground rod be installed through a foundation or beneath travelled roadway pavement.
5. Whenever possible, the spacing between adjacent ground rods shall be 2 times the length of the ground rod and a minimum of 6 feet in any direction.
6. When the ITS Element site grounding electrode system as shown on the plans does not result in a resistance less than or equal to 5 ohms, the Contractor shall install additional ground rods and stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductors in an expanding star-burst pattern until the resistance is brought down to acceptable levels. Typically the additional ground rods would be located further out from the MGB than the original equipment ground rods. However, it is permissible to install additional rods between the equipment and MGB as long as the required separation distances are maintained. Any additional ground rods and conductors as required bringing the resistance down to 5 ohms or less shall be included in this work.
7. No more than three grounding electrode conductors shall be connected to a single ground rod.

h) Handholes.

1. All handholes shall be provided with a ground rod extending up into the handhole cavity. The resistance to ground of this ground rod shall be 5 ohms or less.
2. In all cases, power conductors routed between structures include an equipment grounding conductor as shown on the Plans. This equipment grounding conductor shall be bonded to the handhole ground rod.

3. All metallic components of the handhole including but not limited to the frame, lid and any metallic conduits entering the cavity shall be bonded together and to the ground rod utilizing a 1/C braided tinned-copper bonding jumper, minimum No. 2/0 AWG in size.
4. A grounding bushing shall be used if the entire conduit run is metallic.
5. Neutral conductor(s) shall not be bonded to the handhole grounding bus bar or ground rod; neutral conductor(s) shall pass through the handhole non-spliced.
6. Cable with metallic components (e.g. armored fiber optic cable) need to be connected to the ground rod. The metallic conduit sheath which it entered the handhole shall be connected to the ground rod.
7. Any handholes located within 200 feet of the ITS Element site grounding electrode system shall also be bonded to the ITS Element site electrode system by a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor installed a minimum of 30 inches below grade or at the frost line, whichever is deeper.
8. All grounding/bonding connections within the handhole shall be by exothermic welds.
 - i) **ITS Enclosure or Control Cabinet.**
 1. The Contractor shall ensure that every ITS element Control Cabinet is grounded as described herein and on the Plans.
 2. For ITS applications involving dynamic message signs, both the DMS control cabinet and the DMS structure shall be provided with a site grounding electrode system. These grounding electrode systems shall consist of ground rods oriented in a triad/halo next to the concrete foundations of the DMS controller cabinet and the DMS structure as shown on the plans. The ground rods within the grounding triad/halo shall be connected to each other by a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor.
 3. Grounding/bonding of the equipment inside the DMS enclosure shall be similar to the grounding of the DMS Control Cabinet as applicable to the equipment installed. The equipment grounding conductor originating from the electrical service entrance of the DMS system shall be routed to within this enclosure. This conductor shall be bonded to an internal insulated grounding bus bar similar to that of the DMS Controller Cabinet specified elsewhere herein. This equipment grounding conductor shall also be bonded to the MGB specified elsewhere herein. This conductor routed between the MGB and the DMS Enclosure grounding bus bar shall be a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor installed on the structure to the MGB.
 4. The DMS enclosure shall be equipped with at least one internal grounding lug that is installed by the manufacturer. The Contractor shall connect any internal grounding lug(s) to the grounding bus bar.
 5. Any non-welded conductive part of the DMS enclosure shall also be bonded together utilizing 1/C braided bare tinned-copper bonding jumpers, minimum No. 2/0 AWG in size. Portions of the enclosure which are welded together do not require a bonding jumper. U-bolt connections or metal to metal contact do not offer a sufficiently conductive path and so must be equipped with bonding jumper. Connections through a painted DMS enclosure

surface shall not offer a sufficient conductive path and shall be equipped with a bonding plate for connection to the bonding jumper. See General Grounding Installation Requirements section for discussion on bonding the dissimilar metals of the steel DMS truss and the aluminum DMS enclosure.

6. Where the distance between the DMS controller cabinet and the DMS site grounding electrode system is less than 200 feet, the DMS controller site grounding electrode system shall be bonded to the DMS site grounding electrode system at no less than two separate points on each by a stranded continuous 1/C No. 2/0 AWG bare tinned-copper conductor installed a minimum of 30 inches below grade or at the frost line, whichever is deeper.
7. All ITS equipment grounds inside the ITS enclosure shall be connected to a copper bus bar which shall then be connected to the ITS element site grounding electrode system by means of a stranded bare tinned-copper 1/C No. 2/0 AWG conductor routed to each ground rod comprising ITS element site grounding electrode system.
8. The copper bus bar shall be mounted such that it is insulated from all metallic items, including the cabinet chassis itself, except by equipment grounding jumpers.

j) **Testing.** The Contractor shall use the test plans within this special provision to conduct the following tests per ITS Element grounding site in the presence of the Engineer, in accordance with the test requirements identified and found on the ITS Site Grounding Acceptance Test Form included herein.

1. All testing shall be conducted in the presence of the Engineer after a minimum 48 hour notification period. All test results, including those where the design criteria was not achieved, shall be documented. All retests shall be witnessed by the Engineer and documented by the Contractor (via the WBPM system).
2. As stated above, the installed grounding system at ITS Element sites shall be tested by the Contractor to confirm that there is a maximum 5 ohms resistance to ground within the grounding system. Proper grounding of AC power disconnect shall be verified by the use of a clamp-on ohmmeter. Testing of resistance to ground from the chassis of electronic equipment is not recommended due to the potential to damage of the electronics; however, the Contractor shall be required to test resistance to ground from each bus bar after all chassis grounds have been disconnected and taped to avoid accidental contact during testing.
3. Three-Point Fall-of-Potential. The site grounding electrode systems shall be tested using the three-point fall-of-potential method as detailed in ANSI/IEEE STD 81, BS 7430, NFPA 7800-2004, and MIL-HDBK-419A. Test results must be documented and submitted to the Engineer via the WBPM system.

Method of measurement. This work will be measured for payment in units of each ITS element site for all ITS element Grounding as required herein and shown on the plans. Each ITS Element type listed below shall be considered a unit of 1 each per type of site. Adjacent sites shall be measured separately. Co-located devices on a single pole mounted site shall be considered a single site.

- ITS Element Pole Mounted Assembly
- Solar Powered Generator Assembly
- ITS Monopole CCTV Tower Assembly

- Weigh-in-Motion/Virtual Weigh-in-Motion system
- Static Flashing Sign Beacon Assembly
- Roadway Weather Information System
- ATM Equipment Cabinets

Grounding for Dynamic Message Sign and Controller Cabinet will not be measured for payment.

Basis of payment. This work will be paid for at the contract unit price per each for ITS ELEMENT SITE GROUNDING, of the assembly or system specified. Grounding for Dynamic Message Sign and Controller Cabinet shall be included in DMS ELECTRICAL WORK of the Type specified.

The payment to the Contractor will adhere to the following schedule:

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of all system documentation (product submittals and checklist, shop drawings).

Eighty percent (80%) of the contract unit price will be paid upon completion of the installation of the ITS ELEMENT SITE GROUNDING.

Ten percent (10%) of the contract unit price will be paid upon receipt of submission and approval of final documentation (as-builts and testing).

The installation and testing of the ITS Pole Mounted Enclosure (CCTV or MVDS), ITS device pole, foundation, electrical service, grounding, MVDS ITS Assembly, and communications shall be paid separately.

REMOVE CCTV CAMERA (ILLINOIS TOLLWAY)

Effective: March 1, 2019

Revised: March 1, 2022

Description. This work shall consist of removal of an ITS CCTV camera assembly from an ITS pole or sign structure at locations shown in the Plans.

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate with the Engineer. This includes, but is not limited to, the following:

The Contractor shall remove the ITS CCTV camera assembly, video encoder, and associated cabling at locations as shown in the Plans. Mounting arms, brackets, conduit LB's, and other hardware used to attach cameras to poles shall be removed. Any openings that will not be reused shall be sealed with a material, approved by the Engineer, which prevents entry by water or animals. A 1½ inch PVC coated galvanized steel conduit LB shall be reinstalled after removal of the existing LB.

The Contractor shall deliver the CCTV camera assembly and encoder to the Illinois Tollway at the M-14 Maintenance Yard. All CCTV cameras shall be logged by inventory (M tag) number via the Illinois Tollway's A-14 inventory form and then delivered and unloaded at the M-14 building.

Any mounting hardware removed from the site shall be disposed of by the Contractor in accordance with Article 202.03 of the Standard Specifications.

Method of measurement. This work will be measured in units of each.

Basis of payment. This work will be paid for at the contract unit price per each for REMOVE CCTV CAMERA, POLE MOUNTED.

HANDHOLE FOR FIBER OPTIC CABLE, TORSION ASSIST (ILLINOIS TOLLWAY)

Effective: March 1, 2020

Revised: December 8, 2023

Description. This work shall consist of furnishing and installing a precast polymer concrete handhole with torsion-assist frame and cover or standard cover, for use with single or multimode optic fiber, of the dimensions specified in the Plans. This work shall be in association with installation of Locator Tracer Wire and Locate Posts for Fiber Optic Cable.

Materials. The handhole materials shall be according to Article 1088.05 of the Illinois Tollway Supplemental Specifications, be comprised of polymer concrete and steel, and conform to ANSI/SCTE 77 Tier 22. The handhole body and cover shall be made of composite concrete. The cover frame shall be made of steel (for torsion assist). The bottom of the handhole shall be open to allow for conduit entry.

The handhole body, frame, and cover shall have a vertical design/test loading of 22,500/33,750 lbs. respectively. The cover shall have a permanently recessed logo that reads "TOLLWAY FIBER", or as otherwise shown in the Plans. The cover shall have two 1/2-in x 4-in pull slots. The lid surface shall have a minimum coefficient of friction of 0.50 in accordance with ASTM C-1028.

Torsion assist handhole covers shall be secured with two stainless steel penta-head bolts and washers. The Contractor shall furnish a matching penta-head "lock tool" for each handhole to the Engineer for providing future entry into the handhole.

Interior mounting support assemblies, recommended by the manufacturer and approved by the Engineer, shall be provided for securing conduit, fiber optic cable, and splice closures. The support assemblies shall be made from stainless steel. The support assemblies shall be anchored to the walls of the handhole using stainless steel hardware. All mounting components shall be electrically bonded together.

Handholes shown to be installed on cantilevered platform structures shall be furnished with galvanized steel angle brackets and other hardware necessary to secure the handhole to the structure. The Contractor shall submit shop drawings to the Engineer for approval prior to installing handholes.

CONSTRUCTION REQUIREMENTS

Grounding. An 8 foot long and 5/8" diameter copper-clad steel ground rod shall be furnished with each handhole. A No. 6 AWG Type XHHW, solid, green, insulated ground wire shall be furnished for connection to a Locate Post for Fiber Optic Cable and be exothermically welded to the ground

rod. When the handhole is to be installed on structure, grounding shall be installed with all components as shown in the Plans as part of fully grounded system.

Bedding. A French drain shall be provided to allow water egress from the bottom of the handhole and to prevent animal entry. The French drain shall be constructed from coarse aggregate, CA-5 or CA-7 Class A, as specified in Section 1004.05 of the Standard Specifications.

Installation. Installation of the handhole shall be in accordance with Section 814 of the Illinois Tollway Supplemental Specifications and as shown on the Plans. The Contractor shall excavate soil as required for installation of the handhole. The location of the handhole shall be excavated so that the top surface of the handhole shall be 1 in. above the finished grade. The excavation shall be deep enough to accommodate the depth of the handhole and French drain. In order to permit the conduit, elbows, or any couplers to properly enter into the handhole and to permit proper compaction of the backfill material, the excavation shall be made to at least 6 inches, but no greater than 9 inches, greater than the outside edge of the handhole. If the handhole is located in soils classified as Types 1, 2, 3, or 4, the disposal of the excavated surplus material shall be according to the Tollway special provision for "Disposal of Regulated Substances."

Torsion assist handholes shall be installed with the hinged sides perpendicular to the slope.

The French drain shall be installed with a minimum depth of 12" below the base of the handhole. All conduit shown on the Plans to enter the handhole shall be arranged prior to installation of the handhole and shall enter the handhole from the bottom. Conduit shall not enter the handhole through sidewalls. Conduit shall be secured to the handhole interior mounting assemblies for training conduit and cable.

After the handhole has been placed, the contractor shall backfill around the handhole with coarse aggregate, of the same material as the French drain, and other suitable fill material as shown on the Plans. The surface conditions shall be restored to match the existing surroundings unless covered elsewhere by project specific site restoration plans.

Handholes to be installed on cantilevered structures shall be done per the approved method previously submitted to the Engineer. Handholes shall be secured to the structure such that they will be free from movement induced by structural vibrations caused by roadway traffic and other outside forces. Handholes on structure shall be provided with means of drainage.

Handholes shall be grounded as shown on the Plans and Standard Drawing L1-01. All interior components of the handhole shall be properly bonded and grounded according to manufacturer specifications. All Locate Posts and Locator Tracer Wires wire connection shall be made at the time of handhole installation. The handhole shall be thoroughly cleaned of any accumulation of silt, debris, or foreign matter of any kind.

Method of Measurement. This work will be measured for payment in units of each.

Basis of Payment. This work will be paid for at the contract unit price per each for HANDHOLE FOR SINGLE MODE FIBER OPTIC CABLE of the type specified.

CABLE MARKER SIGN WITH POST FOR SINGLE MODE FIBER OPTIC CABLE (ILLINOIS TOLLWAY)

Effective: March 1, 2018

Revised: May 24, 2024

Description. The Contractor shall furnish and install Cable Marker Sign Locate post, Cable Marker Sign Warning post and/or Warning sign for identifying locations of fiber optic cable as shown on the plans or as directed by the Engineer.

Material. Cable markers locate and/or warning sign posts for optic fiber cable shall be made of non- conductive high-density polymer and shall be integrally orange in color with an orange cap with black graphic and lettering on two sides. All colors shall be stabilized against ultraviolet light such that they will not fade under continuous exposure to direct sunlight. The marker shall retain dimensional stability in temperatures ranging between -40°F and 175°F. Each post shall be able to withstand a single vehicle impact at 45 MPH and return to within 10 degrees of vertical within 60 seconds.

Installation. A LOCATE POST with cable marking sign shall be installed next to every Illinois Tollway optic fiber handhole. A 2 inch ID conduit will be installed from the fiber optic handhole to the locate post. The Locate post will have a removeable top exposing seven (7) ½ inch stainless steel bolt lugs with locking washer and nut. A #6 (green) ground wire shall be connected to the top lug in the locate post through the connecting conduit to the optic fiber handhole and connected to the ground rod. Locate/tracer wires will be labeled and connected to the other six (6) locate lugs.

Note: In the event there are two or more handholes for fiber optic installed in close proximity (not exceeding twenty feet to each other) then only one Locate Post can be used to connect the ground wire of the fiber optic handholes.

Warning posts with cable marking signs shall be installed at mid-distance between every two locate posts or at 500 feet spacing along the fiber optic alignment, whichever is less.

WARNING SIGNS [fiber optic] shall be made of aluminum and installed on fences and sound walls every 200 feet wherever the buried optic fiber conduit path is within 10 feet of the fence or sound wall. All signs on fencing shall be installed using stainless steel TY-Raps, on wooden sound walls with stainless steel screws, and on the concrete sound walls with expanding anchors and stainless steel screws.

For duct marker installations at splice points, posts shall be connected to the fiber splice cases and the armored cable with a #6 ground wire in innerduct as indicated on the Plans. Cable markers shall be installed at the same time or immediately after the installation of underground conduits and handholes for identification of underground infrastructure.

Locate and warning posts shall have emergency contact information, route number, and mile post.

Locate/tracer wire shall be tested per manufacturer's recommendations and the results shall be provided to the Engineer for review and approval.

Method of Measurement. This work will be measured in units of each for the number of Posts, Signs and Markers that are placed and accepted.

Basis of Payment. Payment will be made per each for LOCATE POST FOR FIBER OPTIC CABLE locations as shown on the plans or as approved by the Engineer. Payment will be considered full compensation for all work, materials, and equipment required to place the markers at the locations shown on the plans, details, or as directed by the Engineer.

REMOVE FIBER OPTIC CABLE (ILLINOIS TOLLWAY)

Effective: March 12, 2021

Revised: March 1, 2024

Description. This work shall consist of removing an existing fiber optic cable within the ducts or aerially suspended cable utilized for the fiber optic system. The removed fiber optic cable shall be salvaged and returned to the Tollway, as directed by the Engineer. This work shall also include testing of the salvaged fiber.

CONSTRUCTION REQUIREMENTS

The removal of the fiber optic cables shall not begin until the new fiber optic cables are completely in place and have been tested and approved by the Illinois Tollway's Fiber Maintenance Contractor, and all new ITS devices have been tested and accepted by the Illinois Tollway. Coordination with the Illinois Tollway's Fiber Maintenance Contractor is mandatory when concerning the removal of the temporary fiber. The fiber optic cable shall be removed after it has been taken out of service/disconnected by the Illinois Tollway's Fiber Maintenance Contractor. The Contractor shall take special care when removing the existing fiber to avoid damaging the cable and maintain the lengths as continuous segments as much as possible.

The Illinois Tollway's Fiber Maintenance Contractor will cut splice closures and mark all existing fiber cables that are to be removed by the Contractor. For any cable that is not marked or tagged for removal or otherwise noted to remain, the Contractor shall notify the Illinois Tollway to confirm the intent. Contractor shall not remove any cable that is not properly marked. Contractor is responsible for disposing of any discarded splice closures that are left in the handhole or manhole.

Reels to be used for salvaging the fiber optic cable shall be supplied by the Contractor. The reels of salvaged fiber shall be delivered by the Contractor to the storage location listed below. The reels shall be labeled as directed by the Engineer. Each full-length section of fiber optic cable that is salvaged shall be placed on its own reel; no more than one length of fiber shall be installed on a reel. The first end placed on the reel shall have at least twelve (12) feet of a tail brought through the spool and exposed on the outside of the reel for testing access. The last winding tail must be secured to avoid unwrapping. The reels of salvaged fiber shall be tested (on reel with reports submitted to the Engineer) by the Contractor as part of this item prior to delivery to the Illinois Tollway's Fiber Maintenance Contractor. Cables noted for salvage are identified on the plans.

Fiber optic cables that are salvage shall be removed from the underground duct or aerially suspended cable in a safe and careful manner that does not damage the cable. The Illinois Tollway and/or the Illinois Tollway's Fiber Maintenance Contractor are the sole judges of whether safe and careful practices have been employed in removing the cable. Any cable that is noted for salvage that is damaged due to Contractor negligence shall be replaced with a new cable of the

denoted cable length at the Contractor's expense. New cable will be subject to meeting the testing requirements of new fiber, as directed by the Illinois Tollway.

Offloading of the reels shall be provided by the contractor at a site within the storage area directed by the Illinois Tollway's Fiber Maintenance Contractor.

G4S Secure Integration
565 Willowbrook Centre Pkwy Willowbrook, IL 60527

Salvaged fiber reels shall include documentation by the Contractor of fiber optic cable length, size, and condition. Documentation shall be provided to the Illinois Tollway.

Fiber links that are removed and are less than 1000 feet shall not be salvaged.

Fiber links that are not salvaged shall be disposed of off-site by the Contractor. Disposal of associated splice closures and other hardware shall be included as part of this item.

Any temporary removal of fences or guardrail required to perform the work shall be repaired or reinstalled in accordance with the Illinois Tollway Standard.

Any fiber cable removed from the site shall be disposed of by the Contractor in accordance with Article 202.03 of the Standard Specifications.

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

Basis of Payment. This work will be paid for at the contract unit price per foot for SINGLE MODE FIBER OPTIC CABLE REMOVAL, NO SALVAGE.

UNDERGROUND CONDUIT, COILABLE NON-METALLIC CONDUIT, SDR 11 (ILLINOIS TOLLWAY)

Effective: April 1, 2016
Revised: October 23, 2023

Description. This work shall consist of furnishing and installing coilable non-metallic conduit, fittings, and accessories, as part of a raceway bored and pulled in place, plowed, trenched, or pulled in sleeves.

Material. The conduit shall be a solid-wall high density polyethylene (HDPE) duct 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 or performance.

The conduit shall meet the requirements of the following standards:

- American Society for Testing and Materials (ASTM) D 3350, minimum cell class of PE334480 C or E in conformance with Standards D3350 and F2160 of the American Society for Testing and Materials (ASTM).
- National Electrical Manufacturers Association (NEMA) Standard TC 7 (2013) for Smooth Wall Coilable Electrical Polyethylene Conduit

The coilable non-metallic SDR-11 conduit properties shall conform to the nominal dimensions shown in the table below:

Nom. Duct Diameter (in)	Nom. Outside Diameter (in)	Nom. Inside Diameter (in)	Min. Wall Thickness (in)
1	1.315	1.055	0.120
1 ¼	1.660	1.338	0.151
1 ½	1.900	1.533	0.173
2	2.375	1.917	0.216
2 ½	2.875	2.322	0.261
3	3.500	2.825	0.318
4	4.500	3.633	0.409
6	6.625	5.348	0.602

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate the work prescribed under this special provision with the Engineer. This includes, but is not limited to, the following:

Pre-Procurement Documentation Approval. The Contractor shall obtain approval of the conduit installation schedule and catalog cut sheets from the Engineer prior to purchasing, and subsequently performing the installation per the approved documents, contract plans, and specifications.

The Contractor shall make all submissions to the Engineer through the Illinois Tollway Web Based Program Management (WBPM) system.

Conduit Installation

GENERAL

- Coilable non-metallic conduit larger than 3 inches shall be machine straightened to remove the longitudinal curvature and ovality caused by coiling the conduit onto reels. The conduit straightening process shall not deform the cross-section of the conduit.
- If the trench is located in soils classified as Types 1, 2, 3, or 4, the disposal of the surplus material shall be according to the Tollway special provision for "Disposal of Regulated Substances and Uncontaminated Soils".
- Maximum Deflection: Fiber optic conduit runs shall not exceed 90-degrees of total deflection.
- The Contractor shall install in all empty conduits, underground or above grade, a 5/8 inch woven polyester toneable pull tape with a minimum tensile strength of 1200 lbs.-force. When multiple underground conduits are installed in the same trench, the toneable pull tape may be installed in only one conduit designated last for cable installation. A non-toneable pull tape with a minimum tensile strength of 1200 lbs.-force shall be installed in all remaining conduits. All pull tapes shall have six (6) feet of extra slack extending from each end of the conduit and shall be secured before the conduit ends are plugged.
- Underground cable marking tape shall be installed in accordance with Article 810.04 (a) of the Standard Specifications.

IN DUCT PACKAGE

- The conduit shall be installed in continuous lengths without splicing. Conduit bends shall be made manually to prevent conduit damage or possible reduction to the inside diameter of the conduit.
- All underground raceways shall have a minimum depth of 33 inches below finished grade unless otherwise indicated on the contract plans. All raceways installed beneath pavement shall have a minimum depth of 45 inches below the top of pavement to avoid conflicts with the underdrain system unless otherwise indicated on the plans or directed by the Engineer.

PLOWED

- Plowing shall be done with equipment capable of feeding the conduit through the plow. Equipment which pulls the conduit behind a bullet-nose plow will not be allowed except by written approval of the Engineer. The plow shall be capable of plowing a cavity and placing the conduit to the specified depth in a single operation without kinking or otherwise damaging the conduit. The conduit shall be round and free of kinks when fed into the plow and placed in the ground. Pulling of the conduit within the plowed cavity will not be allowed.
- Where another circuit is plowed in parallel to the first, the distance between the two shall not be less than 1 foot nor more than 2 feet.

BORED AND PULLED IN PLACE

- Conduit shall be installed with the use of an auger. Conduit in the subgrade of the proposed improvement shall extend a minimum of 2 feet beyond the edge of proposed pavement, stabilized shoulder, or paved median.
- Areas disturbed by the auguring operation shall be restored to their original condition as directed by the Engineer.

PULLED IN SLEEVES

- Pulled in Sleeves: Conduit shall be pulled in sleeves underground or attached to structure for roadway crossing or bridge transition when noted on the plans.

CONDUIT PROOFING AND TESTING

- All conduits shall be cleaned by wire brush mandrel to remove all dirt and other foreign materials and install compression plugs on both end of the conduit until conductors are installed. The Contractor shall record the results on the Conduit Test form attached to this special provision and provide it to the Engineer for review and acceptance.
- The wire-brush mandrel and solid aluminum mandrel shall be SIGNED BY BOTH the Contractor and the Engineer and submitted via the WBPM system for approval.
- Performance Tests: Conduit test procedures and test results shall meet the requirements of NEMA Standard No. TC 7 and ASTM F2160 Sections 4 and 5. Certified copies of the test report shall be submitted to the Engineer prior to the installation of the conduit.
- All conduits installed under this contract, the Contractor shall proof the conduit

system with a solid aluminum mandrel, as per the Table below, to remove any obstruction or debris. The Contractor shall perform the conduit proofing in the presence of the Engineer. The Contractor shall apply a pressure of 100 – 110 psi to the conduit, close the air output valve and stop compressor, and measure air pressure loss. The maximum allowable air pressure loss within 2 minutes of pressurization is 20 psi. The Contractor shall record results on the Conduit Test form attached to this special provision. The form is signed by the Engineer and submitted via the WBPM system.

Conduit Size (in)	Mandrel Diameter (in)	Minimum Mandrel Length (in)	Maximum Mandrel Length (in)	Proof (%)
1	0.60	1.0	4	80
1 ¼	0.86	1.5	4	80
1 ½	1.12	1.8	4	80
2	1.62	2.4	6	80
2 ½	2.0	2.75	7	80
3	2.5	3.25	8	80
4	3.5	4.25	8	85
6	5.5	6.25	10	85

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

Basis of Payment. This work will be paid for at the contract unit price per foot for UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, SDR 11 of the size specified.

GROUND MOUNTED LIGHT POLE, GALVANIZED STEEL, WITHOUT MAST ARM (ILLINOIS TOLLWAY)

Effective: June 30, 2017
 Revised: March 1, 2022

Description. This work shall consist of furnishing and installing a galvanized steel pole and all hardware and accessories per the contract plans and as required for the intended use of the pole. This work shall also include the installation of rodent protection material between the base of the pole and pole foundation, as well as vibration dampening devices.

Materials. Material shall be according to contract plan details and Section 1069 of the Illinois Tollway Supplemental Specifications.

Q-Set 250 shall be utilized for the rodent protection material.

CONSTRUCTION REQUIREMENTS

Construction shall be according to Section 830 of the Illinois Tollway Supplemental Specifications.

Installation of the Q-Set 250 shall follow the manufacturer guidelines and the following:

- Once cables are installed through the ITS element pole and before the pole is bolted to the anchor plat on the helix foundation, along with the steel mesh the Contractor is required to install a cap at the bottom opening of the ITS element pole to prevent the composite backfill from spilling out of the opening.
- Once capped, the steel pole shall be bolted to the anchor plate using specified installation methods.
- The Contractor shall then mix and prepare the composite backfill (Q-Set 250) as per the manufacturer's recommendation in the presence of the Engineer. Before the composite backfill starts expanding, the mix shall be quickly poured into the steel pole through the handhole access door. As the composite backfill expands during the curing process, the contractor is to ensure that the inner pole remains accessible through the handhole access door. The handhole shall remain accessible after the composite backfill material achieves its fully cured strength. At no time shall the handhole access be blocked or obstructed by the composite filler.

The pole shall be designed to withstand wind induced vibrations in the shaft so that no damage occurs to the shaft, or any attached ITS element and/or the component parts. The pole shall be coordinated with all electronic devices to be free of susceptibility to harmful harmonics and vibrations. A dampening device, as an integral part of the shaft, shall be installed in the shaft to alleviate such vibrations in all ITS poles. Pole deflection and loading compliance, certified by the manufacturer, shall be noted on the pole submittal. The proposed vibration dampening device shall be included with the Contractor's submittal.

Method of measurement. This work will be measured in units of each.

Basis of payment. This work will be paid for at the contract unit price per each for GROUND MOUNTED LIGHT POLE, GALVANIZED STEEL, WITHOUT MAST ARM, of the mounting height specified.

ITS ELEMENT POLE FOUNDATION STEEL HELIX (ILLINOIS TOLLWAY)

Effective: December 16, 2013

Revised: March 1, 2020

Description. This work shall consist of furnishing and installing a helix foundation for an ITS element pole assembly, as indicated on the Plans or directed by the Engineer.

Materials. The metal foundation shall comply with Article 1070.01 of the Standard Specifications for light pole foundation, metal as modified by Section 1070 of the Illinois Tollway Supplemental Specifications.

CONSTRUCTION REQUIREMENTS

Installation. Foundations shall be installed at the locations shown on the Plans, or as directed by the Engineer. Foundations for ITS poles used to mount Microwave Vehicle Detection Sensors shall be field verified by the Engineer to have a minimum 30 foot clearance along the centerline from any metallic structures that could interfere with the MVDS signal.

The steel helix foundation shall be installed in accordance with the manufacturer's recommended procedures. The installation shall be accomplished by either a boom type or a bed mounted type

digger truck. The maximum torque limit of 13,000 ft-lb should not be exceeded since the possible damage to the foundation could occur.

Local soils conditions shall be verified by the Contractor prior to installation of the metal helix foundation. In the case of extremely difficult soils that cause the mechanical limit of the foundation to be exceeded, the helix foundation may be installed at the discretion of the Engineer in one of two methods. Predrilling a hole that is less than the shaft diameter of the foundation or using water as a lubricant. When foundation is installed by either method, minimum torque requirements of 5,000 ft-lb are to be followed. The installation torque may be measured by torque measuring devices currently available or by calibrating the hydraulic system of the installing equipment. As an alternative for foundation installation in extremely difficult soils, a concrete foundation may be used. The Contractor shall submit for approval his structural calculations for installation of a concrete foundation for the pole mounted ITS Element assembly.

Twelve foot (12') helix foundations shall be installed at locations with a slope greater than 1:6 (V:H).

Method of measurement. This work will be measured for payment in units of each.

Basis of payment. This work will be paid for at the contract unit price per each for ITS ELEMENT POLE FOUNDATION STEEL HELIX, of the specified length.

CONCRETE SERVICE PAD (ILLINOIS TOLLWAY)

Effective: March 1, 2019

Revised: March 1, 2023

Description. This work shall consist of furnishing and installing a precast or cast-in-place concrete service pad at ITS pole locations of the type as shown in the Plans.

Materials. Concrete service pad materials shall be according to the following Section and Articles of the Standard Specifications:

Item	Section/Article
(a) Portland Cement Concrete (Class SI/PC)	1020
(b) Reinforcement Bars.....	1006.10
(c) Metal Railings.....	509
(d) NonShrink Grout.....	1024.02
(e) Concrete Curing Materials.....	1022
(f) Precast Concrete Structures.....	504
(g) Forms.....	1103.05

CONSTRUCTION REQUIREMENTS

Concrete service pads shall be installed at the locations shown on the Plans, or as directed by the Engineer. In locations of new construction or reconstruction involving earthwork, the excavation and backfill associated with construction of the service pads in the back slopes of the roadway shall be completed after earthwork has been completed to final grade and stabilized. Earth disturbed due to construction activities for the service pads shall be restored to match existing conditions of the surrounding area and will not be measured for payment.

The subgrade for the concrete service pad shall be tamped or rolled until thoroughly compacted and at the proper line and grade as shown on the plans. The subgrade shall be CA-6 in accordance with Article 1004.5 of the Standard Specifications and shall be compacted to the satisfaction of the Engineer prior to placing the concrete pad. Ensure the subgrade or foundation is moist before placing concrete on grade. Lightly sprinkle the subgrade if dry. Erosion control measures shall follow the plans general notes or as directed by the engineer.

Concrete service pads may be either cast in place or precast and shall in accordance with the details in the plans. Where Precast Service pads are used, the precast pads will be designed by the contractor and Working drawings shall be prepared and submitted for approval. For Type B and C service pads, individual working drawings will be required for each service pad location, unless approved by the Engineer. The precast pads shall include lifting inserts for transportation and placement of the pads at the job site. All lifting inserts shall be backfilled with nonshrink grout. The surface of the cast in place or precast service pads shall be broom finished.

At Type C pad locations, the Contractor shall erect galvanized structural steel handrails in accordance with Article 509.01 through 509.07 of the Standard Specifications. The handrail will be designed by the contractor and Working drawings shall be prepared and submitted for approval. Obtain approval for proposed construction methods before starting work. Approval of construction means and methods does not relieve the contractor responsibility for safety or correctness of methods, adequacy of equipment, or completion of work in full accordance with the laws, regulations, codes, contract, plans, and specifications. Type C pad and handrail shall be installed as soon as possible after installation of the helix foundation and ITS pole. This to provide safety during the installation of the ITS enclosure attached to the ITS pole and other ITS equipment required.

Method of Measurement. This work will be measured for payment in units of each. Excavation and backfill required will not be measured separately for payment.

Basis of Payment. This work will be paid for at the contract unit price per each for CONCRETE SERVICE PAD, of the specified type, of which price shall include all excavation and backfill, coarse aggregate, reinforcement bars, and metal railings.

When the plans specify cast-in-place service pads and the Contractor, at his/her option, constructs the alternate precast service pads, no adjustment in the cost for the specified cast-in-place pads will be allowed.

Excavation in rock will be paid for according to Article 502.13.

Removal and disposal of unstable or unsuitable material below plan bedding grade will be paid for according to Article 502.13.

LOCATE/TRACER WIRE FOR OPTIC FIBER CONDUIT RACEWAYS (ILLINOIS TOLLWAY)

Effective: March 1, 2020

Revised: March 12, 2021

Description. This work shall consist of furnishing and installing a direct buried Locate / Tracer wire with all underground optic fiber Coilable non-metallic Conduit, Bundle or Duct path, and accessories, as part of a trenched, plowed, or bored Tollways optic fiber conduits planned raceway. The tracer wire's purpose of is to carry an electronic signal for use in locating underground conduit and optic fiber.

Material. The tracer wire shall be single conductor 12 AWG insulated with hig-molecular weight polyethylene (HMWPE) specifically for use in direct burial applications. HMWPE shall be rugged and durable with excellent moisture and abrasion resistance.

1. LOCATE TRACER WIRE
 - a. 30-mil high density orange polyethylene jacket with 30-volt rating
2. LOCATOR TRACER WIRE, DIRECTIONAL BORE
 - a. 45-mil high density orange polyethylene jacket with 30-volt rating

AWG 12 Conductors	Breaking Pounds Hard (min)	Insulated Thickness 30v	Nominal Overall Diameter 30v	Approx. Shipping Wgt (Lbs./1000ft.)
Solid Copper	340	0.030"	0.14"	27
Steel Core Copper Clad	1150	0.045"	0.17"	25

CONSTRUCTION REQUIREMENTS

The Contractor shall closely coordinate the work prescribed under this special provision with the Engineer. This includes, but is not limited to, the following:

Pre-Procurement Documentation Approval. The Contractor shall obtain approval of the conduit installation schedule and locate wire catalog cut sheets from the Engineer prior to purchasing, and subsequently performing the installation per the approved documents, contract plans, and specifications. The Contractor shall make all submissions to the Engineer through the Illinois Tollway Web Based Program Management (WBPM) system.

Locate Wire Installation

- LOCATE/TRACER WIRE for all trenched or plowed installations of optic fiber shall be solid copper.
- LOCATE/TRACER WIRE, DIRECTIONAL BORE for all bored optic fiber installations shall be steel core copper clad.
- The locate wire shall be installed with the optic fiber conduit in continuous lengths without splicing. All bends shall be made manually to prevent damage to the locate wire.
- 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.

- Trenched: The direct bury locate wire shall be uncoiled and placed in the trench on top of the optic fiber conduit. Periodically attach the locate wire to the exterior of the conduit using ty-raps or Velcro.
- Plowing: The plow shall be capable of plowing a cavity and placing the locate wire next to the conduit to the specified depth in a single operation without kinking or otherwise damaging the locate wire.
- Duct Package: The locate tracer wire shall be placed on the top center of the ductpackage.
- Directional Boring: The locator trace wire is installed in the bore path, outside the conduit(s).
- All trace wire will be terminated to a locate post located at each end of a fiber path and at every lateral or splice handhole.
- Where fiber conduit paths diverge, a locate/trace wire shall be installed for each path.

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

Basis of Payment. This work will be paid for at the contract unit price per foot for LOCATOR TRACER WIRE.

WARRANTY (ILLINOIS TOLLWAY)

Effective: January 11, 2010

Revised: May 24, 2024

GENERAL

This special provision amends and supersedes any previous warranty provisions and is in addition to the warranty requirements of Article 105.18 of the Illinois Tollway Supplemental Specifications.

The Contractor warrants that all work completed under the contract pay items, including all materials and workmanship furnished by the Contractor and subcontractors shall comply with the contract, and that the work shall be free from defects or failures for the period specified after commencement of the warranty period. The Contractor does not warrant the work against failures due to design defects, due to the Illinois Tollway's routine maintenance operations or due to the occurrence of acts of nature that the finished work was not designed to withstand.

The Contractor guarantees that after receipt of notice from the Illinois Tollway as provided herein, he/she shall perform the warranty work as specified in the notice in accordance with the warranty work actions specified herein including all necessary incidental work to complete the action and restore the complete facility, and damage to adjoining structures caused by failure of the warranted work, including but not limited to removal, engineering, material procurement, reinstallation, or replacement at the Contractor's cost and expense. The Illinois Tollway's remedies under this warranty are not exclusive but are in addition to any other remedies provided by this contract or law. The additional obligations undertaken by the Contractor to provide this warranty for the work and to perform in accordance herewith shall be secured by a performance and payment bond provided by the Contractor in a form furnished by the Illinois Tollway and said bond to remain in full force and effect for the duration of the warranty period.

For the purpose of this special provision, the following definitions shall apply:

Warranty: An assurance by the seller and/or manufacturer of a product that the goods or property will continue to perform as promised or represented and which provides for a specific remedy, such as repair or replacement, in the event the goods or property fails within a specific timeframe.
Guaranty: An assurance by the contractor that the specific Work will meet expected workmanship standards as stated in the contract or in accordance with industry standards and provides for a specific remedy, such as repair or replacement of the Work, if it fails within a specific timeframe.

Std. Sp/S.P.	DESCRIPTION	CONTRACTOR	MANUFACTURER
S.P.	FIBER OPTIC COMMUNICATIONS, ITS ASSEMBLY	1 year	1 year
S.P.	DYNAMIC MESSAGE SIGNS - TYPE 1	1 year	3 years
S.P.	DMS ELECTRICAL WORK - TYPE 1	1 year	3 years
S.P.	ITS POLE MOUNTED ENCLOSURE, ITS ASSEMBLY (CCTV or MVDS)	1 year	1 year
S.P.	ITS DISCONNECT SWITCH ASSEMBLY	1 year	1 year
S.P.	CLOSED CIRCUIT TELEVISION (CCTV) CAMERA, ITS ASSEMBLY	1 year	3 years

*Contractor to perform system calibration as part of the system installation, and again at 12, 24, and 36 months after contract completion.

COMMENCEMENT OF WARRANTY PERIOD

The Warranty Period Start Date shall be the Contract Completion date stated in the Chief Engineer's letter to the Contractor confirming that the Contractor has completed all work.

Commencement of warranty does not relieve the Contractor of any remaining or contractual obligations. Approval of the Warranty Period Start Date shall not be construed as final acceptance of the work of the contract not subject to approval.

The Contractor shall submit Tollway form A-27 documenting the warranty items and terms.

WARRANTY REQUIREMENTS

The Illinois Tollway will notify the Contractor of the need for corrective action. The Contractor shall perform corrective action promptly as defined in the notification. The notification will provide for a requested start date for performance of corrective action covered by the notice, and for a number of working days estimated to complete the corrective action. The Illinois Tollway and Contractor may agree upon a start date and reasonable period of performance to define prompt completion.

CONCRETE BARRIER BASE (SPECIAL)

Description. This work shall consist of constructing a concrete barrier base for concrete barrier wall as shown and detailed in the plans, and as directed by the Engineer.

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, and as directed by the Engineer.

A white membrane curing compound shall be placed on the vertical faces, including the keyway, next to the shoulders. The membrane curing compound shall be in accordance with Article 1022.01(c).

Method of Measurement. CONCRETE BARRIER BASE (SPECIAL) will be measured for payment in feet in place along the centerline of the barrier base. The concrete barrier wall of the specified type will be paid for separately under applicable pay items.

The concrete barrier base width shall be as defined in the plans.

Basis of Payment. This work will be paid for at the contract unit price per foot for CONCRETE BARRIER BASE (SPECIAL), which price shall include all equipment, labor, and materials necessary to construct the concrete barrier base including all keyways and hook bars extending into the concrete barrier wall or concrete barrier transition and tie bars as needed.

HIGH LOAD MULTI-ROTATIONAL BEARINGS

Effective: October 13, 1988

Revised: June 28, 2024

Description. This work shall consist of furnishing and installing High Load Multi-Rotational type bearing assemblies at the locations shown on the plans.

High Load Multi-Rotational (HLMR) bearings shall be the type as shown on the plans, which will be one of the following:

- a) **Pot Bearings.** These bearings shall be manufactured so that the rotational capability is provided by an assembly having a rubber disc of proper thickness, confined in a manner so it behaves like a fluid. The disc shall be installed, with a snug fit, into a steel cylinder and confined by a tight fitting piston. The outside diameter of the piston shall be no more than 0.03 in. (750 microns) less than the inside diameter of the cylinder at the interface level of the piston and rubber disc. The sides of the piston shall be beveled. PTFE sheets, or silicone grease shall be utilized to facilitate rotation of the rubber disc. Suitable brass sealing rings shall be provided to prevent any extrusion between piston and cylinder.
- b) **Shear Inhibited Disc Type Bearing.** The Structural Element shall be restricted from shear by the pin and ring design and need not be completely confined as with the Pot Bearing design. The disc shall be a molded monolithic Polyether Urethane compound.

These bearings shall be further subdivided into one or more of the following classes:

- 1) Fixed. These allow rotation in any direction but are fixed against translation.
- 2) Guided Expansion. These allow rotation in any direction but translation only in limited directions.
- 3) Non-Guided Expansion. These allow rotation and translation in any direction.

Suppliers: The Department maintains a pre-qualified list of proprietary structural systems allowed for High Load Multi-Rotational Bearings. This list can be found on the Departments web site under Prequalified Structural Systems. The Contractor's options are limited to those systems pre-qualified by the Department on the date that the contract was bid. These systems have been reviewed for structural feasibility and adequacy only. Presence on this list shall in no case relieve the Contractor of the site-specific design or QC/QA requirements stated herein.

The supplier shall notify the Department at least two weeks in advance of fabrication of the fabrication shop address. The fabricator shall provide evidence of current certification by AISC according to Article 106.08(e) of the Standard Specifications.

The overall depth dimension for the HLMR bearings shall be as specified on the plans. The horizontal dimensions shall be limited to the available bearing seat area.

Any modifications required to accommodate the bearings chosen shall be submitted to the Engineer for approval prior to ordering materials. Modifications may include the addition of steel filler plates or the adjustment of beam seat elevations. Adjustments to bridge seat elevations and accompanying reinforcement details shall be approved by the Structural Engineer of Record. Modifications required shall be made at no additional cost to the State. Inverted bearing or center-guided bearing configurations will not be permitted.

The Contractor shall comply with all manufacturer's material, fabrication and installation requirements specified.

Submittals. Shop drawings shall be submitted to the Engineer for approval according to Article 105.04 of the Standard Specifications. All steel filler plate details shall be included in the shop drawings. In addition the Contractor shall furnish certified copies of the bearing manufacturer's test reports on the physical properties of the component materials for the bearings to be furnished and a certification by the bearing manufacturer stating the bearing assemblies furnished conform to all the requirements shown on the plans and as herein specified. Submittals with insufficient test data and supporting certifications will be rejected.

Materials. The materials for the HLMR bearing assemblies shall be according to the following:

- (a) Elastomeric Materials. The rubber disc for Pot bearings shall be according to Article 1083.02(a) of the Standard Specifications.

- (b) Polytetrafluoroethylene (PTFE) Material. The PTFE material shall be according to Article 1083.02(b) of the Standard Specifications, except that it shall be dimpled lubricated with a maximum coefficient of friction of 0.02 on stainless steel. The dimpled and lubricated PTFE surface shall comply with AASHTO 14.7.2. The friction requirement shall be as specified in the Long Term Deterioration Test required for prequalification and the Sliding Friction Test as specified below.
- (c) Stainless Steel Sheets. The stainless steel sheets shall be of the thickness specified and shall be according to Article 1083.02(c).
- (d) Structural Steel. All structural steel used in the bearing assemblies shall be according to AASHTO M 270, Grade 50 (M 270M Grade 345), unless otherwise specified.
- (e) Threaded studs. The threaded stud, when required, shall conform to the requirements of Article 1083.02(d)(4) of the Standard Specifications.
- (f) Polyether Urethane for Disc bearings shall be according to all of the following requirements:

PHYSICAL PROPERTY	ASTM TEST METHOD	REQUIREMENTS	
Hardness, Type D durometer	D 2240	45 Min	65 Max
Tensile Stress, psi (kPa) At 100% elongation, min	D 412	1500 psi (10,350 kPa)	2300 psi (15,900 kPa)
Tensile Stress, psi (kPa) At 200% elongation, min	D 412	2800 psi (19,300 kPa)	4000 psi (27,600 kPa)
Tensile Strength, psi (kPa), min	D 412	4000 psi (27,600 kPa)	6000 psi (41,400 kPa)
Ultimate Elongation, %, min	D 412	350	220
Compression Set 22 hr. at 158 °F (70 °C), Method B %, max	D 395	40	40

The physical properties for a durometer hardness between the minimum and maximum values shown above shall be determined by straight line interpolation.

Design. The HLMR bearings shall be of the type and class specified and designed for the loads shown on the plans. Bearing details shown on the contract plans are a schematic representation of the bearing. Actual design of the bearing shall be by the supplier according to:

- the exact parameters specified in the Design Data table noted on the bridge plans,
- the appropriate AASHTO LRFD Bridge Design Specifications, and
- the IDOT Bridge Manual.

The design of the masonry and sole bearing plates are based on detail assumptions which may require modifications depending on the supplier chosen by the Contractor.

Fabrication. The bearings shall be complete factory-produced assemblies. They shall provide for rotation in all directions and for sliding, when specified, in directions as indicated on the plans. All bearings shall be furnished as a complete unit from one manufacturing source. All material used in the manufacture shall be new and unused with no reclaimed material incorporated into the finished assembly.

The translation capability for both guided and non-guided expansion bearings shall be provided by means of a polished stainless steel sliding plate that bears on a PTFE sheet bonded and recessed to the top surface of the piston or disc. The sliding element of expansion bearings shall be restrained against movement in the fixed direction by exterior guide bars capable of resisting the horizontal forces or 20 percent of the vertical design load on the bearing applied in any direction, whichever is greater. The sliding surfaces of the guide bar shall be of PTFE sheet and stainless steel. Guiding off of the fixed base, or any extension of the base, will not be permitted.

Structural steel plates shall be fabricated according to Article 505.04(I) of the Standard Specifications. Prior to shipment the exposed edges and other exposed portions of the structural steel plates shall be cleaned and given a corrosion protection coating as specified on the plans and according to the applicable Special Provisions and Articles 506.03 and 506.04 of the Standard Specifications. During cleaning and coating the stainless steel, PTFE sheet and neoprene shall be protected from abrasion and coating material.

PTFE sheets shall be bonded to steel under factory controlled conditions using heat and pressure for the time required to set the epoxy adhesive used. The PTFE sheet shall be free from bubbles and the sliding surface shall be burnished to an absolutely smooth surface.

The steel piston and the steel cylinder for pot bearings shall each be machined from a solid piece of steel. The steel base cylinder shall be either integrally machined, recessed into with a snug fit, or continuously welded to its steel masonry plate. If the sole plate and piston are not one piece, the piston shall be recessed $\frac{3}{8}$ inch into the sole plate.

If the bottom disc plate or base cylinder is recessed into the masonry plate, the designed thickness of the masonry plate shall take into account the depth of the recess. If the top disc plate is recessed into the sole plate, the designed thickness of the sole plate shall take into account the depth of the recess.

The shear resisting mechanism shall be machined from a solid piece of steel. Connection of the shear resisting mechanism to top and bottom disc plate shall be determined by the bearing fabricator.

Packaging. Each HLMR bearing assembly shall be fully assembled at the manufacturing plant and delivered to the construction site as complete units. The assemblies shall be packaged, crated or wrapped so the assemblies will not be damaged during handling, transporting and shipping. The bearings shall be held together with removable restraints so sliding surfaces are not damaged.

Centerlines shall be marked on both masonry and sole plates for alignment in the field. The bearings shall be shipped in moisture-proof and dust-proof covers.

Performance Testing. The following performance tests are required per lot on the project. A lot size shall be the number of bearings per class (fixed, guided expansion, non-guided expansion) on the project, but not to exceed 25 bearings per class. When multiple sizes of bearings are used on the same contract, they shall be grouped by class when determining lot sizes and amount of bearings to be tested. All tests shall be performed by the manufacturer prior to shipment.

Dimension Check. Each bearing shall be checked dimensionally to verify all bearing components are within tolerances. Failure to satisfy any dimensional tolerance shall be grounds for rejecting the bearing component or the entire bearing assembly.

Clearance Test. This test shall be performed on one bearing per lot. The bearing selected for this test shall be the one with the least amount of clearance based on the dimension check. The bearing assembly shall be loaded to its service limit state rated capacity at its full design rotation but not less than 0.02 radians to verify the required clearances exist. This test shall be performed twice for each bearing with the rotation oriented longitudinally with the bridge once in each direction. Any visual signs of rubbing or binding shall be grounds for rejection of the lot.

Proof Load Test. This test shall be performed on one bearing per lot. The bearing assembly shall be load tested to 150 percent of the service limit state rated capacity at a rotation of 0.02 radians. The load shall be maintained for 5 minutes, removed then reapplied for 5 minutes. If the load drops below the required value during either application, the test shall be restarted from the beginning. This test shall be performed twice for each bearing with the rotation oriented longitudinally with the bridge once in each direction.

The bearing shall be visually examined both during the test and upon disassembly after the test. Any resultant visual defects include, but are not limited to:

1. Extruded or deformed elastomer, polyether urethane, or PTFE.
2. Insufficient clearances such as evidence of metal to metal contact between the pot wall and the top or sole plate.
3. Damaged components such as cracked steel, damaged seal rings, or damaged limiting rings.
4. Bond failure.

If any of the above items are found it shall be grounds for rejection of the lot.

Sliding Friction Test. For expansion bearings, this test shall be performed on one bearing per lot. The sliding surfaces shall be thoroughly cleaned with a degreasing solvent. No lubrication other than that specified for the bearing shall be used. The bearing shall be loaded to its service limit state rated capacity for 1 hour prior to and throughout the duration of the sliding test. At least 12 cycles of plus and minus sliding with an amplitude equaling the smaller of the design displacement and 1 inch (25 mm) shall then be applied. The average sliding speed shall be between 0.1 inch and 1.0 inches (2.5 mm and 25 mm) per minute. The sliding friction coefficient shall be computed for each direction of each cycle and its mean and standard deviation shall be computed for the sixth through twelfth cycles.

The friction coefficient for the first movement and the mean plus two standard deviations for the sixth through twelfth cycles shall not exceed the design value used. In addition, the mean value for the sixth through twelfth cycles shall not exceed 2/3 of the design value used. Failure of either of these shall result in rejection of the lot.

The bearing shall also be visually examined both during and after the testing, any resultant defects, such as bond failure, physical destruction, or cold flow of the PTFE shall also be cause for rejection of the lot.

The Contractor shall furnish a notarized certification from the bearing manufacturer stating the HLMR bearings have been performance tested as specified, and a. purchase order prior to fabrication. The purchase order shall contain, as a minimum, the quantity and size of each type of bearing furnished. The notarized certifications and the purchase order shall be submitted in one package to the Engineer of Tests at the Bureau of Materials and Physical Research (126 East Ash Springfield, IL 62704). The Department reserves the right to perform any of the specified tests on one or more of the furnished bearings. If the tested bearing shows failure it shall be replaced and the remaining bearings shall be similarly tested for acceptance at the Contractor's expense.

The manufacturer shall furnish samples of component materials used in the bearings, for testing by the Department, to the Engineer of Tests at the Bureau of Materials and Physical Research (126 East Ash Springfield, IL 62704). The required components shall be those components of HLMR bearings that are consistent with elastomeric bearing components according to Article 1083.04 of the Standard Specifications.

Installation. The HLMR bearings shall be erected according to Article 521.05 of the Standard Specifications.

Exposed edges and other exposed portions of the structural steel plates shall be field painted as specified for Structural Steel.

Basis of Payment. This work will be paid for at the contract unit price each for HIGH LOAD MULTI-ROTATIONAL BEARINGS, POT , FIXED; HIGH LOAD MULTI-ROTATIONAL BEARINGS, POT, GUIDED EXPANSION; HIGH LOAD MULTI-ROTATIONAL BEARINGS, POT, NON-GUIDED EXPANSION; HIGH LOAD MULTI-ROTATIONAL BEARINGS, DISC, FIXED; HIGH LOAD MULTI-ROTATIONAL BEARINGS, DISC, GUIDED EXPANSION; or HIGH LOAD MULTI-ROTATIONAL BEARINGS, DISC, NON-GUIDED EXPANSION of the load capacity specified.

When the fabrication and erection of HLMR bearings is accomplished under separate contracts, the applicable requirements of Article 505.09 shall apply.

Fabricated HLMR bearings and other materials complying with the requirements of this item, furnished and accepted, will be paid for at the contract unit price each for FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, POT, FIXED; FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, POT, GUIDED EXPANSION; FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, POT, NON-GUIDED EXPANSION; FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, DISC, FIXED; FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, DISC, GUIDED EXPANSION; or FURNISHING

HIGH LOAD MULTI-ROTATIONAL BEARINGS, DISC, NON-GUIDED EXPANSION of the load capacity specified.

Storage and care of fabricated HLMR bearings and other materials complying with the requirements of this item by the Fabrication Contractor beyond the specified storage period, will be paid for at the contract unit price per calendar day for STORAGE OF HIGH LOAD MULTI-ROTATIONAL BEARINGS if a pay item is provided for in the contract, or will be paid for according to Article 109.04 if a pay item is not provided in the contract.

HLMR bearings and other materials fabricated under this item erected according to the requirements of the specifications, and accepted, will be paid for at the contract unit price each for ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, POT, FIXED; ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, POT, GUIDED EXPANSION; ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, POT, NON-GUIDED EXPANSION; ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, DISC, FIXED; ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, DISC, GUIDED EXPANSION; or ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, DISC, NON-GUIDED EXPANSION of the load capacity specified.

MODULAR EXPANSION JOINT

Effective: May 19, 1994

Revised: October 27, 2023

Description. This work shall consist of furnishing and installing a modular expansion joint(s) as shown on the plans, and according to applicable portions of Section 520 of the Standard Specifications.

General. The expansion joint device shall be capable of handling the specified longitudinal movement. In addition, when specified, the joint shall also be capable of handling the differential non-parallel longitudinal movement. The expansion joint device shall effectively seal the joint opening in the deck surface and barrier curbs against the entrance of water and foreign materials. There shall be no appreciable change in the deck surface plane with the expansion and contraction movements of the bridge.

The device shall consist of a shop-fabricated modular assembly of transverse elastomeric seals, edge and center beams, bearing on support bars spanning the joint opening. The assembly shall maintain equal distances between intermediate support rails, at any cross section, for the entire length of the joint. The assembly shall be stable under all conditions of expansion and contraction.

The noise level of the joint in service shall meet all Federal and State of Illinois noise requirements.

At sidewalks, concrete median barriers and concrete parapet joints, a sliding steel plate shall be fabricated and installed according to the plans. Painting or galvanizing of sliding steel plates shall be as specified on the plans.

Suppliers: The Department maintains a pre-qualified list of proprietary structural systems allowed for modular expansion joints. This list can be found on the Departments web site under Prequalified Structural Systems. The Contractor's options are limited to those systems pre-qualified by the Department on the date that the contract was bid. These systems have been reviewed for structural feasibility and adequacy only. Presence on this list shall in no case relieve the Contractor of the site-specific design or QC/QA requirements stated herein.

The supplier shall notify the Department at least two weeks in advance of fabrication of the fabrication shop address. The fabricator shall provide evidence of current certification by AISC according to Article 106.08(e) of the Standard Specifications.

Submittals: Shop drawings and a copy of the calculations and support documents shall be submitted to the Engineer for approval according to Article 105.04 of the Standard Specifications. Calculations shall be sealed by an Illinois Licensed Professional Engineer. Submittals will be required for each modular expansion joint device specified. In addition, the Contractor shall provide the Department with a certification of compliance by the manufacturer listing all materials in the system. The certification shall attest that the system conforms to the design requirements, material requirements, and that all components of the joint are the same as what was included in the prequalification submittal that was successfully tested in the OMV, seal push out, and fatigue tests of Section 19, Appendix 19, Article 5.1, 5.2, and 5.3 of the AASHTO LRFD Bridge Construction Specifications. Submittals with insufficient test data and supporting certifications will be rejected.

The shop drawings shall include tables showing the total anticipated movements for each joint and the required setting width of the joint assemblies at various temperatures.

The shop drawings shall include installation drawings or details showing locations and details of temporary installation supports, and joint assembly components, in relation to the adjacent primary structural beams, girders, or members. These details shall demonstrate that the proposed modular expansion joint is designed to fit and operate around all primary structural members within the space provided on the contract plans.

Fabrication: Fabricators of the modular expansion device(s) are required to meet the following tolerances:

Allowable variation in straightness of center beam rails Length < 30' Length 30' to 45' Length > 45'	1/8" per 10' total length 3/8" $3/8" + 1/8" * (\text{total length (feet)} - 45') / 10'$
Allowable lateral variation in specified location of support boxes	±1/4"
Allowable lateral variation in specified location of stirrup or other attachments to center beam	±1/16"
Allowable variation in total depth	±1/8"
Allowable vertical dimension variation of all components	±1/8"
Allowable variation from specified elevation end squareness or skew	±1/8"
Allowable variation in overall length of joint	±1"

Metallic attachments used to secure elastomeric seals to centerbeams, if welded to the centerbeams and edge beams, shall be welded continuously along either their top or bottom edges.

Run off tabs shall be used for stirrup or other attachments to the center beam full penetration welds.

Design Requirements: The maximum vertical, transverse and horizontal rotations and displacements shall be defined and included in the design.

The expansion joint device(s) shall be designed, detailed and successfully tested, according to Section 14 of the AASHTO LRFD Bridge Design Specifications.

The design forces used for centerbeam to support bar analysis shall be taken at the centerline of the centerbeam.

The maximum fatigue resistance of any detail shall not exceed that associated with the fatigue category prescribed in the table below.

Type of Detail	Maximum Permitted Category
Welded Multiple Centerbeam to Support Bar Connections	C
Weld Stirrup Attachments for Single Support Bar Systems	C
Bolted Stirrup Attachments for Single Support Bar Systems	D
Groove Welded Centerbeam Splices	B
Miscellaneous Welded Connections ¹	C
Miscellaneous Bolted Connections	D

¹Miscellaneous connections include attachments for equidistant devices and any metallic attachments to the centerbeams or edge beams that are used to secure the elastomeric seals.

In addition, expansion joint device(s) shall be designed for the vehicular live load as specified on the General, Plan, and Elevation sheet of the plans across the entire width of the structure.

Top, bottom and sides of support bars shall be restrained to prevent uplift, transmit bearing loads, and maintain the lateral position of the bars.

The total service movement of each individual sealing element shall not exceed 3 in. (75 mm).

The joint supplier shall design, layout, and detail the modular expansion joint assembly and components to miss existing or proposed structural beams, girders, or members. Cutting of structural members to install joint assemblies shall not be permitted.

Materials:

- (a) Metals. Structural Steel. All structural steel, except stainless steel, shall be according to AASHTO M 270, Grade 50 or 50W (M 270M Grade 345), unless otherwise specified. All structural steel, except stainless steel, shall be hot-dip galvanized according to ASTM A123 or A153 as applicable.

Stainless steel sheets for the sliding surfaces of the support bars shall conform to the requirements of ASTM A240 (A240M) type 302 or 304. Stainless steel mating surfaces shall require a No. 8 finish. For non-mating surfaces a 2B finish is required.

The use of aluminum components in the modular joint will not be allowed.

- (b) Preformed Elastomeric Seals. The elastomeric sealing element shall be according to ASTM D5973.

Lubricant/Adhesive for installing the preformed elastomeric elements in place shall be a one-part, moisture-curing, polyurethane and hydrocarbon solvent mixture as recommended by the manufacturer and containing not less than 65 percent solids.

- (c) Support Bar Bearings. Support bar bearings shall be fabricated from elastomeric pads with polytetrafluorethylene (PTFE) surfacing or from polyurethane compound with PTFE sliding surfaces. The elastomeric and PTFE materials shall meet the requirements of Section 1083 of the Standard Specifications.

- (d) Support Bars. Support bars shall incorporate stainless steel sliding surfaces to permit joint movement.

Construction Requirements

General. Installation of expansion devices shall be according to the plans and shop drawings.

The fabricator of the modular joint assembly shall be AISC certified according to Article 106.08 for Bridge and Highway Metal Component Manufacturers. In lieu of AISC certification, the Contractor may have all welding on main members (support bars and center beams) observed and inspected by independent (third party) personnel at the Contractor's expense. Welding shall then be observed by a Certified Welding Inspector (CWI) in addition to the manufacturer's own welding inspection. Third-party Non-Destructive Examination (NDE) shall be performed by inspector(s), certified as level II in applicable methods, and all complete penetration beam-to-bar welds and butt joints in beams shall be UT inspected and 10 percent of fillet and partial pen welds shall be MT inspected.

The manufacturer of the expansion device shall provide a qualified technical service representative to supervise installation. Modular expansion joint devices shall be factory prefabricated assemblies, preset by the manufacturer prior to shipment with provisions for field adjustment for the ambient temperature at the time of installation.

Unless otherwise shown on the plans, the neoprene seals shall be continuous without any field splices. Installation of the joint seals shall be performed by a trained representative of the Manufacturer.

The metal surfaces in direct contact with the neoprene seals shall be blast cleaned to permit a high strength bond of the lubricant/adhesive between the neoprene seal and mating metal surfaces.

The Contractor shall anticipate and make all necessary adjustments to existing or plan-specified reinforcement bars, subject to the approval of the Engineer, in order to prevent interferences with placement of the selected joint in the structure. Any adjustments to reinforcement bars interfering with the joint installation shall be the responsibility of the Contractor and preapproved by the Engineer prior to installation of the joint. Cutting of reinforcement shall be minimized, and any bars that are cut shall be replaced in-kind at no additional cost.

The prefabricated joint assembly shall be properly positioned and attached to the structure according to the manufacturer's approved shop drawings. The attachment shall be sufficiently rigid to prevent non-thermal rotation, distortion, or misalignment of the joint system relative to the deck prior to casting the concrete. The joints shall be adjusted to the proper opening based on the ambient temperature at the time of installation and then all restraints preventing thermal movement shall be immediately released and/or removed. The joint upturn may be recessed 1 inch into the parapet to allow for lateral adjustment. The joint assembly units shall be straight, parallel and in proper vertical alignment or reworked until proper adjustment is obtained prior to casting of the concrete around the joint.

After the joint system is installed, the joint area shall be flooded with water and inspected, from below for leakage. If leakage is observed, the joint system shall be repaired, at the expense of the Contractor, as recommended by the manufacturer and approved by the Engineer.

Method of Measurement. This work will be measured for payment in place, in feet (meters), along the centerline of the joint. All sliding plate assemblies at the sidewalks, parapets and median barriers will not be measured for payment. The size will be defined as the specified longitudinal movement rounded up to the nearest 3 inch (75 mm) increment.

Basis of Payment: When only a longitudinal movement is specified, this work will be paid for at the contract unit price per foot (meter) for the MODULAR EXPANSION JOINT, of the size specified. When a differential non-parallel movement is also specified, this work will be paid for at the contract unit price per foot (meter) for the MODULAR EXPANSION JOINT-SWIVEL, of the size specified.

All materials, equipment and labor required to fabricate, paint and install the sliding plate assemblies at the sidewalks, parapets and median barriers will not be paid for separately but shall be included in the price for the expansion joint specified.

When the fabrication and erection of modular expansion joint is accomplished under separate contracts, the applicable requirements of Article 505.09 shall apply, except the furnishing pay items shall include storage and protection of fabricated materials up to 75 days after the completion dates.

Fabricated modular expansion joints and other materials complying with the requirements of this item, furnished and accepted, will be paid for at the contract unit price per foot (meter) for FURNISHING MODULAR EXPANSION JOINT or FURNISHING MODULAR EXPANSION JOINT – SWIVEL of the size specified.

Storage and care of fabricated joints and other materials complying with the requirements of this item by the Fabrication Contractor beyond the specified storage period, will be paid for at the contract unit price per calendar day for STORAGE OF MODULAR EXPANSION JOINTS if a pay item is provided for in the contract, or will be paid for according to Article 109.04 if a pay item is not provided in the contract.

Modular expansion joints and other materials erected according to the requirements of the specifications, and accepted, will be paid for at the contract unit price per foot (meter) for ERECTING MODULAR EXPANSION JOINT or ERECTING MODULAR EXPANSION JOINT - SWIVEL of the size specified.

DIAMOND GRINDING AND SURFACE TESTING BRIDGE SECTIONS

Effective: December 6, 2004

Revised: April 15, 2022

Description. This work shall consist of diamond grinding and surface testing bridge sections.

The bridge section shall consist of the bridge deck plus the bridge approach slab and pavement connector, if present, at each end of the bridge.

Equipment. Equipment shall be according to the following.

- (a) Diamond Grinder. The diamond grinder shall be a self-propelled planing machine specifically designed for diamond saw grinding. It shall be capable of accurately establishing the profile grade and controlling the grinding cross slope. It shall also have an effective means for removing excess material and slurry from the surface and for preventing dust from escaping into the air. The removal of slurry shall be continuous throughout the grinding operation. The slurry shall be disposed of according to Article 202.03.

The grinding head shall be a minimum of 4 ft. (1.2 m) wide and the diamond saw blades shall be gang mounted on the grinding head at a rate of 50 to 60 blades / ft. (164 to 197 blades/m).

- (b) Surface Testing Equipment. Required surface testing and analysis equipment and their jobsite transportation shall be provided by the Contractor. The Profile Testing Device shall be according to Illinois Test Procedure 701 except the trace analysis shall be based on traces from bridge sections.

CONSTRUCTION REQUIREMENTS

General. After all components have been properly cured, the bridge section shall be ground over its entire length and over a width that extends to within 2 ft. (600 mm) of the curbs or parapets. Grinding shall be done separately before any saw cut grooving, and no concurrent combination of the two operations will be permitted. Whenever possible, each subsequent longitudinal grinding pass shall progress down the cross slope from high to low. The maximum thickness removed shall be 1/4 inch (6 mm); however, when the bridge deck thickness noted on the plans can be maintained, as a minimum, additional removal thickness may be permitted.

The grinding process shall produce a pavement surface that is true in grade and uniform in appearance with longitudinal line-type texture. The line-type texture shall contain corrugations parallel to the outside pavement edge and present a narrow ridge corduroy type appearance. The peaks of the ridges shall be 1/8-inch +/- 1/16-inch (3 mm +/- 1.5 mm) higher than the bottom of the grinding with evenly spaced ridges. It shall be the Contractor's responsibility to select the actual number of blades per foot (meter) to be used to provide the proper surface finish for the aggregate type and concrete present on the project within the limits specified above.

The vertical difference between longitudinal passes shall be 1/8 inch (3 mm) maximum. The grinding at the ends of the bridge section shall be diminished uniformly at a rate of 1:240 over the pavement connectors.

Grinding shall be continuous through all joints. All expansion joints and bridge components under the joints shall be protected from damage or contact with the grinding slurry.

Surface Testing. The diamond ground bridge section shall be surface tested in the presence of the Engineer prior to opening to traffic.

A copy of the approval letter and recorded settings from the Profile Equipment Verification (PEV) Program shall be submitted to the Engineer prior to testing.

The Contractor shall notify the Engineer a minimum of 24 hours prior to commencement of measurements. All objects and debris shall be removed from the bridge section surface prior to testing. During surface testing, joint openings may be temporarily filled with material approved by the Engineer.

Profiles shall be taken in both wheel paths of each lane, 3 ft. (1 m) from, and parallel to, the planned lane lines.

The profile report shall have stationing indicated every 500 ft. (150 m) at a minimum. The profile report shall include the following information: contract number, structure number, beginning and ending stationing, which lane was tested, direction of travel on the trace, date of collection, time of collection, ambient air temperature at time of collection, and the device operator name(s). The data file created from the testing will be submitted to the Engineer and the Bureau of Research for analysis. The file shall be in a format that is compatible with ProVAL software (ERD, PPF).

Trace Reduction and Bump Locating Procedure. All traces shall be reduced using ProVal. This software shall calculate the Mean International Roughness Index (MRI) in inches/mile (mm/km) and indicate any areas of localized roughness in excess of 200 inches/mile (3105 mm/km) on a continuous 25 feet (8 meters) basis.

The average MRI and locations with deviations exceeding the 200 inches/mile (3105 mm/km) limit will be recorded on the Profile Report for Bridge Deck Smoothness.

All ProVAL files shall be provided to the Engineer within two working days of completing the testing. Bureau of Construction Form BC 2450 shall be provided to the Engineer. An example Form BC 2450 is attached. All files shall contain serial numbers for the vehicle and profiling equipment, the approved settings from the PEV program. The Engineer will compare these settings with the approved settings from the PEV Program. If the settings do not match, the results will be rejected and the section shall be retested/reanalyzed with the appropriate settings.

Corrective Actions. Within the bridge section, all deviations in excess of 200 inches/mile (1575 mm) within any continuous length of 25 ft. (8 m) shall be corrected. Correction of deviations shall not result in the deck thickness being less than the minimum. Where corrective work is performed, the bridge section shall be retested to verify that corrections have produced a MRI of 200 inch/mile (3105 mm/km) within an continuous length of 25 ft (8 m) or less for each lane. The Contractor shall furnish and Form BC 2450 the ProVAL files to the Engineer and the Bureau of Research within two working days after any corrections are made.

Corrective actions shall be performed at no additional cost to the department.

The Engineer may perform profile testing on the surface at any time for monitoring and comparison purposes.

Method of Measurement. This work will be measured for payment in place and the area computed in square yards (square meters) of diamond grinding performed.

Basis of Payment. This work will be paid for at the contract unit price per square yard (square meter) for DIAMOND GRINDING (BRIDGE SECTION).

Instructions for Completing Bridge Deck Smoothness Assessment Summary ALR

This form shall be prepared and submitted, along with the raw data files, to the Engineer.

Report Type:

Initial – Testing of bridge section prior to any smoothness grinding.

Intermediate – After initial pass of smoothness grinding has been completed.

Final – All smoothness grinding has been completed.

Other information:

Submission Date – Date in which it has been submitted to the Engineer

Project Type – New Deck, Microsilica Overlay, Latex Overlay, Fly Ash Overlay

Specification Effective Date – revision date of the specification in the contract

Begin ALR Section 1 – beginning station of ALR finding

End ALR Section 1 – end station of ALR finding

Distance – End ALR minus the Begin ALR station number

MRI – The value of the ALR at that location.



Bridge Deck Smoothness Assessment Summary

Areas of Localized Roughness

This worksheet is intended as a reference for documenting Areas of Localized Roughness (ALR) as described in GBSP-59.					
Contract Information		Contact Info			
Contract	60111	IDOT RE Name	Jerry Jones		
District	1	IDOT RE E-Mail	Jerry.Jones2@illinois.gov		
Letting Date	1/15/2022	IDOT RE Phone	217-555-4183		
Item #	26	Contractor Rep. Name	Bob Builder		
Route	IL 164	Contractor Rep. E-Mail	Bob.Builder@RTBRConstr.com		
Report Type (Initial or Post Grinding)	Initial	Contractor Rep. Phone	217-555-2822		
Lane	Driving	General Comments			
Direction	Eastbound				
Begin Station	13+45.00				
End Station	14+65.00				
Contractor	Bob the Bridge Builder				
Submission Date	4/1/2022				
Overlay Type	Microsilica				
Specification Effective Date	1/1/2022				
Begin ALR Section 1	13+56.00			Distance (ft)	MRI (in/mi)
End ALR Section 1	13+64.20			8.2	256.40
Begin ALR Section 2	14+04.60	1.4	278.90		
End ALR Section 2	14+06.00				
Begin ALR Section 3					
End ALR Section 3					
Begin ALR Section 4					
End ALR Section 4					
Begin ALR Section 5					
End ALR Section 5					
Begin ALR Section 6					
End ALR Section 6					
Begin ALR Section 7					
End ALR Section 7					
Begin ALR Section 8					
End ALR Section 8					
Begin ALR Section 9					
End ALR Section 9					
Begin ALR Section 10					
End ALR Section 10					

SLIPFORM PARAPET

Effective: June 1, 2007

Revised: April 15, 2022

The following shall be added to the end of Article 503.16(b) of the Standard Specifications.

- (3) Slipforming parapets. Unless otherwise prohibited herein or on the plans, at the option of the Contractor, concrete parapets on bridge decks may be constructed by slipforming in lieu of the conventional forming methods. Slipforming will not be permitted for curved parapets on a radius of 1500 ft (457 m) or less.

The slipform machine shall be self-propelled and have automatic horizontal and vertical grade control. For 34 in. (864 mm) and 39 in. (991 mm) tall parapets the machine shall be equipped with a minimum of four (4) vibrators. For 42 in. (1.067 m) and 44 in. (1.118 m) tall parapets the machine shall be equipped with a minimum of five (5) vibrators. The equipment shall be approved by the Engineer before use.

If the Contractor wishes to use the slipform parapet option for 42 in. (1.067 m) or 44 in. (1.118 m) tall parapets he/she shall construct an acceptable test section in a temporary location to demonstrate his/her ability to construct the parapets without defect. The test section shall be constructed under similar anticipated weather conditions, using the same means and methods, equipment, equipment vibrator settings, travel speed, operator, concrete plant, concrete mix design, and slump as proposed for the permanent slipform parapets.

The test section shall be at least 30 feet (9 meters) in length and shall be of the same cross section shown on the plans. The contractor shall place all of the reinforcement embedded in the parapet as shown on the plans. Upon completion of the test section, the Contractor shall saw cut the test section into 2 ft (600 mm) segments and separate the segments for inspection by the Engineer. Test sections containing segments showing voids adjacent to a reinforcement bar, 1/4 square inch (160 square millimeters) or more in area and extending along the reinforcement bar into the section, or showing excessive voids not adjacent to reinforcement bars 1/4 square inch (160 square millimeters) or more in area, or showing cracking extending through a segment, shall be considered unacceptable.

The test section shall demonstrate to the satisfaction of the Engineer that the Contractor can slipform the parapets on this project without defects. The acceptance of the test section does not constitute acceptance of the slipform parapets in place.

The concrete mix design may combine two or more coarse aggregate sizes, consisting of CA-7, CA-11, CA-13, CA-14, and CA-16, provided a CA-7 or CA-11 is included in the blend in a proportion approved by the Engineer.

The slipform machine travel speed shall not exceed the lesser of 3 ft (0.9 m) per minute, or the speed used to construct the acceptable test section. Any time the speed of the machine drops below 0.5 ft (150 mm) per minute will be considered a stoppage of the slipforming operation, portions of parapet placed with three or more intermittent stoppages within any 15 ft (4.6 m) length will be rejected. The contractor shall schedule concrete delivery to maintain a uniform delivery rate of concrete into the slipform machine. If delivery of concrete from the

truck into the slipforming machine is interrupted by more than 15 minutes, the portion of the wall within the limits of the slipform machine will be rejected.

If the Contractor elects to slipform, the parapet cross-sectional area and reinforcement bar clearances shall be revised according to the details for the Concrete Parapet Slipforming Option. In addition, if embedded conduit(s) are detailed, then the contractor shall utilize the alternate reinforcement as detailed.

The use of cast-in-place anchorage devices for attaching appurtenances and/or railings to the parapets will not be allowed in conjunction with slipforming of parapets. Alternate means for making these attachments shall be as detailed on the plans or as approved by the Engineer.

All reinforcement bar intersections within the parapet cross section shall be 100 percent tied utilizing saddle ties, wrap and saddle ties, or figure eight ties to maintain rigidity during concrete placement. At pre-planned sawcut joints in the parapet, Glass Fiber Reinforced Polymer (GFRP) reinforcement shall be used to maintain the rigidity of the reinforcement cage across the proposed joints as detailed for the Concrete Parapet Slipforming Option.

Glass Fiber Reinforced Polymer (GFRP) reinforcement shall be subject to approval by the Engineer. Other non-ferrous reinforcement may be proposed for use but shall be subject to approval by the Engineer. GFRP reinforcement shall be tied the same as stated in the previous paragraph.

The Contractor may propose supplemental reinforcement for stiffening to prevent movement of the reinforcement cage and/or for conduit support subject to approval by the Engineer.

Clearances for these bars shall be the same as shown for the required bars and these bars shall be epoxy coated. If the additional reinforcement is used, it shall be at no additional cost to the Department.

For projects with plan details specifying parapet joints spaced greater than 20 ft (6 m) apart, additional sawcut joints, spaced between 10 ft (3 m) and 20 ft (6 m), shall be placed as directed by the Engineer. The horizontal reinforcement extending through the proposed joints shall be precut to provide a minimum of 4 in. (100 mm) gap, centered over the joint, between rebar ends. The ends of the reinforcement shall be repaired according to Article 508.04.

After the slipform machine has been set to proper grade and prior to concrete placement, the clearance between the slipform machine inside faces and reinforcement bars shall be checked during a dry run by the Contractor in the presence of the Engineer. The dry run shall not begin until the entire reinforcing cage has been tied and the Engineer has verified and approved the placement and tying of the reinforcing bars. Any reinforcement bars found to be out of place by more than $\frac{1}{2}$ in. (13 mm), or any dimensions between bars differing from the plans by more than $\frac{1}{2}$ in. (13 mm) shall be re-tied to the plan dimensions.

During the dry run and in the presence of the Engineer, the Contractor shall check the clearance of the reinforcement bars from the inside faces of the slipform mold. In all locations, the Contractor shall ensure the reinforcement bars have the minimum cover distance shown on the plans. This dry run check shall be made for the full distance that is anticipated to be placed in the subsequent pour. Reinforcement bars found to have less than the minimum clearance shall be adjusted, and the dry run will be performed again, at least in any locations that have been readjusted.

For parapets adjacent to the watertable, the contractor shall, for the duration of the construction and curing of the parapet, provide and maintain an inspection platform along the back face of the parapet. The inspection platform shall be rigidly attached to the bridge superstructure and be of such design to allow ready movement of inspection personnel along the entire length of the bridge.

The aluminum cracker plates as detailed in the plans shall be securely tied in place and shall be coated or otherwise treated to minimize their potential reaction with wet concrete. In lieu of chamfer strips at horizontal and vertical edges, radii may be used. Prior to slipforming, the Contractor shall verify proper operation of the vibrators using a mechanical measuring device subject to approval by the Engineer.

The top portion of the joint shall be sawcut as shown in the details for the Concrete Parapet Slipforming Option. Sawing of the joints shall commence as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling. All joints shall be sawed to the full thickness before uncontrolled shrinkage cracking takes place, but no later than 8 hours after concrete placement. The sawcut shall be approximately 3/8 in. (10 mm) wide and shall be performed with a power circular concrete saw. The joints shall be sealed with an approved polyurethane sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25, Use T, to a minimum depth of 1/2 in. (12 mm), with surface preparation and installation according to the manufacturer's written instructions. Cork, hemp, or other compressible material may be used as a backer. The sawcut will not require chamfered edges.

Ends of the parapet shall be formed and the forms securely braced. When slipforming of parapets with cross sectional discontinuities such as light standards, junction boxes or other embedded appurtenances except for name plates, is allowed, the parapet shall be formed for a minimum distance of 4 ft (1.2 m) on each side of the discontinuity.

For acceptance and rejection purposes a parapet section shall be defined as the length of parapet between adjacent vertical parapet joints.

The maximum variance of actual to proposed longitudinal alignment shall not exceed $\pm 3/4$ in. (20 mm) with no more than 1/4 inch in 10 ft (6 mm in 3 m). Notwithstanding this tolerance, abrupt variance in actual alignment of 1/2 inch in 10 ft (13 mm in 3 m) will be cause for rejection of the parapet section.

In addition, all surfaces shall be checked with a 10 ft (3 m) straight edge furnished and used by the Contractor as the concrete is extruded from the slipform mold. Continued variations in the barrier surface exceeding 1/4 in. in 10 ft (6 mm in 3 m) will not be permitted and remedial action shall immediately be taken to correct the problem.

The use of equipment or methods which result in dimensions outside the tolerance limits shall be discontinued. Parapet sections having dimensions outside the tolerance limits will be rejected.

Any visible indication that less than specified cover of concrete over the reinforcing bars has been obtained, or of any cracking, tearing, or honeycombing of the plastic concrete, or any location showing diagonal or horizontal cracking will be cause for rejection of the parapet section in which they are found.

The vertical surfaces at the base of the barrier within 3 in. (75 mm) of the deck surface shall be trowelled true after passage of the slipform machine. Hand finishing of minor sporadic surface defects may be allowed at the discretion of the Engineer. All surfaces of the parapet except the top shall receive a final vertical broom finish. Any deformations or bulges remaining after the initial set shall be removed by grinding after the concrete has hardened.

Slipformed parapets shall be wet cured according to either Article 1020.13(a)(3) or Article 1020.13(a)(5). For either method, the concrete surface shall be covered within 30 minutes after it has been finished. The cotton mat or burlap covering shall be held in place with brackets or another method approved by the Engineer. The Contractor shall have the option, during the period from April 16 through October 31, to delay the start of wet curing by applying a linseed oil emulsion curing compound. Exercising this option waives the requirement for protective coat according to Article 503.19. The linseed oil emulsion shall be according to Article 1022.01 and shall be applied according to Articles 1020.13 Notes-General 8/ and 1020.13(a)(4). The delay for wet curing shall not exceed 3 hours after application of the linseed oil emulsion.

A maximum of three random 4 in. (100 mm) diameter cores per 100 ft (30 m) of parapet shall be taken as directed by the Engineer, but no less than two random cores shall be taken for each parapet pour. At least one core shall be located to intercept a horizontal bar in the upper half of the parapet. Unless otherwise directed by the Engineer, coring shall be accomplished within 48 hours following each parapet pour. Separate parapets poured on the same date shall be considered separate pours. Random cores will not be measured for payment.

The Engineer will mark additional locations for cores where, in the sole opinion of the Engineer, the quality of the slipformed parapet is suspect.

The Engineer or his/her representative will be responsible for evaluation the cores. Any cores showing voids adjacent to a reinforcement bar 1/4 square inch (160 square millimeters) or more in area and extending along the reinforcement bar into the section, or showing excessive voids not adjacent to reinforcement bars 1/4 square inch (160 square millimeters) or more in area, or showing cracking, shall be considered unacceptable and the parapet section from which it was taken will be rejected. Parapets with less than 1½ inches of concrete cover over the reinforcement shall be rejected.

Rejected parapet sections shall be removed and replaced for the full depth cross-section of the parapet except that concrete cover between 1 inch and 1½ inches may be open to remedial action subject to the approval of the Engineer. Such action could entail up to and including removal and replacement.

The minimum length of parapet removed and replaced shall be 3 ft (1 m). Cores may be required to determine the longitudinal extent of removal and replacement if it can not be determined and agreed upon by other means (i.e. visual, sounding, non-destructive testing, etc.).

Any parapet section with more than one half of its length rejected or with remaining segments less than 10 ft (3 m) in length shall be removed and replaced in its entirety.

If reinforcement bars are damaged during the removal and replacement, additional removal and replacement shall be done, as necessary, to ensure minimum splice length of replacement bars. Any damage to epoxy coating of bars shall be repaired according to Article 508.04.

All remaining core holes will be filled with a non-shrink grout meeting the requirements of Section 1024.

Basis of Payment. When the Contractor, at his/her option, constructs the parapet using slipforming methods, no adjustment in the quantities for Concrete Superstructures and Reinforcement Bars, Epoxy Coated to accommodate this option will be allowed. Compensation under the contract bid items for Concrete Superstructures and Reinforcement Bars, Epoxy Coated shall cover the cost of all work required for the construction of the parapet and any test section(s) required, and for any additional costs of work or materials associated with slipforming methods.

BRIDGE DECK CONSTRUCTION

Effective: October 22, 2013

Revised: December 21, 2016

When Diamond Grinding of Bridge Sections is specified, hand finishing of the deck surface shall be limited to areas not finished by the finishing machine and to address surface corrections according to Article 503.16(a)(2). Hand finishing shall be limited as previously stated solely for the purpose of facilitating a more timely application of the curing protection. In addition the requirements of 503.16(a)(3)a. and 503.16(a)(4) will be waived.

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

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

Revise Article 503.06(b)(1) to read as follows.

- “(1) Bracket Placement. The spacing of brackets shall be per the manufacturer’s published design specifications for the size of the overhang and the construction loads anticipated. The resulting force of the leg brace of the cantilever bracket shall bear on the web within 6 inches (150 mm) of the bottom flange of the beam or girder.”

Revise Article 503.06(b)(2) to read as follows.

- “(2) Beam Ties. The top flange of exterior steel beams or girders supporting the cantilever forming brackets shall be tied to the bottom flange of the next interior beam. The top flange of exterior concrete beams supporting the cantilever forming brackets shall be tied to the top flange of the next interior beam. The ties shall be spaced at 4 ft (1.2 m) centers. Permanent cross frames on steel girders may be considered a tie. Ties shall be a minimum of 1/2 inch (13 mm) diameter threaded rod with an adjusting mechanism for drawing the tie taut. The ties shall utilize hanger brackets or clips which hook onto the flange of steel beams. No welding will be permitted to the structural steel or stud shear connectors, or to reinforcement bars of concrete beams, for the installation of the tie bar system. After installation of the ties and blocking, the tie shall be drawn taut until the tie

does not vary from a straight line from beam to beam. The tie system shall be approved by the Engineer.”

Revise Article 503.06(b)(3) to read as follows.

“(3) Beam Blocks. Suitable beam blocks of 4 in x 4 in (100 x 100 mm) timbers or metal structural shapes of equivalent strength or better, acceptable to the Engineer, shall be wedged between the webs of the two beams tied together, within 6 inches (150 mm) of the bottom flange at each location where they are tied. When it is not feasible to have the resulting force from the leg brace of the cantilever brackets transmitted to the web within 6 inches (150 mm) of the bottom flange, then additional blocking shall be placed at each bracket to transmit the resulting force to within 6 inches (150 mm) of the bottom flange of the next interior beam or girder.”

Delete the last paragraph of Article 503.06(b).

BRIDGE DECK GROOVING (LONGITUDINAL)

Effective: December 29, 2014

Revised: March 29, 2017

Revise Article 503.16(a)(3)b. to read as follows.

b. Saw Cut Grooving. The grooving operation shall not be started until after the expiration of the required curing or protection period and after correcting excessive variations by grinding or cutting has been completed.

The grooves shall be cut into the hardened concrete, parallel to the centerline of the roadway, using a mechanical saw device equipped with diamond blades that will leave grooves 1/8 in. wide and 3/16 in. \pm 1/16 in. deep (3 mm wide and 5 mm \pm 1.5 mm deep), with a uniform spacing of 3/4 in. \pm 1/16 in. (20 mm \pm 1.5 mm) centers. The grooving shall typically extend the full width of the traffic lanes and terminate at the edge of the traffic lane or shoulder. If the bridge has a variable width traffic lane, the grooving shall remain parallel to the centerline of the main roadway. Any staggering of the groove terminations to accommodate the variable width shall be within the shoulders. Grooves shall not be cut closer than 3 inches (75 mm) nor further than 6 inches (150 mm) from any construction joint running parallel to the grooving. In addition, grooves shall not be cut within 6 in. \pm 1 in. (150 mm \pm 25 mm) from deck drains and expansion joints.

The grooving machine shall contain diamond blades mounted on a multi-blade arbor on a self-propelled machine built for grooving hardened concrete surfaces. The grooving machine shall have a depth control device that detects variations in the deck surface and adjusts the cutting head height to maintain a specified depth of groove. The grooving machine shall have a guide device to control multi-pass alignment.

The removal of slurry shall be continuous throughout the grooving operations. The grooving equipment shall be equipped with vacuum slurry pickup equipment which shall continuously pick up water and sawing dust, and pump the slurry to a collection tank. The slurry shall be disposed of offsite according to Article 202.03.

Cleanup shall be continuous throughout the grooving operation. All grooved areas of the deck shall be flushed with water as soon as possible to remove any slurry material not collected by the vacuum pickup. Flushing shall be continued until all surfaces are clean.

Method of Measurement. This work shall be measured for payment according to Article 503.21(b) except no measurement will be made for any grooving of the shoulders to accommodate a variable width traffic lane.

Basis of Payment. This work will be paid for at the contract unit price per square yard (square meter) for BRIDGE DECK GROOVING (LONGITUDINAL).

MEMBRANE WATERPROOFING SYSTEM FOR BURIED STRUCTURES

Effective: October 4, 2016

Revised: March 1, 2019

Description. This work shall consist of furnishing and placing a membrane waterproofing system on the top slab and sidewalls, or portions thereof, for buried structures as detailed on the contract plans.

All membrane waterproofing systems shall be supplied by qualified producers. The Department will maintain a list of qualified producers.

Materials. The materials used in the waterproofing system shall consist of the following.

- (a) Cold-applied, self-adhering rubberized asphalt/polyethylene membrane sheet with the following properties:

Physical Properties	
Thickness ASTM D 1777 or D 3767	60 mils (1.500 mm) min.
Width	36 inches (914 mm) min.
Tensile Strength, Film ASTM D 882	5000 lb./in ² (34.5 MPa) min.
Pliability [180° bend over 1" inch (25 mm) mandrel @ -20 °F (-29 °C)] ASTM D 146 (Modified) or D1970	No Effect
Puncture Resistance-Membrane ASTM E 154	40 lb. (178 N) min.
Permeability (Perms) ASTM E 96, Method B	0.1 max.
Water Absorption (% by Weight) ASTM D 570	0.2 max.
Peel Strength ASTM D 903	9 lb./in (1576 N/m) min.

- (b) Ancillary Materials: Adhesives, Conditioners, Primers, Mastic, Two-Part Liquid Membranes, and Sealing Tapes as required by the manufacturer of the membrane and film for use with the respective membrane waterproofing system.

Construction. The areas requiring waterproofing shall be prepared and the waterproofing shall be installed in accordance with the manufacturer's instructions. The Contractor shall not install any part of a membrane waterproofing system in wet conditions, or if the ambient or concrete surface temperature is below 40° (4° C), unless allowed by the Engineer.

Surfaces to be waterproofed shall be smooth and free from projections which might damage the membrane sheet. Projections or depressions on the surface that may cause damage to the membrane shall be removed or filled as directed by the Engineer. The surface shall be power washed and cleaned of dust, dirt, grease, and loose particles, and shall be dry before the waterproofing is applied.

The Contractor shall uniformly apply primer to the entire area to be waterproofed, at the rate stated in the manufacturer's instructions, by brush, or roller. The Contractor shall brush out primer that tends to puddle in low spots to allow complete drying. The primer shall be cured according to the manufacturer's instructions. Primed areas shall not stand uncovered overnight. If membrane sheets are not placed over primer within the time recommended by the manufacturer, the Contractor shall recoat the surfaces at no additional cost to the Department.

The installation of the membrane sheet to primed surfaces shall be such that all joints are shingled to shed water by commencing from the lowest elevation of the buried structure's top slab and progress towards the highest elevation. The membrane sheets shall be overlapped as required by the manufacturer. The Contractor shall seal with mastic any laps that were not thoroughly sealed. The membrane shall be smooth and free of wrinkles and there shall be no depressions in horizontal surfaces of the finished waterproofing. After placement, exposed edges of membrane sheets shall be sealed with a troweled bead of a manufacturer's recommended mastic, or two-part liquid membrane, or with sealing tape.

Sealing bands at joints between precast segments shall be installed prior to the waterproofing system being applied. Where the waterproofing system and sealing band overlap, the installation shall be planned such that water will not be trapped or directed underneath the membrane or sealing band.

Care shall be taken to protect and to prevent damage to the waterproofing system prior to and during backfilling operations. The waterproofing system shall be removed as required for the installation of slab mounted guardrails and other appurtenances. After the installation is complete, the system shall be repaired and sealed against water intrusion according to the manufacturer's instructions and to the satisfaction of the Engineer.

Replace the last paragraph of Article 540.06 Precast Concrete Box Culverts and replace with:

Handling holes shall be filled with a polyethylene plug. The plug shall not project beyond the inside surface after installation nor project above the outside surface to the extent that may cause damage to the membrane. When metal lifting inserts are used, their sockets shall be filled with mastic or mortar compatible with the membrane.

Method of Measurement. The waterproofing system will be measured in place, in square yards (square meters) of the concrete surface to be waterproofed.

Basis of Payment. This work will be paid for at the contract unit price, per square yard (square meter) for MEMBRANE WATERPROOFING SYSTEM FOR BURIED STRUCTURES.

METALLIZING OF STRUCTURAL STEEL

Effective: October 4, 2016

Revised: October 20, 2017

Description: This work consists of furnishing all materials, equipment, labor, and other essentials necessary to accomplish the surface preparation and application of thermal spray metallizing to all new structural steel, or portions thereof as detailed in the plans, in the shop. Also included in this work, when specified on the Contract plans, is the application of a paint system over the metallizing in the shop and/or in the field.

Materials: Materials shall be according to the following.

Metallizing Wire: All thermal spray feedstock (metallizing wire) shall be the products of a single manufacturer, meet the requirements below, and meet the thermal spray equipment manufacturer's specifications.

- a. The metallizing wire shall consist of 99.9% zinc or 85/15 zinc/aluminum complying with ASTM B-833 and ANSI/AWS C2.25/C2.25M
- b. The Contractor shall provide a certificate of chemical composition of the proposed metallizing wire from the metallizing wire manufacturer.

Paint: All materials to be used on an individual structure shall be produced by the same manufacturer.

The Bureau of Materials and Physical Research has established a list of all paint products that have met preliminary requirements. Each batch of material, except for the clear aliphatic urethane and the penetrating sealer shall be tested and approved for use. The specified colors shall be produced in the coating manufacturer's facility. Tinting of coating after it leaves the manufacturing facility is not allowed.

The paint materials shall meet the following requirements of the Standard Specification and as noted below:

<u>Item</u>	<u>Article</u>
(a) Waterborne Acrylic	1008.04
(b) Aluminum Epoxy Mastic (Note 1)	1008.03
(c) Epoxy/ Aliphatic Urethane (Note 1)	1008.05
(d) Penetrating Sealer (Note 2)	
(e) Clear Aliphatic Urethane (Note 3)	

Note 1: If the finish coats are being applied in the field over a shop applied epoxy, select an epoxy intermediate for shop application with a recoat window that is long enough to support the construction schedule.

Note 2: The Epoxy Penetrating Sealer shall be a cross-linked multi component sealer. The sealer shall have the following properties:

- (a) The volume solids shall be 98 percent (plus or minus 2 percent).

- (b) Shall be clear or slightly tinted color.

Note 3: The Clear Aliphatic Urethane material shall be one of the following products:

- (a) Carbothane Clear Coat by Carboline Company
- (b) Pitthane Ultra Clear 95-8000 by Pittsburgh Paints (PPG)
- (c) ArmorSeal Rexthane I MCU by Sherwin-Williams

Shop Prequalification: The Contractor performing the shop work shall have either an SSPC-QP 3 Certification or an AISC Sophisticated Paint Endorsement certification. The certification(s) shall remain current throughout the duration of the contract.

The Contractor performing the shop work shall have satisfactorily performed a minimum of three (3) previous projects involving abrasive blast cleaning, metallizing, and paint application. At least one project within the past two (2) years shall have involved a bridge or similar industrial type application. The suitability of the Contractor's qualifications and prior experience will be considered by the Department before granting approval to proceed.

Submittals: The Contractor performing the shop work shall submit the following plans and information for Engineer review and acceptance within 30 days of contract execution (unless written permission from the Engineer states otherwise). When full coats are being applied in the field, the field painting contractor shall comply with the submittal requirements of Article 506.03. Work in the shop or field shall not proceed until submittals are accepted by the Engineer.

- (a) **Contractor Personnel Qualifications:** Evidence of experience and the names and qualifications/experience/training of the personnel managing and implementing the Quality Control program, and for those performing the quality control tests. QC personnel qualification requirements are found under "Quality Control (QC) Inspection."

All metallizing applicators shall be qualified in accordance with AWS C2.16/C2.16M.

- (b) **Quality Control (QC) Plan:** A Quality Control Plan that identifies: test instruments to be used, a schedule of required measurements and observations, procedures for correcting unacceptable work, and procedures for improving surface preparation and metallizing/painting quality as a result of quality control findings. The program shall incorporate the IDOT Quality Control Daily Report Forms as supplied by the Engineer, or equivalent information on Engineer-approved Shop Contractor-designed forms.
- (c) **Surface Preparation Plan:** The surface preparation plan shall include the methods of surface preparation and types of equipment that will be used to prepare the surfaces as specified herein. Also any solvents proposed for solvent cleaning shall be identified and MSDS provided.
- (d) **Abrasives:** Identify the type and brand name of the abrasive proposed for use, provide MSDS and manufacturer's data indicating that the abrasive meets requirements of the SSPC-AB 1 or AB 3 standards as specified herein.
- (e) **Metallizing Plan:** Written procedures for the shop application of metallizing, including the brand name and type of metallizing wire and application equipment to be used. Proof that the metallizing wire complies with ASTM B-833 and ANSI/AWS C2.25/C2.25M shall also

be provided. Provide written documentation verifying that all metallizing applicators are qualified in accordance with ANSI/AWS C2.16/C2.16M.

- (f) Painting Plan: If shop painting is specified to be applied over the metallizing or if galvanizing is used in lieu of metallizing on minor bridge members, procedures for the application of the coating system shall be provided along with MSDS and product data sheets. A description of the application equipment to be used shall be included. The plan shall include the requirements to be followed by the field contractor for field touch up.
- (g) Shipping and Handling Plan: A written plan outlining the precautions that shall be taken for the protection of the finished surface during shipping and handling. The plan shall address the steps to be taken, such as insulating padding, wood dunnage, load securing strapping, binding apparatus, etc.
- (h) Galvanizing Option: At the Contractor's option, hot dip galvanizing may be proposed as a substitute for shop metallizing of bearings, typical cross frames, or diaphragms on non-curved structures; expansion joint assemblies; and other elements not carrying calculated stress. Submittal requirements are found under "Hot Dip Galvanizing Option." Include the proposed cleaning and painting plan.

The Engineer will provide written notification to the Contractor when submittals are complete and acceptable. No surface preparation work shall begin until that notification is received. This acceptance shall not be construed to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Acceptance does not relieve the Contractor from the responsibility to conduct the work according to the requirements of Federal, State, or Local regulations and this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

Quality Control (QC) Inspections: The Contractor performing the shop work shall perform first line, in process QC inspections. The Contractor shall implement the accepted QC Program to insure that the work complies with these specifications. The designated Quality Control inspector shall be onsite full time during any operations that affect the quality of the system (e.g., surface preparation, metallizing application, paint application, and final inspection at project completion). The Contractor shall use the IDOT Contractor Daily (QC) Metallizing & Painting Report form (supplied by the Engineer, or Engineer-approved Contractor-designed forms that contain the same information, to record the results of quality control tests and inspections. The completed reports shall be given to the Engineer before work resumes the following day.

QC inspections shall include, but are not limited to the following:

- Ambient conditions.
- Surface preparation (solvent cleaning, abrasive blast cleanliness, surface profile depth, etc.).
- Metallizing application (specified materials used, bend test, continuity and coverage, adhesion, dry film thickness).

- Verification that the MISTIC test ID number for the paint system has been issued when painting is specified.
- Paint Application (when specified)(specified materials used, continuity and coverage, dry film thickness, freedom from overspray, dry spray, pinholes, skips, misses, etc.).

The personnel managing the QC Program shall possess a minimum classification as a NACE CIP Level 2, or shall provide evidence of successful inspection of three projects of similar or greater complexity and scope completed in the last two years. References shall include the name, address, and telephone number of a contact person employed by the facility owner.

The personnel performing the QC tests shall be trained in all tests, inspections, and instrument use required for the inspection of surface preparation, metallizing and paint application. Documentation of training shall be provided. The QC personnel shall be solely dedicated to quality control activities and shall not perform any production work. QC personnel shall take the lead in all inspections, but applicators shall perform wet film thickness measurements during application of the coatings, with QC personnel conducting random spot checks. The Contractor shall not replace the QC personnel assigned to the project without advance notice to the Engineer, and acceptance of the replacement(s), by the Engineer.

The Contractor performing the shop work shall supply all necessary equipment to perform the QC tests and inspections as specified. Equipment shall include the following at a minimum:

- Psychrometer or comparable equipment for measurement of dew point and relative humidity, including weather bureau tables or psychrometric charts
- Surface temperature thermometer
- SSPC Visual Standard VIS 1
- Surface profile replica tape and spring micrometer or electronic micrometer designed for use with replica tape; or electronic profilometer designed for measuring blast profile.
- Blotter paper for compressed air cleanliness checks
- Type 2 Electronic Dry Film Thickness Gage
- Calibration standards for dry film thickness gage
- Bend test coupons and bend test mandrel
- Adhesion testing instrument

- Companion panels for adhesion testing (if that option is selected)
- All applicable ASTM, ANSI, AWS, and SSPC Standards used for the work (reference list attached)

The instruments shall be verified for accuracy and adjusted by the Contractor's personnel in accordance with the equipment manufacturer's recommendations and the Contractor's QC Program. All inspection equipment shall be made available to the Engineer for QA observations as needed.

Hold Point Notification: Specific inspection and testing requirements within this specification are designated as Hold Points. Unless other arrangements are made, the Contractor shall provide the Engineer with a minimum four-hour notification in advance of the Hold Point. If four-hour notification is provided and the work is ready for inspection at that time, the Engineer will conduct the necessary observations. If the work is not ready at the appointed time, unless other arrangements are made, an additional four-hour notification is required. Permission to proceed beyond a Hold Point without a QA inspection will be at the sole discretion of the Engineer and will only be granted on a case-by-case basis.

Quality Assurance (QA) Observations: The Engineer will conduct QA observations of any or all phases of the work. The presence or activity of Engineer observations in no way relieves the Contractor of the responsibility to perform all necessary daily QC inspections of their own and to comply with all requirements of this Specification.

The Engineer has the right to reject any work that was performed without adequate provision for QA observations.

CONSTRUCTION REQUIREMENTS

The surface preparation and metallizing shall be according to the SSPC Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc and their Alloys and Composites for the Corrosion Protection of Steel, SSPC-CS 23.00/AWS C2.23M/NACE No. 12 except as modified herein. In the event of a conflict, the requirements of this specification shall prevail.

Hot Dip Galvanizing Option: At the Contractor's option, hot dip galvanizing may be substituted for shop metallizing of bearings, typical cross frames, or diaphragms on non-curved structures; expansion joint assemblies; and other elements not carrying calculated stress. Galvanized surfaces which shall have concrete poured against them shall be chemically passivated or otherwise protected by a method approved by the Engineer. Galvanized bearings for exterior members and elements readily visible after erection shall be prepared for field painting, but galvanized items obscured from public view will not require field painting. The Contractor shall submit a proposal for substituting galvanizing to the Engineer, showing items to be field painted, applicable provisions of AASHTO M 111 (ASTM A 123), drain/vent holes and any other necessary modifications.

Notification: The Contractor shall notify the Engineer 24-hours in advance of beginning surface preparation operations.

Surface Preparation, Metallizing and Painting Equipment: The Contractor shall provide surface preparation, metallizing, and painting equipment as needed to perform the work as specified herein.

Metallizing application equipment shall be portable electric arc thermal spray units that are set-up, adjusted and operated in accordance with the manufacturer's written instructions.

All cleaning and painting equipment shall include gages capable of accurately measuring fluid and air pressures and shall have valves capable of regulating the flow of air, water or paint as recommended by the equipment manufacturer. The equipment shall be maintained in proper working order.

Diesel or gasoline powered equipment shall be positioned or vented in a manner to prevent deposition of combustion contaminants on any part of the structure.

Hand tools, power tools, pressure washing, water jetting, abrasive blast cleaning equipment, brushes, rollers, and spray equipment shall be of suitable size and capacity to perform the work required by this specification. Appropriate filters, traps and dryers shall be provided for the compressed air used for abrasive blast cleaning and conventional spray application. Paint pots shall be equipped with air operated continuous mixing devices unless prohibited by the coating manufacturer.

Test Areas (Sections): Prior to proceeding with production work on the project, the Contractor shall prepare test sections of at least 10 square feet (0.93 sq. m). More than one test section may be needed to represent the various design configurations of the structure. The test section(s) shall be blast cleaned, metallized and painted (if specified) in accordance with the requirements specified herein using the same equipment, materials and procedures that will be used for the production.

During the blast cleaning, metallizing, and painting of the test section(s), in the presence of the Engineer, the Contractor shall perform all quality control tests and inspections required by this specification including complete documentation. In addition, the Contractor shall allow sufficient time for the Engineer to perform any or all quality assurance tests and inspections desired.

Production work shall not proceed until the Engineer agrees that the blast cleaning, metallizing, and painting work, along with the quality control testing, inspection, and documentation are acceptable.

No additional compensation will be paid for the preparation of the test section(s).

Protective Coverings and Damage: The Contractor shall apply protective coverings to all surfaces of the structural steel that are not scheduled for surface preparation, metallizing, and painting. The coverings shall be maintained and remain in place until the work is completed and then shall be removed prior to shipping.

Metallized or painted surfaces damaged by any Contractor's operation shall be repaired, and re-metallized and/or re-painted, as directed by the Engineer, at no additional cost to the Department.

Ambient Conditions: Surfaces prepared for metallizing or painting shall be free of moisture and other contaminants. The Contractor shall control operations to insure that dust, dirt, or moisture do not come in contact with surfaces on which work will take place. The surface temperature shall be at least 5°F (3°C) above the dew point during final surface preparation operations, and the application of metallizing. Metallizing shall only be applied when the surface and air temperatures are above 32°F (0°C). The manufacturers' published literature shall be followed for specific temperature, dew point, and humidity restrictions during the application of each paint coat. Metallizing or paint shall not be applied in rain, wind, snow, fog or mist. Ambient conditions shall be maintained during the drying period specified by the manufacturer.

Compressed Air Cleanliness: Prior to using compressed air for abrasive blast cleaning, blowing down surfaces, and metallizing or painting application, the Contractor shall verify that the compressed air is free of moisture and oil contamination according to the requirements of ASTM D 4285. The tests shall be conducted at least one time per shift for each compressor system in operation. If air contamination is evident, the Contractor shall change filters, clean traps, add moisture separators or filters, or make other adjustments as necessary to achieve clean, dry air. The Contractor shall also examine the work performed since the last acceptable test for evidence of defects or contamination caused by the contaminated compressed air. Contaminated work shall be repaired at no additional cost to the Department.

Solvent Cleaning (HOLD POINT): All traces of oil, grease, and other detrimental contaminants on the steel surfaces to be metallized shall be removed by solvent cleaning in accordance with SSPC-SP 1. The brand name of proposed cleaning solvent(s) and/or proprietary chemical cleaners including manufacturers' product data sheet and MSDS shall be submitted for Engineer acceptance prior to use.

Under no circumstances shall blast cleaning be performed in areas containing surface contaminants or in areas where the Engineer has not accepted the solvent cleaning. Rejected surfaces shall be re-cleaned to the specified requirements at no additional cost to the Department.

Abrasives: Abrasive blast cleaning shall be performed using either expendable abrasives or recyclable steel grit abrasives. Expendable abrasives shall be used one time and discarded. The abrasive shall be angular in shape. Acceptable angular shaped abrasives include, but are not limited to, aluminum oxide, steel grit, and crushed slag. Silica sand shall not be used. Steel shot and other abrasives producing a rounded surface profile are not acceptable, even if mixed with angular grit abrasives.

Abrasive suppliers shall provide written certification that expendable abrasives and recyclable steel grit abrasives meet the requirements of SSPC-AB 1 and AB 3, respectively. Abrasive suppliers shall certify that abrasives are not oil contaminated and shall have a water extract pH value within the range of 6 to 8. On a daily basis, the Contractor shall verify that recycled abrasives are free of oil and contamination by performing a vial test in accordance with SSPC-AB 2.

All surfaces that are found to have been prepared using abrasives not meeting the SSPC-AB 1, AB 2, or AB 3 requirements, as applicable, are oil contaminated, or have a pH outside the specified range, shall be solvent cleaned or low pressure water cleaned, and re-blast cleaned at no cost to the Department.

Surface Preparation (HOLD POINT): The following method of surface preparation shall be used:

- (a) **Flame Cut Steel:** Prior to blast cleaning, all flame cut edges shall be ground to remove hardened steel and any sharp or irregular shapes.
- (b) **Near-White Metal Blast Cleaning:** All steel surfaces to be metallized shall be near white metal blast cleaned in accordance with SSPC-SP 10 using dry abrasive blast cleaning methods.
- (c) **Galvanized Minor Bridge Members:** If galvanizing of minor bridge members is selected in lieu of metallizing, prepare all galvanized surfaces for painting by brush-off blast cleaning in accordance with SSPC-SP 16 or by using proprietary solutions that are specifically designed to clean and etch (superficially roughed) galvanized steel for painting. If cleaning and etching solutions are selected, submit manufacturer's technical product literature and MSDS for Engineer's review and written acceptance prior to use.
- (d) **Base Metal Irregularities:** If hackles, burrs, or slivers in the base metal are visible on the steel surface after cleaning, the Contractor shall remove them by grinding followed by re-blast cleaning.

Surface Profile (HOLD POINT): Blast cleaning abrasives shall be of the size and grade that will produce a uniform angular surface profile depth of 3.5 to 4.5 mils (89 to 114 microns). If the metallizing wire manufacturer's profile requirements are more restrictive, the Contractor shall advise the Engineer and comply with those requirements. For recycled abrasives, an appropriate operating mix shall be maintained in order to control the profile within these limits.

The average surface profile shall be determined each work day with a minimum frequency of one location per every 200 sq ft (18.6 sq m) per piece of equipment. All surfaces, including flame cut edges, shall be tested in accordance with SSPC-PA 17. Surface profile replica tape or electronic profilometer shall be used. The tape shall be retained and included with the daily QC report. Single measurements less than 3.5 mils (89 microns) are unacceptable. In that event, additional testing shall be done to determine the limits of the deficient area and, if it is not isolated, work will be suspended. The Contractor shall submit a plan for making the necessary adjustments to insure that the specified surface profile is achieved on all surfaces. Work shall not resume until the Engineer provides written acceptance.

Surface Condition Prior to Metallizing (HOLD POINT): Prepared surfaces shall meet the requirements of SSPC-SP 10 immediately prior to metallizing, and shall be metallized within six hours of blast cleaning. If rust appears or bare steel has been exposed for more than six hours, the affected area shall be re-blasted at no additional cost to the Department.

All dust and surface preparation residue on steel surfaces shall be removed prior to metallizing.

The quality of surface preparation and cleaning of surface dust and debris shall be accepted by the Engineer prior to metallizing.

The Engineer has the right to reject any work that was performed without adequate provision for QA observations to accept the degree of cleaning. Rejected metallizing work shall be removed and replaced at no additional cost to the Department.

Daily Metallizing Operator-Equipment Qualification – Bend Tests: Unless directed otherwise by the Engineer, each day that metallizing will be applied, the Contractor shall perform bend testing prior to beginning production work. For each metallizing applicator, five carbon steel coupons measuring 2 inch wide x 8 inch long x 0.05 inch (50mm x400 mm x 1.3 mm) thick shall be blast cleaned using the same equipment and abrasive used for the production work. Each applicator shall apply the metallizing to five coupons in accordance with the requirements of this Specification to a dry film thickness of 8.0 to 12.0 mils (200 to 300µm). 180 degree bend testing shall be performed on all five coupons using a 13mm (1/2") mandrel in accordance with the requirements and acceptance criteria of SSPC-CS 23/AWS C2.23M/NACE 12. Minor cracks that cannot be lifted from the substrate with knife blade are acceptable. If lifting occurs on any coupon, the surface preparation and/or metallizing process shall be modified until acceptable results are achieved before proceeding with production work.

Application of Metallizing: Application shall be done in overlapping passes in a cross-hatch pattern (i.e., a second set of overlapping passes shall be applied at right angles to the first set of overlapping passes) to ensure uniform coverage. The gun shall be held at such a distance from the work surfaces that the metal is still molten on impact. The metallizing shall be applied as a continuous film of uniform thickness, firmly adherent, and free from thin spots, misses, lumps or blisters, and have a fine sprayed texture. Thin spots and misses shall be re-metallized. If touch up metallizing or the application of additional metallizing to previously applied metallizing does not occur within 24 hours, the surface of the metallizing shall be brush off blast cleaned according to SSPC-SP7 to remove oxidation and surface contaminants prior to the application of additional metallizing. The final appearance of the metallizing when left un-top coated or top coated with System 1 shall be uniform without excessive blotchiness or contrast in color. If the surface does not have a uniform appearance, remove and replace the metallizing at no cost to the Department. If the configuration of the surface being metallized does not allow for a proper gun-to-work piece standoff distance, the Contractor shall notify the Engineer.

Unless required by the contract plans, the top of the top flanges shall not be metallized or painted. If the contract plans indicate that the top flange is to be metallized, only the first coat of the paint system shall be applied to the top flange.

Metallizing Thickness: The thickness of the metallizing shall be 8.0 to 12.0 mils (200-300 microns). Thickness shall be measured as specified by SSPC-PA 2 (use a Type 2 Electronic Gauge only).

Metallizing Adhesion: Adhesion testing of metallizing applied each day shall be determined with a self-adjusting adhesion tester in accordance with ASTM D 4541. Unless otherwise directed by the Engineer, a minimum of one test shall be conducted for every 500 sq ft (46sq m) of metallized surface. The tests shall be conducted prior to application of any coating. If any of the tests exhibit less than 700 psi (4.83 MPa) for 85/15 or less than 500 psi (3.45 MPa) for zinc, additional tests shall be conducted to determine the extent of the deficient material. All deficient metallizing shall be removed by blast cleaning and re-applied at no additional cost to the Department.

At the discretion of the Engineer, a representative blast cleaned test panel (or steel companion panel approximately 12 inch x 12 inch x ¼ inch thick) can be metallized at the same time each 500 sq ft (46sq m) of surface area, or portion thereof, is metallized. Adhesion testing can be performed on the companion panel rather than on the structure. If the adhesion tests on the panels are acceptable, the metallizing on the structure is considered acceptable and testing on the structure is not required. If adhesion testing of the panels fails, testing shall be conducted on the structure. If adhesion testing on the structure is acceptable, the metallizing on the structure

is considered to be acceptable. If tests on the structure are unacceptable, complete removal of the failing metallizing and re-metallizing in accordance with this Specification shall be performed at no additional cost to the Department.

Application of Paint Systems Over Metallizing:

When painting over the metallizing is specified, three painting system options exist for application over the metallizing as shown below. Systems, or components of systems, specified to be shop applied shall not be applied to the faying surfaces of bolted connections. The system to be applied shall be as designated on the plans.

- (a) **System 1** is a single coat system consisting of a full clear aliphatic urethane coat shop applied to all metallized surfaces except as noted above.

The thickness of the clear coat to be applied is dependent on the product selected and shall be as follows:

TABLE 1

CLEAR URETHANE COAT (SINGLE COAT SYSTEM)

MANUFACTURER	SEALER COAT ONLY (DFT)
Carboline Company	Carbothane Clear Coat (3.0 to 5.0 mils) (75 to 125 microns)
Pittsburgh Paints (PPG)	Pitthane Ultra Clear 95-8000 (2.0 to 3.0 mils) (50 to 75 microns)
Sherwin-Williams	AarmorSeal Rexthane I MCU (3.0 to 5.0 mils) (75 to 125 microns)

The clear urethane shall be applied in a 2 step process. The first step shall be to apply a “mist coat” that is thinned at the maximum allowable thinning rate as listed on the manufacturer’s product data sheet that is compliant with VOC regulations. The intent of the mist coat is to saturate the porous metallizing surface and displace entrapped air within the porosity of the metallizing. After allowing the mist coat to flash off for 20 minutes, the full coat of clear urethane shall be applied to achieve the manufacturer’s recommended dry film thickness.

- (b) **System 2** is a four coat system consisting of a full shop coat of epoxy penetrating sealer coat, a full shop coat of an extended recoat epoxy and two full field applied coats of waterborne acrylic.

The epoxy penetrating sealer shall be applied in accordance with the coating manufacturer's instructions at a coverage rate designed to achieve a theoretical dry film thickness of 1.5 mils (38 microns). The intent of the epoxy penetrating sealer coat is to saturate the metallizing and cover the surface rather than to build a film thickness; therefore, dry film thickness measurement of the epoxy penetrating sealer coat is not required. The top of top flanges that are specified to be metallized and embedded in concrete shall receive the epoxy penetrating sealer only.

The thicknesses of the epoxy and waterborne acrylic coats shall be according to Article 506.09(f)(1).

- (c) **System 3** is a three coat system consisting of a full epoxy penetrating sealer coat, a full epoxy intermediate coat, and a full urethane finish coat. All coats shall be shop-applied unless specified otherwise. If the urethane is field-applied, an extended recoat epoxy shall be applied in the shop.

The epoxy penetrating sealer shall be applied in accordance with the coating manufacturer's instructions at a coverage rate designed to achieve a theoretical dry film thickness of 1.5 mils (38 microns). The intent of the epoxy penetrating sealer coat is to saturate the metallizing and cover the surface rather than to build a film thickness; therefore, dry film thickness measurement of the epoxy penetrating sealer coat is not required. The top of top flanges that are specified to be metallized and embedded in concrete shall receive the epoxy penetrating sealer only.

The thicknesses of the epoxy and urethane coats shall be according to Article 506.09(f)(2).

The single clear urethane coat or the epoxy penetrating sealer coat shall be applied within 24 hours of metallizing providing that the immediate work environment is controlled. If temperature and humidity cannot be controlled, that time frame shall be reduced to within 8 hours. The metallizing shall be dry and free of any visible debris or oxidation (zinc oxide) at the time of application. Visible oxidation shall be removed by mechanical methods such as stiff bristle or wire brushing. Contact surfaces for bolted connections shall consist of bare, uncoated metallizing only and shall be masked off prior to the application of any shop applied coatings.

The clear urethane coat or the epoxy penetrating sealer shall be applied in accordance with the manufacturer's instructions and in such a manner to assure thorough wetting and sealing of the metallizing.

For systems 2 and 3, prior to application of any subsequent coat, the surface of the previous coat shall be dry in accordance with the manufacturer's instructions and free of any visible contamination. If the manufacturer's specified recoat times are exceeded, the effected coat(s) shall be completely roughened or removed and replaced, according to the manufacturer's instructions, at no cost to the Department. The same restrictions regarding film appearance and continuity for the seal coat apply to the intermediate coat and topcoat.

All coats shall be applied to achieve a smooth, uniform appearance that is free of dryspray, overspray, and orange peel. Shadow-through, pinholes, bubbles, skips, misses, lap marks between applications, runs, sags, or other visible discontinuities are unacceptable.

Masked off areas around field connections shall be coated in the field after the steel is fully erected according to the touch-up procedure for the completed system.

When the application of field coat(s) is required, the existing shop applied coats shall be prepared and field painting performed according to the applicable provisions of Article 506.10. If any coat has exceeded its recoat time, the surface shall be completely roughened or removed and replaced according to the manufacturer's instructions, prior to the application of the topcoat.

All coatings shall be applied by spray, supplemented with brushing or rolling, if needed. Special attention shall be given to obtaining complete coverage and proper coating thickness in crevices, on welds and edges, and in hard to reach areas.

Application of Paint System over Galvanizing: If galvanizing is used in lieu of metallizing and Paint System 1, no further painting is required. If galvanizing is used in lieu of metallizing and Paint System 2, apply a two-coat system consisting of a full waterborne acrylic intermediate coat and a full waterborne acrylic finish coat from System 2. If galvanizing is used in lieu of metallizing and Paint System 3, apply a full epoxy intermediate coat and a full urethane coat from System 3. To minimize handling and erection damage the acrylic coats of System 2 shall be applied in the field. Except as noted on the plans, the epoxy and urethane coats of System 3 can be applied in the shop or field.

Touch-Up of Completed Coating System: The Contractor shall repair all damaged and/or unacceptable areas of the completed coating system (all metallizing, galvanizing, and paint layers) prior to shipment as defined below. The same process shall be followed for the repair of shipping, handling, and erection damage.

Damage to the metallizing, galvanizing, and/or paint that does not expose the substrate shall be prepared by solvent cleaning in accordance with SSPC-SP 1 followed by power tool cleaning in accordance with SSPC-SP 3 to remove loose material. For the repair of damaged metallizing or galvanizing that exposes the substrate, the surface shall be spot blast cleaned in accordance with SSPC-SP 10. If blast cleaning cannot be performed, as authorized by the Engineer, the damage shall be spot power tool cleaned to SSPC-SP11.

The metallizing, galvanizing and/or paint surrounding each repair area shall be feathered for a distance of 1 to 2 inches (25 to 50 mm) to provide a smooth, tapered transition into the existing intact material. The surrounding intact paint shall be roughened to promote adhesion of the repair coats.

Damage to metallizing or galvanizing extends to the substrate shall be repaired. For metallizing it is critical that all remnants of sealer or paint have been removed from the porosity of the metallizing before applying new metallizing or an adhesion failure can occur. If it is no longer feasible to apply metallizing, spot-apply an organic zinc primer meeting the requirements of Section 1008. For galvanizing, spot apply organic zinc. After priming, for both the metallizing and galvanizing, apply the same intermediate and finish coats used on the surrounding steel. If the damage does not expose the substrate, only the effected paint coat(s) shall be applied.

Surface Preparation and Painting of Galvanized Fasteners: All ASTM A 325 or ASTM F 3125 high strength steel bolts, nuts and washers shall be hot dip galvanized according to AASHTO M232, except in areas where the metallized surfaces are to be top coated, in which case they shall be mechanically galvanized according to Article 1006.08(a) of the Standard Specifications.

The Contractor shall prepare all fasteners (i.e., galvanized nuts, bolts, etc.) by power tool cleaning in accordance with SSPC-SP 3. Following power tool cleaning and prior to painting, the surfaces shall be solvent cleaned according to SSPC-SP 1. Slight stains of torqueing compound dye may remain after cleaning provided the dye is not transferred to a cloth after vigorous rubbing. If any dye is transferred to a cloth after vigorous rubbing, additional cleaning is required.

Spot paint the fasteners with one coat of an aluminum epoxy mastic coating meeting the requirements of Article 1008.03 of the Standard Specifications.

Shipping and Handling: The Contractor shall take special care in handling the steel in the shop and when loading for shipment. Painted, metallized, or galvanized steel shall not be moved or handled until sufficient cure time has elapsed to prevent handling damage. During shipping, the steel shall be insulated from the moving apparatus (i.e., chains, cables, hooks, clamps, etc.) by softeners approved by the Engineer. Apparatus used to hoist the steel shall be padded. Steel shall be placed on wood dunnage and spaced in such a manner that no rubbing will occur during shipment that could damage the paint, metallizing or galvanizing.

Special Instructions: At the completion of the work, the Contractor shall stencil on the bridge, using a contrasting colored paint, the date of metallizing and painting. The letters shall be capitals, not less than 2 inches (50 mm) and not more than 3 inches (75 mm) in height. The information defined below shall be stenciled on the exterior face of the first girders at the bridge abutments (approximately 1 or 2 feet outward from the abutment end of the girders). The Engineer will identify the bridge member(s) to be stenciled.

When all coats are applied in the shop with the exception of touch-up, the shop Contractor shall do the stenciling. The stencil shall contain the following words on four lines: "METALLIZED BY" on the first line; name of the Contractor on the second line; and the month and year in which the coating was completed on the third line; and the applicable system Code on the fourth line.

When the finish coat is applied in the field, the Contractor shall do the stenciling as described above, but insert "PAINTED BY" and the Contractor's name after the fourth line.

Basis of Payment: This work shall not be paid for separately but shall be included in the unit price bid for furnishing and/or erecting structural steel according to Article 505.13.

Appendix 1 – Reference List

The Shop and Field Contractor(s) shall maintain the following regulations and references on site for the duration of the project:

Illinois Environmental Protection Act

American Society of Testing Material

- ASTM D 4285, Standard Test Method for Indicating Oil or Water in Compressed Air
- ASTM B833, Standard Specifications for Zinc Wire for Thermal Spraying (Metallizing)
- ASTM D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

Society of Protective Coatings

- SSPC-AB 1, Mineral and Slag Abrasives
- SSPC-AB 2, Specification for Cleanliness of Recycled Ferrous Metallic Abrasives
- SSPC-AB 3, Newly Manufactured or Re-Manufactured Steel Abrasives
- SSPC-PA 2, Measurement of Dry Coating Thickness with Magnetic Gages
- SSPC-QP 1, Standard Procedure for Evaluating Painting Shop Contractors (Field Application to Complex Structures)
- SSPC-QP 2, Standard Procedure for Evaluating the Qualifications of Painting Shop Contractors to Remove Hazardous Paint
- SSPC-SP 1, Solvent Cleaning
- SSPC-SP 5/NACE No. 1, White Metal Blast Cleaning
- SSPC-SP 11, Power Tool Cleaning to Bare Metal
- SSPC-SP 12/NACE No. 5, Surface Preparation and Cleaning of Metals by Water Jetting Prior to Recoating
- SSPC-SP 16, Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals
- SSPC-PA 17, Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements.
- SSPC-VIS 1, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning

- SSPC-VIS 5, Guide and Reference Photographs for Steel Prepared by Wet Abrasive Blast Cleaning
- SSPC-Guide 15, Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Surfaces
- SSPC-CS 23.00/AWS C2.23M/NACE No. 12, Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel

American National Standards Institute/American Welding Society

- ANSI/AWS C2.25/C2.25M, Specification for Solid and Composite Wires, and Ceramic Rods for Thermal Spraying
- AWS C2.6/C2.6M, Guide for Thermal-Spray Operator Qualification

Metallizing wire and coating manufacturer's application instructions, MSDS and product data sheets

HOT DIP GALVANIZING FOR STRUCTURAL STEEL

Effective: June 22, 1999

Revised: June 28, 2024

Description. This work shall consist of surface preparation and hot dip galvanizing all structural steel specified on the plans and painting of galvanized structural steel when specified on the plans.

Materials. Fasteners shall be ASTM F 3125, Grade 325, Type 1, High Strength bolts with matching nuts and washers.

Fabrication Requirements. Hot-dip galvanizing shall be indicated on the shop drawings. The fabricator shall coordinate with the galvanizer to incorporate additional steel details required to facilitate galvanizing of the steel. These additional details shall be indicated on the shop drawings.

Additional temporary stiffeners may be added at the contractor's expense as necessary to prevent distortion of the girders during galvanizing. The contractor shall coordinate with the fabricator and the galvanizer to determine if additional stiffeners are necessary, and where these shall be placed. Any proposed changes shall be submitted to the Engineer for approval prior to making any changes and documented on the shop drawings.

Temporary stiffener angles shall be bolted to each side of the splice ends of each girder segment to prevent distortion during galvanizing. Temporary stiffener angles shall bolt or fit tight against top and bottom flanges and include spacer tubes to minimize damage to galvanizing during removal.

To ensure identification after galvanizing, piece marks shall be supplemented with metal tags for all items where fit-up requires matching specific pieces.

After fabrication (cutting, welding, drilling, etc.) is complete, all holes shall be deburred and all fins, scabs or other surface/edge anomalies shall be ground or repaired per ASTM A6. The items shall then be cleaned per Steel Structures Painting Council's Surface Preparation Specification SSPC-SP1 (Solvent Cleaning) and SSPC-SP6 (Commercial Blast Cleaning). All surfaces shall be inspected to verify no fins, scabs or other similar defects are present.

The Contractor shall consult with the galvanizer to ensure proper removal of grease, paint and other deleterious materials prior to galvanizing.

Surface Preparation and Hot Dip Galvanizing

General. Surfaces of the structural steel specified on the plans shall be prepared and hot dip galvanized as described herein.

Cleaning Structural Steel. If rust, mill scale, dirt, oil, grease or other foreign substances have accumulated prior to galvanizing, steel surfaces shall be cleaned by a combination of caustic cleaning and cleaning according to SSPC-SP8 (Pickling).

Special attention shall be given to the cleaning of corners and reentrant angles.

Surface Preparation. A flux shall be applied to all steel surfaces to be galvanized. Any surfaces which will receive field-installed stud shear connectors shall not be galvanized within 2 in. (50 mm) of the stud location. Either the entire area receiving studs or just individual stud locations may be left ungalvanized. The following steel surfaces of bearings shall not be galvanized: stainless steel surfaces, surfaces which will be machined (except for fixed bearing sole plates), and surfaces which will have TFE, elastomer, or stainless steel parts bonded to them.

The cleaned surfaces shall be galvanized within 24 hours after cleaning, unless otherwise authorized by the Engineer.

Application of Hot Dip Galvanized Coating. Steel members, fabrications and assemblies shall be galvanized by the hot dip process in the shop according to AASHTO M 111.

Bolts, nuts, and washers shall be galvanized according to ASTM F 2329.

All steel shall be safeguarded against embrittlement according to ASTM A 143. Water quenching or chromate conversion coating shall not be used on any steel work that is to be painted. All galvanized steel work shall be handled in such a manner as to avoid any mechanical damage and to minimize distortion.

Beams and girders shall be handled, stored and transported with their webs vertical and with proper cushioning to prevent damage to the member and coating. Members shall be supported and externally stiffened during galvanizing to prevent permanent distortion.

Hot Dip Galvanized Coating Requirements. Coating weight, surface finish, appearance and adhesion shall conform to requirements of ASTM A 385, ASTM F2329, AASHTO M 111 or AASHTO M 232, as appropriate.

Any high spots of zinc coating, such as metal drip lines and rough edges, left by the galvanizing operation in areas that are to be field connected or in areas that are to be painted shall be removed by cleaning per SSPC-SP2 (Hand Tool Cleaning) or SSPC-SP3 (Power Tool Cleaning). The zinc shall be removed until it is level with the surrounding area, leaving at least the minimum required zinc thickness.

Shop assemblies producing field splices shall provide 1/8 in. (3 mm) minimum gaps between ends of members to be galvanized. At field splices of beams or girders, galvanizing exceeding 0.08 in. (2 mm) on the cross-sectional (end) face shall be partially removed until it is 0.04 in. to 0.08 in. (1 to 2 mm) thick.

Testing of Hot Dip Galvanized Coating. Inspection and testing of hot dip galvanized coatings shall follow the guidelines provided in the American Galvanizers Association publication "*Inspection of Products Hot Dip Galvanized After Fabrication*". Sampling, inspection, rejection and retesting for conformance with requirements shall be according to AASHTO M 111 or AASHTO M 232, as applicable. Coating thickness shall be measured according to AASHTO M 111, for magnetic thickness gage measurement or AASHTO M 232, as applicable.

All steel shall be visually inspected for finish and appearance.

Bolts, nuts, washers, and steel components shall be packaged according to ASTM F 2329. Identity of bolts, nuts and washers shall be maintained for lot-testing after galvanizing according to Article 505.04(f)(2) for high strength steel bolts.

A notarized certificate of compliance with the requirements listed herein shall be furnished. The certificate shall include a detailed description of the material processed and a statement that the processes used met or exceeded the requirements for successful galvanizing of the surface, where applicable. The certificate shall be signed by the galvanizer.

Repair of Hot Dip Galvanized Coating. Surfaces with inadequate zinc thickness shall be repaired in the shop according to ASTM A 780 and AASHTO M 111.

Surfaces of galvanized steel that are damaged after the galvanizing operation shall be repaired according to ASTM A 780 whenever damage exceeds 3/16 in. (5 mm) in width and/or 4 in. (100 mm) in length. Damage that occurs in the shop shall be repaired in the shop. Damage that occurs during transport or in the field shall be repaired in the field.

Connection Treatment. All bolt holes shall be reamed or drilled to their specified diameters after galvanizing. All bolts shall be installed after galvanizing.

Surface Preparation and Painting

Surface Preparation. When galvanized steel surfaces are specified to be painted they shall be clean and free of oil, grease, and other foreign substances. Surface preparation necessary to provide adequate adhesion of the coating shall be performed according to ASTM D6386. Surface preparation shall include, but not be limited to the following:

- All galvanized steel surfaces that are to be painted shall be cleaned according to SSPC-SP1 (Solvent Cleaning). After cleaning, all chemicals shall be thoroughly rinsed from the surface with a suitable solvent. The steel shall be allowed to completely dry prior to coating application.
- All galvanized steel surfaces that are to be painted shall be checked for the presence of chromate conversion coating according to ASTM D 6386 Appendix X1. Surfaces where chromate conversion coating is found shall be cleaned according to the same appendix and blown down with clean, compressed air according to ASTM D 6386 Section 6.1.
- All galvanized steel surfaces that are to be painted shall be checked for the presence of wet storage stain. Surfaces where wet storage stain is found shall be cleaned, rinsed and completely dried according to ASTM D 6386 Section 6.2.
- Following galvanizing, thickness readings shall verify the acceptable thickness of the galvanizing according to AASHTO M111/ASTM A123.

Paint Requirements. The paint materials (epoxy intermediate coat and aliphatic urethane finish coat) shall meet the requirements of the Articles 1008.05(d) and (e) of the Standard Specification.

All paint materials for the shop and field shall be supplied by the same manufacturer, and samples of components submitted for approval by the Department, before use.

Paint storage, mixing, and application shall be according to Section 506 of the Standard Specifications and the paint manufacturer's written instructions and product data sheets. In the event of a conflict the Contractor shall advise the Engineer and comply with the Engineer's written resolution. Until a resolution is provided, the most restrictive conditions shall apply.

Shop Application of the Paint System. The areas to be painted shall receive one full coat of an epoxy intermediate coat and one full coat of an aliphatic urethane finish coat. The film thickness of each coat shall be according to Article 506.09(f)(2).

Construction Requirements. The contact surfaces of splice flange connections (mating flange faces and areas under splice bolt heads and nuts) shall be free of paint prior to assembly. If white rust is visible on the mating flange surfaces, the steel shall be prepared by hand wire brushing or brush-off blasting according to SSPC-SP7. Power wire brushing is not allowed.

After field erection, the following areas shall be prepared by cleaning according to SSPC-SP1 (Solvent Cleaning), tie- or wash-coated if applicable, and then painted or touched up with the paint specified for shop application (the intermediate coat and/or the finish coat):

- exposed unpainted areas at bolted connections
- areas where the shop paint has been damaged
- any other unpainted, exposed areas as directed by the Engineer.

Special Instructions. Painting Date/System Code. At the completion of the work, the Contractor shall stencil in contrasting color paint the date of painting the bridge and the paint type code from the Structure Information and Procedure Manual for the system used according to Article 506.10(i). The code designation for galvanizing is "V". If painting of the structural steel is not specified then the word "PAINTED" may be omitted, the month and year shall then correspond to the date the stencil is applied.

Basis of Payment. The cost of all surface preparation, galvanizing, painting and all other work described herein shall be considered as included in the unit price bid for the applicable pay items to be galvanized and painted, according to the Standard Specifications.

DRILLED SHAFTS

Effective: October 5, 2015

Revised: October 27, 2023

Revise Section 516 of the Standard Specifications to read:

"SECTION 516. DRILLED SHAFTS

516.01 Description. This work shall consist of constructing drilled shaft foundations.

516.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Portland Cement Concrete (Note 1).....	1020
(b) Reinforcement Bars	1006.10
(c) Grout (Note 2).....	1024.01
(d) Permanent Steel Casing	1006.05(d)
(e) Slurry (Note 3)	

Note 1. When the soil contains sulfate contaminates, ASTM C 1580 testing will be performed to assess the severity of sulfate exposure to the concrete. If the sulfate contaminate is >0.10 to < 0.20 percent by mass, a Type II (MH) cement shall be used. If the sulfate contaminate is >0.20 to < 2.0 percent by mass, a Type V cement shall be used. If the sulfate contaminate is \geq 2.0 percent by mass, refer to ACI 201.2R for guidance.

Note 2. The sand-cement grout mix shall be according to Section 1020 and shall be two to five parts sand and one part Type I or II cement. The maximum water cement ratio shall be sufficient to provide a flowable mixture with a typical slump of 10 in. (250 mm).

Note 3. Slurry shall be bentonite, emulsified polymer, or dry polymer, and shall be approved by the Engineer.

516.03 Equipment. Equipment shall be according to the following.

Item	Article/Section
(a) Concrete Equipment	1020.03
(b) Drilling Equipment (Note 1)	
(c) Hand Vibrator	1103.17(a)
(d) Underwater Concrete Placement Equipment	1103.18

Note 1. The drilling equipment shall have adequate capacity, including power, torque and down thrust, to create a shaft excavation of the maximum diameter specified to a depth of 20 percent beyond the depths shown on the plans.

516.04 Submittals. The following information shall be submitted on form BBS 133.

(a) Qualifications. At the time of the preconstruction conference, the Contractor shall provide the following documentation.

(1) References. A list containing at least three projects completed within the three years prior to this project's bid date which the Contractor performing this work has installed drilled shafts of similar diameter, length, and site conditions to those shown in the plans. The list of projects shall contain names and phone numbers of owner's representatives who can verify the Contractor's participation on those projects.

(2) Experience. Name and experience record of the drilled shaft supervisor, responsible for all facets of the shaft installation, and the drill operator(s) who will be assigned to this project. The supervisor and operator(s) shall each have a minimum of three years experience in the construction of drilled shafts.

(b) Installation Procedure. A detailed installation procedure shall be submitted to the Engineer for acceptance at least 28 days prior to drilled shaft construction and shall address each of the following items unless otherwise directed by the Engineer in writing.

(1) Equipment List. List of proposed equipment to be used including cranes, drill rigs, augers, belling tools, casing, vibratory hammers, core barrels, bailing buckets, final cleaning equipment, slurry equipment, tremies, or concrete pumps, etc.

(2) General Sequence. Details of the overall construction operation sequence, equipment access, and the sequence of individual shaft construction within each substructure bent or footing group. The submittal shall address the Contractor's proposed time delay and/or the minimum concrete strength necessary before initiating a shaft excavation adjacent to a recently installed drilled shaft.

(3) Shaft Excavation. A site specific step by step description of how the Contractor anticipates the shaft excavation to be advanced based on their evaluation of the subsurface data and conditions expected to be encountered. This sequence shall note the method of casing advancement, anticipated casing lengths, tip elevations and diameters, the excavation tools used and drilled diameters created. The Contractor shall indicate whether wet or dry drilling conditions are expected and if groundwater will be sealed from the excavation.

- (4) Slurry. When the use of slurry is proposed, details on the types of additives to be used and their manufacturers shall be provided. In addition, details covering the measurement and control of the hardness of the mixing water, agitation, circulation, de-sanding, sampling, testing, and chemical properties of the slurry shall be submitted.
- (5) Shaft Cleaning. Method(s) and sequence proposed for the shaft cleaning operation.
- (6) Reinforcement Cage and Permanent Casing. Details of reinforcement placement including rolling spacers to be used and method to maintain proper elevation and location of the reinforcement cage within the shaft excavation during concrete placement. The method(s) of adjusting the reinforcement cage length and permanent casing if rock is encountered at an elevation other than as shown on the plans. As an option, the Contractor may perform soil borings and rock cores at the drilled shaft locations to determine the required reinforcement cage and permanent casing lengths.
- (7) Concrete Placement. Details of concrete placement including proposed operational procedures for free fall, tremie or pumping methods. The sequence and method of casing removal shall also be stated along with the top of pour elevation, and method of forming through water above streambed.
- (8) Mix Design. The proposed concrete mix design(s).
- (9) Disposal Plan. Containment and disposal plan for slurry and displaced water. Containment and disposal plan for contaminated concrete pushed out of the top of the shaft by uncontaminated concrete during concrete placement.
- (10) Access and Site Protection Plan. Details of access to the drilled shafts and safety measures proposed. This shall include a list of casing, scaffolding, work platforms, temporary walkways, railings, and other items needed to provide safe access to the drilled shafts. Provisions to protect open excavations during non-working hours shall be included.

The Engineer will evaluate the drilled shaft installation procedure and notify the Contractor of acceptance, need for additional information, or concerns with the installation's effect on the existing or proposed structure(s).

CONSTRUCTION REQUIREMENTS

516.05 General. Excavation for drilled shaft(s) shall not proceed until written authorization is received from the Engineer. The Contractor shall be responsible for verification of the dimensions and alignment of each shaft excavation as directed by the Engineer.

Unless otherwise approved in the Contractor's installation procedure, no shaft excavation, casing installation, or casing removal with a vibratory hammer shall be made within four shaft diameters center to center of a shaft with concrete that has a compressive strength less than 1500 psi (10,300 kPa). The site-specific soil strengths and installation methods selected will determine the actual required minimum spacing, if any, to address vibration and blow out concerns.

Lost tools shall not remain in the shaft excavation without the approval of the Engineer.

Blasting shall not be used as a method of shaft excavation.

516.06 Shaft Excavation Protection Methods. The construction of drilled shafts may involve the use of one or more of the following methods to support the excavation during the various phases of shaft excavation, cleaning, and concrete placement dependent on the site conditions encountered. Surface water shall not flow uncontrolled into the shaft excavation, however water may be placed into the shaft excavation in order to meet head pressure requirements according to Articles 516.06(c) and 516.13.

The following are general descriptions indicating the conditions when these methods may be used.

- (a) Dry Method. The dry construction method shall only be used at sites where the groundwater and soil conditions are suitable to permit the drilling and dewatering of the excavation without causing subsidence of adjacent ground, boiling of the base soils, squeezing, or caving of the shaft side walls. The dry method shall consist of drilling the shaft excavation, removing accumulated water, cleaning the shaft base, and placing the reinforcement cage and concrete in a predominately dry excavation.

Slurry Method. The slurry construction method may be used at sites where dewatering the excavation would cause collapse of the shaft sidewalls or when the volume and head of water flowing into the shaft is likely to contaminate the concrete during placement resulting in a shaft defect. This method uses slurry, or in rare cases water, to maintain stability of the shaft sidewall while advancing the shaft excavation. After the shaft excavation is completed, the slurry level in the shaft shall be kept at an elevation to maintain stability of the shaft sidewall, maintain stability of the shaft base, and prevent additional groundwater from entering the shaft. The shaft base shall be cleaned, the reinforcement cage shall be set, and the concrete shall be discharged at the bottom of the shaft excavation, displacing the slurry upwards.

- (b) Temporary Casing Method. Temporary casing shall be used when either the dry or slurry methods provide inadequate support to prevent sidewall caving or excessive deformation of the shaft excavation. Temporary casing may be used with slurry or be used to reduce the flow of water into the excavation to allow dewatering and concrete placement in a dry shaft excavation. Temporary casing shall not be allowed to remain permanently without the approval of the Engineer.

During removal of the temporary casing, the level of concrete in the casing shall be maintained at a level such that the head pressure inside the casing is a minimum of 1.25 times the head pressure outside the casing, but in no case is less than 5 ft (1.5 m) above the bottom of the casing. Casing removal shall be at a slow, uniform rate with the pull in line with the shaft axis. Excessive rotation of the casing shall be avoided to limit deformation of the reinforcement cage. In addition, the slump requirements during casing removal shall be according to Article 516.12.

When called for on the plans, the Contractor shall install a permanent casing as specified. Permanent casing may be used as a shaft excavation support method or may be installed after shaft excavation is completed using one of the above methods. After construction, if voids are present between the permanent casing and the drilled excavation, the voids shall be filled with

grout by means of tremie(s) or concrete pump which shall be lowered to the bottom of the excavation. The contractor's means and methods for grout placement shall fill the annular void(s) between the permanent casing and the surrounding earth material to restore and provide lateral earth resistance to the shaft. Grout yield checks shall be performed by the contractor for submittal to the Engineer. Permanent casing shall not remain in place beyond the limits shown on the plans without the specific approval of the Engineer.

When the shaft extends above the streambed through a body of water and permanent casing is not shown, the portion above the streambed shall be formed with removable casings, column forms, or other forming systems as approved by the Engineer. The forming system shall not scar or spall the finished concrete or leave in place any forms or casing within the removable form limits as shown on the plans unless approved as part of the installation procedure. The forming system shall not be removed until the concrete has attained a minimum compressive strength of 2500 psi (17,200 kPa) and cured for a minimum of 72 hours. For shafts extending through water, the concrete shall be protected from water action after placement for a minimum of seven days.

516.07 Slurry. When slurry is used, the Contractor shall provide a technical representative of the slurry additive manufacturer at the site prior to introduction of the slurry into the first shaft where slurry will be used, and during drilling and completion of a minimum of one shaft to adjust the slurry mix to the specific site conditions. During construction, the level of the slurry shall be maintained a minimum of 5 feet (1.5 m) above the height required to prevent caving of the shaft excavation. In the event of a sudden or significant loss of slurry in the shaft excavation, the construction of that foundation shall be stopped and the shaft excavation backfilled or supported by temporary casing, until a method to stop slurry loss, or an alternate construction procedure, has been approved by the Engineer.

- (a) General Properties. The material used to make the slurry shall not be detrimental to the concrete or surrounding ground. Mineral slurries shall have both a mineral grain size that remains in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. Polymer slurries shall have sufficient viscosity and gel characteristics to transport excavated material to suitable screening systems or settling tanks. The percentage and specific gravity of the material used to make the slurry shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement.

If approved by the Engineer, the Contractor may use water and excavated soils as drilling slurry. In this case, the range of acceptable values for density, viscosity and pH, as shown in the following table for bentonite slurry shall be met.

When water is used as the slurry to construct rock sockets in limestone, dolomite, sandstone or other formations that are not erodible, the requirements for slurry testing shall not apply if the entire fluid column is replaced with fresh water after drilling. To do so, fresh water shall be introduced at the top of the shaft excavation and existing water used during drilling shall be pumped out of the shaft excavation from the bottom of the shaft excavation until the entire volume of fluid has been replaced.

- (b) Preparation. Prior to introduction into the shaft excavation, the manufactured slurry admixture shall be pre-mixed thoroughly with clean, fresh water and for adequate time in accordance with the slurry admixture manufacturer's recommendations. Slurry tanks of adequate capacity shall be used for slurry mixing, circulation, storage and treatment.

No excavated slurry pits will be allowed in lieu of slurry tanks without approval from the Engineer. Adequate desanding equipment shall be provided to control slurry properties during the drilled shaft excavation in accordance with the values provided in Table 1.

- (c) Quality Control. Quality control tests shall be performed on the slurry to determine density, viscosity, sand content and pH of freshly mixed slurry, recycled slurry and slurry in the shaft excavation. Tests of slurry samples from within two feet of the bottom and at mid-height of the shaft excavation shall be conducted in each shaft excavation during the excavation process to measure the consistency of the slurry. A minimum of four sets of tests shall be conducted during the first eight hours of slurry use on the project. When a series of four test results do not change more than 1% from the initial test, the testing frequency may be decreased to one set every four hours of slurry use. Reports of all tests, signed by an authorized representative of the Contractor, shall be furnished to the Engineer upon completion of each drilled shaft. The physical properties of the slurry shall be as shown in Table 1.

The slurry shall be sampled and tested less than 1 hour before concrete placement. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be removed. The contractor shall perform final shaft bottom cleaning after suspended solids have settled from the slurry. Concrete shall not be placed if the slurry does not have the required physical properties.

Table 1 – SLURRY PROPERTIES				
	Bentonite	Emulsified Polymer	Dry Polymer	Test Method
Density, lb/cu ft (kg/cu m) (at introduction)	65.2 ± 1.6 ¹ (1043.5 ± 25.6)	63 (1009.0) max.	63 (1009.0) max.	ASTM D 4380
Density, lb/cu ft (kg/cu m) (prior to concrete placement)	67.0 ± 3.5 ¹ (1073.0 ± 56.0)	63 (1009.0) max.	63 (1009.0) max.	ASTM D 4380
Viscosity ² , sec/qt (sec/L)	46 ± 14 (48 ± 14)	38 ± 5 (40 ± 5)	65 ± 15 (69 ± 16)	ASTM D 6910
pH	9.0 ± 1.0	9.5 ± 1.5	9.0 ± 2.0	ASTM D 4972
Sand Content, percent by volume (at introduction)	4 max.	1 max.	1 max.	ASTM D 4381
Sand Content, percent by volume (prior to concrete placement)	10 max.	1 max.	1 max.	ASTM D 4381
Contact Time ³ , hours	4 max.	72 max.	72 max	

Note 1. When the slurry consists of only water and excavated soils, the density shall not exceed 70 lb/cu ft (1121 kg/cu m).

Note 2. Higher viscosities may be required in loose or gravelly sand deposits.

Note 3. Contact time is the time without agitation and sidewall cleaning.

516.08 Obstructions. An obstruction is an unknown isolated object that causes the shaft excavation method to experience a significant decrease in the actual production rate and requires the Contractor to core, break up, push aside, or use other means to mitigate the obstruction. Subsurface conditions such as boulders, cobbles, or logs and buried infrastructure such as footings, piling, or abandoned utilities, when shown on the plans, shall not constitute an obstruction. When an obstruction is encountered, the Contractor shall notify the Engineer immediately and upon concurrence of the Engineer, the Contractor shall mitigate the obstruction with an approved method.

516.09 Top of Rock. The top of rock will be considered as the point where rock, defined as bedded deposits and conglomerate deposits exhibiting the physical characteristics and difficulty of rock removal as determined by the Engineer, is encountered which cannot be drilled with augers and/or underreaming tools configured to be effective in the soils indicated in the contract documents.

516.10 Design Modifications. If the top of rock elevation differs from that shown on the plans by more than 10 percent of the length of the drilled shaft above the rock, the Engineer shall be contacted to determine if any drilled shaft design changes may be required. In addition, if the type of soil or rock encountered is not similar to that shown in the subsurface exploration data, the Contractor may be required to extend the drilled shaft length(s) beyond those specified in the plans. In either case, the Engineer will determine if revisions are necessary and the extent of the modifications required.

516.11 Excavation Cleaning and Inspection. Materials removed or generated from the shaft excavations shall be disposed of according to Article 202.03.

After excavation, each shaft shall be cleaned. For a drilled shaft terminating in soil, the depth of sediment or debris shall be a maximum of 1 1/2 in. (38 mm). For a drilled shaft terminating in rock, the depth of sediment or debris shall be a maximum of 1/2 in. (13 mm).

A shaft excavation shall be overreamed when, in the opinion of the Engineer, the sidewall has softened, swelled, or has a buildup of slurry cake. Overreaming may also be required to correct a shaft excavation which has been drilled out of tolerance. Overreaming may be accomplished with a grooving tool, overreaming bucket, or other approved equipment. Overreaming thickness shall be a minimum of 1/2 in. (13 mm) and a maximum of 3 in. (75 mm).

516.12 Reinforcement. This work shall be according to Section 508 and the following.

The shaft excavation shall be cleaned and inspected prior to placing the reinforcement cage. The reinforcement cage shall be completely assembled prior to drilling and be ready for adjustment in length as required by the conditions encountered. The reinforcement cage shall be lifted using multiple point sling straps or other approved methods to avoid reinforcement cage distortion or stress. Cross frame stiffeners may be required for lifting or to keep the reinforcement cage in proper position during lifting and concrete placement.

The Contractor shall attach rolling spacers to keep the reinforcement cage centered within the shaft excavation during concrete placement and to ensure that at no point will the finished shaft have less than the minimum concrete cover(s) shown on the plans. The rolling spacers or other approved non-corrosive spacing devices shall be installed within 2 ft (0.6 m) of both the top and bottom of the drilled shaft and at intervals not exceeding 10 ft (3 m) throughout the length of the shaft to ensure proper reinforcement cage alignment and clearance for the entire shaft. The number of rolling spacers at each level shall be one for each 1.0 ft (300 mm) of shaft diameter, with a minimum of four rolling spacers at each level. For shafts with different shaft diameters throughout the length of the excavation, different sized rolling spacers shall be provided to ensure the reinforcement cage is properly positioned throughout the entire length of the shaft.

When a specific concrete cover between the base of the drilled shaft and the reinforcement cage is shown on the plans, the bottom of the reinforcement cage shall be supported so that the proper concrete cover is maintained.

If the conditions differ such that the length of the shaft is increased, additional longitudinal bars shall be either mechanically spliced or lap spliced to the lower end of the reinforcement cage and confined with either hoop ties or spirals. The Contractor shall have additional reinforcement available or fabricate the reinforcement cages with additional length as necessary to make the required adjustments in a timely manner as dictated by the encountered conditions. The additional reinforcement may be non-epoxy coated.

516.13 Concrete Placement. Concrete work shall be performed according to the following.

Throughout concrete placement the head pressure inside the drilled shaft shall be at least 1.1 times the head pressure outside the drilled shaft.

Concrete placement shall begin within 1 hour of shaft cleaning and inspection. The pour shall be made in a continuous manner from the bottom to the top elevation of the shaft as shown on the contract plan or as approved in the Contractor's installation procedure. Concrete placement shall continue after the shaft excavation is full and until 18 in. (450 mm) of good quality, uncontaminated concrete is expelled at the top of shaft. Vibration of the concrete will not be allowed when the concrete is displacing slurry or water. In dry excavations, the concrete in the top 10 ft (3 m) of the shaft shall be vibrated.

When using temporary casing or placing concrete under water or slurry, a minimum of seven days prior to concrete placement, a 4 cu yd (3 cu m) trial batch of the concrete mixture shall be performed to evaluate slump retention. Temporary casing shall be withdrawn before the slump of the concrete drops below 6 in. (150 mm). For concrete placed using the slurry method of construction, the slump of all concrete placed shall be a minimum of 6 in. (150 mm) at the end of concrete placement.

Devices used to place concrete shall have no aluminum parts in contact with concrete.

When the top of the shaft is at the finished elevation and no further concrete placement above the finished elevation is specified, the top of the shaft shall be level and finished according to Article 503.15(a).

Concrete shall be placed by free fall, tremie, or concrete pump subject to the following conditions.

- (a) Free Fall Placement. Concrete shall only be placed by free fall when the rate of water infiltration into the shaft excavation is less than 12 in. (300 mm) per hour and the depth of water in the shaft excavation is less than 3 in. (75 mm) at the time of concrete placement.

Concrete placed by free fall shall fall directly to the base without contacting the reinforcement cage, cross frame stiffeners, or shaft sidewall. Drop chutes may be used to direct concrete to the base during free fall placement.

Drop chutes used to direct placement of free fall concrete shall consist of a smooth tube. Concrete may be placed through either a hopper at the top of the tube or side openings as the drop chute is retrieved during concrete placement. The drop chute shall be supported so that free fall does not exceed 60 ft (18.3 m) for conventional concrete or 30 ft (9.1 m) for self-consolidating concrete. If placement cannot be satisfactorily accomplished by free fall in the opinion of the Engineer, either a tremie or pump shall be used to accomplish the pour.

- (b) Tremie and Concrete Pump Placement. Concrete placement shall be according to Article 503.08, except the discharge end of the steel pipe shall remain embedded in the concrete a minimum of 10 ft (3.0 m) throughout concrete placement when displacing slurry or water.

516.14 Construction Tolerances. The following construction tolerances shall apply to all drilled shafts.

- (a) Center of Shaft. The center of the drilled shaft shall be within 3 in. (75 mm) of the plan station and offset at the top of the shaft.
- (b) Center of Reinforcement Cage. The center of the reinforcement cage shall be within 1 1/2 in. (40 mm) of plan station and offset at the top of the shaft.
- (c) Vertical Plumbness of Shaft. The out of vertical plumbness of the shaft shall not exceed 1.5 percent.
- (d) Vertical Plumbness of Reinforcement Cage. The out of vertical plumbness of the shaft reinforcement cage shall not exceed 0.83 percent.
- (e) Top of Shaft. The top of the shaft shall be no more than 1 in. (25 mm) above and no more than 3 in. (75 mm) below the plan elevation.
- (f) Top of Reinforcement Cage. The top of the reinforcement cage shall be no more than 1 in. (25 mm) above and no more than 3 in. (75 mm) below the plan elevation.
- (g) Bottom of shaft. Excavation equipment and methods used to complete the shaft excavation shall have a nearly planar bottom. The cutting edges of excavation equipment used to create the bottom of shafts in rock shall be normal to the vertical axis of the shaft within a tolerance of 6.25 percent.

516.15 Method of Measurement. This work will be measured for payment in place and the volume computed in cubic yards (cubic meters). The volume will be computed using the plan diameter of the shaft multiplied by the measured length of the shaft. The length of shaft in soil will be computed as the difference in elevation between the top of the drilled shaft shown on the plans, or as installed as part of the Contractor's installation procedure, and the bottom of the shaft or the top of rock (when present) whichever is higher. The length of shaft in rock will be computed as the difference in elevation between the measured top of rock and the bottom of the shaft.

When permanent casing is specified, it will be measured for payment in place, in feet (meters). Permanent casing installed at the Contractor's option will not be measured for payment.

Reinforcement furnished and installed will be measured for payment according to Article 508.07.

516.16 Basis of Payment. This work will be paid for at the contract unit price per cubic yard (cubic meter) for DRILLED SHAFT IN SOIL, and/or DRILLED SHAFT IN ROCK.

Permanent casing will be paid for at the contract unit price per foot (meter) for PERMANENT CASING.

Reinforcement furnished and installed will be paid for according to Article 508.08.

Obstruction mitigation will be paid for according to Article 109.04."

PREFORMED PAVEMENT JOINT SEAL

Effective: October 4, 2016

Revised: March 24, 2023

Description. This work shall consist of furnishing all labor, equipment and materials necessary to prepare the joint opening and install pavement joint seal(s) at the locations specified. Unless otherwise detailed on the plans, the joint shall be sized for a rated movement of 2 inches (50 mm).

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

- (a) Preformed Elastomeric Joint Seal. This material shall be according to Section 1053.01.
- (b) Preformed Pre-compressed, Silicone Coated, Self-Expanding Sealant System. This Sealant system shall be comprised of three components: 1) cellular polyurethane foam impregnated with hydrophobic 100% acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone; 2) field-applied epoxy adhesive primer, 3) field-injected silicone sealant bands.

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

- The joint seal shall be held in place by a non-sag, high modulus silicone adhesive.
- The joint seal shall be compatible with the epoxy and header material.

- The joint seal shall withstand the effects of vertical and lateral movements, skew movements and rotational movement without adhesive or cohesive failure.
- The joint seal shall be designed so that, the material is capable of movement of +50%, -50% (100% total) of nominal material size.
- The gland shall not contain any open, unsealed joints along its length in its final condition.
- Changes in plane and direction shall be executed using factory fabricated 90 degree transition assemblies. The transitions shall be watertight at the inside and outside corners through the full movement of the product.
- The depth of the joint shall be recessed 3/4 in. (19 mm) below the riding surface throughout the normal limits of joint movement.
- The joint seal shall be resistant to ultraviolet rays.
- The joint seal shall be resistant to abrasion, oxidation, oils, gasoline, salt, and other materials that may be spilled on or applied to the surface.
- The manufacturer shall certify that the joint composition shall be free of any waxes or wax compounds; asphalts or asphalt compounds.

The joint material shall meet the following physical properties:

Property	Requirement	Test Method
Tensile Strength of Silicone Coating (min)	140 psi	ASTM D 412
UV Resistance of Joint System	No Changes--2000 Hours	ASTM C793
Density of Cellular Polyurethane Foam	4.0 lb/ cu ft (200kg/cu m)	ASTM D545
Heat Aging Effects (Silicone Coating)	No cracking, chalking	ASTM C 792
Joint System Operating temp range (min)	-40° F to 185° F	ASTM C 711

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

Property	Requirement	Test method
Tensile Strength	2,500 psi (24 MPa) min.	ASTM D638
Compressive Strength	7000 psi (48 MPa) min.	ASTM D695
Bond Strength (Dry Cure)	2000 psi (28MPa) min	ASTM C882
Water Absorption	0.1% by weight	ASTM D570

The silicone band adhesive shall have the following properties:

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

- (c) Performed Silicone Joint Seal. The preformed silicone joint seal used for this item shall conform to the following specifications:

Table 1
Physical Properties of Preformed Silicone Gland

Property	Requirement	Test Method
Rated Movement Capability	+2 ¼ inch total	N/A
Tensile Strength, psi.	1000 min	ASTM D 412
Elongation	400% min	ASTM D 412
Tear (die B)	100 ppi. min	ASTM D 624
Hardness Durometer (Shore A).	55 +/- 5 max	ASTM D 2240
Compression set at 212°F, 70 hrs	30% max	ASTM D 395
Heat Aged Properties	5pt max loss on Durometer	ASTM D 573
Tensile and Elongation % Loss	10 % max	

The color of the preformed silicone seal shall be black, made by the addition of Carbon Black fillers which increases UV resistance, tensile strength, and abrasion wear properties.

The locking adhesive shall be non-sag, high modulus silicone adhesive conforming to the following specifications:

Table 2
Physical Properties of the Silicone Locking Adhesive

Property	Requirement	Test Method
Tensile Strength, psi.	200 min	ASTM D 412
Elongation, %	450 min	ASTM D 412
Tack Free Time, minutes.	20 max.	ASTM C 679
Cure Time ¼" bead, hrs	24 max	ASTM C 679
Resistance to U.V.	No cracking, chalking, or degradation	ASTM C793
VOC (g/L)	0	ASTM D 3960

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

The two part epoxy primer shall be supplied for application to the vertical faces of the joint opening. The supplied primer shall be equally as effective when bonded to concrete or steel. This primer shall meet the following criteria:

Table 3
Physical Properties of Preformed Silicone Joint System Primer

Property	Requirement	Test Method
Viscosity (cps)	44	ASTM D 2196
Color	Light Amber	Visual
Solids (%)	41	ASTM D 4209
Specific Gravity	0.92	ASTM D 1217
Product Flash Point (°F, T.C.C.)	48	ASTM D 56
Package Stability	N/A	One year in tightly sealed containers
Cleaning	N/A	Mineral Spirits
VOC (g/L)	520	ASTM D 3960

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

Table 1
Physical Properties of Preformed Silicone Gland

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

Table 2
Physical Properties of the V-Epoxy-R

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

Property	Requirement	Test Method
Color	Gray	Visual
Viscosity	45,000 CP (typ.)	N/A
Gel Time (minutes)	30 min.	ASTM C 881
Shelf Life (Separate Sealed Containers)	12 Months	N/A
Resistance to U.V.	No cracking, chalking, or degradation	ASTM C793
VOC (g/L)	0	ASTM D 3960

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

- (e) Bonded Preformed Joint Seal. This joint system shall consist of preformed elastomeric seal bonded to the side walls of the joint opening using an adhesive as specified by the Manufacturer of the joint seal.

The bonded preformed joint seal shall be according to Table 1 of ASTM D2628 with the following exceptions: Compression set shall not be over 40 percent when tested according to Method B (Modified) of ASTM D 395 after 70 hours at 212 °F (100 °C). The Compression-Deflection requirement will not apply to the bonded preformed joint seal.

The adhesive shall be epoxy base, dual component, which resists salt, diluted acids, alkalis, solvents, greases, oils, moisture, sunlight and weathering. Temperatures up to 200 °F (93 °C) shall not reduce bond strength. At 68 °F (20 °C), the bond strength shall be a minimum of 1000 psi (6.9 MPa) within 24 hours.

Any primers or cleaning solutions used on the faces of the joint or on the profile of the sides of the bonded preformed joint seal shall be supplied by the manufacturer of the bonded preformed joint seal.

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

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

CONSTRUCTION REQUIREMENTS

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

The minimum ambient air temperature in which the joint seal can be installed is 40° F (4.4° C) and rising, except for bonded preformed joint seals which shall not be installed when temperatures below 50 °F (10 °C) are predicted within a 48 hour period.

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

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

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

After surface preparation is completed, the joint shall be cleaned of debris using compressed air with a minimum pressure of 90 psi (620 kPa). The air compressor shall be equipped with traps to prevent the inclusion of water and/or oil in the air line. The compressed air shall be according to the cleanliness requirements of ASTM D 4285.

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

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

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

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

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

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

ERECTION OF BRIDGE GIRDERS OVER OR ADJACENT TO RAILROADS

Effective: August 9, 2019

Description: In addition to the requirements of Article 504.06(d) and 505.08(e), the following shall apply.

The Contractor or sub-Contractor performing the erection of steel or concrete beams or girders over, or adjacent to (within 25 ft. of), active railroad tracks shall submit an erection plan to the Engineer for approval prior to starting the work.

Erection Plan: The Erection Contractor shall retain the services of an Illinois Licensed Structural Engineer for the completion of a project-specific erection plan. The structural engineer, herein referred to as the Erection Engineer, shall sign and seal the erection plan, drawings, and calculations for the proposed erection of the structural beams or girders.

The erection plan shall be complete in detail for all phases, stages, and conditions anticipated during erection. The erection plan shall include structural calculations and supporting documentation necessary to completely describe and document the means, methods, temporary support positions, and loads necessary to safely erect the structural members in conformance with the contract documents and as outlined herein. The erection plans shall address and account for all items pertinent to the erection including such items as sequencing, falsework, temporary shoring and/or bracing, girder stability, crane positioning and movement, means of access, pick points, girder shape, permissible deformations and roll, interim/final plumbness, cross frame/diaphragm placement and connections, bolting and anchor bolt installation sequences and procedures, and blocking and anchoring of bearings. The Erection Contractor shall be responsible for the stability of the partially erected structure during all phases of erection.

The erection plans and procedures shall be submitted to the Engineer for review and acceptance prior to starting the work. Review, acceptance and/or comments by the Department shall not be construed to guarantee the safety or final acceptability of the work or compliance with all applicable specifications, codes, or contract requirements, and shall neither relieve the Contractor of the responsibility and liability to comply with these requirements, nor create liability for the Department. Significant changes to the erection plan in the field must be approved by the Erection Engineer and accepted by the Engineer for the Department.

Basis of Payment: This work shall not be paid for separately but shall be included in the applicable pay items according to Article 504.08 or 505.13 of the Standard Specifications.

BAR SPLICERS, HEADED REINFORCEMENT

Effective: September 2, 2022

Revised: October 27, 2023

Add the following to Article 508.08(b):

When bar splicers are epoxy-coated, all damaged or uncoated areas near the threaded ends shall be coated with a two-part epoxy according to ASTM D 3963 (D 3963M). All threaded ends of Stage II construction threaded splicer bars shall be coated according to ASTM D 3963 or dipped in an epoxy-mastic primer prior to joining the Stage II construction threaded splicer bar to the threaded coupler.

Add the following Article 508.02 (d)

Bar Terminators 1006.10(a)(1)h

Add the following paragraph after Article 508.08 (c):

Bar terminators are threaded, headed attachments to reinforcement to form headed reinforcement. When specified on the plans, a bar terminator shall be attached to the designated reinforcement for development.

Add the following 4th paragraph to Article 508.11:

Bar Terminators will be paid for at the contract unit price per each for BAR TERMINATORS.

Add the following to Article 1006.10(a)(1)g:

For bar splicers with welded connections between the threaded coupler and threaded rod, the Stage I construction threaded splicer bar shall be welded to the threaded coupler using an all-around fillet weld.

Add the following Article 1006.10(a)(1)h:

Bar Terminators. Designated bars shall use a bar terminator to form headed reinforcement. Headed reinforcement shall conform to ASTM A970 with threaded attachment; Class HA; and reinforcement bars conforming to ASTM A706, except the connection strength of the bar terminator to the reinforcement bar shall meet, in tension, at least 125 percent of the specified yield strength of the reinforcement bar. The bar terminator shall be on the Department's qualified product list.

When the reinforcement bar to receive the bar terminator is epoxy coated, the bar terminator shall also be epoxy coated according to ASTM A 775 (A 775M)

NOISE ABATEMENT WALL, GROUND MOUNTED

Effective: December 9, 2022

Revised: June 28, 2024

General. This work shall consist of furnishing the design, shop drawings, materials, post anchorage, and construction of ground mounted concrete noise abatement walls (noise walls) according to this Special Provision, the Contract Plans and/or as directed by the Engineer.

The noise abatement wall shall consist of precast concrete panels spanning between vertical posts supported by concrete drilled shaft foundations (ground mounted) as shown on the plans. Driven piles will not be allowed. The posts shall be steel or concrete, unless otherwise specified on the Contract Plans. The design, material, fabrication and construction shall comply with this Special Provision and the requirements specified by the noise wall supplier selected by the Contractor for use on this project. The walls shall have no omissions or gap except as detailed in the Contract Plans.

The Contractor shall verify the locations for the proposed ground mounted wall for conflicts and inform the Engineer in writing of any conflicts before realigning or redesigning the wall. The Contractor shall realign or redesign the wall to avoid any conflicts.

Post spacing shall avoid existing and proposed underground utilities and storm sewers.

Wall components shall be fabricated and erected to produce a precast concrete reflective noise wall system and/or an absorptive noise reduction system at the locations shown in the Contract Plans. The noise reduction system shall satisfy the acoustical requirements as specified on the Contract Plans. An absorptive noise reduction system may be used as an alternate to a reflective noise wall system. Substitution of alternate materials in lieu of precast concrete panels will not be allowed.

All appurtenances behind, in front of, under, over, mounted upon, or passing through the noise wall, such as drainage structures, fire hydrant access, highway signage, emergency access, utilities, and storm sewers shall be accounted for in design of the wall.

The noise walls shall be designed and constructed to extend to the minimum lines, grades and dimensions of the wall envelope, with no omissions or gaps, as shown on the Contract Plans and as directed by the Engineer.

Submittals. A complete wall and foundation design submittal, including design calculations for wall panels, posts, foundations, and all connections and shop drawings shall be submitted to the Department for review and approval no later than 90 days prior to beginning construction of the wall. The time required for the preparation and review of these submittals shall be charged to the allowable contract time. Delays caused by untimely submittals or insufficient data will not be considered justifications for any time extensions. No additional compensation will be made for any additional material, equipment or other items found necessary to comply with the project specifications as a result of the Engineer's review. The Contractor will be required to submit the necessary shop drawings. All submittals shall be prepared and sealed by an Illinois Licensed Structural Engineer.

Submittals shall include all structural calculations, details, dimensions, quantities and cross sections necessary for the construction of the noise abatement walls including but not be limited to:

- (1) Structural design calculations for all structural members, foundations, and connections prepared and sealed by an Illinois Licensed Structural Engineer, and prints of shop drawings on reduced size 11 x 17 in. (275 x 425 mm) sheets in accordance with Article 503.05 and 1042.03(b) of the Standard Specifications.
- (2) A plan view of the wall indicating the stations and offsets required to locate the drilled shaft foundations. The proposed foundation diameter(s) and spacing(s) shall be indicated with all changes to the horizontal alignment shown. Each panel and post shall be numbered and any changes in type or size shall be noted. The centerline of any utilities passing under the wall and locations of expansion joints, access doors, lighting, signing, curb cuts, and drainage structures shall also be shown.
- (3) An elevation view of the wall, indicating the elevations of the top of the posts and panels as well as the elevations of the bottom of the panels, tops of the shaft foundations, all steps in wall system, the finished grade line, and vertical clearances to existing utilities and storm sewers. Each post size and length, panel type and size, and foundation depth shall be designated.
- (4) A typical cross section(s) that shows the panel, post, foundation, and the elevation relationship between existing ground conditions and the finished grade as well as slopes adjacent to the wall.
- (5) All general notes required for constructing the wall.
- (6) All details for the steps in the bottom of panels shall be shown. The bottom of the panels shall be located at or below the theoretical bottom of panel line shown on the Contract Plans. The theoretical bottom of panel line is assumed to be 8 in (200 mm) below the finished grade line at front face of the wall for ground mounted noise walls, unless otherwise shown on the Contract Plans.
- (7) Tops of the panels and posts shall extend to or above the theoretical top of wall line shown on the Contract Plans. All panel tops shall be cast and placed horizontally with any changes in elevation accomplished by stepping adjacent panel sections at posts. Steps shall not exceed 2 ft (300 mm) in height.

- (8) All panel types shall be detailed. The details shall show panel weight, orientation, all dimensions necessary to cast and/or fabricate each type of panel, the reinforcing steel, and location of post or foundation connection hardware as well as lifting devices embedded in the panels. The Noise Reduction Coefficient (NRC) of each panel of the absorptive face shall be noted.
- (9) All post types shall be detailed. The details shall show post weight, orientation, all dimensions necessary to cast and/or fabricate each type of post, the reinforcing steel, connecting plates, and anchorage details as well as lifting devices embedded in or attached to the posts. Post spacing for walls shall be limited to a distance that does not over stress the supporting structure.
- (10) Details of wall panels with appurtenances attached to or passing through the wall, as shown on the contract plans, such as utilities, emergency access doors, framed openings, drainage structures, signs, etc. shall be shown. Any modifications to the design or location of these appurtenances to accommodate a particular system shall also be submitted.
- (11) All architectural panel treatment, including color, texture and form liner patterns shall be shown. All joints shall be placed horizontal or vertical and shall be aligned with adjacent panels.
- (12) The details for the connection between panels and posts as well as their connection to the foundation, shall be shown. Foundation details, including details showing the dimensions, reinforcement, and post anchorage system for the drilled shaft foundations, shall be shown. The method of securing the reinforcement in the foundation prior to concrete placement shall be shown.
- (13) Testing, certifications and reports from independent laboratories documenting that the panel's sound Transmission Loss (TL) and NRC for the panel satisfy the criteria shown in the design criteria section of this specification. The testing results for the flame spread, smoke density and freeze-thaw/salt scaling requirements described in the materials section of this specification shall also be submitted. If unable to document panel and post deflections by calculations, reports of full scale testing shall be submitted to demonstrate the deflection criteria have been met.
- (14) Manufacturer recommended installation requirements, a sequence of construction and a detailed bill of materials shall be included.
- (15) The color of the wall panels and support posts identified by Federal Standard 595-B color number.

The Contractor shall deliver to the Department, a 2 ft x 2 ft (600 mm x 600 mm) precast concrete sample of the wall which contains the colors, textures and patterns proposed for use on the project for approval.

The samples shall be made at the same plant manufacturing the product for the noise walls under this contract and shall be representative of those which will be tested per this specification. Once the color sample is approved, a batch shall be designated by batch number and date and will remain the standard for the entire project.

The Contractor shall submit site access plans showing access and limits of the work areas for the installation of the wall. Any required traffic controls shall be according to the requirements in the plans or the special provision for TRAFFIC CONTROL PLAN.

The initial wall and foundation design submittal shall include three (3) sets of shop drawings and calculations. One set of drawings will be returned to the Contractor with any corrections indicated. The Contractor shall do no work or ordering of materials for the structure until the Engineer has approved the submittal.

Design Criteria. The wall system shall be designed to withstand wind pressure, applied perpendicular to the panels in either direction, according to the AASHTO LRFD Bridge Design Specifications, Chapter 15, for the Design of Sound Barriers. The noise wall design life shall be 75 years unless otherwise noted. The wall system shall be designed to withstand active earth pressure and live load surcharge at locations indicated on the plans. The contractor shall be responsible for the structural adequacy of the panels, posts, foundations and connections as well as overall wall overturning stability. Prestressed and/or post tensioned panel concepts will not be permitted.

The factored Strength III design wind loading shall be as specified on the plans but not less than 35 psf (1.7 kPa). The Service I factored design wind loading shall be as specified on the plans but not less than 15 psf. When a sound wall is also required to support earth pressures, the unfactored design active earth pressure shall be based on an equivalent fluid pressure of 55 pounds per cubic foot (880 kg/m³) and a minimum live load surcharge pressure of 2 feet (600 mm) of earth pressure. The earth pressure fill height shall be defined by the proposed grade line elevation and the theoretical bottom of panel line.

The post shall be connected to the foundation by either embedding the post inside the concrete foundation shaft or by attaching the post to the foundation shaft with base plates and anchor bolts as required by design. Embedded posts shall extend into the shaft for the full length of the shaft. For base plate and anchor bolt connections, the minimum number of anchor bolts per post shall be four 1 in. (M24) diameter bolts, with a minimum embedment depth of 18 in. (450 mm). The concrete shaft for base plate and anchor bolt type connections shall be reinforced. For embedded post type connections, the shaft need not be reinforced unless the minimum clear cover over the post exceeds 10 inches (250 mm). When reinforcement of the concrete shaft is required as specified above, the reinforcement shall consist of a minimum of eight #5 (#15) vertical bars symmetrically placed and tied with #3 (#10) ties at 6 in. (150 mm) centers. An additional tie shall be provided at the top and bottom of the foundation. As an alternative to the ties, a #3 (#10) spiral at a 6 in. (150 mm) pitch with an additional 1 1/2 turns at the top and bottom of the foundation or an equivalent 4 x 4 – W12.3 x W7.4 welded wire fabric may be substituted. Reinforcement bars inside the concrete foundations do not require epoxy coating.

Posts shall be oversized by 0.0625 in. in each direction to account for corrosion.

The material and construction of the foundations (drilled shafts) shall be according to Section 516 of the Standard Specifications.

The shaft foundation dimensions shall be determined according to AASHTO LRFD Bridge Design Specifications. Soil borings from prior soil investigations when available are shown in the plans and may be used to generate foundation design parameters. The design shall utilize load and resistance factors as specified in the AASHTO LRFD Bridge Design Specifications and shall account for the effects of a sloping ground surface and water table indicated on the plans. In the

event that insufficient data is shown on the plans, the following parameters should be assumed for the foundation design:

Effective unit weight	70 pcf (1120 kg/m ³)
Internal friction angle	30 degrees
Cohesion intercept	0 ksf (0 kg/m ³)

The maximum post spacing shall be as specified in the Contractor's approved design, but not greater than 20 ft.

The maximum allowable panel deflection shall be no more than the panel length (L) divided by 240 (L/240). The maximum post deflection due to post curvature shall be $H/180$, where H is the height of the post above the foundation. The maximum total post deflection due to post curvature, foundation curvature, and top-of-foundation rotation shall be $H/90$. A method utilizing P-y springs for different soil layers shall be used to calculate the total post deflection. When meeting the deflection limits cannot be demonstrated by calculations, a lateral load test and report shall be submitted to the Engineer indicating that the above noted design lateral loads can be applied to the panels and/or posts without exceeding noted deflection tolerance. The test shall apply lateral loads to the panel simulating uniform wind pressure, and earth pressure when present.

The design shall account for the presence of all appurtenances mounted on or passing through the wall such as drainage structures, existing or proposed utilities, emergency access doors and other items.

Corrugations, ribs or battens on the panel shall be oriented vertically when erected. The panels shall be designed to prevent entrapment and ponding of water. The walls shall not have openings allowing the perching or nesting of birds or the collection of dirt, debris or water.

The walls shall not have handholds or grips promoting climbing of the walls. Any bolts or fasteners used to connect material to the supporting panel, posts, or foundations shall be recessed or embedded in concrete, hidden from view and weather exposure. No external mechanical fastening devices such as frames or clips shall be used for these connections.

The noise abatement material shall be designed to achieve a sound TL equal to or greater than 20 dB in all one-third octave bands from 100 hertz to 5000 hertz, inclusive, when tested according to ASTM E-90. The sound absorptive material shall have a minimum NRC as indicated on the plans. For the side of the walls specified as reflective, no minimum NRC is required.

The NRC shall be determined per ASTM E795, tested according to ASTM C423 (mounting type A). The ratio of noise absorptive material on the panel surface to total wall area (including posts) shall be greater than 90 percent. NRC testing shall be performed on coated samples, utilizing the stain that will be applied for color.

Access Doors. All access doors shall be designed to fit within the design of the noise wall as shown on the plans. Doors shall be complete with hardware and locking devices. Each door shall provide a 3 ft (0.9 m) wide by 7 ft (2.1 m) high minimum clear access opening. Both door jambs shall be securely fastened to anchored posts. Front and back face of the installed door shall be flush with the faces of the noise wall.

The door, jambs, head, hinges, door appurtenances, and adjacent ground mounted posts shall be designed to withstand the wind pressure of 30 psf (1.4 kPa) with the door in fully open and fully closed positions and support the weight of the door and a 300 lb (136 kg) vertical load on the non-hinged side of the door. Provide steel bracing as required. Door bottom shall be equipped with drainage holes to avoid accumulation of trapped moisture.

Door jambs and head section shall be hot dip galvanized steel. Door hinges shall be barrel type, edge mount, extra heavy-duty, hot dip galvanized steel or stainless steel. The hinges shall be designed to support the weight of door assembly, wind loads on the open door, and a 300 lb (136 kg) vertical load on the non-hinged side of the door.

Door pulls shall be provided on both sides of access door(s). Door locking hardware shall be hasp-type to be used with a padlock and shall be located according to local fire department or other requirements as applicable. A solid steel emergency access lock box system shall be provided and mounted near the hasp location at the steel post on the locking hardware side of door. The lock box for emergency access doors shall be according to local fire department requirements.

Doors shall be equipped with lifting bolts or beams as required for safe lifting of door units.

Materials. Noise wall materials shall conform to the supplier's standards, AASHTO Specifications for noise walls and the following:

- (a) Reinforcement bars shall satisfy ASTM A706 Grade 60 (400). Welded wire fabric shall be according to AASHTO M 336. All reinforcement in the wall panels shall be epoxy coated or galvanized.
- (b) Anchor bolts shall conform to ASTM F1554 Grade 55 or 105 and shall be galvanized per AASHTO M232.
- (c) The precast elements shall be according to applicable portions of Section 1042 of the Standard Specifications. The precast elements are considered to be Precast Concrete Structural Members. Coarse Aggregate shall meet the requirements of Article 1004.02(f) of the Standard Specifications. Concrete shall be Class PC with a minimum compressive strength of 4500 psi (31,000 kPa) at 28 days. Dry cast concrete element will not be permitted.
- (d) For sound absorptive panels, the manufacturer shall provide test information from an independent lab that the panels meet specified durability requirements.

All sound absorbing concrete and composite concrete components shall be tested for long-term durability according to AASHTO T 161 (ASTM C666), Procedure A or B, or ASTM C672-12. For testing according to AASHTO T 161 (ASTM C666), a minimum of three specimens shall be tested, and the maximum weight (mass) loss after 300 cycles shall be 7.0 percent with no cracks, delamination (applies to composite panels), or other excessive physical distress. For testing according to ASTM C672-12, the following modifications and requirements shall apply:

Three specimens of a full cross section of the panel at least 144 square inches in face area will be selected at random from the provided panel. Sample specimens shall be representative of the manufacturer's continuous production operation, as selected and marked by the engineer. Specimens shall be 2D-symmetric and shaped according to the testing laboratory's accommodations. Surfaces of the sample specimens shall be prepared for testing as follows. Brush the surfaces of the sample to remove any loose particles. Before testing, submerge the test specimens be submerged in water for a period of 24 hours before testing. Immediately following this, cover the specimens with the sodium chloride solution as stated below.

Test Procedure

Place samples in a 5 sided water tight container, fully submerged in a solution of sodium chloride (concentration 3% by mass). Maintain 1/4 inch of sodium chloride solution above the top surface of the fully submerged specimen within the container.

Subject the submerged specimens to continuous freeze-thaw cycles as follows:

After each five cycles, remove the salt solution and particles of deteriorated concrete from the slab and collect in a watertight container. The operation is best accomplished by tilting the slab in a funnel approximately 20 inches in diameter and washing the surface of the slab with a 3% sodium chloride solution. Continue this washing until all loose particles are removed from the sample. Strain the solution through a filter and dry the residue at 221 degrees Fahrenheit to a constant mass condition. Cumulatively weigh the residue after each five cycles. The dry residue is defined as the loss of mass. Calculate the loss of mass to the nearest 0.01 pounds per square foot, not including the exposed surface of any core material on the cast or cut edges. Visually rate the surfaces according to 10.1.5 of ASTM C672 including any delamination of the sound absorbing material from the concrete core for composite concrete materials. After each washing of each sample, re-establish the initial submerged condition with a new solution of 3% sodium chloride before continuing with freeze-thaw cycling.

Continue the test until 30 freeze-thaw cycles have been completed.

During the test position and support each specimen to allow free circulation of the test solution under, around, and over test pieces. Support the bottom of the specimens on blocks in a manner to facilitate movement of moisture through and around the test specimens.

Test Report

Submit to the engineer an independent testing laboratory test report which shows that all solid and composite concrete products meet or exceed the following criteria:

1. After 30 freeze-thaw cycles the test specimens shall not exhibit excessive deterioration in the form of cracks, spalls, aggregate disintegration, delamination or other objectionable features.
 2. Compliance with the test requirements is based upon a loss of mass of not more than 0.2 pounds per square foot from the surface after 30 cycles of freezing and thawing.
 3. The report shall include the following:
 - a. Name of manufacturer.
 - b. Location of production.
 - c. Production description.
 - d. Date product sample was cast.
 - e. Date testing began.
 - f. Specimen identification.
 - g. 5x7-inch color photographs of the test specimens before and after the 30 cycles of freeze-thaw test showing both sound absorbing faces and at least one representative side view of a cut (not cast) face, and any defects.
 - h. A graph of the cumulative mass loss of each specimen plotted against the number of freeze-thaw cycles for 5, 10, 15, 20, 25, and 30 freeze-thaw cycles.
 - i. Visual rating according to ASTM C672 Section 10.1.5, including report of any delamination of the sound absorbing material from the concrete core for composite concrete components.
- (e) The manufacturer for the noise abatement wall shall provide their quality control plan for testing the product, and test results shall be provided upon request by the Engineer. Manufacturers on the Department's Qualified Product List of Certified Precast Concrete Producers who are approved for noise abatement walls will be considered in compliance with this requirement. The panel manufacturer shall warranty the panels for aesthetic coating durability and no material delaminations or failures for a minimum of ten years.
- (f) Steel plates and posts shall conform to AASHTO M 270 (M 270 M) Grade 36 (250) or 50 (345). All portions of the post shall be galvanized according to AASHTO M111 and ASTM A385 or primed according to Section 506 of the Standard Specifications. The exposed portions of the steel posts shall be painted according to Section 506 of the Standard Specifications. The adjacent concrete panels shall be protected from over spray. The color shall closely match the color of the concrete panels, unless otherwise specified on the plans. Steel bolts, nuts, and washers shall be galvanized according to AASHTO M232.
- (g) Lifting inserts cast into the panels shall be hot dipped galvanized.
- (h) Non shrink grout shall be according to Section 1024 of the Standard Specifications.

- (i) The default color of both sides of the panels, posts and other visible elements shall be a light brown earth tone unless specified otherwise on the Contract Plans. Colors shall be achieved through the use of integral pigments or stains, which are in compliance with the environmental regulation of the State of Illinois. Components manufactured with integral pigment shall be tested and certified in conformance to ASTM C979. Stains shall be non film forming, penetrating stains. Stains shall be applied to concrete at the cured age of the manufacturer's recommendation. Surface preparation and application shall be according to manufacturer written recommendations. Coloring of concrete elements shall be accomplished using a single component water based, sound absorptive, penetrating, architectural stain that is weather resistant. Stains and/or pigments must be applied at the manufacturing plant; application in the field on site will not be allowed. The final color shall be consistent with the quality and appearance of the approved sample. The surface coating shall be tested for accelerated weathering as follows:

Submit to the engineer certification of compliance that all coatings on barrier components, with the exception of structural steel and wood components comply with the following requirements when tested according to ASTM Standard G155, G153, or G152 after 2400 hours of exposure on a cement based test specimens:

1. No checking when rated according to ASTM D660.
 2. No cracking when rated according to ASTM D661.
 3. No blistering when rated according to ASTM D714.
 4. No difference in adhesion between the unexposed control sample and an exposed sample when tested according to ASTM D3359, Method A.
 5. No chalking less than #7 rating when rated according to ASTM D4214.
 6. No color change greater than 5 NBS units when measured according to ASTM D2244, using illuminant D65 and the 1964 10-degree standard observer.
- (j) The finish pattern of the precast panels shall be as specified on the Contract Plans.
- (k) With the exception of the steel and Portland cement concrete elements of the wall, all materials shall be tested for flame spread and smoke density developed according to ASTM E84. The material must exhibit a flame-spread index less than 10 and a smoke density developed value of 10 or less.

Fabrication. All precast units shall be manufactured according to Section 504 of the Standard Specifications, and the following requirements and tolerances with respect to the dimensions shown on the approved shop drawings.

- (a) The minimum reinforcement bar cover shall be 1 1/2 in (40 mm).
- (b) Panel dimensions shall be within 1/4 in (6 mm).
- (c) All hardware embedded in panels or posts shall be within 1/4 in (6 mm).
- (d) Angular distortion with regard to panel squareness, defined as the difference between the two diagonals, shall not exceed 1/2 in (13 mm).
- (e) Surface defects on formed surfaces measured on a length of 5 ft (1.5 m) shall not be more than 0.10 in (2.5 mm).
- (f) Posts shall be installed plumb to within 1/2 in (13 mm) of vertical for every 15 ft (5 m) of height and to within 1/2 in (13 mm) of the station and offset indicated on the approved shop drawings.
- (g) Drilled shaft foundations shall be placed within 2 in (50 mm) of the station and offset indicated on the approved shop drawings.

- (h) Panel reinforcement and lifting devices shall be set in place to the dimension and tolerances shown on the plans and these special provisions prior to casting.

The date of manufacture, the production lot number, and the piece-mark shall be clearly noted on each panel.

Absorptive material shall be permanently attached to their supporting elements and no external mechanical fastening systems such as frames or clips shall be used. Any bolts or fasteners used shall be recessed or embedded below the surface.

Any chipping, cracks, honeycomb, or other defects, to be allowed, shall be within acceptable standards for precast concrete products according to Section 1042 of the Standard Specifications and as determined by the Engineer.

Construction. The Contractor shall obtain technical assistance from the supplier during wall erection to demonstrate proper construction procedures and shall include any costs related to this technical assistance in the contract unit price for Noise Abatement Wall. The instructions provided by the wall supplier are guidelines and do not relieve the contractor of the responsibility to adhere to contract requirements.

It is recommended that all bottom panels be installed for a length of wall prior to placing middle or top panels. After bottom panels are in-place, finish grading can be accomplished with heavy equipment by reaching over the in-place panels.

Site excavations and/or fill construction shall be completed to plan elevations and profiles prior to the start of wall foundation construction. All underground utility or drainage structure installation shall be completed prior to foundation installation. The ground elevations as shown on the plans and the approved noise wall shop drawings shall be verified by the contractor and discrepancies corrected prior to material fabrication. Buried utilities shall be marked to verify proper clearance from the drilled foundations. The Contractor should consider overhead obstruction such as electric and telephone wires prior to wall erection.

If the soils encountered during drilling of the foundations do not satisfy the design strengths shown on the Contract Plans, the Engineer shall be notified to evaluate the required foundation modifications. The shaft foundation will normally require additional length, which may be paid separately under Article 104.03 of the Standard Specifications. All drilled shaft excavations shall be filled with concrete within 6 hours of their initiation. The concrete for the drilled shaft foundations shall be placed against undisturbed, in-place soils. The concrete at the top of the shaft shall be shaped to provide the panels on each side of the post adequate bearing area and correct elevation per the approved shop drawings.

The panels shall be delivered to the project site in full truckload quantities. They may be off-loaded individually or by forklift with a solid steel plate spanning between the forks providing uniform, fully distributed bearing support to the underside of the panels. Units shall be shipped, handled and stored in such a manner as to minimize the danger of staining, chipping, spalling, development of cracks, fractures, and excessive bending stresses. Panels shall be stored and shipped in bundles, on edge. Any touch up and repair is at the Contractor's expense and shall be carried out according to the manufacturer's recommendations.

Method of Measurement. Noise abatement walls will be measured in square feet (square meters) from the wall envelope, defined by the theoretical top of wall line to the theoretical bottom of wall line for the length of the wall as shown on the Contract Plans.

Drilled shafts, concrete, reinforcement bars and other elements for supporting the ground mounted noise abatement walls will not be measured for payment.

Access doors shown on the Contract Plans will not be measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for NOISE ABATEMENT WALL, GROUND MOUNTED.

The costs for drilled shafts, concrete, reinforcement bars and other elements supporting the noise abatement walls will not be paid for separately but will be included in the item for NOISE ABATEMENT WALL, GROUND MOUNTED.

NOISE ABATEMENT WALL ANCHOR ROD ASSEMBLY

Effective: December 9, 2022

Description. This work shall consist of furnishing and installing Anchor Rod Assembly for future Noise Abatement Wall installation. It includes installation of threaded anchor rods, nuts, washers, and a template plate.

Materials. Materials shall be according to the following.

<u>Item</u>	<u>Article</u>
(f) Structural Steel	1006.04
(g) High Strength Steel Nuts and Washers	1006.08(a)
(h) Anchor Bolts and Rods	1006.09

Anchor rods, nuts, washers, and template plates shall be hot dipped galvanized according to the requirements of AASHTO M111 or M232 as applicable.

Anchor rods shall be according to ASTM F 1554 Grade 105, and shall satisfy Charpy V-Notch (CVN) toughness requirements according to Supplemental Requirement S4 of ASTM F 1554.

Construction. All structural steel related work shall be according to Section 505 of the Standard Specifications.

Welding of anchor rods is not permitted.

A 1/4" structural steel template plate shall be used to ensure the anchor rods retain the correct geometry during the pouring of the parapets. The template plate shall be embedded in the parapet, with the exterior face of the plate flush with the back face of the parapet.

Anchor Rod Assemblies shall be installed according to Article 521.06 of the Standard Specifications.

Method of Measurement. This work will be measured for payment as each. Each will be defined as complete anchor rod assembly which shall include furnishing and installing of anchor rods, washers, nuts, and template plate.

Basis of Payment. Anchor rod assembly furnished and installed will be paid for at the contract unit price each for NOISE ABATEMENT WALL ANCHOR ROD ASSEMBLY.

AGGREGATE SUBGRADE IMPROVEMENT (BDE)

Effective: April 1, 2012

Revised: April 1, 2022

Add the following Section to the Standard Specifications:

“SECTION 303. AGGREGATE SUBGRADE IMPROVEMENT

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

303.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Coarse Aggregate	1004.07
(b) Reclaimed Asphalt Pavement (RAP)	1031.09

303.03 Equipment. The vibratory roller shall be according to Article 1101.01, or as approved by the Engineer. Vibratory machines, such as tampers, shall be used in areas where rollers do not fit.

303.04 Soil Preparation. The minimum immediate bearing value (IBV) of the soil below the improved subgrade shall be according to the Department’s “Subgrade Stability Manual” for the aggregate thickness specified.

303.05 Placing and Compacting. The maximum nominal lift thickness of aggregate gradations CA 2, CA 6, and CA 10 when compacted shall be 9 in. (225 mm). The maximum nominal lift thickness of aggregate gradations CS 1, CS 2, and RR 1 when compacted shall be 24 in. (600 mm).

The top surface of the aggregate subgrade improvement shall consist of a layer of capping aggregate gradations CA 6 or CA 10 that is 3 in. (75 mm) thick after compaction. Capping aggregate will not be required when aggregate subgrade improvement is used as a cubic yard pay item for undercut applications.

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

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

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

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

Add the following to Section 1004 of the Standard Specifications:

"1004.07 Coarse Aggregate for Aggregate Subgrade Improvement (ASI). The aggregate shall be according to Article 1004.01 and the following.

- (a) Description. The coarse aggregate shall be crushed gravel, crushed stone, or crushed concrete. In applications where greater than 24 in. (600 mm) of ASI material is required, gravel may be used below the top 12 in (300 mm) of ASI.
- (b) Quality. The coarse aggregate shall consist of sound durable particles reasonably free of deleterious materials.
- (c) Gradation.
 - (1) The coarse aggregate gradation for total ASI thickness less than or equal to 12 in. (300 mm) shall be CA 2, CA 6, CA 10, or CS 1.

The coarse aggregate gradation for total ASI thickness greater than 12 in. (300 mm) shall be CS 1 or CS 2 as shown below or RR 1 according to Article 1005.01(c).

COARSE AGGREGATE SUBGRADE GRADATIONS					
Grad No.	Sieve Size and Percent Passing				
	8"	6"	4"	2"	#4
CS 1	100	97 ± 3	90 ± 10	45 ± 25	20 ± 20
CS 2		100	80 ± 10	25 ± 15	

COARSE AGGREGATE SUBGRADE GRADATIONS (Metric)					
Grad No.	Sieve Size and Percent Passing				
	200 mm	150 mm	100 mm	50 mm	4.75 mm
CS 1	100	97 ± 3	90 ± 10	45 ± 25	20 ± 20
CS 2		100	80 ± 10	25 ± 15	

- (2) Capping aggregate shall be gradation CA 6 or CA 10."

Add the following to Article 1031.09 of the Standard Specifications:

"(b) RAP in Aggregate Subgrade Improvement (ASI). RAP in ASI shall be according to Articles 1031.01(a), 1031.02(a), 1031.06(a)(1), and 1031.06(a)(2), and the following.

- (1) The testing requirements of Article 1031.03 shall not apply.

- (2) Crushed RAP used for the lower lift may be mechanically blended with aggregate gradations CS 1, CS 2, and RR 1 but it shall be no greater than 40 percent of the total product volume. RAP agglomerations shall be no greater than 4 in. (100 mm).
- (3) For capping aggregate, well graded RAP having 100 percent passing the 1 1/2 in. (38 mm) sieve may be used when aggregate gradations CS 1, CS 2, CA 2, or RR 1 are used in the lower lift. FRAP will not be permitted as capping material.

Blending shall be through calibrated interlocked feeders or a calibrated blending plant such that the prescribed blending percentage is maintained throughout the blending process. The calibration shall have an accuracy of ± 2.0 percent of the actual quantity of material delivered."

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.

CEMENT, FINELY DIVIDED MINERALS, ADMIXTURES; CONCRETE, AND MORTAR (BDE)

Effective: January 1, 2025

Revise the first paragraph of Article 285.05 of the Standard Specifications to read:

“285.05 Fabric Formed Concrete Revetment Mat. The grout shall consist of a mixture of cement, fine aggregate, and water so proportioned and mixed as to provide a pumpable slurry. Fly ash or ground granulated blast furnace (GGBF) slag, and concrete admixtures may be used at the option of the Contractor. The grout shall have an air content of not less than 6.0 percent nor more than 9.0 percent of the volume of the grout. The mix shall obtain a compressive strength of 2500 psi (17,000 kPa) at 28 days according to Article 1020.09.”

Revise Article 302.02 of the Standard Specifications to read:

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

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Hydrated Lime	1012.01
(d) By-Product, Hydrated Lime	1012.02
(e) By-Product, Non-Hydrated Lime	1012.03
(f) Lime Slurry	1012.04

(g) Fly Ash	1010
(h) Soil for Soil Modification (Note 1)	1009.01
(i) Bituminous Materials (Note 2)	1032

Note 1. This soil requirement only applies when modifying with lime (slurry or dry).

Note 2. The bituminous materials used for curing shall be emulsified asphalt RS-2, CRS-2, HFE 90, or HFE 150; rapid curing liquid asphalt RC-70; or medium curing liquid asphalt MC-70 or MC-250."

Revise Article 312.07(c) of the Standard Specifications to read:

"(c) Cement	1001"
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Add Article 312.07(i) of the Standard Specifications to read:

"(i) Ground Granulated Blast Furnace (GGBF) Slag	1010"
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Revise the first paragraph of Article 312.09 of the Standard Specifications to read:

"312.09 Proportioning and Mix Design. At least 60 days prior to start of placing CAM II, the Contractor shall submit samples of materials to be used in the work for proportioning and testing. The mixture shall contain a minimum of 200 lb (120 kg) of cement per cubic yard (cubic meter). Cement may be replaced with fly ash or ground granulated blast furnace (GGBF) slag according to Article 1020.05(c)(1) or 1020.05(c)(2), respectively, however the minimum cement content in the mixture shall be 170 lbs/cu yd (101 kg/cu m). Blends of coarse and fine aggregates will be permitted, provided the volume of fine aggregate does not exceed the volume of coarse aggregate. The Engineer will determine the proportions of materials for the mixture according to the "Portland Cement Concrete Level III Technician Course" manual. However, the Contractor may substitute their own mix design. Article 1020.05(a) shall apply, and a Level III PCC Technician shall develop the mix design."

Revise Article 352.02 of the Standard Specifications to read:

"352.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement (Note 1)	1001
(b) Soil for Soil-Cement Base Course	1009.03
(c) Water	1002
(d) Bituminous Materials (Note 2)	1032

Note 1. Bulk cement may be used for the traveling mixing plant method if the equipment for handling, weighing, and spreading the cement is approved by the Engineer.

Note 2. The bituminous materials used for curing shall be emulsified asphalt RS-2, CRS-2, HFE 90, or HFE 150; rapid curing liquid asphalt RC-70; or medium curing liquid asphalt MC-70 or MC-250."

Revise Article 404.02 of the Standard Specifications to read:

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

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fine Aggregate	1003.08
(d) Bituminous Material (Tack Coat)	1032.06
(e) Emulsified Asphalts (Note 1) (Note 2)	1032.06
(f) Fiber Modified Joint Sealer	1050.05
(g) Additives (Note 3)	

Note 1. When used for slurry seal, the emulsified asphalt shall be CQS-1h according to Article 1032.06(b).

Note 2. When used for micro-surfacing, the emulsified asphalt shall be CQS-1hP according to Article 1032.06(e).

Note 3. Additives may be added to the emulsion mix or any of the component materials to provide the control of the quick-traffic properties. They shall be included as part of the mix design and be compatible with the other components of the mix.

Revise the last sentence of the fourth paragraph of Article 404.08 of the Standard Specifications to read:

“When approved by the Engineer, the sealant may be dusted with fine sand, cement, or mineral filler to prevent tracking.”

Revise Note 2 of Article 516.02 of the Standard Specifications to read:

“Note 2. The sand-cement grout mix shall be according to Section 1020 and shall be a 1:1 blend of sand and cement comprised of a Type I, IL, or II cement at 185 lb/cu yd (110 kg/cu m). The maximum water cement ratio shall be sufficient to provide a flowable mixture with a typical slump of 10 in. (250 mm).”

Revise Note 2 of Article 543.02 of the Standard Specifications to read:

“Note 2. The grout mixture shall be 6.50 hundredweight/cu yd (385 kg/cu m) of cement plus fine aggregate and water. Fly ash or ground granulated blast furnace (GGBF) slag may replace a maximum of 5.25 hundredweight/cu yd (310 kg/cu m) of the cement. The water/cement ratio, according to Article 1020.06, shall not exceed 0.60. An air-entraining admixture shall be used to produce an air content, according to Article 1020.08, of not less than 6.0 percent nor more than 9.0 percent of the volume of the grout. The Contractor shall have the option to use a water-reducing or high range water-reducing admixture.”

Revise Article 583.01 of the Standard Specifications to read:

“583.01 Description. This work shall consist of placing cement mortar along precast, prestressed concrete bridge deck beams as required for fairing out any unevenness between adjacent deck beams prior to placing of waterproofing membrane and surfacing.”

Revise Article 583.02(a) of the Standard Specifications to read:

“(a) Cement1001”

Revise the first paragraph of Article 583.03 of the Standard Specifications to read:

“583.03 General. This work shall only be performed when the air temperature is 45 °F (7 °C) and rising. The mixture for cement mortar shall consist of three parts sand to one part cement by volume. The amount of water shall be no more than that necessary to produce a workable, plastic mortar.”

Revise Note 2/ in Article 1003.01(b) of the Standard Specifications to read:

“2/ Applies only to sand. Sand exceeding the colorimetric test standard of 11 (Illinois Modified AASHTO T 21) will be checked for mortar making properties according to Illinois Modified ASTM C 87 and shall develop a compressive strength at the age of 14 days when using Type I, IL, or II cement of not less than 95 percent of the comparable standard.

Revise the second sentence of Article 1003.02(e)(1) of the Standard Specifications to read:

“The test will be performed with Type I, IL, or II portland cement having a total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of 0.90 percent or greater.”

Revise the first sentence of the second paragraph of Article 1003.02(e)(3) of the Standard Specifications to read:

“The ASTM C 1293 test shall be performed with Type I, IL, or II portland cement having a total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of 0.80 percent or greater.”

Revise the second sentence of Article 1004.02(g)(1) of the Standard Specifications to read:

“The test will be performed with Type I, IL, or II portland cement having a total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of 0.90 percent or greater.”

Revise Article 1017.01 of the Standard Specifications to read:

“1017.01 Requirements. The mortar shall be high-strength according to ASTM C 387 and shall have a minimum 80.0 percent relative dynamic modulus of elasticity when tested by the Department according to Illinois Modified AASHTO T 161 or AASHTO T 161 when tested by an independent lab. The high-strength mortar 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-strength mortar 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 five years, and the test

results shall be provided to the Department. Mixing of the high-strength mortar shall be according to the manufacturer's specifications. The Department will maintain a qualified product list."

Revise the fourth sentence of Article 1018.01 of the Standard Specifications to read:

"The ASTM C 1218 test shall be performed by an independent lab a minimum of once every five years, and the test results shall be provided to the Department."

Revise Article 1019.02 of the Standard Specifications to read:

"1019.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fine Aggregate for Controlled Low-Strength Material (CLSM)	1003.06
(d) Fly Ash	1010
(e) Ground Granulated Blast Furnace (GGBF) Slag.....	1010
(f) Admixtures (Note 1)	

Note 1. The air-entraining admixture may be in powder or liquid form. Prior to approval, a CLSM air-entraining admixture will be evaluated by the Department. The admixture shall be able to meet the air content requirements of Mix 2. The Department will maintain a qualified product list."

Revise Article 1019.05 of the Standard Specifications to read:

"1019.05 Department Mix Design. The Department mix design shall be Mix 1, 2, or 3 and shall be proportioned to yield approximately one cubic yard (cubic meter).

Mix 1	
Cement	50 lb (30 kg)
Fly Ash – Class C or F, and/or GGBF Slag	125 lb (74 kg)
Fine Aggregate – Saturated Surface Dry	2900 lb (1720 kg)
Water	50-65 gal (248-322 L)
Air Content	No air is entrained

Mix 2	
Cement	125 lb (74 kg)
Fine Aggregate – Saturated Surface Dry	2500 lb (1483 kg)
Water	35-50 gal (173-248 L)
Air Content	15-25 %

Mix 3	
Cement	40 lb (24 kg)
Fly Ash – Class C or F, and/or GGBF Slag	125 lb (74 kg)
Fine Aggregate – Saturated Surface Dry	2500 lb (1483 kg)
Water	35-50 gal (179-248 L)
Air Content	15-25 %"

Revise Article 1020.04, Table 1, Note (8) of the Standard Specifications to read:

“(8) In addition to the Type III portland cement, 100 lb/cu yd of ground granulated blast-furnace slag and 50 lb/cu yd of microsilica (silica fume) shall be used. For an air temperature greater than 85 °F, the Type III portland cement may be replaced with Type I, IL, or II portland cement.”

Revise Article 1020.04, Table 1 (Metric), Note (8) of the Standard Specifications to read:

“(8) In addition to the Type III portland cement, 60 kg/cu m of ground granulated blast-furnace slag and 30 kg/cu m of microsilica (silica fume) shall be used. For an air temperature greater than 30 °C, the Type III portland cement may be replaced with Type I, IL, or II portland cement.”

Revise the second paragraph of Article 1020.05(a) of the Standard Specifications to read:

“For a mix design using a portland-pozzolan cement, portland blast-furnace slag cement, portland-limestone cement, or replacing portland cement with finely divided minerals per Articles 1020.05(c) and 1020.05(d), the Contractor may submit a mix design with a minimum portland cement content less than 400 lbs/cu yd (237 kg/cu m), but not less than 375 lbs/cu yd (222 kg/cu m), if the mix design is shown to have a minimum relative dynamic modulus of elasticity of 80 percent determined according to AASHTO T 161. Testing shall be performed by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete.”

Revise the first sentence of the first paragraph of Article 1020.05(b) of the Standard Specifications to read:

“Corrosion inhibitors and concrete admixtures shall be according to the qualified product lists.”

Delete the fourth and fifth sentences of the second paragraph of Article 1020.05(b) of the Standard Specifications.

Revise the third sentence of the second paragraph of Article 1020.05(b)(5) of the Standard Specifications to read:

“The qualified product lists of concrete admixtures shall not apply.”

Revise second paragraph of Article 1020.05(b)(10) of the Standard Specifications to read:

“When calcium nitrite is used, it shall be added at the rate of 4 gal/cu yd (20 L/cu m) and shall be added to the mix immediately after all compatible admixtures have been introduced to the batch. Other corrosion inhibitors shall be added per the manufacturer’s specifications.”

Delete the third paragraph of Article 1020.05(b)(10) of the Standard Specifications.

Revise Article 1020.15(b)(1)c. of the Standard Specifications to read:

- “c. The minimum portland cement content in the mixture shall be 375 lbs/cu yd (222 kg/cu m). When the total of organic processing additions, inorganic processing additions, and limestone addition exceed 5.0 percent in the cement, the minimum portland cement content in the mixture shall be 400 lbs/cu yd (237 kg/cu m). For a drilled shaft, foundation, footing, or substructure, the minimum portland cement may be reduced to as low as 330 lbs/cu yd (196 kg/cu m) if the concrete has adequate freeze/thaw durability. The Contractor shall provide freeze/thaw test results according to AASHTO T 161, and the relative dynamic modulus of elasticity of the mix design shall be a minimum of 80 percent. Testing shall be performed by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete. Freeze/thaw testing will not be required for concrete that will not be exposed to freezing and thawing conditions as determined by the Engineer.”

Revise Article 1021.01 of the Standard Specifications to read:

“**1021.01 General.** Admixtures shall be furnished in liquid or powder form ready for use. The admixtures shall be delivered in the manufacturer's original containers, bulk tank trucks or such containers or tanks as are acceptable to the Engineer. Delivery shall be accompanied by a ticket which clearly identifies the manufacturer, the date of manufacture, and trade name of the material. Containers shall be readily identifiable as to manufacturer, the date of manufacture, and trade name of the material they contain.

Concrete admixtures shall be on one of the Department's qualified product lists. Unless otherwise noted, admixtures shall have successfully completed and remain current with the AASHTO Product Eval and Audit Concrete Admixture (CADD) testing program. For admixture submittals to the Department; the product brand name, manufacturer name, admixture type or types, an electronic link to the product's technical data sheet, and the NTPEP testing number which contains an electronic link to all test data shall be provided. In addition, a letter shall be submitted certifying that no changes have been made in the formulation of the material since the most current round of tests conducted by AASHTO Product Eval and Audit. After 28 days of testing by AASHTO Product Eval and Audit, air-entraining admixtures may be provisionally approved and used on Departmental projects. For all other admixtures, unless otherwise noted, the time period after which provisionally approved status may be earned is 6 months.

The manufacturer shall include the following in the submittal to the AASHTO Product Eval and Audit CADD testing program: the manufacturing range for specific gravity, the midpoint and manufacturing range for residue by oven drying, and manufacturing range of pH. The submittal shall also include an infrared spectrophotometer trace no more than five years old.

For air-entraining admixtures according to Article 1021.02, the specific gravity allowable manufacturing range established by the manufacturer shall be according to AASHTO M 194. For residue by oven drying and pH, the allowable manufacturing range and test methods shall be according to AASHTO M 194.

For admixtures according to Articles 1021.03, 1021.04, 1021.05, 1021.06, 1021.07, and 1021.08, the pH allowable manufacturing range established by the manufacturer shall be according to ASTM E 70. For specific gravity and residue by oven drying, the allowable manufacturing range and test methods shall be according to AASHTO M 194.

All admixtures, except chloride-based accelerators, shall contain a maximum of 0.3 percent chloride by weight (mass) as determined by an appropriate test method. To verify the test result, the Department will use Illinois Modified AASHTO T 260, Procedure A, Method 1.

Prior to final approval of an admixture, the Engineer reserves the right to request a sample for testing. The test and reference concrete mixtures tested by the Engineer will contain a cement content of 5.65 cwt/cu yd (335 kg/cu m). For freeze-thaw testing, the Department will perform the test according to Illinois Modified AASHTO T 161. The flexural strength test will be performed according to AASHTO T 177. If the Engineer decides to test the admixture, the manufacturer shall submit AASHTO T 197 water content and set time test results on the standard cement used by the Department. The manufacturer may select their lab or an independent lab to perform this testing. The laboratory is not required to be accredited by AASHTO.

Random field samples may be taken by the Department to verify an admixture meets specification. A split sample will be provided to the manufacturer if requested. Admixtures that do not meet specification requirements or an allowable manufacturing range established by the manufacturer shall be replaced with new material.”

Revise Article 1021.03 of the Standard Specifications to read:

“1021.03 Retarding and Water-Reducing Admixtures. The admixture shall be according to the following.

- (a) Retarding admixtures shall be according to AASHTO M 194, Type B (retarding) or Type D (water-reducing and retarding).
- (b) Water-reducing admixtures shall be according to AASHTO M 194, Type A.
- (c) High range water-reducing admixtures shall be according to AASHTO M 194, Type F (high range water-reducing) or Type G (high range water-reducing and retarding).”

Revise Article 1021.05 of the Standard Specifications to read:

“1021.05 Self-Consolidating Admixtures. Self-consolidating admixture systems shall consist of either a high range water-reducing admixture only or a high range water-reducing admixture combined with a separate viscosity modifying admixture. The one or two component admixture system shall be capable of producing a concrete that can flow around reinforcement and consolidate under its own weight without additional effort and without segregation.

High range water-reducing admixtures shall be according to AASHTO M 194, Type F.

Viscosity modifying admixtures shall be according to AASHTO M 194, Type S (specific performance).”

Revise Article 1021.06 of the Standard Specifications to read:

“1021.06 Rheology-Controlling Admixture. Rheology-controlling admixtures shall be capable of producing a concrete mixture with a lower yield stress that will consolidate easier for slipform applications used by the Contractor. Rheology-controlling admixtures shall be according to AASHTO M 194, Type S (specific performance).”

Revise Article 1021.07 of the Standard Specifications to read:

“1021.07 Corrosion Inhibitor. The corrosion inhibitor shall be according to one of the following.

- (a) Calcium Nitrite. Corrosion inhibitors shall contain a minimum 30 percent calcium nitrite by weight (mass) of solution and shall comply with either the requirements of AASHTO M 194, Type C (accelerating) or the requirements of ASTM C 1582. The corrosion inhibiting performance requirements of ASTM C 1582 shall not apply.
- (b) Other Materials. The corrosion inhibitor shall be according to ASTM C 1582.

For submittals requiring testing according to ASTM M 194, Type C (accelerating), the admixture shall meet the requirements of the AASHTO Product Eval and Audit CADD testing program according to Article 1021.01.

For submittals requiring testing according to ASTM C 1582, a report prepared by an independent laboratory accredited by AASHTO re:source for portland cement concrete shall be provided. The report shall show the results of physical tests conducted no more than five years prior to the time of submittal, according to applicable specifications. However, ASTM G 109 test information specified in ASTM C 1582 is not required to be from an independent accredited lab. All other information in ASTM C 1582 shall be from an independent accredited lab. Test data and other information required to be submitted to AASHTO Product Eval and Audit according to Article 1021.01, shall instead be submitted directly to the Department.”

Add Article 1021.08 of the Standard Specifications as follows:

“1021.08 Other Specific Performance Admixtures. Other specific performance admixtures shall, at a minimum, be according to AASHTO M 194, Type S (specific performance). The Department also reserves the right to require other testing, as determined by the Engineer, to show evidence of specific performance characteristics.

Initial testing according to AASHTO M 194 may be conducted under the AASHTO Product Eval and Audit CADD testing program according to Article 1021.01, or by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete. In either case, test data and other information required to be submitted to AASHTO Product Eval and Audit according to Article 1021.01, shall also be submitted directly to the Department. The independent accredited lab report shall show the results of physical tests conducted no more than five years prior to the time of submittal, according to applicable specifications.”

Revise Article 1024.01 of the Standard Specifications to read:

“1024.01 Requirements for Grout. The grout shall be proportioned by dry volume, thoroughly mixed, and shall have a minimum temperature of 50 °F (10 °C). Water shall not exceed the minimum needed for placement and finishing.

Materials for the grout shall be according to the following.

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fine Aggregate	1003.02
(d) Fly Ash	1010
(e) Ground Granulated Blast Furnace (GGBF) Slag.....	1010
(f) Concrete Admixtures	1021”

Revise Note 1 of Article 1024.02 of the Standard Specifications to read:

“Note 1. Nonshrink grout shall be according to Illinois Modified ASTM C 1107.

The nonshrink grout 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 grout 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 five years, and the test results shall be provided to the Department. Mixing of the nonshrink grout shall be according to the manufacturer’s specifications. The Department will maintain a qualified product list.”

Revise Article 1029.02 of the Standard Specifications to read:

“1029.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement.....	1001
(b) Fly Ash	1010
(c) Ground Granulated Blast Furnace (GGBF) Slag	1010
(d) Water.....	1002
(e) Fine Aggregate.....	1003
(f) Concrete Admixtures	1021
(g) Foaming Agent (Note 1)	

Note 1. The manufacturer shall submit infrared spectrophotometer trace and test results indicating the foaming agent meets the requirements of ASTM C 869 in order to be on the Department’s qualified product list. Submitted data/results shall not be more than five years old.”

Revise the second paragraph of Article 1103.03(a)(4) the Standard Specifications to read:

“The dispenser system shall provide a visual indication that the liquid admixture is actually entering the batch, such as via a transparent or translucent section of tubing or by independent check with an integrated secondary metering device. If approved by the Engineer, an alternate indicator may be used for admixtures dosed at rates of 25 oz/cwt (1630 mL/100 kg) or greater, such as accelerating admixtures, corrosion inhibitors, and viscosity modifying admixtures.”

Revise the first two sections of Check Sheet #11 of the Supplemental Specifications and Recurring Special Provisions to read:

“Description. This work shall consist of filling voids beneath rigid and composite pavements with cement grout.

Materials. Materials shall be according to the following Articles of Division 1000 - Materials of the Standard Specifications:

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fly Ash	1010
(d) Ground Granulated Blast Furnace (GGBF) Slag.....	1010
(e) Admixtures	1021
(f) Packaged Rapid Hardening Mortar or Concrete	1018”

Revise the third paragraph of Materials Note 2 of Check Sheet #28 of the Supplemental Specifications and Recurring Special Provisions to read:

“The Department will maintain a qualified product list of synthetic fibers, which will include the minimum required dosage rate. For the minimum required fiber dosage rate based on the Illinois Modified ASTM C 1609 test, a report prepared by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete shall be provided. The report shall show results of tests conducted no more than five years prior to the time of submittal.”

COMPENSABLE DELAY COSTS (BDE)

Effective: June 2, 2017

Revised: April 1, 2019

Revise Article 107.40(b) of the Standard Specifications to read:

“(b) Compensation. Compensation will not be allowed for delays, inconveniences, or damages sustained by the Contractor from conflicts with facilities not meeting the above definition; or if a conflict with a utility in an unanticipated location does not cause a shutdown of the work or a documentable reduction in the rate of progress exceeding the limits set herein. The provisions of Article 104.03 notwithstanding, compensation for delays caused by a utility in an unanticipated location will be paid according to the provisions of this Article

governing minor and major delays or reduced rate of production which are defined as follows.

- (1) Minor Delay. A minor delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two hours, but not to exceed two weeks.
- (2) Major Delay. A major delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two weeks.
- (3) Reduced Rate of Production Delay. A reduced rate of production delay occurs when the rate of production on the work in conflict with the utility in an unanticipated location decreases by more than 25 percent and lasts longer than seven calendar days."

Revise Article 107.40(c) of the Standard Specifications to read:

"(c) Payment. Payment for Minor, Major, and Reduced Rate of Production Delays will be made as follows.

- (1) Minor Delay. Labor idled which cannot be used on other work will be paid for according to Article 109.04(b)(1) and (2) for the time between start of the delay and the minimum remaining hours in the work shift required by the prevailing practice in the area.

Equipment idled which cannot be used on other work, and which is authorized to standby on the project site by the Engineer, will be paid for according to Article 109.04(b)(4).

- (2) Major Delay. Labor will be the same as for a minor delay.

Equipment will be the same as for a minor delay, except Contractor-owned equipment will be limited to two weeks plus the cost of move-out to either the Contractor's yard or another job and the cost to re-mobilize, whichever is less. Rental equipment may be paid for longer than two weeks provided the Contractor presents adequate support to the Department (including lease agreement) to show retaining equipment on the job is the most economical course to follow and in the public interest.

- (3) Reduced Rate of Production Delay. The Contractor will be compensated for the reduced productivity for labor and equipment time in excess of the 25 percent threshold for that portion of the delay in excess of seven calendar days. Determination of compensation will be in accordance with Article 104.02, except labor and material additives will not be permitted.

Payment for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be determined according to Article 109.13."

Revise Article 108.04(b) of the Standard Specifications to read:

“(b) No working day will be charged under the following conditions.

- (1) When adverse weather prevents work on the controlling item.
- (2) When job conditions due to recent weather prevent work on the controlling item.
- (3) When conduct or lack of conduct by the Department or its consultants, representatives, officers, agents, or employees; delay by the Department in making the site available; or delay in furnishing any items required to be furnished to the Contractor by the Department prevents work on the controlling item.
- (4) When delays caused by utility or railroad adjustments prevent work on the controlling item.
- (5) When strikes, lock-outs, extraordinary delays in transportation, or inability to procure critical materials prevent work on the controlling item, as long as these delays are not due to any fault of the Contractor.
- (6) When any condition over which the Contractor has no control prevents work on the controlling item.”

Revise Article 109.09(f) of the Standard Specifications to read:

“(f) **Basis of Payment.** After resolution of a claim in favor of the Contractor, any adjustment in time required for the work will be made according to Section 108. Any adjustment in the costs to be paid will be made for direct labor, direct materials, direct equipment, direct jobsite overhead, direct offsite overhead, and other direct costs allowed by the resolution. Adjustments in costs will not be made for interest charges, loss of anticipated profit, undocumented loss of efficiency, home office overhead and unabsorbed overhead other than as allowed by Article 109.13, lost opportunity, preparation of claim expenses and other consequential indirect costs regardless of method of calculation.

The above Basis of Payment is an essential element of the contract and the claim cost recovery of the Contractor shall be so limited.”

Add the following to Section 109 of the Standard Specifications.

“**109.13 Payment for Contract Delay.** Compensation for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be allowed when such costs result from a delay meeting the criteria in the following table.

Contract Type	Cause of Delay	Length of Delay
Working Days	Article 108.04(b)(3) or Article 108.04(b)(4)	No working days have been charged for two consecutive weeks.
Completion Date	Article 108.08(b)(1) or Article 108.08(b)(7)	The Contractor has been granted a minimum two week extension of contract time, according to Article 108.08.

Payment for each of the various costs will be according to the following.

- (a) Escalated Material and/or Labor Costs. When the delay causes work, which would have otherwise been completed, to be done after material and/or labor costs have increased, such increases will be paid. Payment for escalated material costs will be limited to the increased costs substantiated by documentation furnished by the Contractor. Payment for escalated labor costs will be limited to those items in Article 109.04(b)(1) and (2), except the 35 percent and 10 percent additives will not be permitted.
- (b) Extended Project Overhead. For the duration of the delay, payment for extended project overhead will be paid as follows.
 - (1) Direct Jobsite and Offsite Overhead. Payment for documented direct jobsite overhead and documented direct offsite overhead, including onsite supervisory and administrative personnel, will be allowed according to the following table.

Original Contract Amount	Supervisory and Administrative Personnel
Up to \$5,000,000	One Project Superintendent
Over \$ 5,000,000 - up to \$25,000,000	One Project Manager, One Project Superintendent or Engineer, and One Clerk
Over \$25,000,000 - up to \$50,000,000	One Project Manager, One Project Superintendent, One Engineer, and One Clerk
Over \$50,000,000	One Project Manager, Two Project Superintendents, One Engineer, and One Clerk

- (2) Home Office and Unabsorbed Overhead. Payment for home office and unabsorbed overhead will be calculated as 8 percent of the total delay cost.
- (c) Extended Traffic Control. Traffic control required for an extended period of time due to the delay will be paid for according to Article 109.04.

When an extended traffic control adjustment is paid under this provision, an adjusted unit price as provided for in Article 701.20(a) for increase or decrease in the value of work by more than ten percent will not be paid.

Upon payment for a contract delay under this provision, the Contractor shall assign subrogation rights to the Department for the Department's efforts of recovery from any other party for monies paid by the Department as a result of any claim under this provision. The Contractor shall fully cooperate with the Department in its efforts to recover from another party any money paid to the Contractor for delay damages under this provision."

CONCRETE BARRIER (BDE)

Effective: January 1, 2025

Revise the second paragraph of Article 637.12 of the Standard Specifications to read:

“When a double face concrete barrier with a variable cross-section is required, and the variation exceeds 1/2 in. (13 mm), the barrier will be paid for at the contract unit price per foot (meter) for CONCRETE BARRIER, VARIABLE CROSS-SECTION, of the height specified.”

CONCRETE SEALER (BDE)

Effective: November 1, 2023

Replace Section 1026 of the Standard Specifications with the following:

“SECTION 1026. CONCRETE SEALER

1026.01 General. Sealer types shall be according to the listing in AASHTO M 224. All concrete sealer types shall meet the sealer requirements of AASHTO M 224 when tested in accordance with AASHTO T 384. The sealer shall be listed on the Department’s qualified product list.

The sealer shall have a clear or amber color when dry.

The Department will perform the sealer characterization properties of ATR-FTIR spectra, total solids, and specific gravity in accordance with AASHTO M 224.”

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)

Effective: September 1, 2000

Revised: January 2, 2025

1. OVERVIEW AND GENERAL 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 in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory. Award of the contract is conditioned on meeting the requirements of 49 CFR Part 26, and failure by the Contractor to carry out the requirements of Part 26 is a material breach of the contract and may result in the termination of the contract or such other remedies as the Department deems appropriate.
2. CONTRACTOR ASSURANCE. All assurances set forth in FHWA 1273 are hereby incorporated by reference and will be physically attached to the final contract and all subcontracts.
3. CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. The Department has determined the work of this contract has subcontracting opportunities that may be suitable for

performance by DBE companies and that, in the absence of unlawful discrimination and in an arena of fair and open competition, DBE companies can be expected to perform **3.00%** 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 in accordance with the requirements of 49 CFR 26.53 and SBE Memorandum No. 24-02.

4. IDENTIFICATION OF CERTIFIED DBE. Information about certified DBE Contractors can be found in the Illinois UCP Directory. Bidders can obtain additional information and assistance with identifying DBE-certified companies at the Department's website or by contacting the Department's Bureau of Small Business Enterprises at (217) 785-4611.
5. BIDDING PROCEDURES. Compliance with this Special Provision and SBE Policy Memorandum 24-02 is a material bidding requirement. The following shall be included with the bid.
 - (a) DBE Utilization Plan (form SBE 2026) documenting enough DBE participation has been obtained to meet the goal, or a good faith effort has been made to meet the goal even though the efforts did not succeed in obtaining enough DBE participation to meet the goal.
 - (b) Applicable DBE Participation Statement (form SBE 2023, 2024, and/or 2025) for each DBE firm the bidder has committed to perform the work to achieve the contract goal.

The required forms and documentation shall be submitted as a single .pdf file using the "Integrated Contractor Exchange (iCX)" application within the Department's "EBids System".

The Department will not accept a bid if it does not meet the bidding procedures set forth herein and the bid will be declared non-responsive. A bidder declared non-responsive for failure to meet the bidding procedures will not give rise to an administrative reconsideration. In the event the bid is declared non-responsive, 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.

6. UTILIZATION PLAN EVALUATION. The contract will not be awarded until the Utilization Plan is approved. All information submitted by the bidder must be complete, accurate, and adequately document the bidder has committed to DBE participation sufficient to meet the goal, or that the bidder has made good faith efforts to do so, in the event the bidder cannot meet the goal, in order for the Department to 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 Department determines, based upon the documentation submitted, that the bidder has made a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A and the requirements of SBE 2026.

If the Department determines that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan of that determination in accordance with SBE Policy Memorandum 24-02.

7. CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work the bidder commits to have performed by the specified DBEs 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 firms. 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 guidelines for counting goal credit are provided in 49 CFR Part 26.55. In evaluating Utilization Plans for award the Department will count goal credit as set forth in Part 26 and in accordance with SBE Policy Memorandum 24-02.
8. CONTRACT COMPLIANCE. The Contractor must utilize the specific DBEs listed to perform the work and supply the materials for which each DBE is listed in the Contractor's approved Utilization Plan, unless the Contractor obtains the Department's written consent to terminate the DBE or any portion of its work. The DBE Utilization Plan approved by SBE is a condition-of-award, and any deviation to that Utilization Plan, the work set forth therein to be performed by DBE firms, or the DBE firms specified to perform that work, must be approved, in writing, by the Department in accordance with federal regulatory requirements. Deviation from the DBE Utilization Plan condition-of-award without such written approval is a violation of the contract and may result in termination of the contract or such other remedy the Department deems appropriate. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan.
 - (a) NOTICE OF DBE PERFORMANCE. The Contractor shall provide the Engineer with at least three days advance notice of when all DBE firms are expected to perform the work committed under the Contractor's Utilization Plan.
 - (b) SUBCONTRACT. If awarded the contract, the Contractor is required to enter into written subcontracts with all DBE firms indicated in the approved Utilization Plan and must provide copies of fully executed DBE subcontracts to the Department 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.
 - (c) PAYMENT TO DBE FIRMS. 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 goal has been paid to the DBE. The Contractor shall document and report all payments for work performed by DBE certified firms in accordance with Article 109.11 of the Standard Specifications. All records of payment for work performed by DBE certified firms shall be made available to the Department upon request.
 - (d) FINAL PAYMENT. After the performance of the final item of work or trucking, or delivery of material by a DBE and final payment to the DBE by the Contractor, but not later than 30 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 (form SBE 2115) to the Engineer. 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.

- (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.

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.

FULL LANE SEALANT WATERPROOFING SYSTEM (BDE)

Effective: November 1, 2023

Replace Section 581 of the Standard Specifications with the following:

“SECTION 581. FULL LANE SEALANT WATERPROOFING SYSTEM

581.01 Description. This work shall consist of furnishing and placing a full lane sealant (FLS) waterproofing system over a prepared concrete bridge deck.

581.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Hot-Mix Asphalt	1030
(b) Bituminous Materials (Note 1)	1032
(c) Full Lane Sealant (FLS)	1032.13

Note 1. The bituminous material used for the tack coat shall be emulsified asphalt according to Article 1032.06. The emulsion producer shall perform any dilution with water. The emulsified asphalt shall be thoroughly agitated within 24 hours of application and show no separation of water and emulsion.

581.03 Equipment. Equipment shall be according to Article 406.03 and the following.

(a) Regenerative Air Vacuum Sweeper (Note 1)

Note 1. The regenerative air vacuum sweeper shall blast re-circulated, filtered air through a vacuum head having a minimum width of 6.0 ft (1.83 m) at a minimum rate of 20,000 cu ft/min (560 cu m/min).

CONSTRUCTION REQUIREMENTS

581.04 General. FLS waterproofing system shall be constructed according to Section 406, except as modified herein, with a tack coat, a layer of FLS, a layer of IL-4.75, a second layer of FLS, and a final layer of SMA-9.5 as shown on the plans.

581.05 Preparation of Concrete Deck. Surfaces shall be cleaned according to Article 406.05(c). In non-attainment areas, vacuum sweeping shall be performed using a regenerative air vacuum sweeper.

Deck drains shall be temporarily plugged before the tack coat is applied. The material used to plug the drains shall be removed and disposed of upon completion of the work.

From the time the bridge deck is cleaned and prepared for the FLS until the HMA is spread and compacted, the only traffic permitted shall be the necessary workers and equipment to perform the work.

581.06 Application of Full Lane Sealant Waterproofing System. FLS shall be applied uniformly to the surface of the bridge deck in a single application per pass with an FLS pressure distributor. Hand application with a squeegee shall be used at places not covered by the FLS pressure distributor.

If FLS pickup occurs, paving shall cease in order for corrective measures to be taken. Corrective measures shall include applying water to the wheels or paving in cooler ambient conditions, and repairing all areas where the pickup occurred.

Before applying the second layer of FLS, remove any standing water from the IL-4.75 binder course.

581.07 HMA Compaction. HMA shall be compacted according to Article 406.07, except the density requirement for mixtures on bridge decks shall be replaced with 5 and 7 roller pass coverages per location of IL-4.75 and SMA-9.5 mixtures, respectively.

581.08 Sequence of Construction Operations. The sequence of construction operations shall be as follows.

(a) Tack coat shall be applied at a residual rate of 0.05 lb/sq ft (0.244 kg/sq m).

(b) FLS shall be applied at a residual rate of 0.25 lb/sq ft (1.21 kg/sq m).

(c) HMA IL-4.75 binder course shall have a compacted lift thickness of 3/4 in. (19 mm).

(d) FLS shall be applied at a residual rate of 0.15 lb/sq ft (0.73 kg/sq m).

(e) HMA SMA-9.5 surface course shall have a compacted lift thickness of 1 1/2 in. (38 mm).

581.09 Method of Measurement. This work will be measured for payment as follows.

(a) Contract Quantities. The requirements for the use of contract quantities shall conform to Article 202.07(a).

(b) Measured Quantities. This work will be measured for payment and the area computed in square yards (square meters) of the bridge deck surface covered. No measurement or allowance will be made for laps, the material used for extending up curb faces, other vertical barriers, or extensions over lips or edges.

HMA SMA-9.5 will be measured for payment according to Article 406.13(b).

581.10 Basis of Payment. This work will be paid for at the contract unit price per square yard (square meter) for FULL LANE SEALANT WATERPROOFING SYSTEM.

HMA SMA-9.5 will be paid for at the contract unit price per ton (metric ton) for POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, 9.5, of the friction aggregate and Ndesign specified, according to Article 406.14."

HOT-MIX ASPHALT (BDE)

Effective: January 1, 2024

Revised: January 1, 2025

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

"(2) Personnel. The Contractor shall provide a QC Manager who shall have overall responsibility and authority for quality control. This individual shall maintain active certification as a Hot-Mix Asphalt Level II technician.

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

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

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

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

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

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

“When establishing the target density, the HMA maximum theoretical specific gravity (G_{mm}) will be the Department mix design verification test result.”

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

“Production is not required to stop after a test strip has been constructed.”

PAVEMENT MARKING INSPECTION (BDE)

Effective: April 1, 2025

Revise the second sentence of the first paragraph of Article 780.13 of the Standard Specifications to read:

“In addition, thermoplastic, preformed plastic, epoxy, preformed thermoplastic, polyurea, and modified urethane pavement markings will be inspected following a winter performance period that extends from November 15 to April 1 of the next year.”

PERFORMANCE GRADED ASPHALT BINDER (BDE)

Effective: January 1, 2023

Revise Article 1032.05 of the Standard Specifications to read:

“1032.05 Performance Graded Asphalt Binder. These materials will be accepted according to the Bureau of Materials Policy Memorandum, “Performance Graded Asphalt Binder Qualification Procedure.” The Department will maintain a qualified producer list. These materials shall be free from water and shall not foam when heated to any temperature below the actual flash point. Air blown asphalt, recycle engine oil bottoms (ReOB), and polyphosphoric acid (PPA) modification shall not be used.

When requested, producers shall provide the Engineer with viscosity/temperature relationships for the performance graded asphalt binders delivered and incorporated in the work.

- (a) Performance Graded (PG) Asphalt Binder. The asphalt binder shall meet the requirements of AASHTO M 320, Table 1 “Standard Specification for Performance Graded Asphalt Binder” for the grade shown on the plans and the following.

Test	Parameter
Small Strain Parameter (AASHTO PP 113) BBR, ΔT_c , 40 hrs PAV (40 hrs continuous or 2 PAV at 20 hrs)	-5 °C min.

- (b) Modified Performance Graded (PG) Asphalt Binder. The asphalt binder shall meet the requirements of AASHTO M 320, Table 1 “Standard Specification for Performance Graded Asphalt Binder” for the grade shown on the plans.

Asphalt binder modification shall be performed at the source, as defined in the Bureau of Materials Policy Memorandum, “Performance Graded Asphalt Binder Qualification Procedure.”

Modified asphalt binder shall be safe to handle at asphalt binder production and storage temperatures or HMA construction temperatures. Safety Data Sheets (SDS) shall be provided for all asphalt modifiers.

- (1) Polymer Modification (SB/SBS or SBR). Elastomers shall be added to the base asphalt binder to achieve the specified performance grade and shall be either a styrene-butadiene diblock, triblock copolymer without oil extension, or a styrene-butadiene rubber. The polymer modified asphalt binder shall be smooth, homogeneous, and be according to the requirements shown in Table 1 or 2 for the grade shown on the plans.

Table 1 - Requirements for Styrene-Butadiene Copolymer (SB/SBS) Modified Asphalt Binders		
Test	Asphalt Grade SB/SBS PG 64-28 SB/SBS PG 70-22	Asphalt Grade SB/SBS PG 64-34 SB/SBS PG 70-28 SB/SBS PG 76-22 SB/SBS PG 76-28
Separation of Polymer ITP, "Separation of Polymer from Asphalt Binder" Difference in °F (°C) of the softening point between top and bottom portions	4 (2) max.	4 (2) max.
TESTS ON RESIDUE FROM ROLLING THIN FILM OVEN TEST (AASHTO T 240)		
Elastic Recovery ASTM D 6084, Procedure A, 77 °F (25 °C), 100 mm elongation, %	60 min.	70 min.

Table 2 - Requirements for Styrene-Butadiene Rubber (SBR) Modified Asphalt Binders		
Test	Asphalt Grade SBR PG 64-28 SBR PG 70-22	Asphalt Grade SB/SBS PG 64-34 SB/SBS PG 70-28 SBR PG 76-22 SBR PG 76-28
Separation of Polymer ITP, "Separation of Polymer from Asphalt Binder" Difference in °F (°C) of the softening point between top and bottom portions	4 (2) max.	4 (2) max.
Toughness ASTM D 5801, 77 °F (25 °C), 20 in./min. (500 mm/min.), in.-lbs (N-m)	110 (12.5) min.	110 (12.5) min.
Tenacity ASTM D 5801, 77 °F (25 °C), 20 in./min. (500 mm/min.), in.-lbs (N-m)	75 (8.5) min.	75 (8.5) min.
TESTS ON RESIDUE FROM ROLLING THIN FILM OVEN TEST (AASHTO T 240)		
Elastic Recovery ASTM D 6084, Procedure A, 77 °F (25 °C), 100 mm elongation, %	40 min.	50 min.

- (2) Ground Tire Rubber (GTR) Modification. GTR modification is the addition of recycled ground tire rubber to liquid asphalt binder to achieve the specified performance grade. GTR shall be produced from processing automobile and/or truck tires by the ambient grinding method or micronizing through a cryogenic process. GTR shall not exceed 1/16 in. (2 mm) in any dimension and shall not contain free metal particles, moisture that would cause foaming of the asphalt, or other foreign materials. A mineral powder (such as talc) meeting the requirements of AASHTO M 17 may be added, up to a

maximum of four percent by weight of GTR to reduce sticking and caking of the GTR particles. When tested in accordance with Illinois Modified AASHTO T 27 “Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates” or AASHTO PP 74 “Standard Practice for Determination of Size and Shape of Glass Beads Used in Traffic Markings by Means of Computerized Optical Method”, a 50 g sample of the GTR shall conform to the following gradation requirements.

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

GTR modified asphalt binder shall be tested for rotational viscosity according to AASHTO T 316 using spindle S27. GTR modified asphalt binder shall be tested for original dynamic shear and RTFO dynamic shear according to AASHTO T 315 using a gap of 2 mm.

The GTR modified asphalt binder shall meet the requirements of Table 3.

Table 3 - Requirements for Ground Tire Rubber (GTR) Modified Asphalt Binders		
Test	Asphalt Grade GTR PG 64-28 GTR PG 70-22	Asphalt Grade GTR PG 76-22 GTR PG 76-28 GTR PG 70-28
TESTS ON RESIDUE FROM ROLLING THIN FILM OVEN TEST (AASHTO T 240)		
Elastic Recovery ASTM D 6084, Procedure A, 77 °F (25 °C), 100 mm elongation, %	60 min.	70 min.

- (3) Softener Modification (SM). Softener modification is the addition of organic compounds, such as engineered flux, bio-oil blends, modified vegetable oils, glycol amines, and fatty acid derivatives, to the base asphalt binder to achieve the specified performance grade. Softeners shall be dissolved, dispersed, or reacted in the asphalt binder to enhance its performance and shall remain compatible with the asphalt binder with no separation. Softeners shall not be added to modified PG asphalt binder as defined in Articles 1032.05(b)(1) or 1032.05(b)(2).

An Attenuated Total Reflectance-Fourier Transform Infrared spectrum (ATR-FTIR) shall be collected for both the softening compound as well as the softener modified asphalt binder at the dose intended for qualification. The ATR-FTIR spectra shall be collected on unaged softener modified binder, 20-hour Pressurized Aging Vessel (PAV) aged softener modified binder, and 40-hour PAV aged softener modified binder. The ATR-FTIR shall be collected in accordance with Illinois Test Procedure 601. The electronic files spectral files (in one of the following extensions or equivalent: *.SPA, *.SPG, *.IRD, *.IFG, *.CSV, *.SP, *.IRS, *.GAML, *. [0-9], *.IGM, *.ABS, *.DRT, *.SBM, *.RAS) shall be submitted to the Central Bureau of Materials.

Softener modified asphalt binders shall meet the requirements in Table 4.

Table 4 - Requirements for Softener Modified Asphalt Binders		
Test	Asphalt Grade	
	SM PG 46-28	SM PG 46-34
	SM PG 52-28	SM PG 52-34
	SM PG 58-22	SM PG 58-28
	SM PG 64-22	
Small Strain Parameter (AASHTO PP 113) BBR, ΔT_c , 40 hrs PAV (40 hrs continuous or 2 PAV at 20 hrs)	-5°C min.	
Large Strain Parameter (Illinois Modified AASHTO T 391) DSR/LAS Fatigue Property, $\Delta G^* _{peak}$, 40 hrs PAV (40 hrs continuous or 2 PAV at 20 hrs)	≥ 54 %	

The following grades may be specified as tack coats.

Asphalt Grade	Use
PG 58-22, PG 58-28, PG 64-22	Tack Coat"

Revise Article 1031.06(c)(1) and 1031.06(c)(2) of the Standard Specifications to read:

“(1) RAP/RAS. When RAP is used alone or RAP is used in conjunction with RAS, the percentage of virgin ABR shall not exceed the amounts listed in the following table.

HMA Mixtures - RAP/RAS Maximum ABR % ^{1/ 2/}			
Ndesign	Binder	Surface	Polymer Modified Binder or Surface ^{3/}
30	30	30	10
50	25	15	10
70	15	10	10
90	10	10	10

- 1/ For Low ESAL HMA shoulder and stabilized subbase, the RAP/RAS ABR shall not exceed 50 percent of the mixture.
- 2/ When RAP/RAS ABR exceeds 20 percent, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent ABR would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).
- 3/ The maximum ABR percentages for ground tire rubber (GTR) modified mixes shall be equivalent to the percentages specified for SBS/SBR polymer modified mixes.

- (2) FRAP/RAS. When FRAP is used alone or FRAP is used in conjunction with RAS, the percentage of virgin asphalt binder replacement shall not exceed the amounts listed in the following table.

HMA Mixtures - FRAP/RAS Maximum ABR % ^{1/ 2/}			
Ndesign	Binder	Surface	Polymer Modified Binder or Surface ^{3/}
30	55	45	15
50	45	40	15
70	45	35	15
90	45	35	15
SMA	- -	- -	25
IL-4.75	- -	- -	35

- 1/ For Low ESAL HMA shoulder and stabilized subbase, the FRAP/RAS ABR shall not exceed 50 percent of the mixture.
- 2/ When FRAP/RAS ABR exceeds 20 percent for all mixes, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 percent ABR would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).
- 3/ The maximum ABR percentages for GTR modified mixes shall be equivalent to the percentages specified for SBS/SBR polymer modified mixes.”

Add the following to the end of Note 2 of Article 1030.03 of the Standard Specifications.

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

PREFORMED PLASTIC PAVEMENT MARKING (BDE)

Effective: June 2, 2024

Revise Article 1095.03(h) of the Standard Specifications to read:

- “(h) Glass Beads. Glass beads shall be colorless and uniformly distributed throughout the yellow and white portions of the material only. A top coating of beads shall be bonded to or directly embedded into the surface of the markings such that the beads are not easily removed when the film is scratched firmly with a thumb nail.

The glass bead refractive index shall be tested using the liquid immersion method.

Type B material shall have an inner mix of glass beads with a minimum refractive index of 1.50 and a top coating of ceramic beads bonded to top urethane wear surface with a minimum refractive index of 1.70. Beads with a refractive index greater than 1.80 shall not be used.

Type C material shall have glass beads with a minimum refractive index of 1.50 and a layer of skid resistant ceramic particles bonded to the top urethane wear surface. The urethane wear surface shall have a nominal thickness of 5 mils (0.13 mm)."

Revise Article 1095.03(n) of the Standard Specifications to read:

"(n) Sampling and Inspection.

- (1) Sample. Prior to approval and use of preformed plastic pavement markings, the manufacturer shall submit a notarized certification from an independent laboratory, together with the results of all tests, stating that the material meets the requirements as set forth herein. The independent laboratory test report shall state the lot tested, the manufacturer's name, and the date of manufacture.

After initial approval by the Department, samples and certification by the manufacturer shall be submitted for each subsequent batch used. The manufacturer shall submit a certification stating that the material meets the requirements as set forth herein and is essentially identical to the material sent for qualification. The certification shall state the lot tested, the manufacturer's name, and the date of manufacture.

- (2) Inspection. The Contractor shall provide a manufacturer's certification to the Engineer stating the material meets all requirements of this specification. All material samples for acceptance tests will be taken or witnessed by a representative of the Bureau of Materials and will be submitted to the Engineer of Materials, 126 East Ash Street, Springfield, Illinois 62704-4766 at least 30 days in advance of the pavement marking operations."

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES (BDE)

Effective: January 1, 2024

Revised: April 1, 2024

Revise the first paragraph of Article 669.04 of the Standard Specifications to read:

"669.04 Regulated Substances Monitoring. Regulated substances monitoring includes environmental observation and field screening during regulated substances management activities. The excavated soil and groundwater within the work areas shall be managed as either uncontaminated soil, hazardous waste, special waste, or non-special waste.

As part of the regulated substances monitoring, the monitoring personnel shall perform and document the applicable duties listed on form BDE 2732 "Regulated Substances Monitoring Daily Record (RSMDBR)".

Revise the first two sentences of the nineteenth paragraph of Article 669.05 of the Standard Specifications to read:

“The Contractor shall coordinate waste disposal approvals with the disposal facility and provide the specific analytical testing requirements of that facility. The Contractor shall make all arrangements for collection, transportation, and analysis of landfill acceptance testing.”

Revise the last paragraph of Article 669.05 of the Standard Specifications to read:

“The Contractor shall select a permitted landfill facility or CCDD/USFO facility meeting the requirements of 35 Ill. Admin. Code Parts 810-814 or Part 1100, respectively. The Department will review and approve or reject the facility proposed by the Contractor based upon information provided in BDE 2730. The Contractor shall verify whether the selected facility is compliant with those applicable standards as mandated by their permit and whether the facility is presently, has previously been, or has never been, on the United States Environmental Protection Agency (U.S. EPA) National Priorities List or the Resource Conservation and Recovery Act (RCRA) List of Violating Facilities. The use of a Contractor selected facility shall in no manner delay the construction schedule or alter the Contractor's responsibilities as set forth.”

Revise the first paragraph of Article 669.07 of the Standard Specifications to read:

“669.07 Temporary Staging. Soil classified according to Articles 669.05(a)(2), (b)(1), or (c) may be temporarily staged at the Contractor's option. All other soil classified according to Articles 669.05(a)(1), (a)(3), (a)(4), (a)(5), (a)(6), or (b)(2) shall be managed and disposed of without temporary staging to the greatest extent practicable. If circumstances beyond the Contractor's control require temporary staging of these latter materials, the Contractor shall request approval from the Engineer in writing.

Topsoil for re-use as final cover which has been field screened and found not to exhibit PID readings over daily background readings as documented on the BDE 2732, visual staining or odors, and is classified according to Articles 669.05(a)(2), (a)(3), (a)(4), (b)(1), or (c) may be temporarily staged at the Contractor's option.”

Add the following paragraph after the sixth paragraph of Article 669.11 of the Standard Specifications.

“The sampling and testing of effluent water derived from dewatering discharges for priority pollutants volatile organic compounds (VOCs), priority pollutants semi-volatile organic compounds (SVOCs), or priority pollutants metals, will be paid for at the contract unit price per each for VOCS GROUNDWATER ANALYSIS using EPA Method 8260B, SVOCs GROUNDWATER ANALYSIS using EPA Method 8270C, or RCRA METALS GROUNDWATER ANALYSIS using EPA Methods 6010B and 7471A. This price shall include transporting the sample from the job site to the laboratory.”

Revise the first sentence of the eight paragraph of Article 669.11 of the Standard Specifications to read:

“Payment for temporary staging of soil classified according to Articles 669.05(a)(1), (a)(3), (a)(4), (a)(5), (a)(6), or (b)(2) to be managed and disposed of, if required and approved by the Engineer, will be paid according to Article 109.04.”

SEEDING (BDE)

Effective: November 1, 2022

Revise Article 250.07 of the Standard Specifications to read:

“250.07 Seeding Mixtures. The classes of seeding mixtures and combinations of mixtures will be designated in the plans.

When an area is to be seeded with two or more seeding classes, those mixtures shall be applied separately on the designated area within a seven day period. Seeding shall occur prior to placement of mulch cover. A Class 7 mixture can be applied at any time prior to applying any seeding class or added to them and applied at the same time.

TABLE 1 - SEEDING MIXTURES			
Class - Type	Seeds	lb/acre (kg/hectare)	
1 Lawn Mixture 1/	Kentucky Bluegrass	100	(110)
	Perennial Ryegrass	60	(70)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	40	(50)
1A Salt Tolerant Lawn Mixture 1/	Kentucky Bluegrass	60	(70)
	Perennial Ryegrass	20	(20)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	20	(20)
	<i>Festuca brevipilla</i> (Hard Fescue)	20	(20)
	<i>Puccinellia distans</i> (Fults Saltgrass or Salty Alkaligrass)	60	(70)
1B Low Maintenance Lawn Mixture 1/	Turf-Type Fine Fescue 3/	150	(170)
	Perennial Ryegrass	20	(20)
	Red Top	10	(10)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	20	(20)
2 Roadside Mixture 1/	<i>Lolium arundinaceum</i> (Tall Fescue)	100	(110)
	Perennial Ryegrass	50	(55)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	40	(50)
	Red Top	10	(10)
2A Salt Tolerant Roadside Mixture 1/	<i>Lolium arundinaceum</i> (Tall Fescue)	60	(70)
	Perennial Ryegrass	20	(20)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	30	(20)
	<i>Festuca brevipilla</i> (Hard Fescue)	30	(20)
	<i>Puccinellia distans</i> (Fults Saltgrass or Salty Alkaligrass)	60	(70)
3 Northern Illinois Slope Mixture 1/	<i>Elymus canadensis</i> (Canada Wild Rye) 5/	5	(5)
	Perennial Ryegrass	20	(20)
	Alsike Clover 4/	5	(5)
	<i>Desmanthus illinoensis</i> (Illinois Bundleflower) 4/ 5/	2	(2)
	<i>Schizachyrium scoparium</i> (Little Bluestem) 5/	12	(12)
	<i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/	10	(10)
	<i>Puccinellia distans</i> (Fults Saltgrass or Salty Alkaligrass)	30	(35)
	Oats, Spring	50	(55)
	Slender Wheat Grass 5/	15	(15)
	Buffalo Grass 5/ 7/	5	(5)
3A Southern Illinois Slope Mixture 1/	Perennial Ryegrass	20	(20)
	<i>Elymus canadensis</i> (Canada Wild Rye) 5/	20	(20)
	<i>Panicum virgatum</i> (Switchgrass) 5/	10	(10)
	<i>Schizachyrium scoparium</i> (Little Blue Stem) 5/	12	(12)
	<i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/	10	(10)
	<i>Dalea candida</i> (White Prairie Clover) 4/ 5/	5	(5)
	<i>Rudbeckia hirta</i> (Black-Eyed Susan) 5/	5	(5)
	Oats, Spring	50	(55)

Class – Type		Seeds	lb/acre (kg/hectare)
4	Native Grass 2/ 6/	<i>Andropogon gerardi</i>	4 (4)
		(Big Blue Stem) 5/	
		<i>Schizachyrium scoparium</i>	5 (5)
		(Little Blue Stem) 5/	
		<i>Bouteloua curtipendula</i>	5 (5)
		(Side-Oats Grama) 5/	
		<i>Elymus canadensis</i>	1 (1)
		(Canada Wild Rye) 5/	
		<i>Panicum virgatum</i> (Switch Grass) 5/	1 (1)
		<i>Sorghastrum nutans</i> (Indian Grass) 5/	2 (2)
4A	Low Profile Native Grass 2/ 6/	Annual Ryegrass	25 (25)
		Oats, Spring	25 (25)
		Perennial Ryegrass	15 (15)
		<i>Schizachyrium scoparium</i>	5 (5)
		(Little Blue Stem) 5/	
		<i>Bouteloua curtipendula</i>	5 (5)
		(Side-Oats Grama) 5/	
		<i>Elymus canadensis</i>	1 (1)
		(Canada Wild Rye) 5/	
		<i>Sporobolus heterolepis</i>	0.5 (0.5)
4B	Wetland Grass and Sedge Mixture 2/ 6/	(Prairie Dropseed) 5/	
		Annual Ryegrass	25 (25)
		Oats, Spring	25 (25)
		Perennial Ryegrass	15 (15)
		Wetland Grasses (species below) 5/	6 (6)
		<u>Species:</u>	<u>% By Weight</u>
		<i>Calamagrostis canadensis</i> (Blue Joint Grass)	12
		<i>Carex lacustris</i> (Lake-Bank Sedge)	6
		<i>Carex slipata</i> (Awl-Fruited Sedge)	6
		<i>Carex stricta</i> (Tussock Sedge)	6
		<i>Carex vulpinoidea</i> (Fox Sedge)	6
		<i>Eleocharis acicularis</i> (Needle Spike Rush)	3
		<i>Eleocharis obtusa</i> (Blunt Spike Rush)	3
		<i>Glyceria striata</i> (Fowl Manna Grass)	14
		<i>Juncus effusus</i> (Common Rush)	6
		<i>Juncus tenuis</i> (Slender Rush)	6
		<i>Juncus torreyi</i> (Torrey's Rush)	6
		<i>Leersia oryzoides</i> (Rice Cut Grass)	10
		<i>Scirpus acutus</i> (Hard-Stemmed Bulrush)	3
		<i>Scirpus atrovirens</i> (Dark Green Rush)	3
		<i>Bolboschoenus fluviatilis</i> (River Bulrush)	3
		<i>Schoenoplectus tabernaemontani</i> (Softstem Bulrush)	3
		<i>Spartina pectinata</i> (Cord Grass)	4

Class – Type	Seeds	lb/acre (kg/hectare)
5	Forb with Annuals Mixture (Below)	1 (1)
	Annuals Mixture 2/ 5/ 6/ Forb Mixture (Below)	10 (10)
Annuals Mixture - Mixture not exceeding 25 % by weight of any one species, of the following:		
<i>Coreopsis lanceolata</i> (Sand Coreopsis)		
<i>Leucanthemum maximum</i> (Shasta Daisy)		
<i>Gaillardia pulchella</i> (Blanket Flower)		
<i>Ratibida columnifera</i> (Prairie Coneflower)		
<i>Rudbeckia hirta</i> (Black-Eyed Susan)		
Forb Mixture - Mixture not exceeding 5 % by weight PLS of any one species, of the following:		
<i>Amorpha canescens</i> (Lead Plant) 4/		
<i>Anemone cylindrica</i> (Thimble Weed)		
<i>Asclepias tuberosa</i> (Butterfly Weed)		
<i>Aster azureus</i> (Sky Blue Aster)		
<i>Symphyotrichum leave</i> (Smooth Aster)		
<i>Aster novae-angliae</i> (New England Aster)		
<i>Baptisia leucantha</i> (White Wild Indigo) 4/		
<i>Coreopsis palmata</i> (Prairie Coreopsis)		
<i>Echinacea pallida</i> (Pale Purple Coneflower)		
<i>Eryngium yuccifolium</i> (Rattlesnake Master)		
<i>Helianthus mollis</i> (Downy Sunflower)		
<i>Heliopsis helianthoides</i> (Ox-Eye)		
<i>Liatris aspera</i> (Rough Blazing Star)		
<i>Liatris pycnostachya</i> (Prairie Blazing Star)		
<i>Monarda fistulosa</i> (Prairie Bergamot)		
<i>Parthenium integrifolium</i> (Wild Quinine)		
<i>Dalea candida</i> (White Prairie Clover) 4/		
<i>Dalea purpurea</i> (Purple Prairie Clover) 4/		
<i>Physostegia virginiana</i> (False Dragonhead)		
<i>Potentilla arguta</i> (Prairie Cinquefoil)		
<i>Ratibida pinnata</i> (Yellow Coneflower)		
<i>Rudbeckia subtomentosa</i> (Fragrant Coneflower)		
<i>Silphium laciniatum</i> (Compass Plant)		
<i>Silphium terebinthinaceum</i> (Prairie Dock)		
<i>Oligoneuron rigidum</i> (Rigid Goldenrod)		
<i>Tradescantia ohimensis</i> (Spiderwort)		
<i>Veronicastrum virginicum</i> (Culver's Root)		

Class – Type	Seeds	lb/acre (kg/hectare)
5A Large Flower Native Forb Mixture 2/ 5/ 6/	Forb Mixture (see below)	5 (5)
<u>Species:</u>		<u>% By Weight</u>
<i>Aster novae-angliae</i> (New England Aster)		5
<i>Echinacea pallida</i> (Pale Purple Coneflower)		10
<i>Helianthus mollis</i> (Downy Sunflower)		10
<i>Heliopsis helianthoides</i> (Ox-Eye)		10
<i>Liatris pycnostachya</i> (Prairie Blazing Star)		10
<i>Ratibida pinnata</i> (Yellow Coneflower)		5
<i>Rudbeckia hirta</i> (Black-Eyed Susan)		10
<i>Silphium laciniatum</i> (Compass Plant)		10
<i>Silphium terebinthinaceum</i> (Prairie Dock)		20
<i>Oligoneuron rigidum</i> (Rigid Goldenrod)		10
5B Wetland Forb 2/ 5/ 6/	Forb Mixture (see below)	2 (2)
<u>Species:</u>		<u>% By Weight</u>
<i>Acorus calamus</i> (Sweet Flag)		3
<i>Angelica atropurpurea</i> (Angelica)		6
<i>Asclepias incarnata</i> (Swamp Milkweed)		2
<i>Aster puniceus</i> (Purple Stemmed Aster)		10
<i>Bidens cernua</i> (Beggarticks)		7
<i>Eutrochium maculatum</i> (Spotted Joe Pye Weed)		7
<i>Eupatorium perfoliatum</i> (Boneset)		7
<i>Helenium autumnale</i> (Autumn Sneeze Weed)		2
<i>Iris virginica shrevei</i> (Blue Flag Iris)		2
<i>Lobelia cardinalis</i> (Cardinal Flower)		5
<i>Lobelia siphilitica</i> (Great Blue Lobelia)		5
<i>Lythrum alatum</i> (Winged Loosestrife)		2
<i>Physostegia virginiana</i> (False Dragonhead)		5
<i>Persicaria pensylvanica</i> (Pennsylvania Smartweed)		10
<i>Persicaria lapathifolia</i> (Curlytop Knotweed)		10
<i>Pychanthemum virginianum</i> (Mountain Mint)		5
<i>Rudbeckia laciniata</i> (Cut-leaf Coneflower)		5
<i>Oligoneuron riddellii</i> (Riddell Goldenrod)		2
<i>Sparganium eurycarpum</i> (Giant Burreed)		5
6 Conservation Mixture 2/ 6/	<i>Schizachyrium scoparium</i> (Little Blue Stem) 5/	5 (5)
	<i>Elymus canadensis</i> (Canada Wild Rye) 5/	2 (2)
	Buffalo Grass 5/ 7/	5 (5)
	Vernal Alfalfa 4/	15 (15)
	Oats, Spring	48 (55)
6A Salt Tolerant Conservation Mixture 2/ 6/	<i>Schizachyrium scoparium</i> (Little Blue Stem) 5/	5 (5)
	<i>Elymus canadensis</i> (Canada Wild Rye) 5/	2 (2)
	Buffalo Grass 5/ 7/	5 (5)
	Vernal Alfalfa 4/	15 (15)
	Oats, Spring	48 (55)
	<i>Puccinellia distans</i> (Fults Saltgrass or Salty Alkaligrass)	20 (20)
7 Temporary Turf Cover Mixture	Perennial Ryegrass	50 (55)
	Oats, Spring	64 (70)

Notes:

- 1/ Seeding shall be performed when the ambient temperature has been between 45 °F (7 °C) and 80 °F (27 °C) for a minimum of seven (7) consecutive days and is forecasted to be the same for the next five (5) days according to the National Weather Service.
- 2/ Seeding shall be performed in late fall through spring beginning when the ambient temperature has been below 45 °F (7 °C) for a minimum of seven (7) consecutive days and ending when the ambient temperature exceeds 80 °F (27 °C) according to the National Weather Service.
- 3/ Specific variety as shown in the plans or approved by the Engineer.
- 4/ Inoculation required.
- 5/ Pure Live Seed (PLS) shall be used.
- 6/ Fertilizer shall not be used.
- 7/ Seed shall be primed with KNO₃ to break dormancy and dyed to indicate such.

Seeding will be inspected after a period of establishment. The period of establishment shall be six (6) months minimum, but not to exceed nine (9) months. After the period of establishment, areas not exhibiting 75 percent uniform growth shall be interseeded or reseeded, as determined by the Engineer, at no additional cost to the Department.”

SHORT TERM AND TEMPORARY PAVEMENT MARKINGS (BDE)

Effective: April 1, 2024

Revised: April 2, 2024

Revise Article 701.02(d) of the Standard Specifications to read:

“(d) Pavement Marking Tapes (Note 3)1095.06”

Add the following Note to the end of Article 701.02 of the Standard Specifications:

“Note 3. White or yellow pavement marking tape that is to remain in place longer than 14 days shall be Type IV tape.”

Revise Article 703.02(c) of the Standard Specifications to read:

“(c) Pavement Marking Tapes (Note 1)1095.06”

Add the following Note to the end of Article 703.02 of the Standard Specifications:

“Note 1. White or yellow pavement marking tape that is to remain in place longer than 14 days shall be Type IV tape.”

Revise Article 1095.06 of the Standard Specifications to read:

“1095.06 **Pavement Marking Tapes.** Type I white or yellow marking tape shall consist of glass spheres embedded into a binder on a foil backing that is precoated with a pressure sensitive adhesive. The spheres shall be of uniform gradation and distributed evenly over the surface of the tape.

Type IV tape shall consist of white or yellow tape with wet reflective media incorporated to provide immediate and continuing retroreflection in wet and dry conditions. The wet retroreflective media shall be bonded to a durable polyurethane surface. The patterned surface shall have approximately 40 ± 10 percent of the surface area raised and presenting a near vertical face to traffic from any direction. The channels between the raised areas shall be substantially free of exposed reflective elements or particles.

Blackout tape shall consist of a matte black, non-reflective, patterned surface that is precoated with a pressure sensitive adhesive.

- (a) Color. The white and yellow markings shall meet the following requirements for daylight reflectance and color, when tested, using a color spectrophotometer with 45 degrees circumferential/zero degree geometry, illuminant D65, and two degree observer angle. The color instrument shall measure the visible spectrum from 380 to 720 nm with a wavelength measurement interval and spectral bandpass of 10 nm.

Color	Daylight Reflectance %Y
White	65 min.
Yellow *	36 - 59

*Shall match Aerospace Material Specification Standard 595 33538 (Orange Yellow) and the chromaticity limits as follows.

x	0.490	0.475	0.485	0.530
y	0.470	0.438	0.425	0.456

- (b) Retroreflectivity. The white and yellow markings shall be retroreflective. Reflective values measured in accordance with the photometric testing procedure of ASTM D 4061 shall not be less than those listed in the table below. The coefficient of retroreflected luminance, R_L , shall be expressed as average millicandelas/footcandle/sq ft (millicandelas/lux/sq m), measured on a 3.0 x 0.5 ft (900 mm x 150 mm) panel at 86 degree entrance angle.

Coefficient of Retroreflected Luminance, R_L , Dry					
Type I			Type IV		
Observation Angle	White	Yellow	Observation Angle	White	Yellow
0.2°	2700	2400	0.2°	1300	1200
0.5°	2250	2000	0.5°	1100	1000

Wet retroreflectance shall be measured for Type IV under wet conditions according to ASTM E 2177 and meet the following.

Wet Retroreflectance, Initial R_L	
Color	R_L 1.05/88.76
White	300
Yellow	200

- (c) Skid Resistance. The surface of Type IV and blackout markings shall provide a minimum skid resistance of 45 BPN when tested according to ASTM E 303.
- (d) Application. The pavement marking tape shall have a precoated pressure sensitive adhesive and shall require no activation procedures. Test pieces of the tape shall be applied according to the manufacturer's instructions and tested according to ASTM D 1000, Method A, except that a stiff, short bristle roller brush and heavy hand pressure will be substituted for the weighted rubber roller in applying the test pieces to the metal test panel. Material tested as directed above shall show a minimum adhesion value of 750 g/in. (30 g/mm) width at the temperatures specified in ASTM D 1000. The adhesive shall be resistant to oils, acids, solvents, and water, and shall not leave objectionable stains or residue after removal. The material shall be flexible and conformable to the texture of the pavement.
- (e) Durability. Type IV and blackout tape shall be capable of performing for the duration of a normal construction season and shall then be capable of being removed intact or in large sections at pavement temperatures above 40 °F (4 °C) either manually or with a roll-up device without the use of sandblasting, solvents, or grinding. The Contractor shall provide a manufacturer's certification that the material meets the requirements for being removed after the following minimum traffic exposure based on transverse test decks with rolling traffic.
- (1) Time in place - 400 days
 - (2) ADT per lane - 9,000 (28 percent trucks)
 - (3) Axle hits - 10,000,000 minimum

Samples of the material applied to standard specimen plates will be measured for thickness and tested for durability in accordance with ASTM D 4060, using a CS-17 wheel and 1000-gram load, and shall meet the following criteria showing no significant change in color after being tested for the number of cycles indicated.

Test	Type I	Type IV	Blackout
Minimum Initial Thickness, mils (mm)	20 (0.51)	65 (1.65) ^{1/} 20 (0.51) ^{2/}	65 (1.65) ^{1/} 20 (0.51) ^{2/}
Durability (cycles)	5,000	1,500	1,500

1/ Measured at the thickest point of the patterned surface.

2/ Measured at the thinnest point of the patterned surface.

The pavement marking tape, when applied according to the manufacturer's recommended procedures, shall be weather resistant and shall show no appreciable fading, lifting, or shrinkage during the useful life of the marking. The tape, as applied, shall be of good appearance, free of cracks, and edges shall be true, straight, and unbroken.

(f) Sampling and Inspection.

- (1) Sample. Prior to approval and use of Type IV pavement marking tape, the manufacturer shall submit a notarized certification from an independent laboratory, together with the results of all tests, stating that the material meets the requirements as set forth herein. The independent laboratory test report shall state the lot tested, the manufacturer's name, and the date of manufacture.

After initial approval by the Department, samples and certification by the manufacturer shall be submitted for each subsequent batch of Type IV tape used. The manufacturer shall submit a certification stating that the material meets the requirements as set forth herein and is essentially identical to the material sent for qualification. The certification shall state the lot tested, the manufacturer's name, and the date of manufacture.

- (2) Inspection. The Contractor shall provide a manufacturer's certification to the Engineer stating the material meets all requirements of this specification. All material samples for acceptance tests shall be taken or witnessed by a representative of the Bureau of Materials and shall be submitted to the Engineer of Materials, 126 East Ash Street, Springfield, Illinois 62704-4766 at least 30 days in advance of the pavement marking operations."

SIGN PANELS AND APPURTENANCES (BDE)

Effective: January 1, 2025

Revised: April 1, 2025

Add Article 720.02(c) of the Standard Specifications to read:

"(c) Aluminum Epoxy Mastic1008.03"

Revise the second and third paragraphs of Article 720.02 of the Standard Specifications to read:

"The sign mounting support channel shall be manufactured from steel or aluminum and shall be according to Standard 720001.

Steel support channels shall be according to ASTM A 1011 (A 1011M), ASTM A 635 (A 635M), ASTM A 568 (A 568M), or ASTM A 684 (A 684M), and shall be galvanized. Galvanizing shall be according to ASTM A 653 (A 653M) when galvanized before fabrication, and AASHTO M 111 (M 111M) when galvanized after fabrication. Field or post fabricated drilled holes shall be spot painted with one coat of aluminum epoxy mastic paint prior to installation."

Revise the fifth paragraph of Article 720.02 of the Standard Specifications to read:

"The stainless steel banding for mounting signs or sign support channels to light or signal standards shall be according to ASTM A 240 (A 240M) Type 302 stainless steel."

SOURCE OF SUPPLY AND QUALITY REQUIREMENTS (BDE)

Effective: January 2, 2023

Add the following to Article 106.01 of the Standard Specifications:

“The final manufacturing process for construction materials and the immediately preceding manufacturing stage for construction materials shall occur within the United States. Construction materials shall include an article, material, or supply that is or consists primarily of the following.

- (a) Non-ferrous metals;
- (b) Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- (c) Glass (including optic glass);
- (d) Lumber;
- (e) Drywall.

Items consisting of two or more of the listed construction materials that have been combined through a manufacturing process, and items including at least one of the listed materials combined with a material that is not listed through a manufacturing process shall be exempt.”

SPEED DISPLAY TRAILER (BDE)

Effective: April 2, 2014

Revised: January 1, 2022

Revise the last 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.”

Add the following to Article 701.20 of the Standard Specifications:

- “(k) When speed display trailers are shown on the Standard, this work will not be paid for separately but shall be considered as included in the cost of the Standard.

For all other speed display trailers, this work will be paid for at the contract unit price per calendar month or fraction thereof for each trailer as SPEED DISPLAY TRAILER.”

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 sign letters shall be between 5 and 8 in. (125 and 200 mm) in height. 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 work zone posted speed 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 25 mph 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 speeds limit shall not be displayed. On any roadway facility if detected speeds are less than 25 mph, they 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.”

STEEL COST ADJUSTMENT (BDE)

Effective: April 2, 2004

Revised: January 1, 2022

Description. Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in steel prices when optioned by the Contractor. The bidder shall indicate with their bid whether or not this special provision will be part of the contract. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment.

Types of Steel Products. An adjustment will be made for fluctuations in the cost of steel used in the manufacture of the following items:

- Metal Piling (excluding temporary sheet piling)
- Structural Steel
- Reinforcing Steel

Other steel materials such as dowel bars, tie bars, welded reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), and frames and grates will be subject to a steel cost adjustment when the pay items they are used in have a contract value of \$10,000 or greater.

The adjustments shall apply to the above items when they are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply when the item is added as extra work and paid for at a lump sum price or by force account.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

- (a) The dates and quantity of steel, in lb (kg), shipped from the mill to the fabricator.
- (b) The quantity of steel, in lb (kg), incorporated into the various items of work covered by this special provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment. Steel cost adjustments will be computed as follows:

$$SCA = Q \times D$$

Where: SCA = steel cost adjustment, in dollars
Q = quantity of steel incorporated into the work, in lb (kg)
D = price factor, in dollars per lb (kg)

$$D = MPI_M - MPI_L$$

Where: MPI_M = The Materials Cost Index for steel as published by the Engineering News-Record for the month the steel is shipped from the mill. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

MPI_L = The Materials Cost Index for steel as published by the Engineering News-Record for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price,. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

The unit weights (masses) of steel that will be used to calculate the steel cost adjustment for the various items are shown in the attached table.

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the letting date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the MPI_M will be based on the date the steel arrives at the job site. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment. Steel cost adjustments may be positive or negative but will only be made when there is a difference between the MPI_L and MPI_M in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(MPI_L - MPI_M) \div MPI_L\} \times 100$$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

FAI Route 39 (I-39) & FAP Route 301 (US 20)
Project NHPP-5F4Z(497)
Section (201-3)R & (4-1,5)R
Winnebago County
Contract No. 64C24

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
Welded 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)

SUBCONTRACTOR AND DBE PAYMENT REPORTING (BDE)

Effective: April 2, 2018

Add the following to Section 109 of the Standard Specifications.

“109.14 Subcontractor and Disadvantaged Business Enterprise Payment Reporting.
The Contractor shall report all payments made to the following parties:

- (a) first tier subcontractors;
- (b) lower tier subcontractors affecting disadvantaged business enterprise (DBE) goal credit;
- (c) material suppliers or trucking firms that are part of the Contractor’s submitted DBE utilization plan.

The report shall be made through the Department’s on-line subcontractor payment reporting system within 21 days of making the payment.”

SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)

Effective: November 2, 2017

Revised: April 1, 2019

Replace the second paragraph of Article 109.12 of the Standard Specifications with the following:

“This mobilization payment shall be made at least seven days prior to the subcontractor starting work. The amount paid shall be at the following percentage of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor’s work.

Value of Subcontract Reported on Form BC 260A	Mobilization Percentage
Less than \$10,000	25%
\$10,000 to less than \$20,000	20%
\$20,000 to less than \$40,000	18%
\$40,000 to less than \$60,000	16%
\$60,000 to less than \$80,000	14%
\$80,000 to less than \$100,000	12%
\$100,000 to less than \$250,000	10%
\$250,000 to less than \$500,000	9%
\$500,000 to \$750,000	8%
Over \$750,000	7%”

SUBMISSION OF BIDDERS LIST INFORMATION (BDE)

Effective: January 2, 2025

Revised: March 2, 2025

In accordance with 49 CFR 26.11(c) all DBE and non-DBEs who bid as prime contractors and subcontractors shall provide bidders list information, including all DBE and non-DBE firms from whom the bidder has received a quote or bid to work as a subcontractor, whether or not the bidder has relied upon that bid in placing its bid as the prime contractor.

The bidders list information shall be submitted with the bid using the link provided within the “Integrated Contractor Exchange (iCX)” application of the Department’s “EBids System”.

SUBMISSION OF PAYROLL RECORDS (BDE)

Effective: April 1, 2021

Revised: November 2, 2023

FEDERAL AID CONTRACTS. Revise the following section of Check Sheet #1 of the Recurring Special Provisions to read:

“STATEMENTS AND PAYROLLS

The payroll records shall include the worker’s name, social security number, last known address, telephone number, email address, classification(s) of work actually performed, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof), daily and weekly number of hours actually worked in total, deductions made, and actual wages paid.

The Contractor and each subcontractor shall submit certified payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers, last known addresses, telephone numbers, and email addresses shall not be included on weekly submittals. Instead, the payrolls need only include an identification number for each employee (e.g., the last four digits of the employee’s social security number). The submittals shall be made using LCPTracker Pro software. The software is web-based and can be accessed at <https://lcptracker.com/>. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option (“No Work”, “Suspended”, or “Complete”) selected.”

STATE CONTRACTS. Revise Item 3 of Section IV of Check Sheet #5 of the Recurring Special Provisions to read:

- “3. Submission of Payroll Records. The Contractor and each subcontractor shall, no later than the 15th day of each calendar month, file a certified payroll for the immediately preceding month to the Illinois Department of Labor (IDOL) through the Illinois Prevailing Wage Portal in compliance with the State Prevailing Wage Act (820 ILCS 130). The portal can be found on the IDOL website at <https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/Prevailing-Wage-Portal.aspx>. Payrolls shall be submitted in the format prescribed by the IDOL.

In addition to filing certified payroll(s) with the IDOL, the Contractor and each subcontractor shall certify and submit payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers shall not be included on weekly submittals. Instead, the payrolls shall include an identification number for each employee (e.g., the last four digits of the employee's social security number). In addition, starting and ending times of work each day may be omitted from the payroll records submitted. The submittals shall be made using LCPtracker Pro software. The software is web-based and can be accessed at <https://lcptracker.com/>. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option ("No Work", "Suspended", or "Complete") selected."

SURFACE TESTING OF PAVEMENTS – IRI (BDE)

Effective: January 1, 2021

Revised: January 1, 2023

Description. This work shall consist of testing the ride quality of the finished surface of pavement sections with new concrete pavement, PCC overlays, full-depth HMA, and HMA overlays with at least 2.25 in. (57 mm) total thickness of new HMA combined with either HMA binder or HMA surface removal, according to Illinois Test Procedure 701, "Ride Quality Testing Using the International Roughness Index (IRI)". Work shall be according to Sections 406, 407, or 420 of the Standard Specifications, except as modified herein.

Hot-Mix Asphalt (HMA) Overlays

Add the following to Article 406.03 of the Standard Specifications:

"(n) Pavement Surface Grinding Equipment.....1101.04"

Revise Article 406.11 of the Standard Specifications to read:

"406.11 Surface Tests. Prior to HMA overlay pavement improvements, the Engineer will measure the smoothness of the existing high-speed mainline pavement. The Contractor shall measure the smoothness of the finished high-speed mainline, low-speed mainline, and miscellaneous pavements after the pavement improvement is complete but within the same construction season. Testing shall be performed in the presence of the Engineer and according to Illinois Test Procedure 701. The pavement will be identified as high-speed mainline, low-speed mainline, or miscellaneous as follows.

(a) Test Sections.

- (1) **High-Speed Mainline Pavement.** High-speed mainline pavement consists of pavements, ramps, and loops with a posted speed limit greater than 45 mph. These sections shall be tested with an inertial profiling system (IPS).
- (2) **Low-Speed Mainline Pavement.** Low-speed mainline pavement consists of pavements, ramps, and loops with a posted speed limit of 45 mph or less. These sections shall be tested using a 16 ft (5 m) straightedge or with an IPS analyzed using the rolling 16 ft (5 m) straightedge simulation in ProVAL.

- (3) Miscellaneous Pavement. Miscellaneous pavement are segments that either cannot readily be tested by an IPS or conditions beyond the control of the Contractor preclude the achievement of smoothness levels typically achievable with mainline pavement construction. This may include the following examples or as determined by the Engineer.
- a. Pavement on horizontal curves with a centerline radius of curvature of less than or equal to 1,000 ft (300 m) and the pavement within the superelevation transition of such curves;
 - b. Pavement on vertical curves having a length less than or equal to 200 ft (60 m) in combination with an algebraic change in tangent grade greater than or equal to 3 percent as may occur on urban ramps or other constricted-space facilities;
 - c. The first and last 50 ft (15 m) of a pavement section where the Contractor is not responsible for the adjoining surface;
 - d. Intersections and the 25 ft (7.6 m) before and after an intersection or end of radius return;
 - e. Variable width pavements;
 - f. Side street returns, to the end of radius return;
 - g. Crossovers;
 - h. Pavement connector for bridge approach slab;
 - i. Bridge approach slab;
 - j. Pavement that must be constructed in segments of 600 ft (180 m) or less;
 - k. Pavement within 25 ft (7.6 m) of manholes, utility structures, at-grade railroad crossings, or other appurtenances;
 - l. Turn lanes; and
 - m. Pavement within 5 ft (1.5 m) of jobsite sampling locations for HMA volumetric testing that fall within the wheel path.

Miscellaneous pavement shall be tested using a 16 ft (5 m) straightedge.

- (4) International Roughness Index (IRI). An index computed from a longitudinal profile measurement using a quarter-car simulation at a simulation speed of 50 mph (80 km/h).
- (5) Mean Roughness Index (MRI). The average of the IRI values for the right and left wheel tracks.

- a. MRI_O . The MRI of the existing pavement prior to construction.
 - b. MRI_I . The MRI value that warrants an incentive payment.
 - c. MRI_F . The MRI value that warrants full payment.
 - d. MRI_D . The MRI value that warrants a financial disincentive.
- (6) Areas of Localized Roughness (ALR). Isolated areas of roughness, which can cause significant increase in the calculated MRI for a given subplot.
- (7) Sublot. A continuous strip of pavement 0.1 mile (160 m) long and one lane wide. A partial subplot greater than or equal to 264 ft (80 m) will be subject to the same evaluation as a whole subplot. Partial sublots less than 264 ft (80 m) shall be included with the previous subplot for evaluation purposes.
- (b) Corrective Work. Corrective work shall be completed according to the following.
- (1) High-Speed Mainline Pavement. For high-speed mainline pavement, any 25 ft (7.6 m) interval with an ALR in excess of 200 in./mile (3,200 mm/km) will be identified by the Engineer and shall be corrected by the Contractor. Any subplot having a MRI greater than MRI_D , including ALR, shall be corrected to reduce the MRI to the MRI_F , or replaced at the Contractor's option.
 - (2) Low-Speed Mainline Pavement. Surface variations in low-speed mainline pavement which exceed the 5/16 in. (8 mm) tolerance will be identified by the Engineer and shall be corrected by the Contractor.
 - (3) Miscellaneous Pavements. Surface variations in miscellaneous pavement which exceed the 5/16 in. (8 mm) tolerance will be identified by the Engineer and shall be corrected by the Contractor.

Corrective work shall be completed with pavement surface grinding equipment or by removing and replacing the pavement. Corrective work shall be applied to the full lane width. When completed, the corrected area shall have uniform texture and appearance, with the beginning and ending of the corrected area perpendicular to the centerline of the paved surface.

Upon completion of the corrective work, the surface of the subplot(s) shall be retested. The Contractor shall furnish the data and reports to the Engineer within 2 working days after corrections are made. If the MRI and/or ALR still do not meet the requirements, additional corrective work shall be performed.

Corrective work shall be at no additional cost to the Department.

- (c) Smoothness Assessments. Assessments will be paid to or deducted from the Contractor for each subplot of high-speed mainline pavement per the Smoothness Assessment Schedule. Assessments will be based on the MRI of each subplot prior to performing any corrective work unless the Contractor has chosen to remove and replace the pavement. For pavement that is replaced, assessments will be based on the MRI determined after replacement.

The upper MRI thresholds for high-speed mainline pavement are dependent on the MRI of the existing pavement before construction (MRI_0) and shall be determined as follows.

Upper MRI Thresholds ^{1/}	MRI Thresholds (High-Speed, HMA Overlay)	
	$MRI_0 \leq 125.0$ in./mile ($\leq 1,975$ mm/km)	$MRI_0 > 125.0$ in./mile ^{1/} ($> 1,975$ mm/km)
Incentive (MRI_I)	45.0 in./mile (710 mm/km)	$0.2 \times MRI_0 + 20$
Full Pay (MRI_F)	75.0 in./mile (1,190 mm/km)	$0.2 \times MRI_0 + 50$
Disincentive (MRI_D)	100.0 in./mile (1,975 mm/km)	$0.2 \times MRI_0 + 75$

1/ MRI_0 , MRI_I , MRI_F , and MRI_D shall be in in./mile for calculation.

Smoothness assessments for high-speed mainline pavement shall be determined as follows.

SMOOTHNESS ASSESSMENT SCHEDULE (High-Speed, HMA Overlay)	
Mainline Pavement MRI Range	Assessment Per Subplot ^{1/}
$MRI \leq MRI_I$	$+ (MRI_I - MRI) \times \$20.00$ ^{2/}
$MRI_I < MRI \leq MRI_F$	$+ \$0.00$
$MRI_F < MRI \leq MRI_D$	$- (MRI - MRI_F) \times \$8.00$
$MRI > MRI_D$	$- \$200.00$

1/ MRI , MRI_I , MRI_F , and MRI_D shall be in in./mile for calculation.

2/ The maximum incentive amount shall not exceed \$300.00.

Smoothness assessments will not be paid or deducted until all other contract requirements for the pavement are satisfied. Pavement that is corrected or replaced for reasons other than smoothness, shall be retested as stated herein."

Hot-Mix Asphalt (HMA) Pavement (Full-Depth)

Revise the first paragraph of Article 407.03 of the Standard Specifications to read:

"407.03 Equipment. Equipment shall be according to Article 406.03."

Revise Article 407.09 of the Standard Specifications to read:

“407.09 Surface Tests. The finished surface of the pavement shall be tested for smoothness according to Article 406.11, except as follows:

The testing of the existing pavement prior to improvements shall not apply and the smoothness assessment for high-speed mainline pavement shall be determined according to the following table.

SMOOTHNESS ASSESSMENT SCHEDULE (High-Speed, Full-Depth HMA)	
Mainline Pavement MRI, in./mile (mm/km)	Assessment Per Sublot ^{1/}
≤ 45.0 (710)	$+ (45 - \text{MRI}) \times \45.00 ^{2/}
> 45.0 (710) to 75.0 (1,190)	$+ \$0.00$
> 75.0 (1,190) to 100.0 (1,580)	$- (\text{MRI} - 75) \times \20.00
> 100.0 (1,580)	$- \$500.00$

1/ MRI shall be in in./mile for calculation.

2/ The maximum incentive amount shall not exceed \$800.00.”

Portland Cement Concrete Pavement

Delete Article 420.03(i) of the Standard Specifications.

Revise Article 420.10 of the Standard Specifications to read:

“420.10 Surface Tests. The finished surface of the pavement shall be tested for smoothness according to Article 406.11, except as follows.

The testing of the existing pavement prior to improvements shall not apply. The Contractor shall measure the smoothness of the finished surface of the pavement after the pavement has attained a flexural strength of 250 psi (3,800 kPa) or a compressive strength of 1,600 psi (20,700 kPa).

Membrane curing damaged during testing shall be repaired as directed by the Engineer at no additional cost to the Department.

- (a) Corrective Work. No further texturing for skid resistance will be required for areas corrected by grinding. Protective coat shall be reapplied to areas ground according to Article 420.18 at no additional cost to the Department.

Jointed portland cement concrete pavement corrected by removal and replacement, shall be corrected in full panel sizes.

- (b) Smoothness Assessments. Smoothness assessment for high-speed mainline pavement shall be determined as follows.

SMOOTHNESS ASSESSMENT SCHEDULE (High-Speed, PCC)	
Mainline Pavement MRI, in./mile (mm/km) ^{3/}	Assessment Per Sublot ^{1/}
≤ 45.0 (710)	$+ (45 - \text{MRI}) \times \60.00 ^{2/}
> 45.0 (710) to 75.0 (1,190)	$+ \$0.00$
> 75.0 (1,190) to 100.0 (1,580)	$- (\text{MRI} - 75) \times \37.50
> 100.0 (1,580)	$- \$750.00$

1/ MRI shall be in in./mile for calculation.

2/ The maximum incentive amount shall not exceed \$1200.00.

3/ If pavement is constructed with traffic in the lane next to it, then an additional 10 in./mile will be added to the upper thresholds.”

Removal of Existing Pavement and Appurtenances

Revise the first paragraph of Article 440.04 of the Standard Specifications to read:

“440.04 HMA Surface Removal for Subsequent Resurfacing. The existing HMA surface shall be removed to the depth specified on the plans with a self-propelled milling machine. The removal depth may be varied slightly at the discretion of the Engineer to satisfy the smoothness requirements of the finished pavement. The temperature at which the work is performed, the nature and condition of the equipment, and the manner of performing the work shall be such that the milled surface is not torn, gouged, shoved or otherwise damaged by the milling operation. Sufficient cutting passes shall be made so that all irregularities or high spots are eliminated to the satisfaction of the Engineer. When tested with a 16 ft (5 m) straightedge, the milled surface shall have no surface variations in excess of 3/16 in. (5 mm).”

General Equipment

Revise Article 1101.04 of the Standard Specifications to read:

“1101.04 Pavement Surface Grinding Equipment. The pavement surface grinding device shall have a minimum effective head width of 3 ft (0.9 m).

- (a) Diamond Saw Blade Machine. The machine shall be self-propelled with multiple diamond saw blades.
- (b) Profile Milling Machine. The profile milling machine shall be a drum device with carbide or diamond teeth with spacing of 0.315 in. (8 mm) or less and maintain proper forward speed for surface texture according to the manufacturer’s specifications.”

SURVEYING SERVICES (BDE)

Effective: April 1, 2025

Delete the fourth paragraph of Article 667.04 of the Standard Specifications.

Delete Section 668 of the Standard Specifications.

TRAINING SPECIAL PROVISIONS (BDE)

Effective: October 15, 1975

Revised: September 2, 2021

This Training Special Provision supersedes Section 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," and is in implementation of 23 U.S.C. 140(a).

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade or job classification involved. The number of trainees to be trained under this contract will be **10**. In the event the Contractor subcontracts a portion of the contract work, it shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also ensure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within the reasonable area of recruitment. Prior to commencing construction, the Contractor shall submit to the Illinois Department of Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee it employs on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g. by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps it has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he or she has successfully completed a training course leading to journeyman status or in which he or she has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the Illinois Department of Transportation and the Federal Highway Administration. The Illinois Department of Transportation and the Federal Highway Administration shall approve a program, if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved by not necessarily sponsored by the U.S. Department of Labor Employment Training Administration shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Illinois Department of Transportation and the Federal Highway Administration. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirement of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program.

It is not required that all trainees be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The Contractor shall provide for the maintenance of records and furnish periodic reports documenting its performance under this Training Special Provision.

For contracts with an awarded contract value of \$500,000 or more, the Contractor is required to comply with the Illinois Works Apprenticeship Initiative (30 ILCS 559/20-20 to 20-25) and all applicable administrative rules to the extent permitted by Section 20-20(g). For federally funded projects, the number of trainees to be trained under this contract, as stated in the Training Special Provisions, will be the established goal for the Illinois Works Apprenticeship Initiative 30 ILCS 559/20-20(g). The Contractor shall make a good faith effort to meet this goal. For federally funded projects, the Illinois Works Apprenticeship Initiative will be implemented using the FHWA approved OJT procedures. The Contractor must comply with the recordkeeping and reporting obligations of the Illinois Works Apprenticeship Initiative for the life of the project, including the certification as to whether the trainee/apprentice labor hour goals were met.

Method of Measurement. The unit of measurement is in hours.

Basis of Payment. This work will be paid for at the contract unit price of 80 cents per hour for TRAINEES. The estimated total number of hours, unit price, and total price have been included in the schedule of prices.

IDOT TRAINING PROGRAM GRADUATE ON-THE-JOB TRAINING SPECIAL PROVISION

Effective: August 1, 2012

Revised: February 2, 2017

In addition to the Contractor's equal employment opportunity (EEO) affirmative action efforts undertaken as required by this Contract, the Contractor is encouraged to participate in the incentive program described below to provide additional on-the-job training to certified graduates of the IDOT pre-apprenticeship training program, as outlined in this Special Provision.

IDOT funds, and various Illinois community colleges operate, pre-apprenticeship training programs throughout the State to provide training and skill-improvement opportunities to promote the increased employment of minority groups, disadvantaged persons and women in all aspects of the highway construction industry. The intent of this IDOT Pre-Apprenticeship Training Program Graduate (TPG) special provision (Special Provision) is to place these certified program graduates on the project site for this Contract in order to provide the graduates with meaningful on-the-job training. Pursuant to this Special Provision, the Contractor must make every reasonable effort to recruit and employ certified TPG trainees to the extent such individuals are

available within a practicable distance of the project site.

Specifically, participation of the Contractor or its subcontractor in the Program entitles the participant to reimbursement for graduates' hourly wages at \$15.00 per hour per utilized TPG trainee, subject to the terms of this Special Provision. Reimbursement payment will be made even though the Contractor or subcontractor may also receive additional training program funds from other non-IDOT sources for other non-TPG trainees on the Contract, provided such other source does not specifically prohibit the Contractor or subcontractor from receiving reimbursement from another entity through another program, such as IDOT through the TPG program. With regard to any IDOT funded construction training program other than TPG, however, additional reimbursement for other IDOT programs will not be made beyond the TPG Program described in this Special Provision when the TPG Program is utilized.

No payment will be made to the Contractor if the Contractor or subcontractor fails to provide the required on-site training to TPG trainees, as solely determined by IDOT. A TPG trainee must begin training on the project as soon as the start of work that utilizes the relevant trade skill and the TPG trainee must remain on the project site through completion of the Contract, so long as training opportunities continue to exist in the relevant work classification. Should a TPG trainee's employment end in advance of the completion of the Contract, the Contractor must promptly notify the IDOT District EEO Officer for the Contract that the TPG's involvement in the Contract has ended. The Contractor must supply a written report for the reason the TPG trainee involvement terminated, the hours completed by the TPG trainee on the Contract, and the number of hours for which the incentive payment provided under this Special Provision will be, or has been claimed for the separated TPG trainee.

Finally, the Contractor must maintain all records it creates as a result of participation in the Program on the Contract, and furnish periodic written reports to the IDOT District EEO Officer that document its contractual performance under and compliance with this Special Provision. Finally, through participation in the Program and reimbursement of wages, the Contractor is not relieved of, and IDOT has not waived, the requirements of any federal or state labor or employment law applicable to TPG workers, including compliance with the Illinois Prevailing Wage Act.

Method of Measurement: The unit of measurement is in hours.

Basis of Payment: This work will be paid for at the contract unit price of \$15.00 per hour for each utilized certified TPG Program trainee (TRAINEES TRAINING PROGRAM GRADUATE). The estimated total number of hours, unit price, and total price must be included in the schedule of prices for the Contract submitted by Contractor prior to beginning work. The initial number of TPG trainees for which the incentive is available for this contract is 10.

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 the TPG trainee(s) has successfully completed a Pre-

Apprenticeship Training Program, proof that the TPG is in an Apprenticeship Training Program approved by the U.S. Department of Labor Bureau of Apprenticeship Training, and the start date for training in each of the applicable work classifications.

To receive payment, the Contractor must provide training opportunities aimed at developing a full journeyworker in the type of trade or job classification involved. During the course of performance of the Contract, the Contractor may seek approval from the IDOT District EEO Officer to employ additional eligible TPG trainees. In the event the Contractor subcontracts a portion of the contracted work, it must determine how many, if any, of the TPGs will be trained by the subcontractor. Though a subcontractor may conduct training, the Contractor retains the responsibility for meeting all requirements imposed by this Special Provision. The Contractor must also include this Special Provision in any subcontract where payment for contracted work performed by a TPG trainee will be passed on to a subcontractor.

Training through the Program is intended to move TPGs toward journeyman status, which is the primary objective of this Special Provision. Accordingly, the Contractor must make every effort to enroll TPG trainees by recruitment through the Program participant educational institutions to the extent eligible TPGs are available within a reasonable geographic area of the project. The Contractor is responsible for demonstrating, through documentation, the recruitment efforts it has undertaken prior to the determination by IDOT whether the Contractor is in compliance with this Special Provision, and therefore, entitled to the Training Program Graduate reimbursement of \$15.00 per hour.

Notwithstanding the on-the-job training requirement of this TPG Special Provision, some minimal off-site training is permissible as long as the offsite training is an integral part of the work of the contract, and does not compromise or conflict with the required on-site training that is central to the purpose of the Program. No individual may be employed as a TPG trainee in any work classification in which he/she has previously successfully completed a training program leading to journeyman status in any trade, or in which he/she has worked at a journeyman level or higher.

VEHICLE AND EQUIPMENT WARNING LIGHTS (BDE)

Effective: November 1, 2021

Revised: November 1, 2022

Add the following paragraph after the first paragraph of Article 701.08 of the Standard Specifications:

“The Contractor shall equip all vehicles and equipment with high-intensity oscillating, rotating, or flashing, amber or amber-and-white, warning lights which are visible from all directions. In accordance with 625 ILCS 5/12-215, the lights may only be in operation while the vehicle or equipment is engaged in construction operations.”

WATERPROOFING MEMBRANE SYSTEM (BDE)

Effective: August 1, 2024

Revise Article 1061.03 of the Standard Specifications to read:

“1061.03 **Coal Tar Pitch Emulsion.** The coal tar pitch emulsion shall be compounded of heavy closed ring hydrocarbons dispersed in water by means of a combination of irreversible colloidal clays meeting ASTM D 5727. The Contractor shall submit a manufacturer’s certification stating it meets these requirements.”

WEEKLY DBE TRUCKING REPORTS (BDE)

Effective: June 2, 2012

Revised: January 2, 2025

The following applies to all Disadvantaged Business Enterprise (DBE) trucks on the project, whether they are utilized for DBE goal credit or not.

The Contractor shall notify the Engineer at least three days prior to DBE trucking activity.

The Contractor shall submit a weekly report of DBE trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) to the Engineer on Department form “SBE 723” within ten business days following the reporting period. The reporting period shall be Sunday through Saturday 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.

WOOD SIGN SUPPORT (BDE)

Effective: November 1, 2023

Add the following to Article 730.02 of the Standard Specifications:

“(c) Preservative Treatment1007.12”

Revise the first paragraph of Article 730.03 of the Standard Specifications to read:

“730.03 **General.** Wood sign supports shall be treated. When the 4 x 6 in. (100 x 150 mm) posts are used, they shall be modified to satisfy the breakaway requirements by drilling 1 1/2 in. (38 mm) diameter holes centered at 4 and 18 in. (100 and 450 mm) above the groundline and perpendicular to the centerline of the roadway.”

WORK ZONE TRAFFIC CONTROL DEVICES (BDE)

Effective: March 2, 2020

Revised: January 1, 2025

Add the following to Article 701.03 of the Standard Specifications:

“(q) Temporary Sign Supports1106.02”

Revise the third paragraph of Article 701.14 of the Standard Specifications to read:

“For temporary sign supports, the Contractor shall provide a FHWA eligibility letter for each device used on the contract. The letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device. The signs shall be supported within 20 degrees of vertical. Weights used to stabilize signs shall be attached to the sign support per the manufacturer’s specifications.”

Revise the first paragraph of Article 701.15 of the Standard Specifications to read:

“ 701.15 **Traffic Control Devices.** For devices that must meet crashworthiness standards, the Contractor shall provide a manufacturer’s self-certification or a FHWA eligibility letter for each Category 1 device and a FHWA eligibility letter for each Category 2 and Category 3 device used on the contract. The self-certification or letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device.”

Revise the first six paragraphs of Article 1106.02 of the Standard Specifications to read:

“ 1106.02**Devices.** Work zone traffic control devices and combinations of devices shall meet crashworthiness standards for their respective categories. The categories are as follows.

Category 1 includes small, lightweight, channelizing and delineating devices that have been in common use for many years and are known to be crashworthy by crash testing of similar devices or years of demonstrable safe performance. These include cones, tubular markers, plastic drums, and delineators, with no attachments (e.g. lights). Category 1 devices shall be MASH compliant.

Category 2 includes devices that are not expected to produce significant vehicular velocity change but may otherwise be hazardous. These include vertical panels with lights, barricades, temporary sign supports, and Category 1 devices with attachments (e.g. drums with lights). Category 2 devices shall be MASH compliant.

Category 3 includes devices that are expected to cause significant velocity changes or other potentially harmful reactions to impacting vehicles. These include crash cushions (impact attenuators), truck mounted attenuators, and other devices not meeting the definitions of Category 1 or 2. Category 3 devices manufactured after December 31, 2019 shall be MASH compliant. Category 3 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350, may be used on contracts let before December 31, 2029. Category 3 devices shall be crash tested for Test Level 3 or the test level specified.

Category 4 includes portable or trailer-mounted devices such as sign supports, speed feedback displays, arrow boards, changeable message signs, temporary traffic signals, and area lighting supports. It is preferable for Category 4 devices manufactured after December 31, 2019 to be MASH-16 compliant; however, there are currently no crash tested devices in this category, so it remains exempt from the NCHRP 350 or MASH compliance requirement.

For each type of device, when no more than one MASH compliant is available, an NCHRP 350 compliant device may be used, even if manufactured after December 31, 2019.”

Revise Articles 1106.02(g), 1106.02(k), and 1106.02(l) to read:

“(g) Truck Mounted/Trailer Mounted Attenuators. The attenuator shall be approved for use at Test Level 3. Test Level 2 may be used for normal posted speeds less than or equal to 45 mph.

(k) Temporary Water Filled Barrier. The water filled barrier shall be a lightweight plastic shell designed to accept water ballast and be on the Department’s qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings.

(l) Movable Traffic Barrier. The movable traffic barrier shall be on the Department’s qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings. The barrier shall be capable of being moved on and off the roadway on a daily basis.”

PROJECT LABOR AGREEMENT

Effective: May 18, 2007

Revised: April 1, 2025

Description. The Illinois Project Labor Agreements Act, 30 ILCS 571, states that the State of Illinois has a compelling interest in awarding public works contracts so as to ensure the highest standards of quality and efficiency at the lowest responsible cost. A project labor agreement (PLA) is a form of pre-hire collective bargaining agreement covering all terms and conditions of employment on a specific project that is intended to support this compelling interest. It has been determined by the Department that a PLA is appropriate for the project that is the subject of this contract. The PLA document, provided below, only applies to the construction site for this contract. It is the policy of the Department on this contract, and all construction projects, to allow all contractors and subcontractors to compete for contracts and subcontracts without regard to whether they are otherwise parties to collective bargaining agreements.

The Department reserves the right to rescind the PLA requirement from this project in the event FHWA disapproves of the inclusion of the PLA terms for this project. The contractor, by bidding, agrees that any rescission of the PLA requirement shall not constitute grounds for the withdrawal of its bid and further agrees to remove the PLA requirement from this contract upon notice from the Department should such be necessary at a later date.

Execution of Letter of Assent. A copy of the PLA applicable to this project is included as part of this special provision. As a condition of the award of the contract, the successful bidder and each of its subcontractors shall execute a "Contractor Letter of Assent", in the form attached to the PLA as Exhibit A. The successful bidder shall submit a Subcontractor's Contractor Letter of Assent to the Department prior to the subcontractor's performance of work on the project. Upon request, copies of the applicable collective bargaining agreements will be provided by the appropriate signatory labor organization at the pre-job conference.

Quarterly Reporting. Section 37 of the Illinois Project Labor Agreements Act requires the Department to submit quarterly reports regarding the number of minorities and females employed under PLAs. To assist in this reporting effort, the Contractor shall provide a quarterly workforce participation report for all minority and female employees working under the PLA of this contract. The data shall be reported on Construction Form BC 820, Project Labor Agreement (PLA) Workforce Participation Quarterly Reporting Form available on the Department's website <https://idot.illinois.gov/content/dam/soi/en/web/idot/documents/idot-forms/bc/bc-820.pdf>.

The report shall be submitted no later than the 15th of the month following the end of each quarter (i.e., April 15 for the January – March reporting period). The form shall be emailed to DOT.PLA.Reporting@illinois.gov or faxed to (217) 524-4922.

Any costs associated with complying with this provision shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

Illinois Department of Transportation
PROJECT LABOR AGREEMENT

This Project Labor Agreement ("PLA" or "Agreement") is entered into this _____ day of

_____, 2025, by and between the Illinois Department of Transportation ("IDOT" or "Department") in its proprietary capacity, and each relevant Illinois AFL-CIO Building Trades signatory hereto as determined by the Illinois AFL-CIO Statewide Project Labor Agreement Committee on behalf of each of its affiliated members (individually and collectively, the "Unions"). This PLA shall apply to Construction Work (as defined herein) to be performed by IDOT's Prime Contractor and each of its subcontractors of whatever tier ("Subcontractor" or "Subcontractors") on Contract No. (hereinafter, the "Project").

ARTICLE I - INTENT AND PURPOSES

- 1.1 This PLA is entered into in accordance with the Project Labor Agreement Act ("Act", 30 ILCS 571). It is mutually understood and agreed that the terms and conditions of this PLA are intended to promote the public interest in obtaining timely and economical completion of the Project by encouraging productive and efficient construction operations; by establishing a spirit of harmony and cooperation among the parties; and by providing for peaceful and prompt settlement of any and all labor grievances or jurisdictional disputes of any kind without strikes, lockouts, slowdowns, delays, or other disruptions to the prosecution of the work. The parties acknowledge the obligations of the Contractors and Subcontractors to comply with the provisions of the Act. The parties will work with the Contractors and Subcontractors within the parameters of other statutory and regulatory requirements to implement the Act's goals and objectives.
- 1.2 As a condition of the award of the contract for performance of work on the Project, IDOT's Prime Contractor and each of its Subcontractors shall execute a "Contractor Letter of Assent", in the form attached hereto as Exhibit A, prior to commencing Construction Work on the Project. The Contractor shall submit a Subcontractor's Contractor Letter of Assent to the Department prior to the Subcontractor's performance of Construction Work on the Project. Upon request copies of the applicable collective bargaining agreements will be provided by the appropriate signatory labor organization consistent with this Agreement and at the pre-job conference referenced in Article III, Section 3.1.

- 1.3 Each Union affiliate and separate local representing workers engaged in Construction Work on the Project in accordance with this PLA are bound to this agreement by the Illinois AFL-CIO Statewide Project Labor Agreement Committee which is the central committee established with full authority to negotiate and sign PLAs with the State on behalf of all respective crafts. Upon their signing the Contractor Letter of Assent, the Prime Contractor, each Subcontractor, and the individual Unions shall thereafter be deemed a party to this PLA. No party signatory to this PLA shall, contract or subcontract, nor permit any other person, firm, company, or entity to contract or subcontract for the performance of Construction Work for the Project to any person, firm, company, or entity that does not agree in writing to become bound for the term of this Project by the terms of this PLA prior to commencing such work and to the applicable area-wide collective bargaining agreement(s) with the Union(s) signatory hereto.
- 1.4 It is understood that the Prime Contractor(s) and each Subcontractor will be considered and accepted by the Unions as separate employers for the purposes of collective bargaining, and it is further agreed that the employees working under this PLA shall constitute a bargaining unit separate and distinct from all others. The parties hereto also agree that this PLA shall be applicable solely with respect to this Project, and shall have no bearing on the interpretation of any other collective bargaining agreement or as to the recognition of any bargaining unit other than for the specific purposes of this Project.
- 1.5 In the event of a variance or conflict, whether explicit or implicit, between the terms and conditions of this PLA and the provisions of any other applicable national, area, or local collective bargaining agreement, the terms and conditions of this PLA shall supersede and control. For any work performed under the NTL Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, the National Agreement of the International Union of Elevator Constructors, and for any instrument calibration work and loop checking performed under the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, the preceding sentence shall apply only with respect to Articles I, II, V, VI, and VII.

- 1.6 Subject to the provisions of paragraph 1.5 of this Article, it is the parties' intent to respect the provisions of any other collective bargaining agreements that may now or hereafter pertain, whether between the Prime Contractor and one or more of the Unions or between a Subcontractor and one or more of the Unions. Accordingly, except and to the extent of any contrary provision set forth in this PLA, the Prime Contractor and each of its Subcontractors agrees to be bound and abide by the terms of the following in order of precedence: (a) the applicable collective bargaining agreement between the Prime Contractor and one or more of the Unions made signatory hereto; (b) the applicable collective bargaining agreement between a Subcontractor and one or more of the Unions made signatory hereto; or (c) the current applicable area collective bargaining agreement for the relevant Union that is the agreement certified by the Illinois Department of Labor for purposes of establishing the Prevailing Wage applicable to the Project. The Union will provide copies of the applicable collective bargaining agreements pursuant to part (c) of the preceding sentence to the Prime Contractor. Assignments by the Contractors or Subcontractors amongst the trades shall be consistent with area practices; in the event of unresolved disagreements as to the propriety of such assignments, the provisions of Article VI shall apply.
- 1.7 Subject to the limitations of paragraphs 1.4 to 1.6 of this Article, the terms of each applicable collective bargaining agreement as determined in accordance with paragraph 1.6 are incorporated herein by reference, and the terms of this PLA shall be deemed incorporated into such other applicable collective bargaining agreements only for purposes of their application to the Project.
- 1.8 To the extent necessary to comply with the requirements of any fringe benefit fund to which the Prime Contractor or Subcontractor is required to contribute under the terms of an applicable collective bargaining agreement pursuant to the preceding paragraph, the Prime Contractor or Subcontractor shall execute all "Participation Agreements" as may be reasonably required by the Union to accomplish such purpose; provided, however, that such Participation Agreements shall, when applicable to the Prime Contractor or Subcontractor solely as a result of this PLA, be amended as reasonably necessary to reflect such fact. Upon written notice in the form of a lien of a Contractor's or Subcontractor's delinquency from any applicable fringe benefit fund, IDOT will withhold from the Contractor's periodic pay request an amount sufficient to extinguish any delinquency obligation of the Contractor or Subcontractor arising out of the Project.
- 1.9 In the event that the applicable collective bargaining agreement between a Prime Contractor and the Union or between the Subcontractor and the Union expires prior to the completion of this Project, the expired applicable contract's terms will be maintained until a new applicable collective bargaining agreement is ratified. The wages and fringe benefits included in any new applicable collective bargaining agreement will apply on and after the effective date of the newly negotiated collective bargaining agreement, except to the extent wage and fringe benefit retroactivity is specifically agreed upon by the relevant bargaining parties.

ARTICLE II – APPLICABILITY, RECOGNITION, AND COMMITMENTS

- 2.1 The term Construction Work as used herein shall include all “construction, demolition, rehabilitation, renovation, or repair” work performed by a “laborer or mechanic” at the “site of the work” for the purpose of “building” the specific structures and improvements that constitute the Project. Terms appearing within quotation marks in the preceding sentence shall have the meaning ascribed to them pursuant to 29 CFR Part 5 and Illinois labor laws.
- 2.2 By executing the Letters of Assent, Prime Contractor and each of its Subcontractors recognizes the Unions signatory to this PLA as the sole and exclusive bargaining representatives for their craft employees employed on the jobsite for this Project. Unions who are signatory to this PLA will have recognition on the Project for their craft.
- 2.3 The Prime Contractor and each of its Subcontractors retains and shall be permitted to exercise full and exclusive authority and responsibility for the management of its operations, except as expressly limited by the terms of this PLA or by the terms and conditions of the applicable collective bargaining agreement.
- 2.4 Except to the extent contrary to an express provision of the relevant collective bargaining agreement, equipment or materials used in the Project may be pre-assembled or pre-fabricated, and there shall be no refusal by the Union to handle, transport, install, or connect such equipment or materials. Equipment or materials delivered to the job-site will be unloaded and handled promptly without regard to potential jurisdictional disputes; any such disputes shall be handled in accordance with the provisions of this PLA.
- 2.5 The parties are mutually committed to promoting a safe working environment for all personnel at the job-site. It shall be the responsibility of each employer to which this PLA applies to provide and maintain safe working conditions for its employees, and to comply with all applicable federal, state, and local health and safety laws and regulations.
- 2.6 The use or furnishing of alcohol or drugs and the conduct of any other illegal activity at the job-site is strictly prohibited. The parties shall take every practical measure consistent with the terms of applicable collective bargaining agreements to ensure that the job-site is free of alcohol and drugs.
- 2.7 All parties to this PLA agree that they will not discriminate against any employee based on race, creed, religion, color, national origin, union activity, age, gender or sexual orientation and shall comply with all applicable federal, state, and local laws.

- 2.8 In accordance with the Act and to promote diversity in employment, IDOT will establish, in cooperation with the other parties, the apprenticeship hours which are to be performed by minorities and females on the Project. IDOT shall consider the total hours to be performed by these underrepresented groups, as a percentage of the workforce, and create aspirational goals for each Project, based on the level of underutilization for the service area of the Project (together "Project Employment Objectives"). IDOT shall provide a quarterly report regarding the racial and gender composition of the workforce on the Project.

Persons currently lacking qualifications to enter apprenticeship programs will have the opportunity to obtain skills through basic training programs as have been established by the Department. The parties will endeavor to support such training programs to allow participants to obtain the requisite qualifications for the Project Employment Objectives.

The parties agree that all Contractors and Subcontractors working on the Project shall be encouraged to utilize the maximum number of apprentices as permitted under the terms of the applicable collective bargaining agreements to realize the Project Employment Objectives.

The Unions shall assist the Contractor and each Subcontractor in efforts to satisfy Project Employment Objectives. A Contractor or Subcontractor may request from a Union specific categories of workers necessary to satisfy Project Employment Objectives. The application of this section shall be consistent with all local Union collective bargaining agreements, and the hiring hall rules and regulations established for the hiring of personnel, as well as the apprenticeship standards set forth by each individual Union.

- 2.9 The parties hereto agree that engineering consultants and materials testing employees, to the extent subject to the terms of this PLA, shall be fully expected to objectively and responsibly perform their duties and obligations owed to the Department without regard to the potential union affiliation of such employees or of other employees on the Project.
- 2.10 This Agreement shall not apply to IDOT employees or employees of any other governmental entity.

ARTICLE III - ADMINISTRATION OF AGREEMENT

- 3.1 In order to assure that all parties have a clear understanding of the PLA, and to promote harmony, at the request of the Unions a post-award pre-job conference will be held among the Prime Contractor, all Subcontractors and Union representatives prior to the start of any Construction Work on the Project. No later than the conclusion of such pre-job conference, the parties shall, among other matters, provide to one another contact information for their respective representatives (including name, address, phone number, facsimile number, e-mail). Nothing herein shall be construed to limit the right of the Department to discuss or explain the purpose and intent of this PLA with prospective bidders or other interested parties prior to or following its award of the job.
- 3.2 Representatives of the Prime Contractor and the Unions shall meet as often as reasonably necessary following award until completion of the Project to assure the effective implementation of this PLA.
- 3.3 Any notice contemplated under Article VI and VII of this Agreement to a signatory labor organization shall be made in writing to the Local Union with copies to the local union's International Representative.

ARTICLE IV - HOURS OF WORK AND GENERAL CONDITIONS

- 4.1 The standard work day and work week for Construction Work on the Project shall be consistent with the respective collective bargaining agreements. In the event Project site or other job conditions dictate a change in the established starting time and/or a staggered lunch period for portions of the Project or for specific crafts, the Prime Contractor, relevant Subcontractors and business managers of the specific crafts involved shall confer and mutually agree to such changes as appropriate. If proposed work schedule changes cannot be mutually agreed upon between the parties, the hours fixed at the time of the pre-job meeting shall prevail.
- 4.2 Shift work may be established and directed by the Prime Contractor or relevant Subcontractor as reasonably necessary or appropriate to fulfill the terms of its contract with the Department. If used, shift hours, rates and conditions shall be as provided in the applicable collective bargaining agreement.
- 4.3 The parties agree that chronic and/or unexcused absenteeism is undesirable and must be controlled in accordance with procedures established by the applicable collective bargaining agreement. Any employee disciplined for absenteeism in accordance with such procedures shall be suspended from all work on the Project for not less than the maximum period permitted under the applicable collective bargaining agreement.

- 4.4 Except as may be otherwise expressly provided by the applicable collective bargaining agreement, employment begins and ends at the Project site; employees shall be at their place of work at the starting time; and employees shall remain at their place of work until quitting time.
- 4.5 Except as may be otherwise expressly provided by the applicable collective bargaining agreement, there shall be no limit on production by workmen, no restrictions on the full use of tools or equipment, and no restrictions on efficient use of manpower or techniques of construction other than as may be required by safety regulations.
- 4.6 The parties recognize that specialized or unusual equipment may be installed on the Project. In such cases, the Union recognizes the right of the Prime Contractor or Subcontractor to involve the equipment supplier or vendor's personnel in supervising the setting up of the equipment, making modifications and final alignment, and performing similar activities that may be reasonably necessary prior to and during the start-up procedure in order to protect factory warranties. The Prime Contractor or Subcontractor shall notify the Union representatives in advance of any work at the job-site by such vendor personnel in order to promote a harmonious relationship between the equipment vendor's personnel and other Project employees.
- 4.7 For the purpose of promoting full and effective implementation of this PLA, authorized Union representatives shall have access to the Project job-site during scheduled work hours. Such access shall be conditioned upon adherence to all reasonable visitor and security rules of general applicability that may be established for the Project site at the pre-job conference or from time to time thereafter.

ARTICLE V – GRIEVANCE PROCEDURES FOR DISPUTES ARISING UNDER A PARTICULAR COLLECTIVE BARGAINING AGREEMENT

- 5.1 In the event a dispute arises under a particular collective bargaining agreement specifically not including jurisdictional disputes referenced in Article VI below, said dispute shall be resolved by the Grievance/Arbitration procedure of the applicable collective bargaining agreement. The resulting determination from this process shall be final and binding on all parties bound to its process.
- 5.2 Employers covered under this Agreement shall have the right to discharge or discipline any employee who violates the provisions of this Agreement. Such discharge or discipline by a contractor or subcontractor shall be subject to Grievance/Arbitration procedure of the applicable collective bargaining agreement only as to the fact of such violation of this agreement. If such fact is established, the penalty imposed shall not be disturbed. Work at the Project site shall continue without disruption or hindrance of any kind as a result of a Grievance/Arbitration procedure under this Article.

- 5.3 In the event there is a deadlock in the foregoing procedure, the parties agree that the matter shall be submitted to arbitration for the selection and decision of an Arbitrator governed under paragraph 6.8.

ARTICLE VI –DISPUTES: GENERAL PRINCIPLES

- 6.1 This Agreement is entered into to prevent strikes, lost time, lockouts and to facilitate the peaceful adjustment of jurisdictional disputes in the building and construction industry and to prevent waste and unnecessary avoidable delays and expense, and for the further purpose of at all times securing for the employer sufficient skilled workers.

- 6.2 A panel of Permanent Arbitrators are attached as addendum (A) to this agreement. By mutual agreement between IDOT and the Unions, the parties can open this section of the agreement as needed to make changes to the list of permanent arbitrators.

The arbitrator is not authorized to award back pay or any other damages for a miss assignment of work. Nor may any party bring an independent action for back pay or any other damages, based upon a decision of an arbitrator.

- 6.3 The PLA Jurisdictional Dispute Resolution Process (“Process”) sets forth the procedures below to resolve jurisdictional disputes between and among Contractors, Subcontractors, and Unions engaged in the building and construction industry. Further, the Process will be followed for any grievance or dispute arising out of the interpretation or application of this PLA by the parties except for the prohibition on attorneys contained in 6.11. All decisions made through the Process are final and binding upon all parties.

DISPUTE PROCESS

- 6.4 Administrative functions under the Process shall be performed through the offices of the President and/or Secretary-Treasurer of the Illinois State Federation of Labor, or their designated representative, called the Administrator. In no event shall any officer, employee, agent, attorney, or other representative of the Illinois Federation of Labor, AFL- CIO be subject to any subpoena to appear or testify at any jurisdictional dispute hearing.
- 6.5 There shall be no abandonment of work during any case participating in this Process or in violation of the arbitration decision. All parties to this Process release the Illinois State Federation of Labor (“Federation”) from any liability arising from its action or inaction and covenant not to sue the Federation, nor its officers, employees, agents or attorneys.

- 6.6 In the event of a dispute relating to trade or work jurisdiction, all parties, including the employers, Contractors or Subcontractors, agree that a final and binding resolution of the dispute shall be resolved as follows:
- (a) Representatives of the affected trades and the Contractor or Subcontractor shall meet on the job site within two (2) business days after receiving written notice in an effort to resolve the dispute. (In the event there is a dispute between local unions affiliated with the same International Union, the decision of the General President, or his/her designee, as the internal jurisdictional authority of that International Union, shall constitute a final and binding decision and determination as to the jurisdiction of work.)
 - (b) If no settlement is achieved subsequent to the preceding Paragraph, the matter shall be referred to the local area Building & Construction Trades Council, which shall meet with the affected trades within two (2) business days subsequent to receiving written notice. In the event the parties do not wish to avail themselves of the local Building & Construction Trades Council, the parties may elect to invoke the services of their respective International Representatives with no extension of the time limitations. An agreement reached at this Step shall be final and binding upon all parties.
 - (c) If no settlement agreement is reached during the proceedings contemplated by Paragraphs "a" or "b" above, the matter shall be immediately referred to the Illinois Jurisdictional Dispute Process for final and binding resolution of said dispute. Said referral submission shall be in writing and served upon the Illinois State Federation of Labor, or the Administrator, pursuant to paragraph 6.4 of this agreement. The Administrator shall, within three (3) days, provide for the selection of an available Arbitrator to hear said dispute within this time period. Upon good cause shown and determined by the Administrator, an additional three (3) day extension for said hearing shall be granted at the sole discretion of the Administrator. Only upon mutual agreement of all parties may the Administrator extend the hearing for a period in excess of the time frames contemplated under this Paragraph. Business days are defined as Monday through Friday, excluding contract holidays.
- 6.7 The primary concern of the Process shall be the adjustment of jurisdictional disputes arising out of the Project. A sufficient number of Arbitrators shall be selected from list of approved Arbitrators as referenced Sec. 6.2 and shall be assigned per Sec. 6.8. Decisions shall be only for the Project and shall become effective immediately upon issuance and complied with by all parties. The authority of the Arbitrator shall be restricted and limited specifically to the terms and provisions of Article VI and generally to this Agreement as a whole.

- 6.8 Arbitrator chosen shall be randomly selected based on the list of Arbitrators in Sec. 6.2 and geographical location of the jurisdictional dispute and upon his/her availability, and ability to conduct a Hearing within two (2) business days of said notice. The Arbitrator may issue a "bench" decision immediately following the Hearing or he/she may elect to only issue a written decision, said decision must be issued within two (2) business days subsequent to the completion of the Hearing. Copies of all notices, pleadings, supporting memoranda, decisions, etc. shall be provided to all disputing parties and the Illinois State Federation of Labor.

Any written decision shall be in accordance with this Process and shall be final and binding upon all parties to the dispute and may be a "short form" decision. Fees and costs of the arbitrator shall be divided evenly between the contesting parties except that any party wishing a full opinion and decision beyond the short form decision shall bear the reasonable fees and costs of such full opinion. The decision of the Arbitrator shall be final and binding upon the parties hereto, their members, and affiliates.

In cases of jurisdictional disputes or other disputes between a signatory labor organization and another labor organization, both of which is an affiliate or member of the same International Union, the matter or dispute shall be settled in the manner set forth by their International Constitution and/or as determined by the International Union's General President whose decision shall be final and binding upon all parties. In no event shall there be an abandonment of work.

- 6.9 In rendering a decision, the Arbitrator shall determine:
- (a) First, whether a previous agreement of record or applicable agreement, including a disclaimer agreement, between National or International Unions to the dispute or agreements between local unions involved in the dispute, governs;
 - (b) Only if the Arbitrator finds that the dispute is not covered by an appropriate or applicable agreement of record or agreement between the crafts to the dispute, he shall then consider the established trade practice in the industry and prevailing practice in the locality. Where there is a previous decision of record governing the case, the Arbitrator shall give equal weight to such decision of record, unless the prevailing practice in the locality in the past ten years favors one craft. In that case, the Arbitrator shall base his decision on the prevailing practice in the locality. Except, that if the Arbitrator finds that a craft has improperly obtained the prevailing practice in the locality through raiding, the undercutting of wages or by the use of vertical agreements, the Arbitrator shall rely on the decision of record and established trade practice in the industry rather than the prevailing practice in the locality; and,

- (c) Only if none of the above criteria is found to exist, the Arbitrator shall then consider that because efficiency, cost or continuity and good management are essential to the well being of the industry, the interests of the consumer or the past practices of the employer shall not be ignored.
 - (d) The arbitrator is not authorized to award back pay or any other damages for a mis-assignment of work. Nor may any party bring an independent action for back pay or any other damages, based upon a decision of an arbitrator.
- 6.10 The Arbitrator shall set forth the basis for his/her decision and shall explain his/her findings regarding the applicability of the above criteria. If lower ranked criteria are relied upon, the Arbitrator shall explain why the higher-ranked criteria were not deemed applicable. The Arbitrator's decision shall only apply to the Project. Agreements of Record, for other PLA projects, are applicable only to those parties signatory to such agreements. Decisions of Record are those that were either attested to by the former Impartial Jurisdictional Disputes Board or adopted by the National Arbitration Panel.
- 6.11 All interested parties, as determined by the Arbitrator, shall be entitled to make presentations to the Arbitrator. Any interested labor organization affiliated to the PLA Committee and party present at the Hearing, whether making a presentation or not, by such presence shall be deemed to accept the jurisdiction of the Arbitrator and to agree to be bound by its decision. In addition to the representative of the local labor organization, a representative of the labor organization's International Union may appear on behalf of the parties. Each party is responsible for arranging for its witnesses. In the event an Arbitrator's subpoena is required, the party requiring said subpoena shall prepare the subpoena for the Arbitrator to execute. Service of the subpoena upon any witness shall be the responsibility of the issuing party.

Attorneys shall not be permitted to attend or participate in any portion of a Hearing.

The parties are encouraged to determine, prior to Hearing, documentary evidence which may be presented to the Arbitrator on a joint basis.

- 6.12 The Order of Presentation in all Hearings before an Arbitrator shall be
- I. Identification and Stipulation of the Parties
 - II. Unions(s) claiming the disputed work presents its case
 - III. Union(s) assigned the disputed work presents its case
 - IV. Employer assigning the disputed work presents its case
 - V. Evidence from other interested parties (i.e., general contractor, project manager, owner)
 - VI. Rebuttal by union(s) claiming the disputed work
 - VII. Additional submissions permitted and requested by Arbitrator
 - VIII. Closing arguments by the parties

- 6.13 All parties bound to the provisions of this Process hereby release the Illinois State Federation of Labor and IDOT, their respective officers, agents, employees or designated representatives, specifically including any Arbitrator participating in said Process, from any and all liability or claim, of whatsoever nature, and specifically incorporating the protections provided in the Illinois Arbitration Act, as amended from time to time.
- 6.14 The Process, as an arbitration panel, nor its Administrator, shall have any authority to undertake any action to enforce its decision(s). Rather, it shall be the responsibility of the prevailing party to seek appropriate enforcement of a decision, including findings, orders or awards of the Arbitrator or Administrator determining non-compliance with a prior award or decision.
- 6.15 If at any time there is a question as to the jurisdiction of the Illinois Jurisdictional Dispute Resolution Process, the primary responsibility for any determination of the arbitrability of a dispute and the jurisdiction of the Arbitrator shall be borne by the party requesting the Arbitrator to hear the underlying jurisdictional dispute. The affected party or parties may proceed before the Arbitrator even in the absence or one or more stipulated parties with the issue of jurisdiction as an additional item to be decided by the Arbitrator. The Administrator may participate in proceedings seeking a declaration or determination that the underlying dispute is subject to the jurisdiction and process of the Illinois Jurisdictional Dispute Resolution Process. In any such proceedings, the non-prevailing party and/or the party challenging the jurisdiction of the Illinois Jurisdictional Dispute Resolution Process shall bear all the costs, expenses and attorneys' fees incurred by the Illinois Jurisdictional Dispute Resolution Process and/or its Administrator in establishing its jurisdiction.

ARTICLE VII - WORK STOPPAGES AND LOCKOUTS

- 7.1 During the term of this PLA, no Union or any of its members, officers, stewards, employees, agents or representatives shall instigate, support, sanction, maintain, or participate in any strike, picketing, walkout, work stoppage, slow down or other activity that interferes with the routine and timely prosecution of work at the Project site or at any other contractor's or supplier's facility that is necessary to performance of work at the Project site. Hand billing at the Project site during the designated lunch period and before commencement or following conclusion of the established standard workday shall not, in itself, be deemed an activity that interferes with the routine and timely prosecution of work on the Project.

7.2 Should any activity prohibited by paragraph 7.1 of this Article occur, the Union shall undertake all steps reasonably necessary to promptly end such prohibited activities.

7.2.A No Union complying with its obligations under this Article shall be liable for acts of employees for which it has no responsibility or for the unauthorized acts of employees it represents. Any employee who participates or encourages any activity prohibited by paragraph 7.1 shall be immediately suspended from all work on the Project for a period equal to the greater of (a) 60 days; or (b) the maximum disciplinary period allowed under the applicable collective bargaining agreement for engaging in comparable unauthorized or prohibited activity.

7.2.B Neither the PLA Committee nor its affiliates shall be liable for acts of employees for which it has no responsibility. The principal officer or officers of the PLA Committee will immediately instruct, order and use the best efforts of his office to cause the affiliated union or unions to cease any violations of this Article. The PLA Committee in its compliance with this obligation shall not be liable for acts of its affiliates. The principal officer or officers of any involved affiliate will immediately instruct, order or use the best effort of his office to cause the employees the union represents to cease any violations of this Article. A union complying with this obligation shall not be liable for unauthorized acts of employees it represents. The failure of the Contractor to exercise its rights in any instance shall not be deemed a waiver of its rights in any other instance.

During the term of this PLA, the Prime Contractor and its Subcontractors shall not engage in any lockout at the Project site of employees covered by this Agreement.

7.3 Upon notification of violations of this Article, the principal officer or officers of the local area Building and Construction Trades Council, and the Illinois AFL-CIO Statewide Project Labor Agreement Committee as appropriate, will immediately instruct, order and use their best efforts to cause the affiliated union or unions to cease any violations of this Article. A Trades Council and the Committee otherwise in compliance with the obligations under this paragraph shall not be liable for unauthorized acts of its affiliates.

7.4 In the event that activities in violation of this Article are not immediately halted through the efforts of the parties, any aggrieved party may invoke the special arbitration provisions set forth in paragraph 7.5 of this Article.

- 7.5 Upon written notice to the other involved parties by the most expeditious means available, any aggrieved party may institute the following special arbitration procedure when a breach of this Article is alleged:
- 7.5.A The party invoking this procedure shall notify the individual designated as the Permanent Arbitrator pursuant to paragraph 6.8 of the nature of the alleged violation; such notice shall be by the most expeditious means possible. The initiating party may also furnish such additional factual information as may be reasonably necessary for the Permanent Arbitrator to understand the relevant circumstances. Copies of any written materials provided to the arbitrator shall also be contemporaneously provided by the most expeditious means possible to the party alleged to be in violation and to all other involved parties.
 - 7.5.B Upon receipt of said notice the Permanent Arbitrator shall set and hold a hearing within twenty-four (24) hours if it is contended the violation is ongoing, but not before twenty-four (24) hours after the written notice to all parties involved as required above.
 - 7.5.C The Permanent Arbitrator shall notify the parties by facsimile or any other effective written means, of the place and time chosen by the Permanent Arbitrator for this hearing. Said hearing shall be completed in one session. A failure of any party or parties to attend said hearing shall not delay the hearing of evidence or issuance of an Award by the Permanent Arbitrator.
 - 7.5.D The sole issue at the hearing shall be whether a violation of this Article has, in fact, occurred. An Award shall be issued in writing within three (3) hours after the close of the hearing, and may be issued without a written opinion. If any party desires a written opinion, one shall be issued within fifteen (15) days, but its issuance shall not delay compliance with, or enforcement of, the Award. The Permanent Arbitrator may order cessation of the violation of this Article, and such Award shall be served on all parties by hand or registered mail upon issuance.
 - 7.5.E Such Award may be enforced by any court of competent jurisdiction upon the filing of the Award and such other relevant documents as may be required. Facsimile or other hardcopy written notice of the filing of such enforcement proceedings shall be given to the other relevant parties. In a proceeding to obtain a temporary order enforcing the Permanent Arbitrator's Award as issued under this Article, all parties waive the right to a hearing and agree that such proceedings may be ex parte. Such agreement does not waive any party's right to participate in a hearing for a final order of enforcement. The Court's order or orders enforcing the Permanent Arbitrator's Award shall be served on all parties by hand or by delivery to their last known address or by registered mail.

- 7.6 Individuals found to have violated the provisions of this Article are subject to immediate termination. In addition, IDOT reserves the right to terminate this PLA as to any party found to have violated the provisions of this Article.
- 7.7 Any rights created by statute or law governing arbitration proceedings inconsistent with the above procedure or which interfere with compliance therewith are hereby waived by parties to whom they accrue.
- 7.8 The fees and expenses of the Permanent Arbitrator shall be borne by the party or parties found in violation, or in the event no violation is found, such fees and expenses shall be borne by the moving party.

ARTICLE VIII – TERMS OF AGREEMENT

- 8.1 If any Article or provision of this Agreement shall be declared invalid, inoperative or unenforceable by operation of law or by any of the above mentioned tribunals of competent jurisdiction, the remainder of this Agreement or the application of such Article or provision to persons or circumstances other than those as to which it has been held invalid, inoperative or unenforceable shall not be affected thereby.
- 8.2 This Agreement shall be in full force as of and from the date of the Notice of Award until the Project contract is closed.
- 8.3 This PLA may not be changed or modified except by the subsequent written agreement of the parties. All parties represent that they have the full legal authority to enter into this PLA. This PLA may be executed by the parties in one or more counterparts.
- 8.4 Any liability arising out of this PLA shall be several and not joint. IDOT shall not be liable to any person or other party for any violation of this PLA by any other party, and no Contractor or Union shall be liable for any violation of this PLA by any other Contractor or Union.
- 8.5 The failure or refusal of a party to exercise its rights hereunder in one or more instances shall not be deemed a waiver of any such rights in respect of a separate instance of the same or similar nature.

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Addendum A

IDOT Slate of Permanent Arbitrators

1. Bruce Feldacker
2. Thomas F. Gibbons
3. Edward J. Harrick
4. Brent L. Motchan
5. Robert Perkovich
6. Byron Yaffee
7. Glenn A. Zipp

Exhibit A - Contractor Letter of Assent

(Date)

To All Parties:

In accordance with the terms and conditions of the contract for Construction Work on [Contract No.], this Letter of Assent hereby confirms that the undersigned Prime Contractor or Subcontractor agrees to be bound by the terms and conditions of the Project Labor Agreement established and entered into by the Illinois Department of Transportation in connection with said Project.

It is the understanding and intent of the undersigned party that this Project Labor Agreement shall pertain only to the identified Project. In the event it is necessary for the undersigned party to become signatory to a collective bargaining agreement to which it is not otherwise a party in order that it may lawfully make certain required contributions to applicable fringe benefit funds, the undersigned party hereby expressly conditions its acceptance of and limits its participation in such collective bargaining agreement to its work on the Project.

(Authorized Company Officer)

(Company)

SWPPP



Storm Water Pollution Prevention Plan

Route	Marked Route	Section Number
FAI 39 & FAP 301	I-39 & US 20	(2013)R & (4-1,5)R
Project Number	County	Contract Number
NHPP-5F4Z(497)	Winnebago	64C24

This plan has been prepared to comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit No. ILR10 (Permit ILR10), issued by the Illinois Environmental Protection Agency (IEPA) for storm water discharges from construction site activities.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Permittee Signature & Date

Julia Shaw 3/19/25

SWPPP Notes

Preparing BDE 2342 (Storm Water Pollution Prevention Plan)

Guidance on preparing each section of BDE 2342 (Storm Water Pollution Prevention Plan) is found in Chapter 41 of the IDOT Bureau of Design and Environment (BDE) Manual, please consult this chapter during SWPPP preparation. Please note that the Illinois Environmental Protection Agency (IEPA) has 30 days to review the Notice of Intent (NOI) prior to project approval and any deficiencies can result in construction delays.

The Notice of Intent contains the following documents:

- BDE 2342 (Storm Water Pollution Prevention Plan)
- BDE 2342 A (Contractor Certification Statement)
- Erosion and Sediment Control Plan (See Section 63-4.09 of the BDE Manual)

Non-applicable information

If any section of the SWPPP is not applicable put "N/A" in box rather than leaving blank.

National Pollutant Discharge Elimination System (NPDES) Compliance

Description of Work: This work shall consist of those efforts necessary for compliance with the requirements of the Clean Water Act, Section 402 (NPDES), and the Illinois Environment Protection Act. This provision also provides the background information needed to comply with ILR10 and ILR40 permits for this project.

NPDES COMPLIANCE REQUIREMENTS

Part I: Site Description

1. Describe the project location; include latitude and longitude, section, town, and range.

I-39 southeast of Rockford, Sections 02, 03, 09, 10, and 35, Townships 43 and 44 North, Range 2 East, starting at 42°13'12.7"N 88°59'44.2"W and ending at 42°14'29.3"N 88°57'51.9"W.

2. Describe the nature of the construction activity or demolition work.

This project includes reconstructing I-39/US 20 and some ramp construction at the Harrison Ave/US 20 Interchange. This includes the removal of existing pavement, installation of new pavement, removal of existing bridges, installation of new bridges, new culvert, new tunnel, noisewall installation, noisewall replacement, drainage systems with in-line detention storage and regrading. +

3. Describe the intended sequence of major activities which disturb soils for major portions of the site (e.g. clearing, grubbing, excavation, grading, on-site or off-site stockpiling of soils, on-site or off-site storage of materials).

The regrading of the project site to support the new roadways, bridges, noise walls, culvert, tunnel, and removal of the existing pavement will cause the most disturbance, and all of these activities occur along various slope depths and lengths. Few of the sloped area are steeper than 3:1, and areas that are steeper than 3:1 will have turf reinforcement mat as a permanent protection installation. Areas steeper than 1:3 are typically near bridge cones. The erosion control plans and plan schedule of quantities provide the sequencing and locations of turf reinforcement mat. Southbound I-39 will be disturbed in Stage 1, the median will be disturbed in Stage 2, and NB I-39 will be disturbed in Stage 3. Each Stage will have clearing and grubbing, excavation and grading. Material will be borrowed from the stockpile site left in place by adjacent contract 64B13. Estimated construction time is 32 months. +

4. The total area of the construction site is estimated to be 1307.8 acres.

5. The total area of the site estimated to be disturbed by excavation, grading or other activities is 1307.8 acres.

6. Determine an estimate of the runoff coefficient of the site after construction activities are completed.

Weighted CN - Proposed: 77.2

7. Provide the existing information describing the potential erosivity of the soil at discharge locations at the project site.

At outlets, ditches, along steeper sloped areas (steeper than 3:1 slope), and with higher velocities. No highly erodible soils are specifically noted in the soils report. +

8. Erosion and Sediment Control Plan (Graphic Plan) is included in the contract. ☒ Yes ☐ No

9. List all soils found within project boundaries; include map until name, slope information, and erosivity.

See Attached. Loam and Silty Clay Loam are predominantly noted in the soils report.

10. List of all MS4 permittees in the area of this project

City of Rockford and Village of Cherry Valley. No discharge directly from project 64C24 into MS4 systems.

Note: For sites discharging to an MS4, a separate map identifying the location of the construction site and the location where the MS4 discharges to surface water must be included.

Part II: Waters of the US

1. List the nearest named receiving water(s) and ultimate receiving waters.

Madigan Creek, Unnamed Tributary to Kishwaukee River, and various unnamed streams are throughout the project area, that ultimately lead to the Kishwaukee River. +

2. Are wetlands present in the project area? ☒ Yes ☐ No

If yes, describe the areal extent of the wetland acreage at the site.

See Attached

3. Natural buffers:

For any storm water discharges from construction activities within 50 feet of a Waters of the United States, except for activities for water-dependent structures authorized by a Section 404 permit, the following shall apply:

(i) A 50-foot undisturbed natural buffer between the construction activity and the Waters of the United States has been provided

☐ Yes ☒ No; and/or

(ii) Additional erosion and sediment controls within that area has been provided

☒ Yes ☐ No; and Describe: In-stream work within Madigan Creek will be protected using silt curtains and is a permitted water-dependent structure.

Part III. Water Quality

1. Water Quality Standards

As determined by the Illinois Pollution Control Board, Illinois waters have defined numeric limits of pollutants under the umbrella term "Water Quality Standards." In the following table are commonly used chemicals/practices used on a construction site. These chemicals if spilled into a waterway, could potentially contribute to a violation of a Water Quality Standard. If other chemicals that could contribute a violation of a Water Quality Standard, add as needed.

☒ Fertilizer (check as appropriate)

☒ Nitrogen

☒ Phosphorus, and/or

☒ Potassium

☐ Herbicide

☒ Petroleum (gas, diesel, oil, kerosene, hydraulic oil / fluids)

☒ Waste water for concrete washout station

☐ Coal tar Pitch Emulsion

☐ Other (Specify) _____

☐ Other (Specify) _____

Table 1: Common chemicals/potential pollutants used during construction

If no boxes are checked in Table 1 above, check the following box:

☐ There are no chemicals on site that will exceed a Water Quality Standards if spilled.

If any boxes are checked in Table 1 above, check the following box:

There are chemicals on site that if spilled could potentially cause an exceedance of a Water Quality Standard. The Department shall implement Pollution Prevention/Good Housekeeping Practices as described in the Department's ILR40 Discharge for Small

☒ Municipal Separate Storm Sewer Systems (MS4) reiterated below and Part VIII. Unexpected Regulated Substances/Chemical Spill Procedures:

FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24

Pollution Prevention:

The Department will design, and the contractor shall, install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants from construction activities. At a minimum, such measures must be designed, installed, implemented and maintained to:

- (a) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge.
- (b) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, chemical storage tanks, deicing material storage facilities and temporary stockpiles, detergents, sanitary waste, and other materials present on the site exposed to precipitation and to storm water.
- (c) Minimize the discharge of pollutants from spills, leaks and vehicle and equipment maintenance and repair activities and implement chemical spill and leak prevention and response procedures;
- (d) Minimize the exposure of fuel, oil, hydraulic fluids, other petroleum products, and other chemicals by storing in covered areas or containment areas. Any chemical container with a storage of 55 gallons or more must be stored a minimum of 50 feet from receiving waters, constructed or natural site drainage features, and storm drain inlets. If infeasible due to site constraints, store containers as far away as the site permits and document in your SWPPP the specific reasons why the 50-foot setback is infeasible and how the containers will be stored.
- (e) The contractor is to provide regular inspection of their construction activities and Best Management Practices (BMPs). Based on inspection findings, the contractor shall determine if repair, replacement, or maintenance measures are necessary in order to ensure the structural integrity, proper function, and treatment effectiveness of structural storm water BMPs. Necessary maintenance shall be completed as soon as conditions allow to prevent or reduce the discharge of pollutants to storm water or as ordered by the Engineer. The Engineer shall conduct inspections required in Section XI Inspections, and report to the contractor deficiencies noted. These Department conducted inspections do not relieve the contractor from their responsibility to inspect their operations and perform timely maintenance; and
- (f) In addition, all IDOT projects are screened for Regulated Substances as described in Section 27-3 of the BDE Manual and implemented via Section 669: Removal and Disposal of Regulated substances in the Standard Specifications for Road and Bridge Construction.

Approved alterations to the Department's provided SWPPP, including those necessary to protect Contractor Borrow, Use and Waste areas, shall be designed, installed, implemented and maintained by the Contractor in accordance with IDOT Standard Specifications Section 280.

2. 303(d) Impaired Waterways

Does the project area have any 303(d) impaired waterways with the following impairments?

- suspended solids
- turbidity, and or
- siltation

☒ Yes ☐ No

If yes, list the name(s) of the listed water body and the impairment(s)

303(d) waterbody	Impairments(s)
Kishwaukee River ILPQ12	Mercury, PCBs, Fecal Coliform

In addition, It is paramount that the project does not increase the level of the impairment(s) described above. Discuss which BMPs will be implemented to reduce the risk of impairment increase

There is no direct discharge from the site to the Kishwaukee River.

3. Total Maximum Daily Load (TMDL)

Does the project include any receiving waters with a TMDL for sediment, total suspended solids, turbidity or siltation? ☐ Yes ☒ No

If yes, List TMDL waterbodies below and describe associated TMDL

TMDL waterbody	TMDL
----------------	------

TMDL waterbody	TMDL

Provide a description of the erosion and sediment control strategy that will be incorporated into the site design that is consistent with the assumptions and requirements of the TMDL

N/A

If a specific numeric waste load allocation has been established that would apply to the project's discharges, provide a description of the necessary steps to meet that allocation

N/A

Part IV. Temporary Erosion and Sediment Controls

Stabilization efforts must be initiated within 1 working day of cessation of construction activity and completed within 14 days. Areas must be stabilized if they will not be disturbed for at least 14 calendar days. Exceptions to this time frame include:

- (i) Where the initiation of stabilization measures is precluded by snow cover, stabilization measures must be initiated as soon as practicable,
- (ii) On areas where construction activities have temporarily ceased and will resume after 14 days, a temporary stabilization method can be used (temporary stabilization techniques must be described), and
- (iii) Stabilization is not required for exit points at linear utility construction site that are used only episodically and for very short durations over the life of the project, provided other exit point controls are implemented to minimize sediment track-out.

Additionally, a record must be kept with the SWPPP throughout construction of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated.

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.

Note: For practices below, consult relevant design criteria in Chapter 41 of the BDE Manual and maintenance criteria in Erosion and Sediment Control Field Guide for Construction.

1. Erosion Control:

The following are erosion control practices which may be used on a project (place a check by each practice that will be utilized on the project, add additional practices as needed):

- | | |
|---|--|
| <input checked="" type="checkbox"/> Mulch | <input checked="" type="checkbox"/> Preservation of existing vegetation |
| <input checked="" type="checkbox"/> Erosion Control Blanket | <input type="checkbox"/> Temporary Turf Cover Mixture (Class 7) |
| <input checked="" type="checkbox"/> Turf Reinforcement Mat | <input checked="" type="checkbox"/> Permanent seeding (Class 1-6) |
| <input type="checkbox"/> Sodding | <input checked="" type="checkbox"/> Other (Specify) <u>Washout Basin</u> |
| <input type="checkbox"/> Geotextile fabric | <input checked="" type="checkbox"/> Other (Specify) <u>Temporary Seeding</u> |
| | <input type="checkbox"/> Other (Specify) _____ |

2. Sediment Control:

The following sediment control devices will be implemented on this project:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Ditch Checks | <input checked="" type="checkbox"/> Perimeter Erosion Barrier |
| <input checked="" type="checkbox"/> Inlet and Pipe protection | <input type="checkbox"/> Rolled Excelsior |
| <input type="checkbox"/> Hay or Straw bales | <input checked="" type="checkbox"/> Silt Filter Fence |

- ☐ Above grade inlet filters (fitted)
☐ Above grade inlet filters (non-fitted)
☒ Inlet filters

- ☐ Urethane foam/geotextiles
☐ Other (Specify) _____
☐ Other (Specify) _____
☐ Other (Specify) _____

3. Structural Practices:

Provide below is a description of structural practices that will be implemented:

- | | |
|---|---|
| <input type="checkbox"/> Aggregate Ditch | <input checked="" type="checkbox"/> Stabilized Construction Exits |
| <input type="checkbox"/> Articulated Block Revetment Mat | <input type="checkbox"/> Stabilized Trench Flow |
| <input checked="" type="checkbox"/> Barrier (Permanent) | <input type="checkbox"/> Sediment Basin |
| <input type="checkbox"/> Concrete Revetment Mats | <input type="checkbox"/> Retaining Walls |
| <input type="checkbox"/> Dewatering Filtering | <input checked="" type="checkbox"/> Riprap |
| <input type="checkbox"/> Gabions | <input type="checkbox"/> Storm Drain Inlet Protection |
| <input checked="" type="checkbox"/> In-Stream or Wetland Work | <input type="checkbox"/> Slope Walls |
| <input type="checkbox"/> Level Spreaders | <input type="checkbox"/> Sediment Trap |
| <input type="checkbox"/> Paved Ditch | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Permanent Check Dams | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Precast Block Revetment Mat | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Rock Outlet Protection | <input type="checkbox"/> Other (Specify) _____ |

4. Polymer Flocculants

Design guidance for polymer flocculants is available in Chapter 41 of the BDE Manual. In addition, Polymer Flocculants may only be used by district Special Provision.

If polymer flocculants are used for this project, the following must be adhered to and described below:

- Identify the use of all polymer flocculants at the site.
- Dosage of treatment chemicals shall be identified along with any information from any Material Safety Data Sheet.
- Describe the location of all storage areas for chemicals.
- Include any information from the manufacturer's specifications.
- Treatment chemicals must be stored in areas where they will not be exposed to precipitation.
- The SWPPP must describe procedures for use of treatment chemicals and staff responsible for use/application of treatment chemicals must be trained on the established procedures.

N/A

Part V. Other Conditions

1. Dewatering

Will dewatering be required for this project? ☐ Yes ☒ No

If yes, the following applies:

- Dewatering discharges shall be routed through a sediment control (e.g., sediment trap or basin, pumped water filter bag) designed to minimize discharges with visual turbidity;
- The discharge shall not include visible floating solids or foam;
- The discharge must not cause the formation of a visible sheen on the water surface, or visible oily deposits on the bottom or shoreline of the receiving water. An oil-water separator or suitable filtration device shall be used to treat oil, grease, or other similar products if dewatering water is found to or expected to contain these materials;
- To the extent feasible, use well-vegetated (e.g., grassy or wooded), upland areas of the site to infiltrate dewatering water before discharge;
- You are prohibited from using receiving waters as part of the treatment area;
- To minimize dewatering-related erosion and related sediment discharges, use stable, erosion-resistant surfaces (e.g., well-vegetated grassy areas, clean filler stone, geotextile underlayment) to discharge from dewatering controls. Do not place dewatering controls, such as pumped water filter bags, on steep slopes (15% or greater in grade);
- Backwash water (water used to backwash/clean any filters used as part of storm water treatment) must be properly treated or hauled off-site for disposal;
- Dewatering treatment devices shall be properly maintained; and
- See Part XI (Inspections) for inspection requirement.

Part VI. Permanent (i.e., Post-Construction) Storm Water Management Controls

Provided below is a description of measures that may be installed during the construction process to control volume and therefore the amount pollutants in storm water runoff that can occur after construction operations have been completed.

Practices may include but are not limited to the following:

- Aggregate ditch checks;
- bioswales,
- detention pond(s),
- infiltration trench;
- retention pond(s),
- open vegetated swales and natural depressions,
- treatment train (sequential system which combine several practices).
- Velocity dissipation devices (See Structural Practices above)

Describe these practices below

Riprap outlet protection, riprap or turf reinforcement mat lined ditches, culverts, and storm underdrains will be installed as permanent storm water management controls.

Part VII. Additional Practices Incorporated From Local Ordinance(s)

In some instances, an additional practice from a local ordinance may be included in the project. If so, describe below (Note: the Department is not subject to local ordinances)

All management plans and practices, controls, and other provisions in these plans are in accordance with "IDOT Standard Specifications for Road and Bridge Construction" and the "Illinois Urban Manual".

Part VIII. Unexpected Regulated Substances/Chemical Spill Procedures

When Unexpected Regulated Substances or chemical spills occur, Article 107.19 of the Standard Specifications for Road and Bridge Construction shall apply. In addition, it is the contractor's responsibility to notify the Engineer in the event of a chemical spill into a ditch or waterway, the Engineer will then notify appropriate IEPA and IEMA personnel for the appropriate cleanup procedures.

Part IX. 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 and exits to be used and how they will be maintained)
- 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 operation
- Time frame for other significant long-term operations or activities that may plan non-storm water discharges as dewatering, grinding, etc.
- Permanent stabilization activities for each area of the project

2. During the pre-construction meeting, 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:

- Temporary Ditch Checks - Identify what type and the source of Temporary Ditch Checks that will be installed as part of the project. The installation details will then be included with the SWPPP.
- 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. Specifically, any chemical stored in a 55 gallon drum provided by the contractor.
- 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.
- Concrete Residuals and Washout Wastes - Discuss the location and type of concrete washout facilities to be used on this project and how they will be signed and maintained.
- Litter Management - Discuss how litter will be maintained for this project (education of employees, number of dumpsters, frequency of dumpster pick-up, etc.).
- Vehicle and Equipment Fueling - Identify equipment fueling locations for this project and what BMPs will be used to ensure

containment and spill prevention.

- Vehicle and Equipment Cleaning and Maintenance - Identify where equipment cleaning and maintenance locations for this project and what BMPs will be used to ensure containment and spill prevention.
- Dewatering Activities - Identify the controls which will be used during dewatering operations to ensure sediments will not leave the construction site.

Additional measures indicated in the plan

Silt Curtains

Part X. Maintenance

It will be the Contractor's responsibility to attain maintenance guidelines for any manufactured BMPs which are to be installed and maintained per manufacture's specifications. However, when requested by the Contractor, the Resident Engineer will provide general maintenance guides (e.g., IDOT Erosion and Sediment Control Field Guide) to the Contractor for the practices associated with this project. Any damage or undermining shall be repaired immediately.

For Inlet Protection: Where there is evidence of sediment accumulation adjacent to the inlet protection measure, the deposited sediment must be removed by the following business day.

Below, describe procedures to maintain in good and effective operating conditions

All maintenance will be required to be completed pursuant to the requirements of the IDOT Erosion and Sediment Control Field Guide and the Illinois Urban Manual. Erosion control measures will be checked pursuant to NPDES guidelines.

Part XI. Inspections

Qualified personnel shall inspect disturbed areas of the construction site that have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within 24 hours of the end of a storm or by the end of the following business or workday that is 0.50 inches or greater or equivalent snowmelt (except as allowed for Frozen Conditions).

In addition, all areas where storm water typically flows within the site should be inspected periodically to check for evidence of pollutants entering the drainage system, as well as all locations where stabilization measures have been implemented to ensure they are operating correctly.

Inspections shall be documented on the form BC 2259 (Storm Water Pollution Prevention Plan Erosion Control Inspection Report).

The Erosion and Sediment Control Field Guide for Construction Inspection shall be consulted as needed.

Dewatering

For site(s) discharging dewatering water, an inspection during the discharge shall be done once per day on which the discharge occurs and record the following in a report within 24 hours of completing the Inspection:

- The inspection date;
- Names and titles of personnel performing the inspection;
- Approximate times that the dewatering discharge began and ended on the day of inspection;
- Estimates of the rate (in gallons per day) of discharge on the day of inspection;
- Whether or not any of the following indications of pollutant discharge were observed at the point of discharge: a sediment plume, suspended solids, unusual color, presence of odor, decreased clarity, or presence of foam; and/or a visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water.

Frozen Conditions

Inspections may be reduced to once per month when all construction activities have ceased due to frozen conditions. Weekly inspections will recommence when construction activities resume, either temporarily or continuously, or if there is 0.5" or greater rain event, or a discharge due to snowmelt occurs.

Flooding or unsafe conditions

Areas that are inaccessible during required inspections due to flooding or other unsafe conditions must be inspected within 72 hours of becoming accessible.

Part XII. Incidence of Noncompliance (ION)

The Department shall notify the appropriate Agency Field Operations Section office by email as described on the IEPA ION form, within 24 hours of any incidence of noncompliance for any violation of the storm water pollution prevention plan observed during any inspection conducted, or for violations of any condition of this permit.

The Department shall complete and submit within 5 days an "Incidence of Noncompliance" (ION) report for any violation of the storm water pollution prevention plan observed during any inspection conducted, or for violations of any condition of this permit. Submission shall be on forms provided by the IEPA and 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. Corrective actions must be undertaken immediately to address the identified non-compliance issue(s).

Illinois EPA
2520 W. Iles Ave./P.O. Box 19276
Springfield, IL 62794-9276

Please note that if these are delivered via FedEx or UPS, these carriers cannot deliver to our P.O. Box and this number must be excluded from the mailing address.

Part XIII. Corrective Actions

Corrective actions must be taken when:

- A storm water control needs repair or replacement;
- A storm water control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly;
- Discharges are causing an exceedance of applicable water quality standards; or
- A prohibited discharge has occurred.

Corrective Actions must be completed as soon as possible and documented within 7 days in an Inspection Report or report of noncompliance. If it is infeasible to complete the installation or repair within 7 calendar days, it must be documented in the records why it is infeasible to complete the installation or repair within the 7 day time-frame and document the schedule for installing the storm water control(s) and making it operational as soon as feasible after the 7-day time-frame.. In the event that maintenance is required for the same storm water control at the same location three or more times, the control must be repaired in a manner that prevents continued failure to the extent feasible, and it must be documented the condition and how it was repaired in the records. Alternatively, it must be documented why the specific re-occurrence of this same issue must continue to be addressed as a routine maintenance fix.

Part XIV. Retention of Records

The Department must retain copies of the SWPPP and all reports and notices required by this permit, records of all data used to complete the NOI to be covered by this permit, and the Agency Notice of Permit Coverage letter for at least three years from the date that the permit coverage expires or is terminated. the permittee must retain a copy of the SWPPP and any revisions to the SWPPP required by this permit at the construction site from the date of project initiation to the date of final stabilization. Any manuals or other documents referenced in the SWPPP must also be retained at the construction site.

Part XV. 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 (See Article 105.03 Conformity with Contract)

Part XVI. Keeping the SWPPP ("plan") Current

IDOT shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to Waters of the United States and which has not otherwise been addressed in the plan or if the plan proves to be ineffective in eliminating or significantly minimizing sediment and/or pollutants identified under paragraph Part II. Water Quality or in otherwise achieving the general objectives of controlling pollutants in storm water discharges associated with construction site activity.

In addition, the plan shall be amended to identify any new contractor and/or subcontractor that will implement a measure of the plan. Amendments to the plan may be reviewed by the IEPA the same manner as the SWPPP and Erosion and Sediment Control Plan (ESCP) submitted as part of the Notice of Intent (NOI). The SWPPP and site map must be modified within 7 days for any changes to construction plans, storm water controls or other activities at the site that are no longer accurately reflected in the SWPPP.

In addition, the NOI shall be modified using the CDX system for any substantial modifications to the project such as:

- address changes
- new contractors
- area coverage
- additional discharges to Waters of the United States, or
- other substantial modifications (e.g. addition of dewatering activities).

The notice of intent shall be modified within 30 days of the modification to the project.

Part XVII: Notifications

In addition to the NOI submitted to IEPA, all MS4 permittees identified in Part I. Site Description shall receive a copy of the NOI.

Part XVIII. Notice of Termination

Where a site has completed final stabilization and all storm water discharges from construction activities that are authorized by this permit are eliminated, the permittee must submit a completed Notice of Termination (NOT) that is signed in accordance with ILR10 permit.

Method of Measurement: NPDES Compliance shall not be measured for payment separately. Measurement for payment for Temporary Erosion and Sediment Control shall be in accordance with Section 280 or as otherwise provided in the contract. Permanent BMPs necessary to comply with this provision shall be measured for payment in accordance with their respective provisions in the contract.

Basis of Payment: NPDES Compliance shall not be paid for separately. Payment for Temporary Erosion and Sediment Control shall be in accordance with Section 280 or as otherwise provided in the contract. Permanent BMPs necessary to comply with this provision shall be paid for in accordance with their respective payment provisions in the contract.

RUNOFF COEFFICIENT CALCULATION

FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24

I-39, Winnebago County, IL
 HH Analysis
 64C24 I-39/US 20
 Weighted CN Calculations

BY EMS, 2/12/24
 QC CAR, 2/12/24

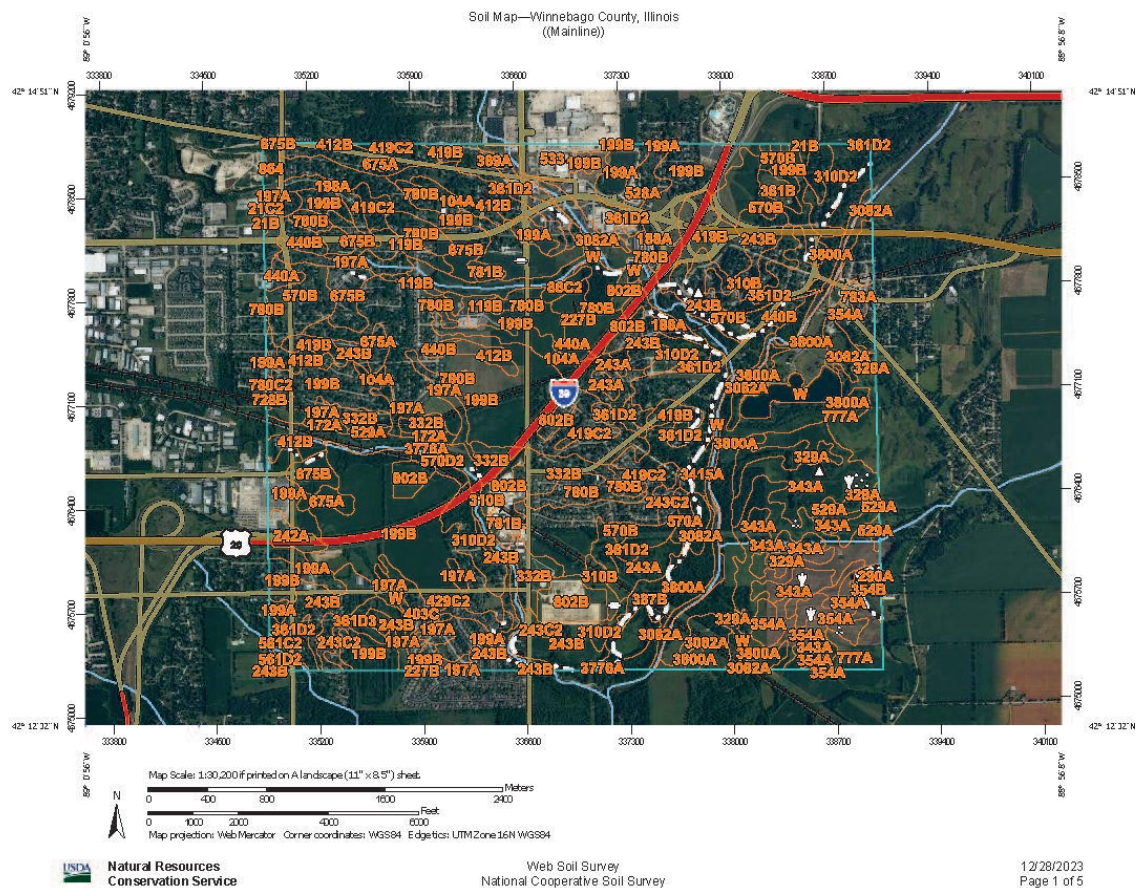
SUMMARY

Total Area (acres) - Existing	1304.3
Total Area (acres) - Proposed	1307.8
Weighted CN - Existing	77.3
Weighted CN - Proposed	77.2

Basin & Subbasin	EXISTING			PROPOSED		
	CN	Area	CN x A	CN	Area	CN x A
Basin H						
Area H1	88.7	3.4	298.9	88.7	3.4	298.4
Area H2	79.9	15.6	1244.2	79.9	15.6	1244.2
Area H3	-	-	-	89.0	2.0	180.3
Area H7	88.6	2.0	175.5	88.3	1.4	-
Area H8	88.9	2.4	208.9	89.0	2.5	220.5
Area H9	-	-	-	89.1	2.5	221.7
Basin I						
Area I1	77.0	1181.9	91017.6	77.0	1181.8	90999.3
Basin J						
Area J1	70.4	8.7	609.2	69.5	8.3	573.9
Area J2	81.8	65.5	5360.9	81.8	65.2	5330.6
Area J3	92.6	0.3	30.4	92.8	0.5	48.4
Area J4	92.9	0.6	58.5	92.8	0.7	63.6
Basin K South						
Area K south	75.6	24.0	1812.6	76.0	24.0	1823.1
Totals		1304.3	100816.9		1307.8	101004.1
	Weighted CN		77.3	Weighted CN		77.2

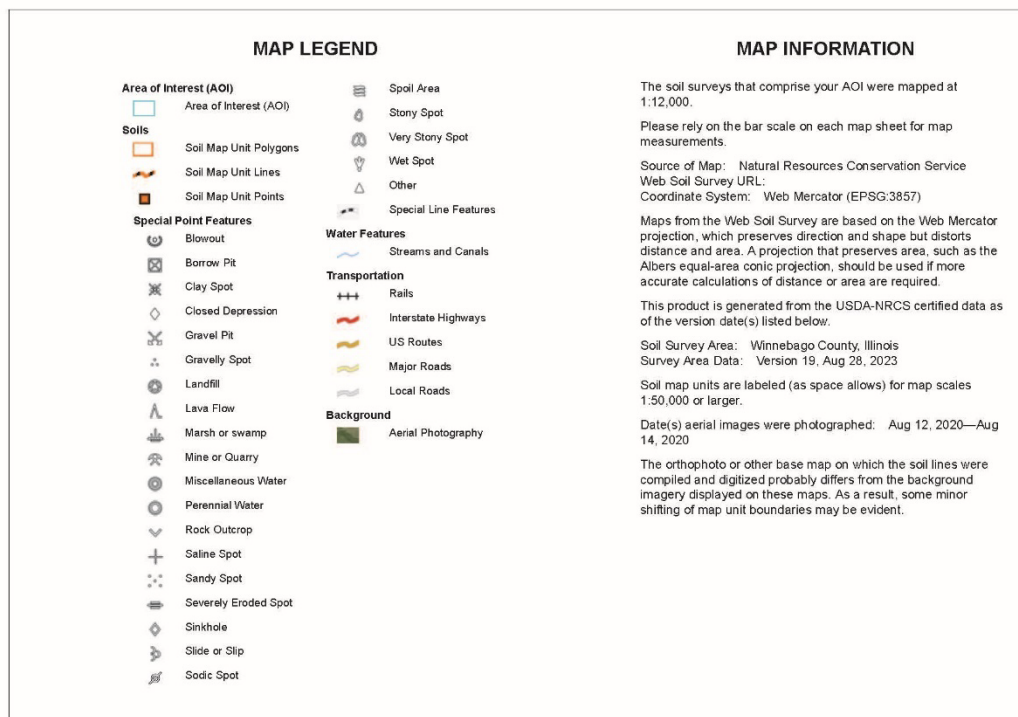
SOILS MAP AND K FACTORS (USDA)

FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24



FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24

Soil Map—Winnebago County, Illinois
 ((Mainline))



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
21B	Pecatonica silt loam, 2 to 5 percent slopes	3.3	0.1%
21C2	Pecatonica silt loam, 5 to 10 percent slopes, eroded	0.9	0.0%
61A	Atterberry silt loam, 0 to 2 percent slopes	2.9	0.1%
86C2	Osko silt loam, 5 to 10 percent slopes, eroded	7.9	0.2%
104A	Virgil silt loam, 0 to 2 percent slopes	76.7	2.1%
119B	Elco silt loam, 2 to 5 percent slopes	35.6	1.0%
172A	Hoopeston sandy loam, 0 to 2 percent slopes	9.6	0.3%
188A	Beardstown loam, 0 to 2 percent slopes	11.2	0.3%
197A	Troxel silt loam, 0 to 2 percent slopes	61.8	1.7%
198A	Elburn silt loam, cool, 0 to 2 percent slopes	17.2	0.5%
199A	Plano silt loam, 0 to 2 percent slopes	101.7	2.8%
199B	Plano silt loam, 2 to 5 percent slopes	723.3	19.9%
227B	Argyle silt loam, 2 to 5 percent slopes	10.0	0.3%
242A	Kendall silt loam, 0 to 2 percent slopes	14.8	0.4%
243A	St. Charles silt loam, 0 to 2 percent slopes	32.7	0.9%
243B	St. Charles silt loam, 2 to 5 percent slopes	321.4	8.8%
243C2	St. Charles silt loam, 5 to 10 percent slopes, eroded	21.9	0.6%
290A	Warsaw loam, 0 to 2 percent slopes	1.4	0.0%
310B	McHenry silt loam, 2 to 4 percent slopes	56.6	1.6%
310D2	McHenry silt loam, 6 to 12 percent slopes, eroded	79.4	2.2%
329A	Will loam, 0 to 2 percent slopes	124.0	3.4%
332B	Billet sandy loam, 2 to 5 percent slopes	89.1	2.5%



FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24

Soil Map—Winnebago County, Illinois

(Mainline)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
343A	Kane silt loam, 0 to 2 percent slopes	141.9	3.9%
354A	Hononegah loamy coarse sand, 0 to 2 percent slopes	75.2	2.1%
354B	Hononegah loamy coarse sand, 2 to 6 percent slopes	9.7	0.3%
361B	Kidder loam, 2 to 4 percent slopes	10.7	0.3%
361D2	Kidder loam, 6 to 12 percent slopes, eroded	114.4	3.1%
361D3	Kidder clay loam, 6 to 12 percent slopes, severely eroded	20.0	0.5%
369A	Waupecan silt loam, 0 to 2 percent slopes	3.8	0.1%
379A	Dakota loam, 0 to 2 percent slopes	0.8	0.0%
387B	Ockley silt loam, 2 to 5 percent slopes	27.9	0.8%
403C	Elizabeth silt loam, 5 to 10 percent slopes	4.3	0.1%
412B	Ogle silt loam, 2 to 5 percent slopes	73.7	2.0%
419B	Flagg silt loam, 2 to 5 percent slopes	76.1	2.1%
419C2	Flagg silt loam, 5 to 10 percent slopes, eroded	23.3	0.6%
429C2	Palsgrove silt loam, 5 to 10 percent slopes, moderately eroded	27.3	0.8%
440A	Jasper silt loam, 0 to 2 percent slopes	13.6	0.4%
440B	Jasper silt loam, 2 to 5 percent slopes	31.2	0.9%
528A	Lahoguess loam, 0 to 2 percent slopes	50.6	1.4%
529A	Selma loam, 0 to 2 percent slopes	10.6	0.3%
533	Urban land	24.3	0.7%
561C2	Whalan and NewGlarus silt loams, 5 to 10 percent slopes, eroded	4.0	0.1%
561D2	Whalan and NewGlarus silt loams, 10 to 15 percent slopes, eroded	2.1	0.1%
570A	Martinsville silt loam, 0 to 2 percent slopes	9.4	0.3%

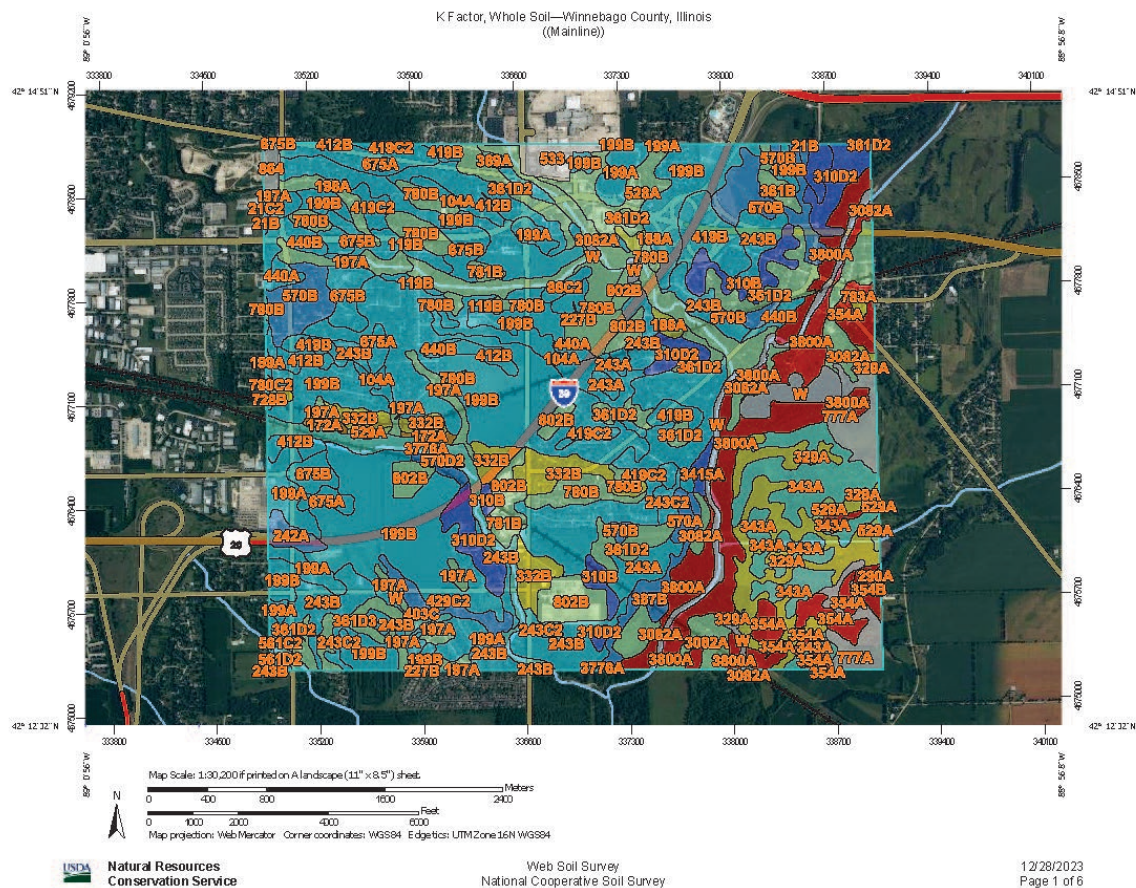
FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24

Soil Map—Winnebago County, Illinois

(Mainline)

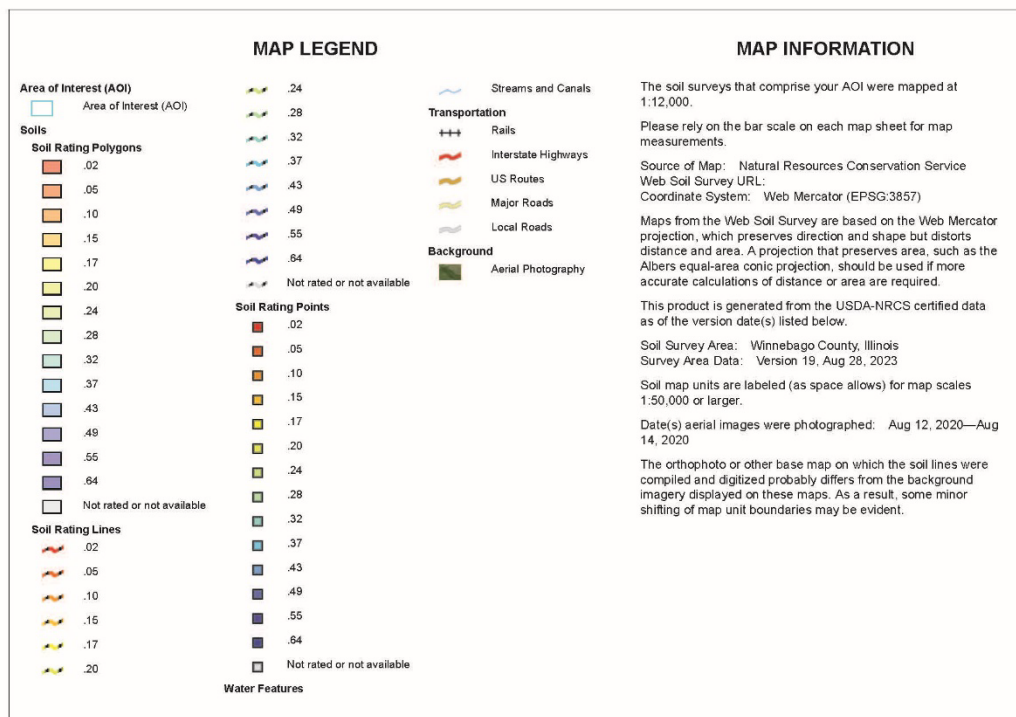
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
570B	Martinsville silt loam, 2 to 4 percent slopes	103.8	2.9%
570D2	Martinsville silt loam, 6 to 12 percent slopes, eroded	6.9	0.2%
675A	Greenbush silt loam, 0 to 2 percent slopes	51.5	1.4%
675B	Greenbush silt loam, 2 to 5 percent slopes	65.5	1.8%
728B	Winnebago silt loam, 2 to 5 percent slopes	1.4	0.0%
777A	Adrian muck, 0 to 2 percent slopes	71.5	2.0%
780B	Grellton fine sandy loam, 2 to 5 percent slopes	120.8	3.3%
780C2	Grellton fine sandy loam, 5 to 10 percent slopes, eroded	1.5	0.0%
781B	Friesland fine sandy loam, 2 to 5 percent slopes	12.8	0.4%
783A	Flagler sandy loam, 0 to 2 percent slopes	3.7	0.1%
802B	Orthents, loamy, undulating	86.4	2.4%
864	Pits, quarries	9.3	0.3%
3082A	Millington silt loam, 0 to 2 percent slopes, frequently flooded	189.7	5.2%
3415A	Orion silt loam, 0 to 2 percent slopes, frequently flooded	7.4	0.2%
3776A	Comfrey loam, 0 to 2 percent slopes, frequently flooded	66.2	1.8%
3800A	Psamments, 0 to 2 percent slopes, frequently flooded	202.6	5.6%
8782A	Juneau silt loam, 0 to 2 percent slopes, occasionally flooded	0.4	0.0%
W	Water	75.9	2.1%
Totals for Area of Interest		3,635.3	100.0%

FAI Route 39 (I-39) & FAP Route 301 (US 20)
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FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
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 Winnebago County
 Contract No. 64C24

K Factor, Whole Soil—Winnebago County, Illinois
 ((Mainline))



K Factor, Whole Soil—Winnebago County, Illinois

(Mainline)

K Factor, Whole Soil

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
21B	Pecatonica silt loam, 2 to 5 percent slopes	.43	3.3	0.1%
21C2	Pecatonica silt loam, 5 to 10 percent slopes, eroded	.43	0.9	0.0%
61A	Atterberry silt loam, 0 to 2 percent slopes	.37	2.9	0.1%
86C2	Oско silt loam, 5 to 10 percent slopes, eroded	.37	7.9	0.2%
104A	Virgil silt loam, 0 to 2 percent slopes	.37	76.7	2.1%
119B	Elco silt loam, 2 to 5 percent slopes	.37	35.6	1.0%
172A	Hoopeston sandy loam, 0 to 2 percent slopes	.10	9.6	0.3%
188A	Beardstown loam, 0 to 2 percent slopes	.20	11.2	0.3%
197A	Troxel silt loam, 0 to 2 percent slopes	.28	61.8	1.7%
198A	Elburn silt loam, cool, 0 to 2 percent slopes	.28	17.2	0.5%
199A	Plano silt loam, 0 to 2 percent slopes	.37	101.7	2.8%
199B	Plano silt loam, 2 to 5 percent slopes	.37	723.3	19.9%
227B	Argyle silt loam, 2 to 5 percent slopes	.37	10.0	0.3%
242A	Kendall silt loam, 0 to 2 percent slopes	.43	14.8	0.4%
243A	St. Charles silt loam, 0 to 2 percent slopes	.37	32.7	0.9%
243B	St. Charles silt loam, 2 to 5 percent slopes	.37	321.4	8.8%
243C2	St. Charles silt loam, 5 to 10 percent slopes, eroded	.37	21.9	0.6%
290A	Warsaw loam, 0 to 2 percent slopes	.24	1.4	0.0%
310B	McHenry silt loam, 2 to 4 percent slopes	.49	56.6	1.6%
310D2	McHenry silt loam, 6 to 12 percent slopes, eroded	.49	79.4	2.2%

FAI Route 39 (I-39) & FAP Route 301 (US 20)
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K Factor, Whole Soil—Winnebago County, Illinois

(Mainline)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
329A	Will loam, 0 to 2 percent slopes	.17	124.0	3.4%
332B	Billet sandy loam, 2 to 5 percent slopes	.17	89.1	2.5%
343A	Kane silt loam, 0 to 2 percent slopes	.32	141.9	3.9%
354A	Hononegah loamy coarse sand, 0 to 2 percent slopes	.02	75.2	2.1%
354B	Hononegah loamy coarse sand, 2 to 6 percent slopes	.02	9.7	0.3%
361B	Kidder loam, 2 to 4 percent slopes	.28	10.7	0.3%
361D2	Kidder loam, 6 to 12 percent slopes, eroded	.28	114.4	3.1%
361D3	Kidder clay loam, 6 to 12 percent slopes, severely eroded	.28	20.0	0.5%
369A	Waupecan silt loam, 0 to 2 percent slopes	.32	3.8	0.1%
379A	Dakota loam, 0 to 2 percent slopes	.20	0.8	0.0%
387B	Ockley silt loam, 2 to 5 percent slopes	.43	27.9	0.8%
403C	Elizabeth silt loam, 5 to 10 percent slopes	.32	4.3	0.1%
412B	Ogle silt loam, 2 to 5 percent slopes	.37	73.7	2.0%
419B	Flagg silt loam, 2 to 5 percent slopes	.37	76.1	2.1%
419C2	Flagg silt loam, 5 to 10 percent slopes, eroded	.37	23.3	0.6%
429C2	Palsgrove silt loam, 5 to 10 percent slopes, moderately eroded	.43	27.3	0.8%
440A	Jasper silt loam, 0 to 2 percent slopes	.37	13.6	0.4%
440B	Jasper silt loam, 2 to 5 percent slopes	.37	31.2	0.9%
528A	Lahoguess loam, 0 to 2 percent slopes	.28	50.6	1.4%
529A	Selma loam, 0 to 2 percent slopes	.24	10.6	0.3%
533	Urban land		24.3	0.7%

FAI Route 39 (I-39) & FAP Route 301 (US 20)
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 Section (201-3)R & (4-1,5)R
 Winnebago County
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K Factor, Whole Soil—Winnebago County, Illinois

(Mainline)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
561C2	Whalan and NewGlarus silt loams, 5 to 10 percent slopes, eroded	.37	4.0	0.1%
561D2	Whalan and NewGlarus silt loams, 10 to 15 percent slopes, eroded	.37	2.1	0.1%
570A	Martinsville silt loam, 0 to 2 percent slopes	.43	9.4	0.3%
570B	Martinsville silt loam, 2 to 4 percent slopes	.43	103.8	2.9%
570D2	Martinsville silt loam, 6 to 12 percent slopes, eroded	.43	6.9	0.2%
675A	Greenbush silt loam, 0 to 2 percent slopes	.37	51.5	1.4%
675B	Greenbush silt loam, 2 to 5 percent slopes	.37	65.5	1.8%
728B	Winnebago silt loam, 2 to 5 percent slopes	.37	1.4	0.0%
777A	Adrian muck, 0 to 2 percent slopes		71.5	2.0%
780B	Grellton fine sandy loam, 2 to 5 percent slopes	.28	120.8	3.3%
780C2	Grellton fine sandy loam, 5 to 10 percent slopes, eroded	.28	1.5	0.0%
781B	Friesland fine sandy loam, 2 to 5 percent slopes	.28	12.8	0.4%
783A	Flagler sandy loam, 0 to 2 percent slopes	.17	3.7	0.1%
802B	Orthents, loamy, undulating	.28	86.4	2.4%
864	Pits, quarries		9.3	0.3%
3082A	Millington silt loam, 0 to 2 percent slopes, frequently flooded	.28	189.7	5.2%
3415A	Orion silt loam, 0 to 2 percent slopes, frequently flooded	.49	7.4	0.2%
3776A	Comfrey loam, 0 to 2 percent slopes, frequently flooded	.32	66.2	1.8%
3800A	Psamments, 0 to 2 percent slopes, frequently flooded	.02	202.6	5.6%

K Factor, Whole Soil—Winnebago County, Illinois

(Mainline)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8782A	Juneau silt loam, 0 to 2 percent slopes, occasionally flooded	.49	0.4	0.0%
W	Water		75.9	2.1%
Totals for Area of Interest			3,635.3	100.0%

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Factor K does not apply to organic horizons and is not reported for those layers.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

FEMA FLOOD MAPS

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, X, A99 With BFE or Depth Zone AE, AD, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee, See Notes, Zone X Area with Flood Risk due to Levee Zone D
OTHER AREAS	No SCREEN Area of Minimal Flood Hazard Zone X Effective LOMRs Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	Cross Sections with 1% Annual Chance Water Surface Elevation Coastal Transect Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary Coastal Transect Baseline Profile Baseline Hydrographic Feature
MAP PANELS	Digital Data Available No Digital Data Available Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/28/2023 at 11:49 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, X, A99
	With BFE or Depth Zone AE, AD, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee. See Notes, Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Effective LOMRs
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
	17.4 Coastal Transect
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
	Coastal Transect Baseline
OTHER FEATURES	Profile Baseline
	Hydrographic Feature
MAP PANELS	Digital Data Available
	No Digital Data Available
	Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

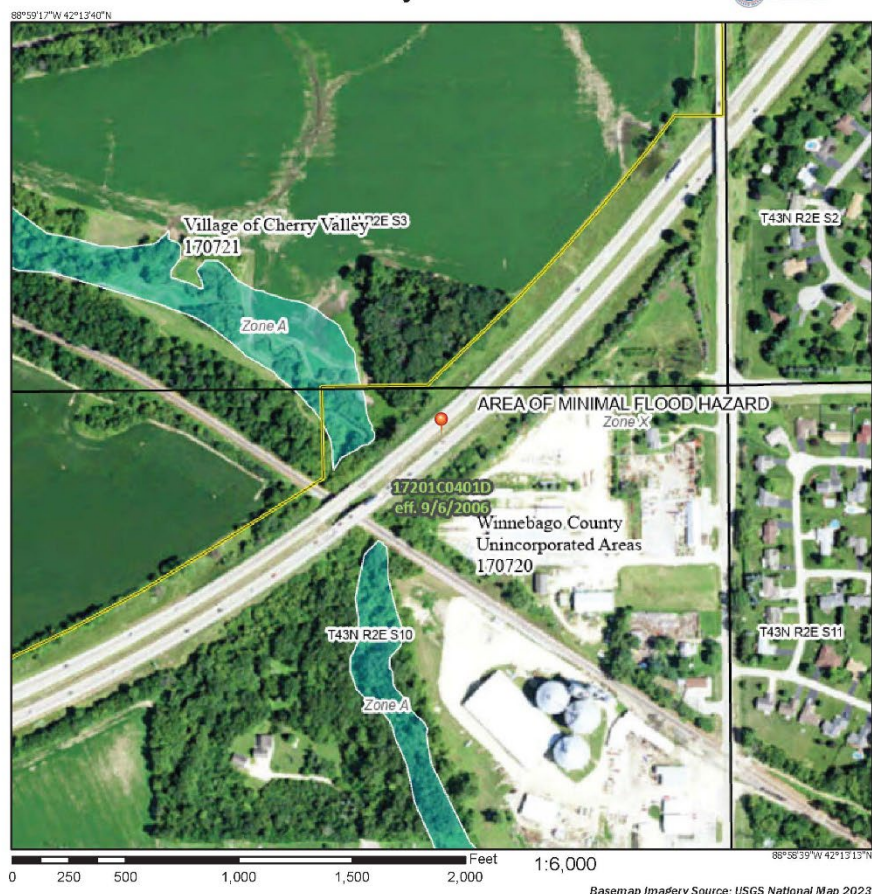
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/2/2024 at 1:18 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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FAI Route 39 (I-39) & FAP Route 301 (US 20)
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National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, X, A99 With BFE or Depth Zone AE, AD, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee, See Notes, Zone X Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X Effective LOMRs Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	Cross Sections with 1% Annual Chance Water Surface Elevation Coastal Transect Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary Coastal Transect Baseline Profile Baseline Hydrographic Feature
MAP PANELS	Digital Data Available No Digital Data Available Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/28/2023 at 12:02 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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FAI Route 39 (I-39) & FAP Route 301 (US 20)
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 Winnebago County
 Contract No. 64C24

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, X, AR With BFE or Depth Zone AE, AD, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee, See Notes, Zone X Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X Effective LOMRs Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	Cross Sections with 1% Annual Chance Water Surface Elevation Coastal Transect Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary Coastal Transect Baseline Profile Baseline Hydrographic Feature
MAP PANELS	Digital Data Available No Digital Data Available Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

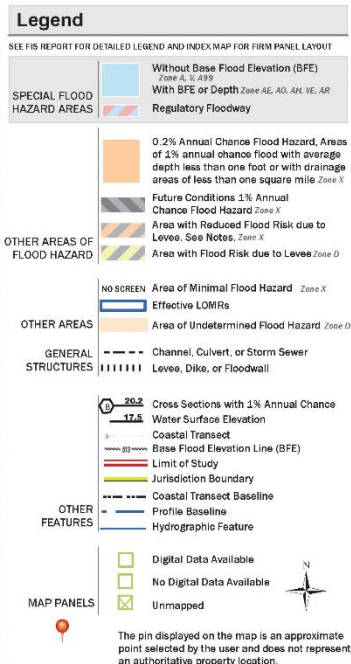
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/28/2023 at 12:07 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
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National Flood Hazard Layer FIRMette



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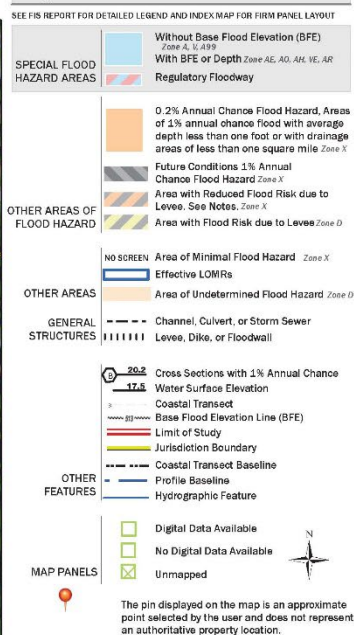
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
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National Flood Hazard Layer FIRMette



Legend



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FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
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National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, X, AE, AR With BFE or Depth Zone AE, AD, AH, VE, AR Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee, See Notes, Zone X Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X Effective LOMRs Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
OTHER FEATURES	Cross Sections with 1% Annual Chance Water Surface Elevation Coastal Transect Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary Coastal Transect Baseline Profile Baseline Hydrographic Feature
MAP PANELS	Digital Data Available No Digital Data Available Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

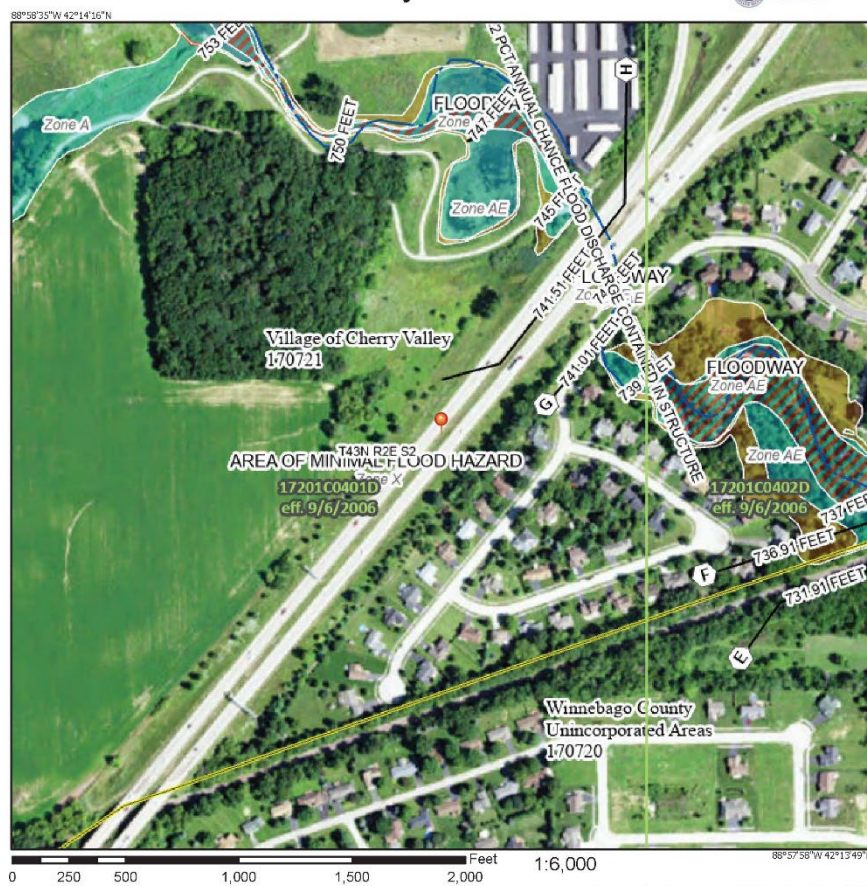
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/28/2023 at 12:45 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

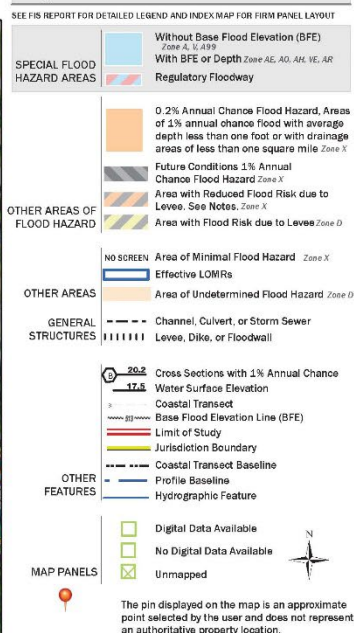
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24

National Flood Hazard Layer FIRMette



Legend



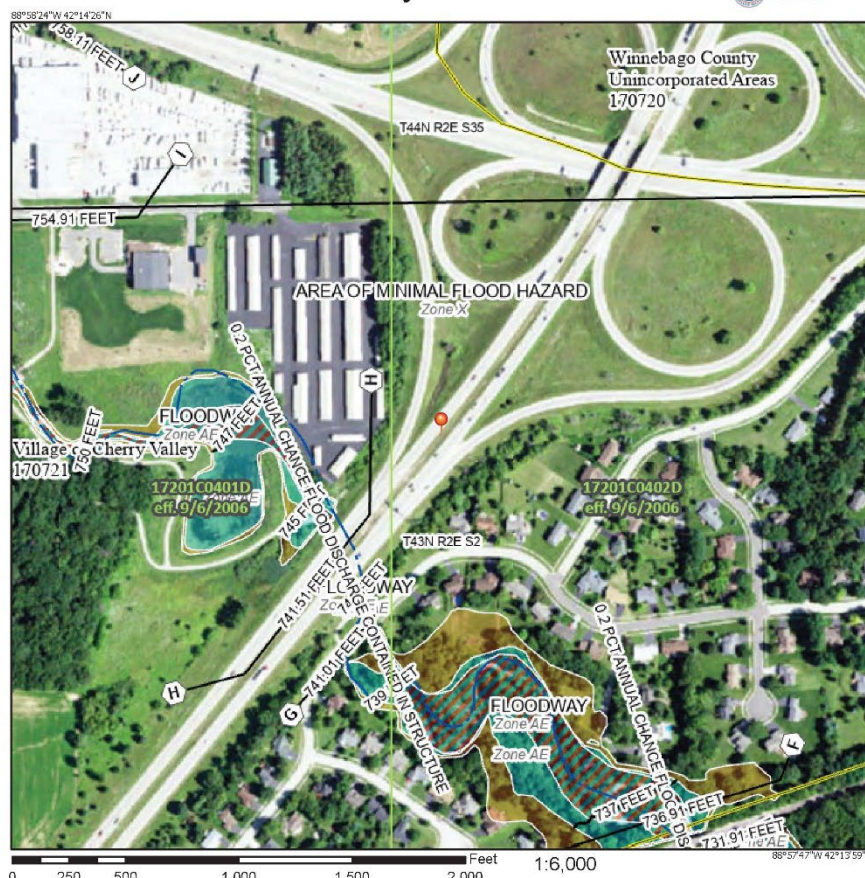
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/28/2023 at 1:48 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmoderated areas cannot be used for regulatory purposes.

FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, X, AE, AD, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
OTHER AREAS OF FLOOD HAZARD	Area with Reduced Flood Risk due to Levee, See Notes, Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Effective LOMRs
GENERAL STRUCTURES	Area of Undetermined Flood Hazard Zone D
	Channel, Culvert, or Storm Sewer
OTHER FEATURES	Levee, Dike, or Floodwall
	Cross Sections with 1% Annual Chance
MAP PANELS	Water Surface Elevation
	Coastal Transect
MAP PANELS	Base Flood Elevation Line (BFE)
	Limit of Study
MAP PANELS	Jurisdiction Boundary
	Coastal Transect Baseline
MAP PANELS	Profile Baseline
	Hydrographic Feature
MAP PANELS	Digital Data Available
	No Digital Data Available
MAP PANELS	Unmapped
	The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/28/2023 at 1:49 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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FAI Route 39 (I-39) & FAP Route 301 (US 20)
 Project NHPP-5F4Z(497)
 Section (201-3)R & (4-1,5)R
 Winnebago County
 Contract No. 64C24

National Flood Hazard Layer FIRMette



SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

Legend	
SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, X, AE, AD, AH, VE, AR
	With BFE or Depth Zone AE, AD, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee. See Notes, Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard Zone X
	Effective LOMRs Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
	Coastal Transect Baseline
MAP PANELS	Digital Data Available
	No Digital Data Available
	Unmapped

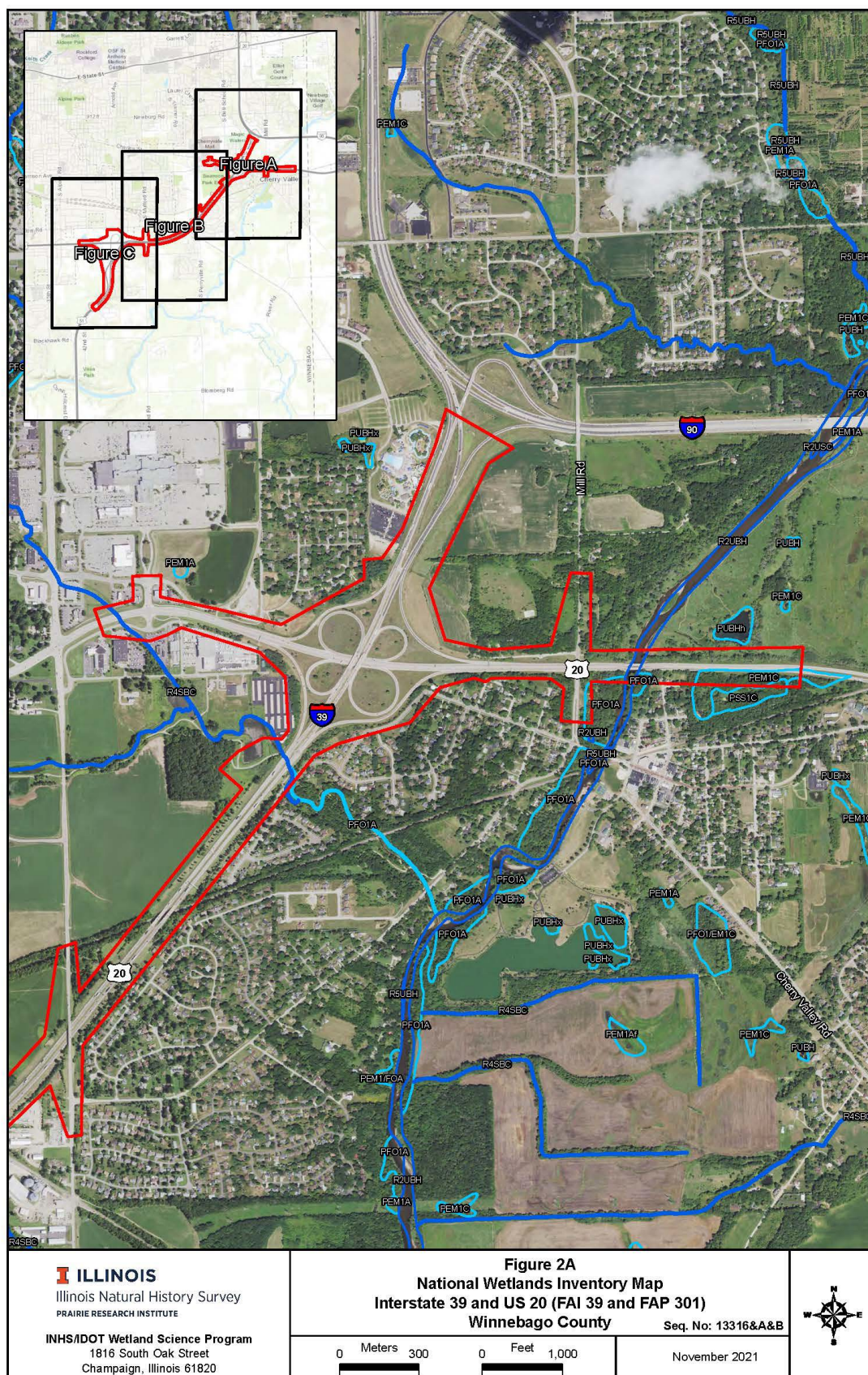
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

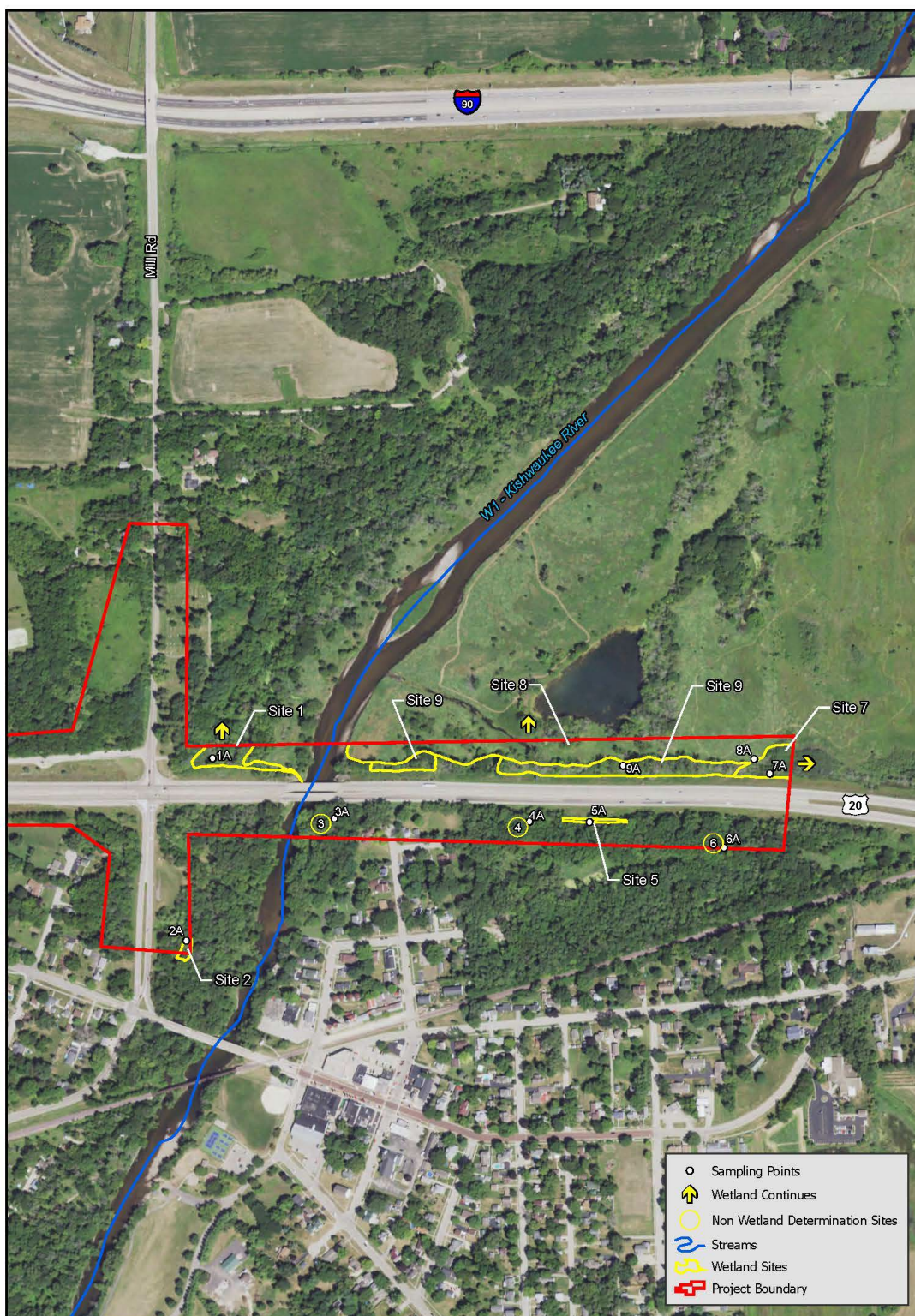
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/28/2023 at 1:57 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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WETLAND MAPS





ILLINOIS

Illinois Natural History Survey
 PRAIRIE RESEARCH INSTITUTE

INHS/IDOT Wetland Science Program
 1816 South Oak Street
 Champaign, Illinois 61820

Figure 4A
Wetland Determination Overview Map
Interstate 39 and US 20 (FAI 39 and FAP 301)
Winnebago County

Seq. No: 13316&A&B

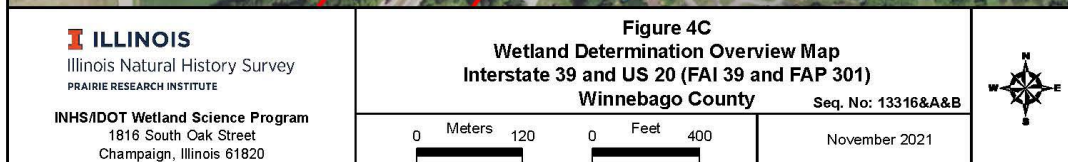
November 2021



0 Meters 120

0 Feet 400







ENDANGERED SPECIES



Applicant: Hanson Professional Services Inc.
Contact: Julianne Epplin
Address: 13801 Riverport Drive, Suite 300
Maryland Heights, MO 63043

IDNR Project Number: 1704360
Date: 11/10/2016
Alternate Number: 06S2055

Project: FAI Route 39 (I-39) & FAP Route 301 (US 20)
Address: 7820 Cherryvale N Blvd, Cherry Valley

Description: project planning

Natural Resource Review Results

This project was submitted for information only. It is not a consultation under Part 1075.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Kishwaukee River INAI Site
American Brook Lamprey (*Lethenteron appendix*)
Black Sandshell (*Ligumia recta*)
Black Sandshell (*Ligumia recta*)
Gravel Chub (*Erimystax x-punctatus*)
Gravel Chub (*Erimystax x-punctatus*)

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Winnebago

Township, Range, Section:

43N, 2E, 1
43N, 2E, 2
43N, 2E, 3
43N, 2E, 4
43N, 2E, 8
43N, 2E, 9
43N, 2E, 10
43N, 2E, 11
43N, 2E, 16
43N, 2E, 17
44N, 2E, 34
44N, 2E, 35
44N, 2E, 36



IDNR Project Number: 1704360

IL Department of Natural Resources
Contact
Impact Assessment Section
217-785-5500
Division of Ecosystems & Environment

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

Terms of Use

By using this website, you acknowledge that you have read and agree to these terms. These terms may be revised by IDNR as necessary. If you continue to use the EcoCAT application after we post changes to these terms, it will mean that you accept such changes. If at any time you do not accept the Terms of Use, you may not continue to use the website.

1. The IDNR EcoCAT website was developed so that units of local government, state agencies and the public could request information or begin natural resource consultations on-line for the Illinois Endangered Species Protection Act, Illinois Natural Areas Preservation Act, and Illinois Interagency Wetland Policy Act. EcoCAT uses databases, Geographic Information System mapping, and a set of programmed decision rules to determine if proposed actions are in the vicinity of protected natural resources. By indicating your agreement to the Terms of Use for this application, you warrant that you will not use this web site for any other purpose.

2. Unauthorized attempts to upload, download, or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act.

3. IDNR reserves the right to enhance, modify, alter, or suspend the website at any time without notice, or to terminate or restrict access.

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EcoCAT operates on a state of Illinois computer system. We may use software to monitor traffic and to identify unauthorized attempts to upload, download, or change information, to cause harm or otherwise to damage this site. Unauthorized attempts to upload, download, or change information on this server is strictly prohibited by law.

Unauthorized use, tampering with or modification of this system, including supporting hardware or software, may subject the violator to criminal and civil penalties. In the event of unauthorized intrusion, all relevant information regarding possible violation of law may be provided to law enforcement officials.

Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.

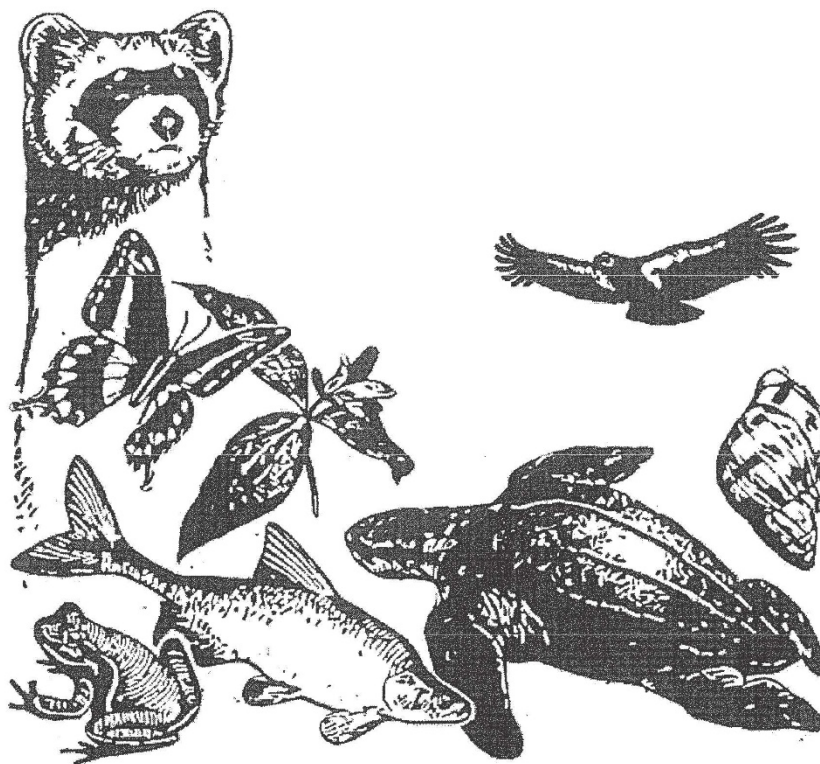
U.S. Fish & Wildlife Service

FAI Route 39 (I-39) & FAP Route 301 (US 20)

IPaC Trust Resources Report

Generated November 07, 2016 09:16 AM MST, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (<https://ecos.fws.gov/ipac/>): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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Endangered Species	<u>2</u>
Migratory Birds	<u>4</u>
Refuges & Hatcheries	<u>7</u>
Wetlands	<u>8</u>

U.S. Fish & Wildlife Service

IPaC Trust Resources Report



NAME

FAI Route 39 (I-39) & FAP Route 301
(US 20)

LOCATION

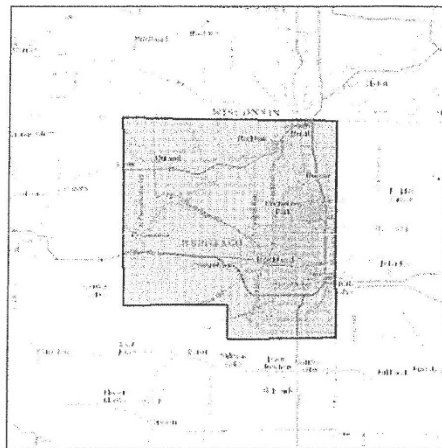
Winnebago County, Illinois

DESCRIPTION

project planning

IPaC LINK

[https://ecos.fws.gov/ipac/project/
KMWQK-YKEY-JHHJPC-I3BJS-BQESOM](https://ecos.fws.gov/ipac/project/KMWQK-YKEY-JHHJPC-I3BJS-BQESOM)



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Rock Island Ecological Services Field Office

Rock Island Ecological Services Field Office

1511 47th Ave

Moline, IL 61265-7022

(309) 757-5800

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IPaC Trust Resources Report
Endangered Species

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Flowering Plants

Eastern Prairie Fringed Orchid *Platanthera leucophaea* Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2GG

Prairie Bush-clover *Lespedeza leptostachya* Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2CB

IPaC Trust Resources Report
Endangered Species

Mammals

Indiana Bat *Myotis sodalis*

Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A000

Northern Long-eared Bat *Myotis septentrionalis*

Threatened

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Critical Habitats

There are no critical habitats in this location

IPaC Trust Resources Report
Migratory Birds

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.^[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
<http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data
<http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The following species of migratory birds could potentially be affected by activities in this location:

Acadian Flycatcher <i>Empidonax vireescens</i>	Bird of conservation concern
Season: Breeding	
Bald Eagle <i>Haliaeetus leucocephalus</i>	Bird of conservation concern
Season: Year-round	
http://ecos.fws.gov/less_public/profile/speciesProfile.action?spcode=B008	
Bell's Vireo <i>Vireo bellii</i>	Bird of conservation concern
Season: Breeding	
http://ecos.fws.gov/less_public/profile/speciesProfile.action?spcode=B0JX	
Black Tern <i>Chlidonias niger</i>	Bird of conservation concern
Season: Breeding	
http://ecos.fws.gov/less_public/profile/speciesProfile.action?spcode=B09E	

IPaC Trust Resources Report
 Migratory Birds

Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i>	Bird of conservation concern
Season: Breeding http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI	
Black-crowned Night-heron <i>Nycticorax nycticorax</i>	Bird of conservation concern
Season: Breeding http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EU	
Blue-winged Warbler <i>Vermivora pinus</i>	Bird of conservation concern
Season: Breeding	
Bobolink <i>Dolichonyx oryzivorus</i>	Bird of conservation concern
Season: Breeding	
Brown Thrasher <i>Toxostoma rufum</i>	Bird of conservation concern
Season: Breeding	
Cerulean Warbler <i>Dendroica cerulea</i>	Bird of conservation concern
Season: Breeding http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09I	
Common Tern <i>Sterna hirundo</i>	Bird of conservation concern
Season: Breeding http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09G	
Dickcissel <i>Spiza americana</i>	Bird of conservation concern
Season: Breeding	
Field Sparrow <i>Spizella pusilla</i>	Bird of conservation concern
Season: Breeding	
Henslow's Sparrow <i>Ammodramus henslowii</i>	Bird of conservation concern
Season: Breeding http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B09D	
Kentucky Warbler <i>Oporornis formosus</i>	Bird of conservation concern
Season: Breeding	
Least Bittern <i>Ixobrychus exilis</i>	
Season: Breeding http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092	
Loggerhead Shrike <i>Lanius ludovicianus</i>	Bird of conservation concern
Season: Breeding http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY	
Marsh Wren <i>Cistothorus palustris</i>	Bird of conservation concern
Season: Breeding	
Northern Flicker <i>Colaptes auratus</i>	Bird of conservation concern
Season: Year-round	
Peregrine Falcon <i>Falco peregrinus</i>	Bird of conservation concern
Season: Breeding http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU	

iPaC Trust Resources Report
 Migratory Birds

Pied-billed Grebe Podilymbus podiceps	Bird of conservation concern
Season: Breeding	
Prothonotary Warbler Protonotaria citrea	Bird of conservation concern
Season: Breeding	
Red-headed Woodpecker Melanerpes erythrocephalus	Bird of conservation concern
Season: Year-round	
Rusty Blackbird Euphagus carolinus	Bird of conservation concern
Season: Wintering	
Short-eared Owl Asio flammeus	Bird of conservation concern
Season: Wintering	
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spscode=B0HD	
Swainson's Hawk Buteo swainsoni	Bird of conservation concern
Season: Breeding	
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spscode=B070	
Upland Sandpiper Bartramia longicauda	Bird of conservation concern
Season: Breeding	
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spscode=B0HC	
Willow Flycatcher Empidonax traillii	Bird of conservation concern
Season: Breeding	
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spscode=B0F6	
Wood Thrush Hylocichla ustulata	Bird of conservation concern
Season: Breeding	

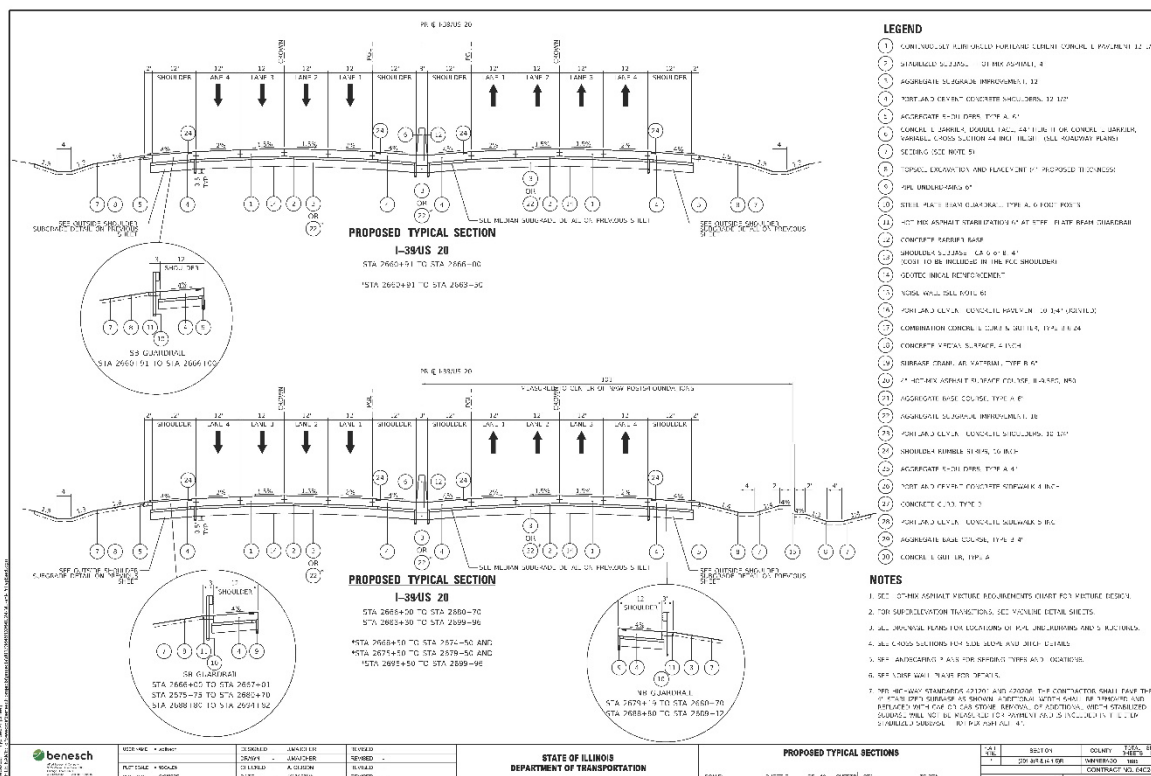
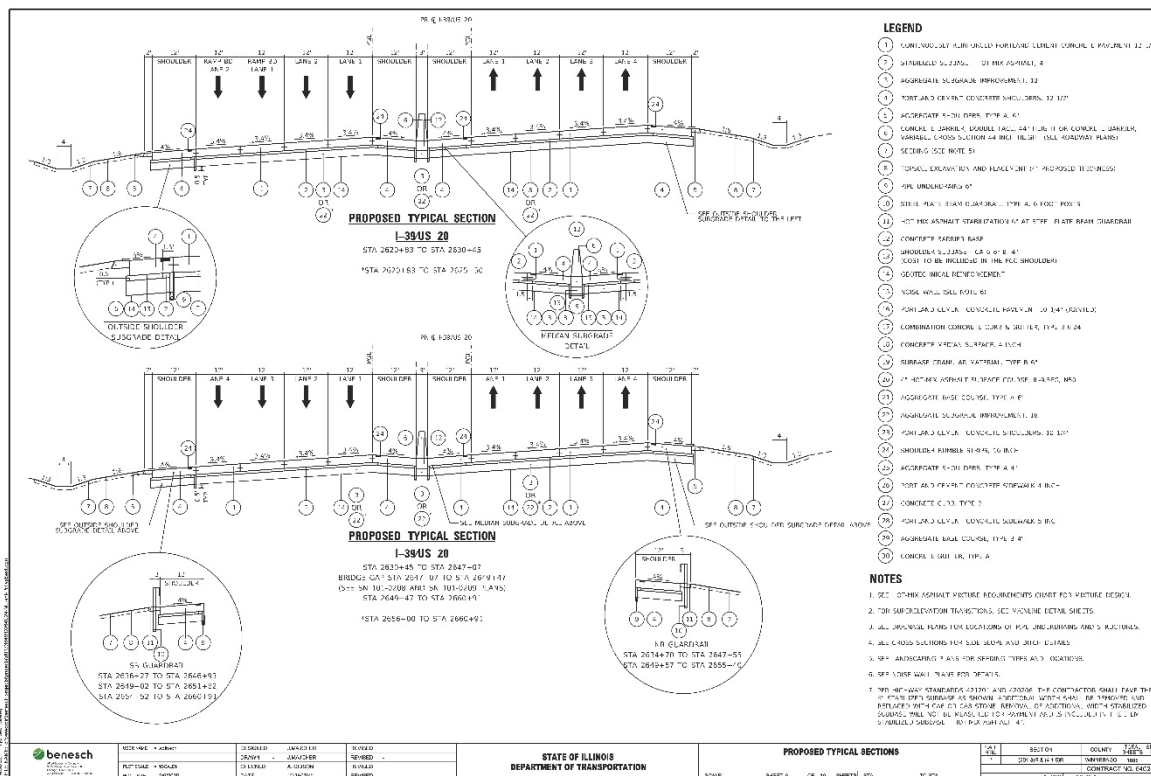
IPaC Trust Resources Report
Refuges & Hatcheries

Wildlife refuges and fish hatcheries

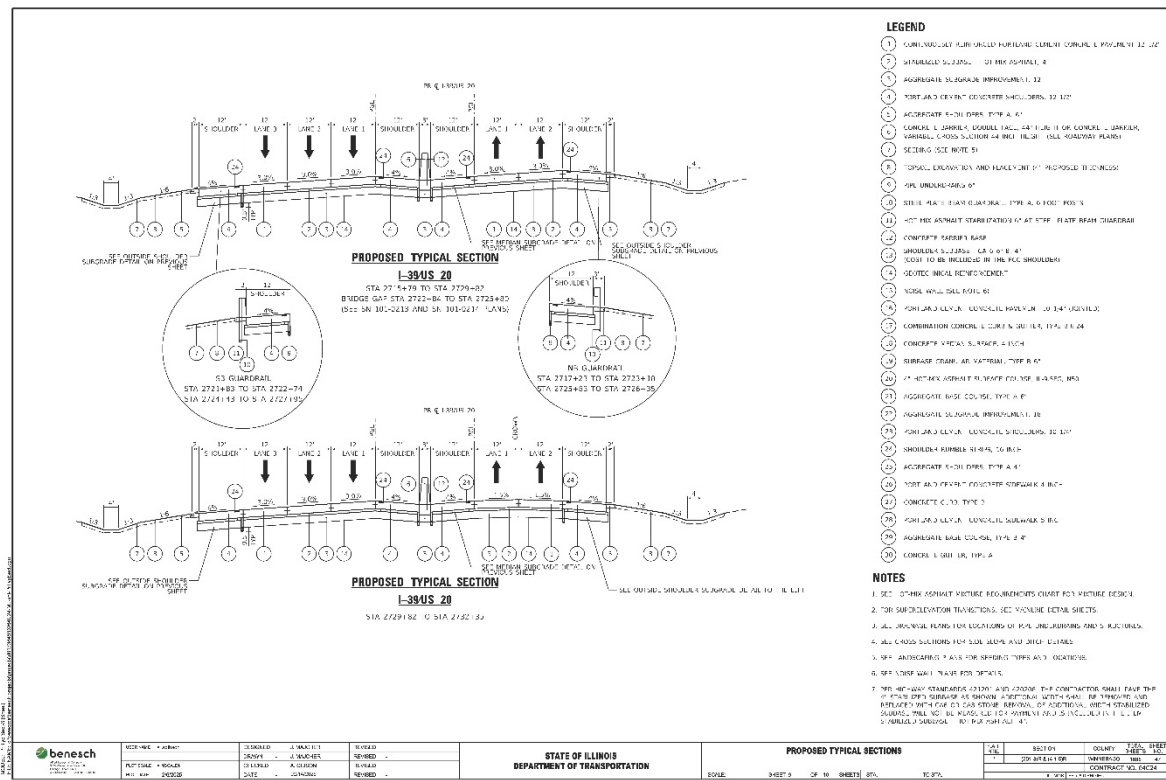
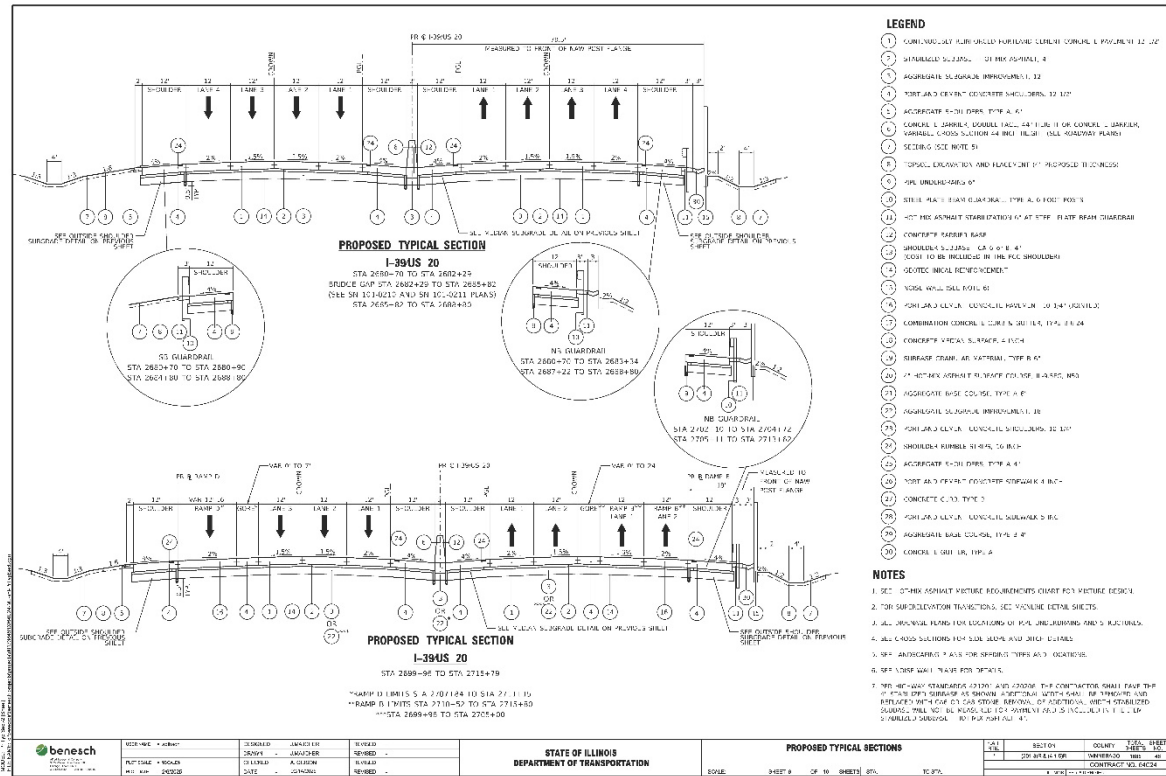
There are no refuges or fish hatcheries in this location

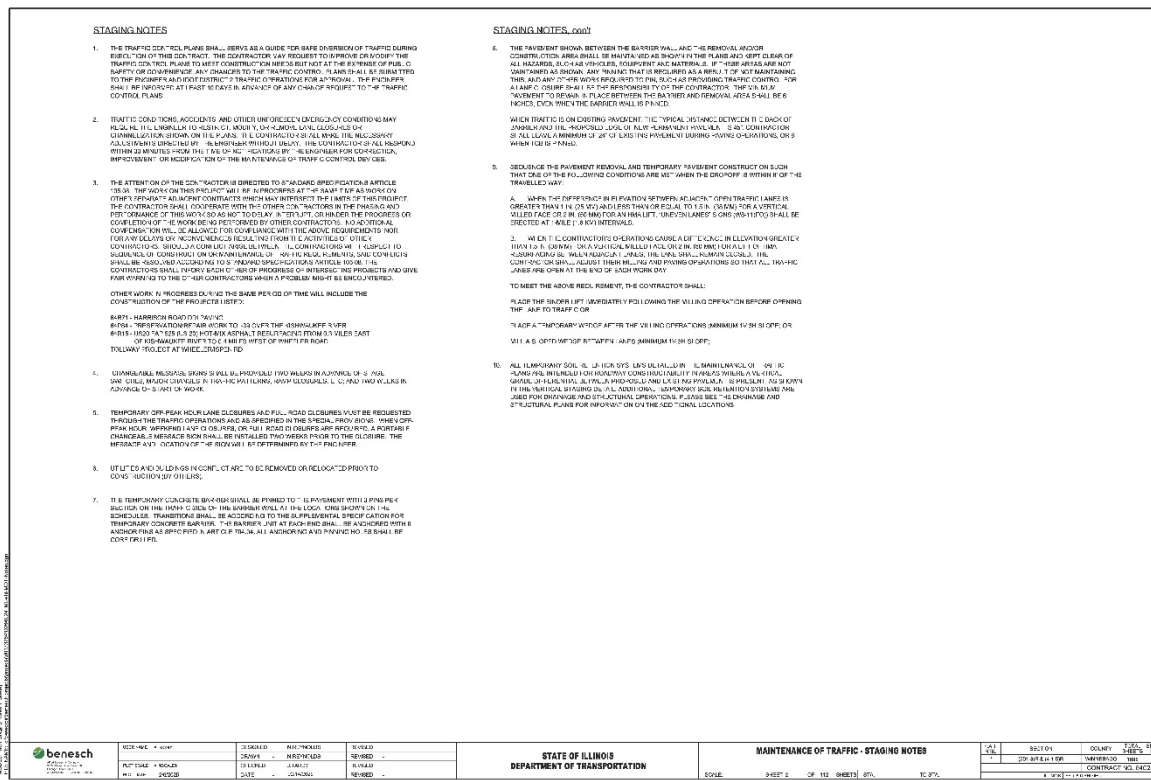
FAI Route 39 (I-39) & FAP Route 301 (US 20)
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Winnebago County
Contract No. 64C24

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39) & FAP Route 301 (US 20)
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FAI Route 39 (I-39) & FAP Route 301 (US 20)
Project NHPP-5F4Z(497)
Section (201-3)R & (4-1,5)R
Winnebago County
Contract No. 64C24

[illegible]

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants /

Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment 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, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA- 1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act ([29 CFR part 3](#))), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act ([40 U.S.C. 3141\(2\)\(B\)](#)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in [29 CFR part 1](#), a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

(i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

(ii) The classification is used in the area by the construction industry; and

(iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is used in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to DBAconformance@dol.gov. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

d. *Fringe benefits not expressed as an hourly rate.*

Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in § 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its repurchase costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

3. Records and certified payrolls (29 CFR 5.5)

a. Basic record requirements (1) Length of record retention. All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) Information required. Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) Additional records relating to fringe benefits. Whenever the Secretary of Labor has found under paragraph 1.e. of this section that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

(4) Additional records relating to apprenticeship. Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. Certified payroll requirements (1) Frequency and method of submission. The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) Information required. The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division website at <https://www.dol.gov/sites/dolgov/files/WHDL/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) Statement of Compliance. Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in [29 CFR part 3](#); and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) Use of Optional Form WH-347. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(3) of this section.

(5) *Signature.* The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification.* The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under [18 U.S.C. 1001](#) and [31 U.S.C. 3729](#).

(7) *Length of certified payroll retention.* The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents.* The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access (1) Required record disclosures and access to workers.* The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements.* If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under [29 CFR part 6](#) any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures.* Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices (1) Rate of pay.* Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits.* Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio.* The allowable ratio of apprentices to journeymen on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates.* Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity.* The use of apprentices and journeymen under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

c. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeyworkers shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility. a. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, [18 U.S.C. 1001](#).

11. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#); or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#).

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchpersons and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1. of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or

mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1. of this section.

* \$31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its repurchase costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901](#)–3907.

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or

d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;

- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and

health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

* * * * *

3. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general 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 recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily

excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

* * * * *

4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or

cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY
SYSTEM OR APPALACHIAN LOCAL ACCESS**

ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.