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Letting March 8, 2019
FOR REVIEW AND INSPECTION ONLY

Notice to Bidders, Specifications and Proposal

Illinois Department of Transportation

Contract No. 68B46
PEORIA-TAZEWELL Counties
Section (15B;[(102-1),(14HB)]BR)BR
Route FAP 317/673
Project NHPP-YRP3(905)
District 4 Construction Funds

Prepared by

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Checked by

(Printed by authority of the State of Illinois)

Illinois Department of Transportation

NOTICE TO BIDDERS

1. **DESCRIPTION OF WORK**. The proposed improvement is identified and advertised for REVIEW AND INSPECTION ONLY in the Invitation for Bids as:

Contract No. 68B46
PEORIA-TAZEWELL Counties
Section (15B;[(102-1),(14HB)]BR)BR
Project NHPP-YRP3(905)
Route FAP 317/673
District 4 Construction Funds

Bridge replacement of the existing eastbound US 150 (McClugage) bridge over the Illinois River. Project includes interchange improvements at the US 150/IL 29 interchange and the US 15/US 24/IL 116 interchange.

By Order of the
Illinois Department of Transportation

Matt Magalis,
Acting Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2019

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

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 4-1-16) (Revised 1-1-19)

SUPPLEMENTAL SPECIFICATIONS

RECURRING SPECIAL PROVISIONS

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

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STATE OF ILLINOIS
SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction," adopted April 1, 2016, the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways," and the "Manual of Test Procedures for Materials" in effect on the date of invitation for bids, and the Supplemental Specifications and Recurring Special Provisions indicated on the Check Sheet included herein which apply to and govern the construction of FAP Routes 317/673 (US 150/IL 116), Section (15B;[(102-1),(14HB)]BR)BR in Peoria and Tazewell Counties, Contract No. 68B46 and in case of conflict with any part or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

LOCATION OF PROJECT

The work on this project is located on US Route 150, Illinois Route 29, and Illinois Route 116 in Peoria and Tazewell Counties in Section 35 in Township 9N, Range 8E, 4th pm and in Sections 10, 11, and 14 in Township 26N, Range 4W, 3rd PM.

The project begins at a point on US Route 150, approximately 0.20 mile west of the centerline of IL Route 29 in Peoria County, and extends east over the Illinois River to a point 0.1 mile west of the centerline of IL Route 116 in Tazewell County. The project extends south of US 150 along both IL Route 29 (0.2 mile south of the EB US Route 150 centerline) and IL Route 116 (0.8 mile south of the EB US 150 centerline).

DESCRIPTION OF PROJECT

The project includes new construction of the following proposed structures:

1. Structure No. 090-0180 Bridge – US 150 EB over the Illinois River
2. Structure No. 072-0250 Bridge – US 150 EB over Illinois Route 29
3. Structure No. 090-2020 Culvert – Ramp SW over the Illinois River Tributary

The project includes the removal of the following existing structures:

1. Structure No. 090-0070 Bridge – US 150 EB over the Illinois River
2. Structure No. 072-0167 Bridge – US 150 EB over Illinois Route 29

Roadway improvements include resurfacing, reconstruction, and widening along EB US 150 both east and west of the river crossing along with improvements to various ramps at the IL 29/US 150 Interchange in Peoria County and the IL 116/US 24/US 150 Interchange in Tazewell County.

Additional work to be performed under this contract shall include, but not be limited to removal of existing pavement, shoulder, sidewalk, curb and gutter, and other roadway appurtenances, earthwork and embankment, erosion control measures, drainage items, subbase improvements, curb and gutter, hot-mix asphalt and concrete roadway paving, roadway lighting, traffic signal improvements, sidewalks and driveways with ADA ramps, pavement marking, signing and landscape restoration as well as all incidental and collateral work necessary to complete the project as shown on the plans and as described herein.

CONSTRUCTION LAYOUT RESPONSIBILITY
Effective April 26, 2015 Revised: November 6, 2015

This special provision is included in addition to Check Sheet #9 or #10 of the Recurring Special Provisions, Special Provision for Construction Layout Stakes, to clearly define the responsibility of the Contractor for construction layout.

As the Contractor is generating the survey layout model, all roadway elements shall be verified to fit within the final proposed slopes and right-of-way. If the Contractor determines a portion of the plans is incorrect or a portion does not agree with another portion, they shall contact the Engineer to have the problem resolved and additional work, if any, agreed upon. The Contractor shall not proceed until authority is received from the Engineer and problems are resolved. The Engineer shall contact the District Studies and Plans Section if need be.

The Contractor shall set all horizontal control points at the end of construction and provide cross ties in a hardback survey book to the Engineer.

The Contractor shall also set and provide the Engineer with a list of final benchmarks in a hardback survey book at the end of construction for future control.

No additional compensation will be allowed for complying with this Special Provision, but all costs shall be included in the contract Lump Sum price for CONSTRUCTION LAYOUT.

CONSTRUCTION LAYOUT UTILIZING GPS EQUIPMENT
Effective: April 26, 2015

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 Check Sheet #9 or #10 of the Recurring Special Provisions 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 QC/QA written plan that they will be following to provide quality control on the actual layout and quality assurance checks of the layout during and after being completed. This will be required to be submitted at the beginning of construction and shall meet the approval of the Engineer.
3. Stationing lathes shall be placed and maintained along the right-of-ways lines, centerline of the median, and agreed offset from other baselines such as interchange ramps and side roads, throughout the duration of the contract.

No additional compensation will be allowed for complying with this special provision, but all costs shall be included in the contract Lump Sum price for CONSTRUCTION LAYOUT.

CONSTRUCTION LAYOUT EQUIPMENT
Effective: April 26, 2015 Revised: November 6, 2015

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 second 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 project data included in the equipment will be consistent with the data used by the Contractor for layout and grading. Any data revisions or software updates to the Contractor's equipment will also be applied to the Department's equipment by the Contractor.

The Contractor will be responsible for providing training for three members of the Department's staff on use of the equipment and software.

Basis of Payment. This work will not be measured separately, but shall be included in the contract Lump Sum price for CONSTRUCTION LAYOUT.

PRESTAGE SITE CONSTRUCTION MEETINGS
Effective June 1, 1992

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

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

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

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

UTILITIES – LOCATIONS/INFORMATION ON PLANS
Effective: November 8, 2013

The locations of existing water mains, gas mains, sewers, electric power lines, telephone lines, and other utilities as shown on the plans are based on field investigation and locations provided by the utility companies, but they are not guaranteed. Unless elevations are shown, all utility locations shown on the cross sections are based on the approximate depth supplied by the utility company. It shall be the Contractor's responsibility to ascertain their exact location from the utility companies and by field inspection.

REQUIREMENTS WHEN WORKING WITH THE RAILROAD
Effective: April 1, 2016

Special attention is brought to Section 100 of the "*Standard Specifications for Road and Bridge Construction"* regarding working with the Railroad and the authority of the Railroad Engineer as defined. The Contractor shall make themselves aware of all the rules and regulations the railroad may have regarding, but not limited to, working restrictions, safety training, safety procedures and flagger scheduling and call-off requirements. The Contractor shall also submit, to the Railroad, copies, for review and approval, of the structure demolition plans, beam erection plans and other work plans that may directly impact the Railroad facilities. This submittal shall happen concurrently when submitting to the Department.

The cost to comply with any requirements the Railroad may have in order to perform work on this project shall be considered included in the cost of the contract items and not additional compensation will be allowed.

LOCATION OF UNDERGROUND STATE MAINTAINED FACILITIES
Effective: August 3, 2007 Revised: July 31, 2009

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

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

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

DATE OF COMPLETION
Effective March 1, 1990 Revised April 25, 2008

The Contractor shall schedule his operations so as to complete all work and open all the roadway to traffic on or before March 31, 2023. The Contractor shall note that this completion date is based on an expedited work schedule.

BORROW AND FURNISHED EXCAVATION
Effective March 7, 2000 Revised April 27, 2007

Add the following to the requirements of Article 204:

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

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

A plasticity index of less than 12.

A liquid limit in excess of 50.

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

Immediate Bearing Value	Shear Strength At 95% Density *	Moisture
3.0	1,000PSF (50 Kpa)	120%
4.0	1,300 PSF (62 Kpa)	110%

*Granular Soils ϕ=35°

EMBANKMENT (RESTRICTIONS)
Effective January 21, 2005 Revised August 3, 2007

Add the following to the requirements of Article 205.04:

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

a. The further restricted materials shall be placed in 4” lifts and disked with the underlying lift material until a uniform and homogenous material is formed having more than 35% passing the number 200 sieve.

b. Sand, gravel or crushed stone embankment when placed on the existing ground surface will be drained using a 10' (3 m) by 10' (3 m) French drain consisting of nonwoven geotechnical fabric with 12” (0.3 m) of B-3 riprap. This shall be constructed on both sides of the embankment at the toe of the foreslope spaced 150’ (46 m) apart. At locations requiring a French drain the 3’ (1 m) cohesive cap shall not be installed within the 10' by 10' riprap area. If the Engineer determines that the existing ground is a granular free draining soil, the French drain may be deleted.

c. Sand, gravel or crushed stone embankment when placed on top of a cohesive embankment will be drained with a permanent 4" (100 mm) underdrain system. The underdrain system shall consist of a longitudinal underdrain on both sides of the embankment and transverse underdrains spaced at 250' (75 m) centers. The underdrain shall consist of a 2' (0.6 m) deep by 1' (0.3 m) wide trench, backfilled with FA4 sand and a 4" (100 mm) diameter underdrain. In addition, both sides of the embankment will have a 6” (150 mm) diameter pipe drain which will drain the underdrain system and outletted into a permanent drainage structure or outletted by a headwall at the toe of the embankment.

The above work will not be paid for separately but shall be included in the cost of EARTH EXCAVATION, FURNISHED EXCAVATION, or BORROW EXCAVATION.

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

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

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

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

MOWING
Effective December 11, 2001 Revised August 2, 2013

This work shall consist of mowing the entire median up to 60' (20m) in width and the roadway foreslopes of the outside lanes to the ditchline or for a width of 15' (4.572 meters) from the edge of pavement or paved shoulder, whichever is less. At intersecting roadways, the mowing shall extend to the proposed right of way for a distance of 150' (45 m) on either side of the intersection. The height of the mowing shall not be more than 6" (150 mm). Equipment used shall be capable of completely severing all growth at the cutting height and distributing it evenly over the mowed area. The Contractor will not be required to mow continuously wet ditches and drainage ways, slopes greater than 1:3 (V:H), or areas which may be designated by the Engineer as not mowable. Mowing shall be done within the project limits during the construction of the project as directed by the Engineer and prior to the final inspection of the project. Any subsequent mowing required to disperse mowed material shall be considered as included in the cost of the mowing. Debris encountered during mowing, which interferes with the mowing operation or is visible from the roadway shall be removed and disposed of according to Article 202.03.

Method of Measurement: Mowing will be measured for payment in acres of surface area mowed.

Basis of Payment: This work will be paid for at the contract unit price per Acre for MOWING.

PROOF ROLLING
Effective April 23, 2004 Revised January 1, 2007

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

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

SUBGRADE TREATMENT
Effective July 1, 1990 Revised January 1, 2019

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

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

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

> "In cut sections the Contractor responsible for the rough grading shall obtain not less than 95% of the standard laboratory density and not more than 110% of the optimum moisture for the top 1' (300 mm) of the subgrade.
>
> The Contractor may, at his/her option, add a drying agent to lower the moisture content as specified. The drying agent must be approved by the Engineer prior to use. Additional compensation will not be allowed for the use of a drying agent, but will be considered as included in the cost of the various earthwork items."

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

ROCK FILL
Effective October 15, 1995 Revised April 26, 2013

This work shall consist of furnishing, transporting and placing rock fill for ground stabilization.

For Rock Fill depths ≤18", the material shall meet Quality Designation "B" as required in Article 1004.01 of the Standard Specifications for Road and Bridge Construction. The material shall be crushed stone and meet the gradation of CA 7 or CA 11 per Article 1004.01 of the Standard Specifications for Road and Bridge Construction.

The aggregate shall be placed in 6 in. (150 mm) lifts, loose measurements, and compacted in a manner approved by the Engineer, except that if the desired results are being obtained, the compacted thickness of any lift may be increased to a maximum of 8 in. (200 mm).

For Rock Fill depths > 18", the top 6" shall meet the requirements listed above for depths ≤18" and the remaining depth shall meet Quality Designation "B" as required in Article 1005.01 of the Standard Specifications for Road and Bridge Construction and may be shot rock or primary crusher run. It shall not contain objectionable quantities of dirt, sand, clay or rock fines. The material shall be well graded with a maximum stone dimension of 8 inches (200 mm). No more than 35% shall have a dimension less than 2 inches (50 mm).

Rock fill will be measured for payment in tons (metric tons), in accordance with Article 311.08 except that all references to cubic yard (cubic meter) measurement and payment shall be deleted. This work will be paid for at the contract unit price per Ton (Metric Ton) for ROCK FILL.

SUBBASE GRANULAR MATERIAL
Effective: November 5, 2004

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

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

SAWCUTTING OF PCC BASE COURSE AND BASE COURSE WIDENING
Effective January 1, 2016

Construction of the PCC Base Course and/or PCC Base Course Widening shall be according to Section 353 of the Standard Specifications and as described herein.

When the PCC Base Course and/or PCC base Course Widening is to be constructed adjacent to concrete gutter, curb, or median, transverse contraction joints shall be cut into the base course or widening as a continuation of the joints required for the concrete gutter, curb, or median. These contraction joints shall be cut in accordance with Article 420.05 of the Standard Specifications. No dowel bars will be required at these contraction joints and no sealing of joints will be required.

This work will not be paid for separately, but will be included in the cost of the PCC BASE COURSE AND BASE COURSE WIDENING pay items and no additional compensation will be allowed.

TEMPORARY PAVEMENT
Effective October 1, 1995 Revised April 26, 2015

This item shall include all materials, labor and equipment necessary to construct temporary pavement in accordance with applicable sections of the Standard Specifications except as herein specified.

The Contractor shall have the option of constructing temporary pavement made of 10 inches hot-mix asphalt base course or 8 inches PCC base course.

Hot-Mix Asphalt base course shall be placed in accordance with applicable portions of Section 355. Material for Hot-Mix Asphalt base course shall be Hot-Mix Asphalt Binder Course in accordance with Sections 406 and 407 and as shown in the Mix Design Table. PCC base course shall be in accordance with Section 353.

This work will be paid for at the contract unit price per Square Yard (Square Meter) for TEMPORARY PAVEMENT which price shall be payment in full for all materials, labor and equipment including bituminous and aggregate prime coat necessary to perform the work as herein specified.

Removal of Temporary Pavement will be paid for separately in accordance with Section 440 of the Standard Specifications.

ANTI-STRIP ADDITIVE FOR HOT-MIX ASPHALT
Effective July 30, 2010

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

HOT-MIX ASPHALT SURFACE COURSE SURFACE TESTS
Effective: November 1, 2003 Revised January 1, 2007

The Contractor shall provide a person to operate the straight edge in accordance with Article 406.11 of the Standard Specifications and communicate with IDOT Personnel to minimize the surface course bumps. If surface course bumps cannot be removed at this time, IDOT personnel will record the locations and provide deductions as stated in Article 406.11.

HOT-MIX ASPHALT MIXTURE IL-9.5FG FOR HMA SHOULDERS
Effective: April 1, 2017

Description. This work shall consist of constructing fine graded hot-mix asphalt (HMA) surface course with an IL-9.5FG mixture. Work shall be according to Sections 482 and 1030 of the Standard Specifications, except as modified herein.

Materials. Revise Article 1003.03(c) of the Standard Specifications to read:

"(c) Gradation. The fine aggregate gradation for all HMA shall be FA 1, FA 2, FA 20, or FA 21. For mixture IL-9.5FG, the fine aggregate fraction shall consist of at least 67 percent manufactured sand meeting FA 20 gradation. The manufactured sand shall be stone sand, slag sand, steel slag sand, or combinations thereof."

Mixture Design. Add the following to the table in Article 1030.04(a)(1):

"High ESAL, MIXTURE COMPOSITION (% PASSING) [1/]		
Sieve Size	IL-9.5FG	
	min	max
1 1/2 in (37.5 mm)		
1 in. (25 mm)		
3/4 in. (19 mm)		
1/2 in. (12.5 mm)		100
3/8 in. (9.5 mm)	90	100
#4 (4.75 mm)	60[4/]	75
#8 (2.36 mm)	45[4/]	60
#16 (1.18 mm)	25	40
#30 (600 μm)	15	30
#50 (300 μm)	8	15
#100 (150 μm)	6	10
#200 (75 μm)	4	6.5
Ratio Dust/Asphalt Binder		1.0"

Add the following to the table in Article 1030.04(b)(1) of the Standard Specifications to read:

"VOLUMETRIC REQUIREMENTS High ESAL		
	Voids in the Mineral Aggregate (VMA), % minimum	Voids Filled with Asphalt Binder (VFA), %
N_{design}	IL-9.5FG	
50	13.5	65 - 78"

Quality Control/Quality Assurance (QC/QA). Revise the second table in Article 1030.05(d)(4) to read:

"DENSITY CONTROL LIMITS		
Mixture Composition	Parameter	Individual Test[3/]
IL-9.5, IL-9.5L, IL-9.5FG	N_{design} < 90	92.5 – 97.4%"

Basis of Payment. Replace the third paragraph of Article 482.08 of the Standard Specifications with the following:

"Mixture IL-9.5FG will be paid for at the contract unit price per Ton (Metric Ton) for HOT MIX ASPHALT SHOULDERS."

PAYMENT FOR USE OF MATERIAL TRANSFER DEVICE
Effective April 23, 2010

This work shall be performed as specified in the plans and specifications herein.

No payment will be made for tonnages of HMA items required to be placed with a Material Transfer Device, but were not able to be placed with a Material Transfer Device.

The maximum tonnage eligible for payment when placed with the Material Transfer Device will be limited to the Final Pay Quantity of the pay items placed.

DOWEL BAR ASSEMBLIES
Effective: January 20, 2017 Revised: August 4, 2017

Revise Article 420.05(c)(2) to read:

Dowel Bar Assemblies. Dowel bar assemblies shall be installed at right angles to the centerline of the pavement with the dowel bars parallel to the proposed pavement surface and to each other.

The assembly shall act as a rigid unit with each component securely held in position relative to the other members of the assembly. The entire assembly shall be held securely in place by means of metal stakes which shall penetrate both the stabilized subbase and soil or granular subbase. At least ten stakes shall be used for each 10, 11, or 12 ft. (3, 3.3, or 3.6 m) section of assembly.

The stakes shall loop over or attach to the top parallel spacer bar of the assembly and penetrate the subgrade or subbase at least 12 in. (300 mm).

At the location of each dowel bar assembly, the subgrade or subbase shall be reshaped and re-tamped when necessary.

Prior to placing concrete, any deviation of the dowel bars from the correct horizontal or vertical alignment greater than 3/8 in. in 12 in. (9 mm in 300 mm) shall be corrected and a light coating of oil shall be uniformly applied to the dowel bars.

Care shall be exercised in depositing the concrete at the dowel bar assemblies so that the horizontal and vertical alignment will be retained.

TEMPORARY SIDEWALKS
Effective March 1, 1991 Revised February 1, 1996

Temporary sidewalks may be required at various locations as determined by the Engineer to provide access to and from businesses and to provide continuity for pedestrian traffic. The temporary sidewalks shall be constructed using material of the type and thickness as specified by the Engineer. The work, including the subsequent removal of the temporary sidewalk, will be paid for in accordance with Article 109.04 of the Standard Specifications.

PROTECTION OF FRAMES AND LIDS OF UTILITY STRUCTURES
Effective March 6, 1991 Revised January 1, 2007

This work shall consist of protecting frames and lids of utility structures in the pavement after the adjacent hot-mix asphalt surface has been removed to the required depth by cold milling or by hand methods.

After the area has been swept clean and before the lane is opened to traffic, a hot bituminous mixture shall be placed around the casting, flush with its surface and decreasing to a featheredge in a distance of 4 feet (1.2 m) around the entire surface of the casting. Cold mix or milled material will not be permitted. This mixture shall remain in place until the day surfacing operations are undertaken within the immediate area of the structure. Prior to placing the surface course, the temporary hot-mix asphalt mixture shall be removed and disposed of by the Contractor as specified in Article 202.03 of the Standard Specifications.

The temporary tapers and their removal shall be considered included in the contract unit price per Square Meter (Square Yard) for HOT-MIX ASPHALT SURFACE REMOVAL of the depth specified, and no additional compensation will be allowed.

HOT-MIX ASPHALT SURFACE REMOVAL, 2½"
Effective: March 1, 1993 Revised: November 17, 2017

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

Equipment: The machine used for milling and planing shall be a self-propelled grinding machine having a minimum 12' (3.6 m) wide drum at least 28" (710 mm) in diameter. When a milling width in excess of 12′ is required and the Contractor's milling machine is less than the required width shown in the plans, the remaining area shall be milled with a machine capable of meeting the requirements of this special provision. Milling attachments used with skid steer tractors will not be allowed for longitudinal areas to mill additional widths.

When the teeth become worn so that they do not produce a uniform surface texture, they shall all be changed at the same time (as a unit). Occasionally, individual teeth may be changed if they lock up or break, but this method shall not be used to avoid changing the set of teeth as a unit. Occasional gouges, due to deteriorated pavement condition, or separation of lifts will not be cause to replace all teeth. The Engineer will be the sole judge of the cause of the pavement gouging and the corrective work required. Corrective work due to negligence or poor workmanship shall be at the Contractor's expense.

The moldboard is critical in obtaining the desired surface texture. It shall be straight, true, and free of excessive nicks or wear, and it shall be replaced as necessary to uniformly produce the required surface texture. Gouging of the pavement by more than 1/4 inch (6 mm) shall be sufficient cause to require replacement of all teeth.

Construction Requirements

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

An automatic grade control device shall be used when milling mainline pavement and shall be capable of controlling the elevation of the drum relative to either a preset grade control stringline or a grade reference device traveling on the adjacent pavement surface. The automatic grade control device may be utilized only on one side of the machine with a automatic slope control device controlling the opposite side. The traveling grade reference device shall not be less than 30 feet (9 m) in length. When milling cross roads, turn lanes, intersections, crossovers, or other miscellaneous areas, the Engineer may permit the matching shoe. The Contractor, at his option, may also substitute an approved 6' wide (1.8 m) machine for areas other than mainline pavement.

The Contractor shall mill 2½" inches at the centerline and project the proposed cross slope to the edge of pavement. In the event the milling at the outer edge of the lane would exceed 2½" inches; then the Contractor shall reduce the cut at the centerline to provide the maximum cut of 2½" inches at the edge of pavement. If deemed necessary, the Contractor may reduce the cross slope from normal 1.5% to 1%.

Surface tests will be performed in accordance with Article 406.11 of the Standard Specifications. The longitudinal profile will be taken 3 ft. (0.9 m) from and parallel to each edge of pavement and 3 ft. (0.9 m) from and parallel to the centerline on each side. If a shadow area is found at the 3 ft. (0.9 m) points the pavement smoothness tester will be moved sufficient distance either side to measure the Contractor's milling efforts. Any surface variations exceeding the tolerance in Article 406.11 shall be corrected by reprofiling at no additional expense to the Department. In addition, the Contractor shall be responsible for refilling with approved hot-mix asphalt mixtures any area that lowered the pavement profile as a result of faulty milling operations if directed by the Engineer. The Contractor shall be responsible for providing the pavement smoothness tester described elsewhere to retest the pavement profile obtained.

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

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

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

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

Cleanup: After cold milling a traffic lane and before opening the lane to traffic, the pavement shall be swept by a (self-propelled street sweeper with power vacuum capability to prevent compaction of the cuttings onto the pavement. All loose material shall be removed from the roadway. Before the prime coat is placed, the pavement shall be cleaned of all foreign material to the satisfaction of the Engineer.

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

Method of Measurement:

(a) Contract Quantities. The requirements for the use of Contract Quantities shall be Article 202.07(a) of the Standard Specifications.

(b) Measured Quantities. Cold milling and planing will be measured and the area computed in square yards (square meters) of surface.

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

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

REFLECTIVE CRACK CONTROL TREATMENT
Effective March 1, 1996 Revised August 3, 2018

Revise the 2nd and 3rd sentences of Article 443.01 to read as follows:

"Area reflective crack control treatment shall be System A. Strip reflective crack control treatment shall be System A."

Add the following paragraph to Article 443.04:

"If rain is imminent, the Contractor is to apply a fog coat prime and a fine aggregate blotter, as directed by the Engineer, to all area crack control fabric that has been placed but not overlaid. This work shall be completed in accordance with Article 406.06, and will be paid for in accordance with Article 109.04."

Add the following paragraph to Article 443.05:

"The Hot-Mix Asphalt (HMA) concrete leveling binder, binder course, or surface course mixture placement on the crack control treatment shall be completed within two working days of the time the crack control is installed.

Reflective crack control treatment placed more than two working days in advance of the overlay placement will be inspected by the Engineer prior to placing the overlay. Any corrective work required by the Engineer shall be completed by the Contractor at no cost to the Department."

Revise the first sentence of Article 443.06 to read as follows:

"The area to be covered with fabric shall be sprayed uniformly with asphalt binder at a rate of 0.2 lb./sq. ft. to 0.3 lb./sq. ft. as directed by the Engineer.

Add after the first paragraph of Article 443.06:

"If the asphalt cement binder bleeds through the fabric under traffic, then a fine aggregate blotter shall be applied as directed by the Engineer and paid for in accordance with Article 109.04 of the Standard Specifications.

After reflective crack control placement and prior to the HMA overlay placement, the Contractor shall furnish, erect and maintain SLIPPERY WHEN WET signs at such locations when required during wet weather. The cost of this work shall be included in the unit prices bid and no additional compensation will be allowed."

HOT-MIX ASPHALT SHOULDER RESURFACING CONSTRUCTED SIMULTANEOUSLY WITH MAINLINE PAVING
Effective January 22, 2001 Revised January 1, 2007

If the Department allows resurfacing hot-mix asphalt shoulders simultaneously with the mainline pavement resurfacing, a roller meeting the requirements of Article 1101.01 shall be required. This roller will be in addition to any rollers required for compaction of the mainline roadway resurfacing. This additional roller will not be paid for separately, but shall be included in the contract unit price bid for the mainline bituminous material being placed.

CONCRETE HEADWALL REMOVAL
Effective July 1, 1990

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

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

GRANULAR BACKFILL FOR STRUCTURES
Effective August 4, 2017

The aggregate shall be one of the following gradations:

FA4, CA7, CA11, or CA13 thru CA16, according to Sections 1003 and 1004 of the Standard Specifications.

BACKFILL - PIPE CULVERTS
Effective October 15, 1995 Revised January 1, 2007

When trenches or excavation are made across existing pavement to remain in place, revise Article 542.04(f) 4th paragraph as follows:

"The remainder of the trench and excavation shall be backfilled with trench backfill. All backfill material shall be deposited in the trench or excavation in such a manner as not to damage the culvert. Trench backfill above the center of the pipe shall be compacted by either Method 2 or Method 3 specified in Article 550.07, or in accordance with Method 1 specified in Article 550.07, except that the compacted lifts shall not exceed 8" (200 mm) in thickness.

When the trench has been widened for the removal and replacement of unstable or unsuitable material, the backfilling with trench backfill and impervious material will be required for the entire width of the trench or excavation. Each 8" (200 mm) layer for the entire trench width shall be completed before beginning the placement of the next layer."

Basis of Payment: This work will not be paid for separately but shall be included in the contract unit price per Foot (Meter) for PIPE CULVERTS, of the type and diameter specified. Trench backfill will be paid for as specified in Article 208.04.

STORM SEWER, (WATER MAIN QUALITY PIPE)
Effective January 1, 2011 Revised August 1, 2014

This work consists of constructing storm sewer to meet water main standards, as required by the IEPA or when otherwise specified. The work shall be performed in accordance with applicable parts of Section 550 of the Standard Specifications, applicable sections of the current edition of the IEPA Regulations (Title 35 of the Illinois Administrative Code, Subtitle F, Chapter II, Section 653.119), the applicable sections of the current edition of the "Standard Specifications for Water and Sewer Main Construction in Illinois", and as herein specified.

This provision shall govern the installation of all storm sewers which do not meet IEPA criteria for separation distance between storm sewers and water mains. Separation criteria for storm sewers placed adjacent to water mains and water service lines are as follows:

(1) Water mains and water service lines shall be located at least 10 feet (3.05 meters) horizontally from any existing or proposed drain, storm sewer, sanitary sewer, or sewer service connections.

(2) Water mains and water service lines may be located closer than 10 feet (3.05 meters) to a sewer line when:

    (a) Local conditions prevent a lateral separation of 10 feet (3.05 meters); and

    (b) The water main or water service invert is 18 inches (460 mm) above the crown of the sewer; and

(c) The water main or water service is either in a separate trench or in the same trench on an undisturbed earth shelf located to one side of the sewer.

(3) A water main or water service shall be separated from a sewer so that its invert is a minimum of 18 inches (460 mm) above the crown of the drain or sewer whenever water mains or services cross storm sewers, sanitary sewers or sewer service connections. The vertical separation shall be maintained for that portion of the water main or water services located within 10 feet (3.05 meters) horizontally of any sewer or drain crossed.

When it is impossible to meet (1), (2) or (3) above, the storm sewer shall be constructed of concrete pressure pipe, slip-on or mechanical joints ductile iron pipe, or PVC pipe equivalent to water main standards of construction. Construction shall extend on each side of the crossing until the perpendicular distance from the water main or water service to the sewer or drain line is at least 10 feet (3.05 meters). Storm sewer meeting water main requirements shall be constructed of the following pipe materials:

Concrete Pressure Pipe

Concrete pressure pipe shall conform to the latest ANSI/AWWA C300, C301, C302, or C303.
Joints shall conform to Article 41-2.07B of the “Standard Specifications for Water and Sewer Main Construction in Illinois.”

Ductile Iron Pipe

Ductile Iron pipe shall conform to ANSI A 21.51 (AWWA C151), class or thickness designed per ANSI A 21,50 (AWWA C150), tar (seal) coated and/or cement lined per ANSI A 21.4 (AWWA C104), with a mechanical or rubber ring (slip seal or push on) joints.

Joints for ductile iron pipe shall be in accordance with the following applicable specifications.

1. Mechanical Joints - AWWA C111 and C600
2. Push-On Joints - AWWA C111 and C600

Plastic Pipe

Plastic pipe shall be marked with the manufacturer’s name (or trademark); ASTM or AWWA specification; Schedule Number, Dimension Ratio (DR) Number or Standard Dimension Ratio (SDR) Number; and Cell Class. The pipe and fittings shall also meet NSF Standard 14, and bear the NSF seal of approval. Fittings shall be compatible with the type of pipe used. The plastic pipe options shall be in accordance with the following:

1. Polyvinyl Chloride (PVC) conforming to ASTM Standard D 1785. Schedule 80 is the minimum required for all pipe sizes, except when the pipe is to be threaded, and then it shall be Schedule 120. It shall be made from PVC compound meeting ASTM D 1784, Class 12454.

2. Polyvinyl Chloride (PVC) conforming to ASTM D 2241. A minimum wall thickness of SDR 26 is required for all pipe sizes (Note: The lower the SDR number, the higher the wall thickness and pressure rating). It shall be made from PVC compound meeting ASTM D 1784, Class 12454.

3. Chlorinated Polyvinyl Chloride (CPVC) conforming to ASTM f 441. A minimum of Schedule 80 is required for all pipe sizes. Threaded joints are not allowed. It shall be made from CPVC compound meeting ASTM D 1784, Class 23447.

4. Chlorinated Polyvinyl Chloride (CPVC) conforming to ASTM F 442. A minimum wall thickness of SDR 26 is required for all pipe sizes (Note: The lower the SDR number, the higher the wall thickness and pressure rating). It shall be made from CPVC compound meeting ASTM D 1784.

5. Polyvinyl Chloride (PVC) conforming to ANSI/AWWA C900. A minimum of wall thickness of DR 25 is required for all pipe sizes (Note: The lower the DR number, the higher the wall thickness and pressure rating). It shall be made from PVC compound meeting ASTM D 1784, Class 12454.

6. Polyvinyl Chloride (PVC) conforming to ANSI/AWWA C905. A minimum of wall thickness of DR 26 is required for all pipe sizes (Note: The lower the DR number, the higher the wall thickness and pressure rating). It shall be made from PVC compound meeting ASTM D 1784, Class 12454.

Joining of plastic pipe shall be by push-on joint, solvent welded joint, heat welded joint, flanged joint, or threaded joint, in accordance with the pipe manufacturer's instructions and industry standards. Special precautions shall be taken to insure clean, dry contact surfaces when making solvent or heat welded joints. Adequate setting time shall be allowed for maximum strength.

Elastometric seals (gaskets) used for push-on joints shall comply with ASTM F477.

Solvent cement shall be specific for the plastic pipe material and shall comply with ASTM D 2564 (PVC) or ASTM F 493 (CPVC) and be approved by NSF.

This work will be measured and paid for at the contract unit price per Foot (Meter) for STORM SEWER (WATER MAIN QUALITY PIPE) of the diameter and type specified.

INLETS, TYPE G-1
Effective October 1, 1995 Revised January 1, 2007

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

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

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

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

INLETS, TYPE G-1, SPECIAL
Effective October 1, 1995 Revised January 1, 2007

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

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

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

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

INLETS, TYPE G-1, DOUBLE, SPECIAL
Effective October 1, 1995 Revised January 1, 2007

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

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

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

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

ISLAND PAVEMENT CONSTRUCTED ON EXISTING PAVEMENT
Effective January 1, 1997 Revised January 1, 2007

This work shall consist of constructing a solid concrete island on the existing pavement as shown on the details included in the plans and shall be done in accordance with the applicable portions of Section 606 of the Standard Specifications and the following provisions:

1. All references to Concrete Median shall be interpreted to mean Island Pavement.

2. Add the following to Article 606.09:

   Transverse expansion joints shall be installed in the Island Pavement producing a vertical prolongation of the joints in the underlying pavement. In no case shall the joints be spaced more than 100' (30 m) apart. The expansion joint shall be constructed of 3/4" (20 mm) preformed joint material.

3. Add the following to Article 606.15:

   This work will be paid for at the contract unit price per Square Foot (Square Meter), measured as specified, for ISLAND PAVEMENT, which shall include payment for furnishing and installing all joints as required. Anchor bolts will be paid for at the contract unit price per Each for ANCHOR BOLTS of the size specified.

GUARDRAIL AGGREGATE EROSION CONTROL
Effective February 1, 1993 Revised January 1, 2007

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

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

The Geotextile Fabric will not be measured for payment.

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

FLEXIBLE DELINEATORS
Effective October 1, 1995 Revised January 1, 2007

Flexible delineators shall meet the requirements of Traffic Control and Protection Standard 702001 of the Illinois Highway Design Standards for Traffic Control and as modified herein.

Flexible delineators post shall be of a hinged, self-recovering design, as manufactured by Flexstake, Inc. or an approved equal.

The top portion of the post is made of a polycarbonate material which shall be resistant to impact, ultraviolet light, ozone hydrocarbons, and shall be self-erecting after withstanding vehicle impacts. Polycarbonate post shall remain dimensionally stable from -150°F (-100°C) (brittleness point) to 285°F (140°C) (melting point).

Post shall remain intact up to seventy-five impacts at a vehicle speed of 55 MPH (90 kph) by a typical American made car from either direction at temperatures from -30°F to 130°F (-35°C to 55°C).

The top section of the post shall be surface mount with a polyurethane hinge. The hinge shall have an internal memory and remain dimensionally stable to from -30°F (-35°C).

The minimum width at the top of the post shall be 3 inches (75 mm) and the maximum wall thickness shall be 0.180 inches (5 mm). Lengths shall be a minimum height of 3 feet (1 m).

The posts shall be orange in color. They shall be colorfast and shall be designed to provide an essential convex surface to accommodate a 100 m (4 inches) wide reflective sheeting on both sides. Sheeting shall meet Article 1097.03 of the Standard Specifications and shall have two alternating, reflectorized white And two alternating orange stripes sloping downward at 45° toward the side on which traffic will pass.

Posts shall be free of surface porosity and other defects that may affect appearance and serviceability.

Posts shall contain a minimum of 40% (by weight) post consumer recycled material, and all material shall be recycled.

Posts shall be field-repairable with a repair kit. Posts and other components shall be field replaceable.

When an existing flexible delineator needs to be replaced due to numerous vehicular hits, the new flexible delineator will be paid for at the contract unit price per Each.

This work will be paid for at the contract unit price per Each for FLEXIBLE DELINEATORS.

PERMANENT SURVEY MARKER, TYPE 1, BRIDGE PLACEMENT
Effective July 1, 1990 Revised March 11, 2011

This work shall consist of furnishing and installing a Permanent Survey Marker as shown on the plans and as specified herein. The survey marker shall be placed in either the abutment seat or in the top of the wingwall. The survey marker shall be located in the same corner as the Bridge Name Plate as shown on the current Standard for Name Plate for Bridges. If the survey marker is to be located on the abutment seat of the structure, it shall be placed in a location with at least 8'–0" (2.4 m) vertical clearance directly above the survey marker, if possible.

After installation, a professional Land Surveyor shall perform a closed loop level circuit to determine the new survey marker elevation and shall stamp the elevation in the face from the temporary bench marker of the survey marker. All level loops used to set the bench mark shall be kept in a field book and shall contain a description and location of the original bench mark used, the temporary bench mark, the proposed bench marker on the survey marker, and the name and license number of the professional land surveyor. Copies of the field book shall be submitted to the District Chief of Surveys or Plats and Plans.

This work will be paid for at the contract unit price Each for PERMANENT SURVEY MARKER, TYPE I.

EQUIPMENT VAULT FOR NUCLEAR TESTING EQUIPMENT
Effective June 24, 1993 Revised July 1, 1994

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

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

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

TRAFFIC CONTROL PLAN
Effective: December 3, 2018

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

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

701006	701011	701101	701106	701311	701411
701421	701422	701426	701427	701428	701451
701456	701602	701701	701801	701901	704001.

Special attention is called to the following special provisions:

- Check Sheet # 20 – Recurring Special Provisions
- BDE 80384 - Compensable Delay Costs
- BDE 80392 – Lights on Barricades
- BDE 80371 – Pavement Marking Removal
- BDE 80377 – Portable Changeable Message Signs
- BDE 80298 – Temporary Pavement Marking
- Pre-stage Site Construction Meetings
- Working Restrictions
- Contractor Access;
- Contractor Staging Area
- Traffic Control and Protection (Special)
- Width Restriction Signing
- Temporary Information Signing

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

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

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

The stage construction and traffic control for this project is designed to function as a single unit.

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

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

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

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

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

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

SPEEDING PENALTY
Effective: January 21, 2005

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

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

WIDTH RESTRICTION SIGNING
Effective November 1, 2007 Revised January 1, 2019

Description. This work shall consist of providing, placing, maintaining, and removing width restriction signing as shown on the plans and special provisions. Width restriction signing shall be required when the roadway width will be less than 17'–6" as measured from face to face of temporary concrete barrier and a concrete parapet, guardrail or other fixed, immovable barrier. Width restriction signing may be required when the roadway width will be less than 17'-6" as measured from movable traffic control devices and a fixed object (concrete parapet, guardrail or other immovable roadside barrier). The contractor shall provide signing if the traffic control devices cannot be shifted (in areas of a fixed object and patching/paving/centerline work etc.) to accommodate a traveled way opening of 17'-6". The Contractor shall furnish all materials, equipment, labor, and other essentials necessary to accomplish this work and all other work described herein and as directed by the Engineer.

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

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

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

Traffic Control Supervisor	Don Hoffman	(309) 671-4488

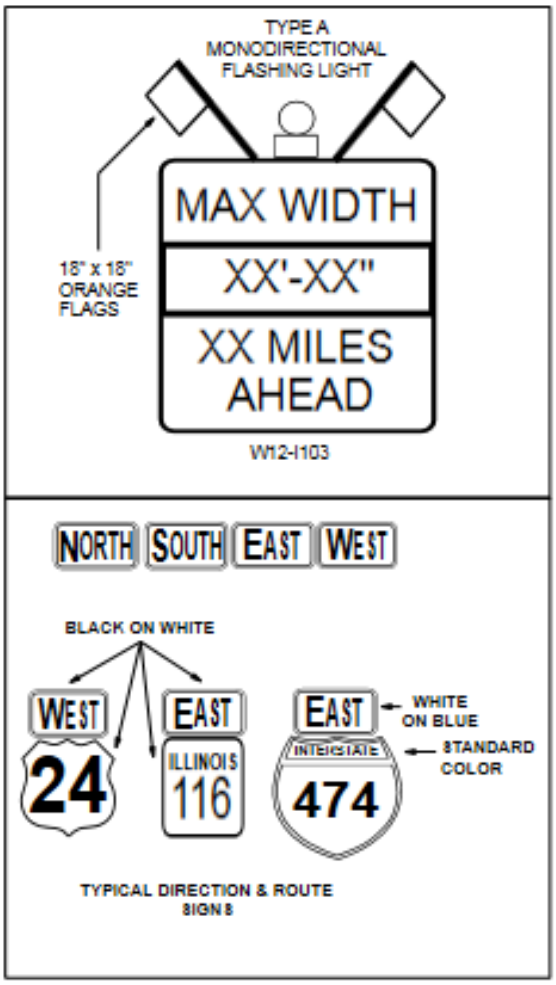
Failure to provide required advanced notice may delay project at the expense of the Contractor.

General. The Contractor shall provide the route and directional (North, South, East and West) signage. The route and directional signage shall be placed, maintained, and removed by the Contractor. The route sign shall visually be the same as the existing route signs as posted by IDOT. The directional signage shall be black lettering on a white background. Interstate signs shall have the cardinal direction signs with white on a blue background. The route and directional signage shall be placed below Sign W12-I103.

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

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

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


TYPE A
MONODIRECTIONAL
FLASHING LIGHT
18" x 18"
ORANGE
FLAGS
MAX WIDTH
XX'-XX"
XX MILES
AHEAD
W12-I103
NORTH
SOUTH
EAST
WEST
BLACK ON WHITE
WEST
24
EAST
ILLINOIS
116
EAST
INTERSTATE
474
WHITE
ON BLUE
STANDARD
COLOR
TYPICAL DIRECTION & ROUTE
SIGNS


MAX WIDTH
XX'-XX"
XX MILES
AHEAD
WEST
24
TYPICAL POST
MOUNT
INSTALLATION

TEMPORARY CONCRETE BARRIER REFLECTORS
Effective: January 21, 2005

Installation of reflectors shall be in accordance with the Traffic Control Standards, plan details, and specifications.

Reflectors mounted on temporary concrete barrier will not be measured for payment and shall be included in the cost of pay items associated with temporary concrete barrier.

RE-TIGHTENING ANCHOR BOLTS FOR CANTILEVER SIGN STRUCTURES
Effective April 25, 2014

After the cantilever sign structure has been installed with all required signs for a minimum of 30 calendar days, the Contractor shall re-tighten the anchor bolts to the original specifications shown on the plan details and/or Standard Specifications.

PCC SLIPFORM PAVING AGGREGATE OPTIMIZATION
Effective August 3, 2012 Revised November 7, 2014

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

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

PCC SUPERSTRUCTURE AGGREGATE OPTIMIZATION
Effective August 4, 2006 Revised July 31, 2015

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

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

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

For bridge decks and bridge approach slabs, the as-placed water cement ratio shall be between 0.39 and 0.41. The coarse aggregate shall be listed on the Department's Bureau of Materials and Physical Research "Freeze Thaw Rating List".

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

MEMBRANE CURING METHOD
Effective: July 29, 2016 Revised: November 17, 2017

Revise Article 1020.13(a)(4) paragraph 2 to read:

"After all finishing work to the concrete surface has been completed, the surface and all exposed edges shall be sealed with membrane curing compound of the type specified within ten minutes. The seal shall be maintained for the specified curing period. The edges of the concrete shall, likewise, be sealed within ten minutes after the forms are removed. Two separate applications, applied at least one minute and no more than fifteen (15) minutes apart, each at the rate of not less than 1 gal./250 sq. ft. (0.16L/sq. m) will be required upon the surfaces and edges of the concrete. These applications shall be made with the mechanical equipment specified. Type III compound shall be agitated immediately before and during the application.

PCC QC/QA ELECTRONIC REPORTS SUBMITTAL
Effective April 26, 2013 Revised: April 26, 2015

The Contractor's QC personnel shall be responsible for electronically submitting PRO and IND MI 654 Air, Slump, Quantity Reports, PRO MI 655 PCC Strength Reports, and MI 504 Field/Lab Gradations to the Department. The format for the electronic submittals will be the PCC QC/QA reporting program, which will be provided by the Department. Microsoft Office 2007 or newer is required for this program which must be provided by the Contractor.

PCC AUTOMATIC BATCHING EQUIPMENT
Effective April 23, 2010 Revised November 7, 2014

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

In addition, the batching plant shall be a computerized plant interfaced with a printer and shall print actual batch weights and aggregate mixtures, all water added, amount of each admixture or additive per batch, and percentage variance from design. The ticket shall also 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 will still be required as per Article 1020.11 (a)(7) of the Standard Specifications.

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES (PROJECT SPECIFIC)

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

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

Site 2926-3 - IDOT ROW, US 150, US 24, IL 29, IL 116, East Peoria and Peoria, Peoria and Tazewell Counties, Illinois

US Route 150

- Station 2093+45 to Station 2095+00 (proposed US 150), 20 to 65 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, lead, manganese.

- Station 2095+00 to Station 2096+35 (proposed US 150), 20 to 65 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene, manganese.

- Station 2096+05 to Station 2097+35 (proposed US 150), 20 to 65 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). COC sampling parameters: benzo(a) pyrene, manganese, pH.

- Station 2097+35 to Station 2098+85 (proposed US 150), 20 to 65 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). COC sampling parameters: benzo(a)pyrene, lead, manganese.

- Station 2097+50 to Station 2099+75 (proposed US 150), 0 to 50 feet RT and 0 to 15 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2098+85 to Station 2101+85 (proposed US 150), 20 to 65 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: arsenic, benzo(a)pyrene, lead, manganese.

- Station 2101+75 to Station 2013+40 (proposed US 150), 0 to 50 feet RT and 0 to 15 feet LT and Station 106+25 to Station 108+75 (Ramp A), 0 to 55 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2101+85 to Station 2103+70 (proposed US 150), 20 to 65 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

- Station 2103+40 to Station 2105+40 (proposed US 150), 0 to 70 feet RT and 0 to 20 feet LT and Station 207+00 to Station 208+65 (Ramp B), 0 to 85 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2105+40 to Station 2106+90 (proposed US 150), 0 to 50 feet RT and 0 to 25 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene, lead, manganese.

- Station 2106+90 to Station 2108+80 (proposed US 150), 0 to 10 feet RT and 0 to 60 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2109+50 to Station 2110+80 (proposed US 150), 0 to 50 feet RT and 0 to 40 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, manganese.

- Station 2110+80 to Station 2112+95 (proposed US 150), 0 to 40 feet RT and 0 to 50 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(4). COC sampling parameters: Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, manganese.

- Station 2112+95 to Station 2115+10 (proposed US 150), 0 to 120 feet RT and 0 to 65 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene, cadmium, manganese.

- Station 2115+10 to Station 2117+05 (proposed US 150), 0 to 110 feet RT and 0 to 80 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). COC sampling parameters: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, antimony, lead, manganese.

- Station 2118+55 to Station 2119+15 (proposed US 150), 0 to 95 feet RT and 0 to 90 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, lead.

- Station 2156+35 to Station 2158+00 (proposed US 150), 0 to 155 feet RT and 0 to 55 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2160+00 to Station 2161+35 (proposed US 150), 0 to 120 feet RT and 0 to 25 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

- Station 2161+35 to Station 2162+80 (proposed US 150), 0 to 110 feet RT and 0 to 20 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2162+80 to Station 2164+25 (proposed US 150), 0 to 105 feet RT and 0 to 10 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2164+25 to Station 2165+70 (proposed US 150), 0 to 90 feet RT and 0 to 5 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

- Station 2165+70 to Station 2169+15 (proposed US 150), 0 to 100 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2169+15 to Station 2171+00 (proposed US 150), 0 to 40 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese and pH.

- Station 2171+00 to Station 2172+85 (proposed US 150), 0 to 40 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

Ramps B, C, D, E, SW

- Station 200+00 to Station 201+00 (Ramp B), 0 to 60 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene and manganese.

- Station 201+00 to Station 207+00 (Ramp B), 0 to 60 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 410+15 to Station 414+25 (Ramp D), 0 to 65 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 507+05 to Station 510+35 (Ramp E), 0 to 50 feet RT and 0 to 60 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)anthracene, benzo(a)pyrene, dibenzo(a,h)anthracene, manganese and lead.

- Station 14+75 to Station 16+75 (Ramp SW), 0 to 60 feet RT and 0 to 35 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 26+30 to Station 27+90 (Ramp SW), 0 to 60 feet RT and 0 to 40 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

- Station 27+90 to Station 29+90 (Ramp SW), 0 to 60 feet RT and 0 to 40 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

IL Route 29

- Station 604+10 to Station 605+00 (IL 29), 0 to 140 feet RT: The engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameter: benzo(a)pyrene.

- Station 605+00 to Station 605+75 (IL 29), 0 to 130 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene.

- Station 605+75 to Station 607+35 (IL 29), 0 to 130 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, manganese.

- Station 607+35 to Station 609+15 (IL 29), 0 to 125 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, manganese.

- Station 609+15 to Station 610+15 (IL 29), 0 to 130 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, manganese.

- Station 610+00 to Station 610+70 (IL 29), 0 to 100 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). COC sampling parameters: arsenic.

- Station 610+15 to Station 611+00 (IL 29), 0 to 130 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene, manganese.

- Station 611+00 to Station 612+85 (IL 29), 0 to 140 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole, and dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, manganese.

- Station 612+85 to Station 615+70 (IL 29), 0 to 75 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 615+00 to Station 615+70 (IL 29), 0 to 115 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: manganese, arsenic.

- Station 616+25 to Station 617+35 (IL 29), 0 to 65 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene, manganese.

- Station 617+35 to Station 618+85 (IL 29), 0 to 65 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). COC sampling parameters: lead, manganese.

- Station 618+85 to Station 620+55 (IL 29), 0 to 160 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

IL Route 116

- Station 211+00 to Station 213+00 (IL 116), 0 to 130 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 205+05 to Station 206+05 (IL 116), 0 to 100 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 203+05 to Station 205+05 (IL 116), 0 to 100 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). COC sampling parameters: manganese.

- Station 201+00 to Station 202+05 (IL 116), 0 to 90 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

- Station 199+00 to Station 201+00 (IL 116), 0 to 90 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 199+00 to Station 201+00 (IL 116), 90 to 180 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

- Station 196+90 to Station 199+00 (Il 116), 90 to 180 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 196+90 to Station 199+00 (Il 116), 0 to 90 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene, manganese.

- Station 188+60 to Station 196+90 (Il 116), 0 to 90 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

Site 2926-6 – Peoria Journal Star, 1 News Plaza, Peoria, Peoria County, Illinois

- Station 2093+45 to Station 2095+00 (proposed US 150), 65 to 85 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, lead, manganese.

- Station 2095+00 to Station 2096+05 (proposed US 150), 65 to 85 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene, manganese.

- Station 2096+05 to Station 2097+35 (proposed US 150), 65 to 85 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). COC sampling parameters: benzo(a)pyrene, manganese, pH.

Site 2926-10 – Goodwill Industries, 2319 East War Memorial Drive, Peoria, Peoria County, Illinois

- Station 2097+35 to Station 2098+85 (proposed US 150), 65 to 85 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). COC sampling parameters: benzo(a)pyrene, lead, manganese.

- Station 2098+85 to Station 2100+35 (proposed US 150), 65 to 85 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: arsenic, manganese.

- Station 2100+35 to Station 2101+85 (proposed US 150), 65 to 85 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: arsenic, benzo(a)pyrene, lead, manganese.

- Station 2101+85 to Station 2103+10 (proposed US 150), 65 to 185 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

Site 2926-23 – Messing Construction, 3410-3416 N.E. Adams Street, Peoria, Peoria County, Illinois

- Station 603+50 to Station 604+10 (IL 29), 0 to 140 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene.

Site 2926-27 - Illinois American Water, 100 E. Lorentz Avenue, Peoria, Peoria County, Illinois

- Station 2115+75 to Station 2116+70 (proposed US 150), 175 to 350 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: manganese and benzo(a)pyrene.

- Station 2112+95 to Station 2115+10 (proposed US 150), 0 to 120 feet RT and 0 to 65 LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene, cadmium, and manganese.

- Station 2115+75 to Station 2116+80 (proposed US 150), 350 to 620 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

- Station 2115+10 to Station 2117+05 (proposed US 150), 0 to 110 feet RT and 0 to 80 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). COC sampling parameters: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, antimony, lead and manganese.

- Station 2117+05 to Station 2118+55 (proposed US 150), 0 to 95 feet RT and 0 to 80 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, antimony, arsenic, lead and manganese.

Site 2926-31 - Vacant Land, 28000 block of US 150, East Peoria, Peoria County, Illinois [north and south sides of US 150 between the Illinois River and IL 116]

- Station 2156+35 to Station 2158+00 (proposed US 150), 0 to 155 feet RT and 0 to 55 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). COC sampling parameters: benzo(a)pyrene, benzo(b)fluoranthene, lead, manganese.

- Station 2158+00 to Station 2159+00 (proposed US 150), 0 to 125 feet RT and 0 to 45 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2159+00 to Station 2161+35 (proposed US 150), 0 to 120 feet RT and 0 to 35 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

Site 2926-32 - Uftring Automall, 500 Fairlane Drive, East Peoria, Tazewell County, Illinois

- Station 2167+30 to Station 2169+15 (proposed US 150), 30 to 100 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 2169+15 to Station 2171+00 (proposed US 150), 40 to 100 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese, pH.

- Station 2171+00 to Station 2172+85 (proposed US 150), 40 to 100 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 14+75 to Station 16+75 (Ramp SW), 0 to 60 feet RT and 0 to 35 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 16+75 to Station 26+30 (Ramp SW), 0 to 55 feet RT and 0 to 40 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 25+00 to Station 26+00 (Ramp SW), 165 to 265 feet RT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). COC sampling parameters: manganese.

- Station 26+30 to Station 27+90 (Ramp SW), 0 to 60 feet RT and 0 to 40 feet LT: The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). COC sampling parameters: benzo(a)pyrene.

Groundwater Management

Site 2926-3 I - IDOT ROW, US 150, US 24, IL 29, IL 116, East Peoria and Peoria, Peoria and Tazewell Counties, Illinois

- Iron, lead and manganese were detected at concentrations above TACO Tier 1 ROs in groundwater at the site. Groundwater was encountered at a depth of approximately 13 feet bgs at boring 2926-03-B68. Excavation for the installation of the traffic signal foundation in the vicinity of the boring is anticipated to encounter impacted groundwater.

  Based on the COCs detected in groundwater (inorganics), it is anticipated that any groundwater encountered during traffic signal installation will be managed within the excavation. Consequently, E & E has not included an estimated cost for offsite management of impacted groundwater.

River Sediment Management

The Engineer has determined that dredged materials meets the criteria of Article 669.05(a)(3) and shall be managed onsite to the extent practicable for sediment removed from Station 2118+55 to Station 2156+35 (proposed US 150), 0 to 95 feet RT and 0 to 90 LT. Dredged material shall be defined as any material removed within these applicable stations either for the purposes of access or excavation including, but not limited to, the structure, cofferdams, or coffercells. If dredged material cannot be used onsite because of excess or unsuitability, it can be used offsite for a beneficial use approved in accordance with Section 107.22 of the Standard Specifications for Road and Bridge Construction and meeting the conditions of IEPA 401 and Army Corps of Engineers (ACOE) 404 Permits.

All excess or unsuitable dredged material that cannot be managed onsite or offsite through beneficial use must be managed in accordance with 669.05(a)(3). Excess dredged material managed in accordance with 669.05(a)(3) will not be measured for payment nor will any compensation be allowed to fulfill the other requirements of Article 669. A copy of anticipated uses of all dredged material managed under 669.05(a)(3) must be included as an attachment to BDE 2730 (Regulated Substances Pre-Construction Plan). The final disposition of all dredged material managed under 669.05(a)(3) must be documented on BDE 2732 (Regulated Substances Monitoring Daily Record) and BDE 2733 (Regulated Substances Final Construction Report).

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:

2926-6 (Peoria Journal Star) and **2926-27 (Illinois American Water).**

Additional information on the above sites collected during the Phase I Engineering process is available through the District's Environmental Studies Unit (DESU).

Revise Section 669 of the Standard Specifications to read:

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES (BDE)
Effective: January 1, 2019

Revise Section 669 of the Standard Specifications to read:

SECTION 669. REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES

669.01 Description. This work shall consist of the transportation and proper disposal of contaminated soil and groundwater. This work shall also consist of the removal, transportation, and proper disposal of underground storage tanks (UST), their content and associated underground piping to the point where the piping is above the ground, including determining the content types and estimated quantities.

669.02 Equipment. The Contractor shall notify the Engineer of the delivery of all excavation, storage, and transportation equipment to a work area location. The equipment shall comply with OSHA and American Petroleum Institute (API) guidelines and shall be furnished in a clean condition. Clean condition means the equipment does not contain any residual material classified as a non-special waste, non-hazardous special waste, or hazardous waste. Residual materials include, but are not limited to, petroleum products, chemical products, sludges, or any other material present in or on equipment.

Before beginning any associated soil or groundwater management activity, the Contractor shall provide the Engineer with the opportunity to visually inspect and approve the equipment. If the equipment contains any contaminated residual material, decontamination shall be performed on the equipment as appropriate to the regulated substance and degree of contamination present according to OSHA and API guidelines. All cleaning fluids used shall be treated as the contaminant unless laboratory testing proves otherwise.

669.03 Pre-construction Submittals. Prior to beginning this work, or working in areas with regulated substances, the Contractor shall submit a Regulated Substance Pre-Construction Plan (RSPCP) to the Engineer for review and approval using form BDE 2730. The form shall be signed by an Illinois licensed Professional Engineer or Professional Geologist.

As part of the RSPCP, the qualifications of Contractor(s) or firm(s) performing the following work shall be listed.

(a) On-Site Monitoring. Qualification for on-site monitoring of regulated substance work and on-site monitoring of UST removal requires either pre-qualification in Hazardous Waste by the Department or demonstration of acceptable project experience in remediation and special waste operations for contaminated sites in accordance with applicable Federal, State, or local regulatory requirements.

Qualification for each individual performing on-site monitoring requires a minimum of one-year of experience in similar activities as those required for the project.

(b) Underground Storage Tank. Qualification for underground storage tank (UST) work requires licensing and certification with the Office of the State Fire Marshall (OSFM) and possession of all permits required to perform the work. A copy of the permit shall be provided to the Engineer prior to tank removal.

The qualified Contractor(s) or firm(s) shall also document it does not have any current or former ties with any of the properties contained within, adjoining, or potentially affecting the work.

The Engineer will require up to 30 calendar days for review of the RSPCP. The review may involve rejection or revision and resubmittal; in which case, an additional 30 days will be required for each subsequent review. Work shall not commence until the RSPCP has been approved by the Engineer. After approval, the RSPCP shall be revised as necessary to reflect changed conditions in the field.

CONSTRUCTION REQUIREMENTS

669.04 Contaminated Soil and/or Groundwater Monitoring. Prior to beginning excavation, the Contractor shall mark the limits of removal for approval by the Engineer. Once excavation begins, the work and work area involving regulated substances shall be monitored by qualified personnel. The qualified personnel shall be on-site continuously during excavation and loading of material containing regulated substances. The qualified personnel shall be equipped with either a photoionization detector (PID) (minimum 10.6eV lamp), or a flame ionization detector (FID), and other equipment, as appropriate, to monitor for potential contaminants associated with volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCs). The PID or FID meter shall be calibrated on-site and background level readings taken and recorded daily, and as field and weather conditions change. Any field screen reading on the PID or FID in excess of background levels indicates the potential presence of contaminated material requiring handling as a non-special waste, special waste, or hazardous waste. PID or FID readings may be used as the basis of increasing the limits of removal with the approval of the Engineer but shall in no case be used to decrease the limits.

The qualified personnel shall document field activities using form BDE 2732 (Regulated Substances Monitoring Daily Record) including the name(s) of personnel conducting the monitoring, weather conditions, PID or FID calibration records, a list of equipment used on-site, a narrative of activities completed, photo log sheets, manifests and landfill tickets, monitoring results, how regulated substances were managed and other pertinent information.

Samples will be collected in accordance with the RSPCP. Samples shall be analyzed for the contaminants of concern (COCs), including pH, based on the property's land use history, the encountered abnormality and/or the parameters listed in the maximum allowable concentration (MAC) for chemical constituents in uncontaminated soil established pursuant to Subpart F of 35 Ill. Adm. Code 1100.605. The analytical results shall serve to document the level of contamination.

Samples shall be grab samples (not combined with other locations). The samples shall be taken with decontaminated or disposable instruments. The samples shall be placed in sealed containers and transported in an insulated container to the laboratory. The container shall maintain a temperature of 39°F (4°C). All samples shall be clearly labeled. The labels shall indicate the sample number, date sampled, collection location and depth, and any other relevant observations.

The laboratory shall use analytical methods which are able to meet the lowest appropriate practical quantitation limits (PQL) or estimated quantitation limit (EQL) specified in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", EPA Publication No. SW-846; "Methods for the Determination of Organic Compounds in Drinking Water", EPA, EMSL, EPA-600/4-88/039; and "Methods for the Determination of Organic Compounds in Drinking Water, Supplement III", EPA 600/R-95/131, August 1995. For parameters where the specified cleanup objective is below the acceptable detection limit (ADL), the ADL shall serve as the cleanup objective. For other parameters the ADL shall be equal to or below the specified cleanup objective.

669.05 Contaminated Soil and/or Groundwater Management and Disposal. The management and disposal of contaminated soil and/or groundwater shall be according to the following:

(a) Soil Analytical Results Exceed Most Stringent MAC. When the soil analytical results indicate that detected levels exceed the most stringent maximum allowable concentration (MAC) for chemical constituents in uncontaminated soil established pursuant to Subpart F of 35 Illinois Administrative Code 1100.605, the soil shall be managed as follows:

(1) When analytical results indicate inorganic chemical constituents exceed the most stringent MAC but they are still considered within area background levels by the Engineer, the excavated soil can be utilized within the construction limits as fill, when suitable. If the soils cannot be utilized within the construction limits, they shall be managed and disposed of off-site as a non-special waste, special waste, or hazardous waste as applicable.

(2) When analytical results indicate chemical constituents exceed the most stringent MAC but do not exceed the MAC for a Metropolitan Statistical Area (MSA) County, the excavated soil can be utilized within the construction limits as fill, when suitable, or managed and disposed of off-site as "uncontaminated soil" at a clean construction and demolition debris (CCDD) facility or an uncontaminated soil fill operation (USFO) within an MSA County provided the pH of the soil is within the range of 6.25 - 9.0, inclusive.

(3) When analytical results indicate chemical constituents exceed the most stringent MAC but do not exceed the MAC for an MSA County excluding Chicago, or the MAC within the Chicago corporate limits, the excavated soil can be utilized within the construction limits as fill, when suitable, or managed and disposed of off-site as "uncontaminated soil" at a CCDD facility or an USFO within an MSA County excluding Chicago or within the Chicago corporate limits provided the pH of the soil is within the range of 6.25 – d9.0, inclusive.

(4) When analytical results indicate chemical constituents exceed the most stringent MAC but do not exceed the MAC for an MSA County excluding Chicago, the excavated soil can be utilized within the construction limits as fill, when suitable, or managed and disposed of off-site as "uncontaminated soil" at a CCDD facility or an USFO within an MSA County excluding Chicago provided the pH of the soil is within the range of 6.25 - 9.0, inclusive.

(5) When the Engineer determines soil cannot be managed according to Articles 669.05(a)(1) through (a)(4) above, the soil shall be managed and disposed of off-site as a non-special waste, special waste, or hazardous waste as applicable.

(b) Soil Analytical Results Do Not Exceed Most Stringent MAC. When the soil analytical results indicate that detected levels do not exceed the most stringent MAC, the excavated soil can be utilized within the construction limits or managed and disposed off-site as "uncontaminated soil" according to Article 202.03. However, the excavated soil cannot be taken to a CCDD facility or an USFO for any of the following reasons.

(1) The pH of the soil is less than 6.25 or greater than 9.0.

(2) The soil exhibited PID or FID readings in excess of background levels.

(c) Soil Analytical Results Exceed Most Stringent MAC but Do Not Exceed Tiered Approach to Corrective Action Objectives (TACO) Residential. When the soil analytical results indicate that detected levels exceed the most stringent MAC but do not exceed TACO Tier 1 Soil Remediation Objectives for Residential Properties pursuant to 35 IAC 742 Appendix B Table A, the excavated soil can be utilized within the right-of-way or managed and disposed off-site as "uncontaminated soil" according to Article 202.03. However, the excavated soil cannot be taken to a CCDD facility or an USFO.

(d) Groundwater. When groundwater analytical results indicate the detected levels are above Appendix B, Table E of 35 Illinois Administrative Code 742, the most stringent Tier 1 Groundwater Remediation Objectives for Groundwater Component of the Groundwater Ingestion Route for Class 1 groundwater, the groundwater shall be managed off-site as a special waste. The groundwater shall be containerized and trucked to an off-site treatment facility or may be discharged to a sanitary sewer or combined sewer when permitted by the local sewer authority. Groundwater discharged to a sewer shall be pre-treated to remove particulates and measured with a calibrated flow meter to comply with applicable discharge limits. A copy of the permit shall be provided to the Engineer prior to discharging groundwater to the sewer.

All groundwater encountered within trenches may be managed within the trench and allowed to infiltrate back into the ground. If the groundwater cannot be managed within the trench it must be removed as a special or hazardous waste. The Contractor is prohibited from managing groundwater within the trench by discharging it through any existing or new storm sewer. The Contractor shall install backfill plugs within the area of groundwater contamination.

One backfill plug shall be placed down gradient to the area of groundwater contamination. Backfill plugs shall be installed at intervals not to exceed 50 ft (15 m). Backfill plugs are to be 4 ft. (1.2 m) long, measured parallel to the trench, full trench width and depth. Backfill plugs shall not have any fine aggregate bedding or backfill, but shall be entirely cohesive soil or any class of concrete. The Contractor shall provide test data that the material has a permeability of less than 10^{-7} cm/sec according to ASTM D 5084, Method A or per another test method approved by the Engineer.

The Contractor shall use due care when transferring contaminated material from the area of origin to the transporter. Should releases of contaminated material to the environment occur (i.e., spillage onto the ground, etc.), the Contractor shall clean-up spilled material and place in the appropriate storage containers as previously specified. Clean-up shall include, but not be limited to, sampling beneath the material staging area to determine complete removal of the spilled material.

The Contractor shall be responsible for transporting and disposing all material classified as a non-special waste, special waste, or hazardous waste from the job site to an appropriately permitted landfill facility. The transporter and the vehicles used for transportation shall comply with all federal, state, and local rules and regulations governing the transportation of non-special waste, special waste, or hazardous waste.

All equipment used by the Contractor to haul contaminated material to the landfill facility shall be lined with a 6 mil (150 micron) polyethylene liner and securely covered during transportation. The Contractor shall obtain all documentation including any permits and/or licenses required to transport the contaminated material to the disposal facility.

The Contractor shall provide engineered barriers, when required, and shall include materials sufficient to completely line excavation surfaces, including sloped surfaces, bottoms, and sidewall faces, within the areas designated for protection.

The Engineer shall coordinate with the Contractor on the completion of all documentation. The Contractor shall make all arrangements for collection and analysis of landfill acceptance testing. The Contractor shall coordinate for waste disposal approval with the disposal facility. After the Contractor completes these activities and upon receipt of authorization from the Engineer, the Contractor shall initiate the disposal process.

The Contractor shall provide the Engineer with all transport-related documentation within two days of transport or receipt of said document(s). The Engineer shall maintain the file for all such documentation. For management of special or hazardous waste, the Contractor shall provide the Engineer with documentation the Contractor (or subcontractor, if a subcontractor is used for transportation) is operating with a valid Illinois special waste transporter permit at least two weeks before transporting the first load of contaminated material.

The Contractor shall schedule and arrange the transport and disposal of each load of contaminated material produced. The Contractor shall make all transport and disposal arrangements so no contaminated material remains within the project area at the close of business each day. Exceptions to this specification require prior approval from the Engineer within 24 hours of close of business. The Contractor shall be responsible for all other pre-disposal/transport preparations necessary daily to accomplish management activities.

Any waste generated as a special or hazardous waste from a non-fixed facility shall be manifested off-site using the Department's county generator number. An authorized representative of the Department shall sign all manifests for the disposal of the contaminated material and confirm the Contractor's transported volume. Any waste generated as a non-special waste may be managed off-site without a manifest, a special waste transporter, or a generator number.

The Contractor shall select a landfill mandated by definition of the contaminant within the State of Illinois. The Department will review and approve or reject the facility proposed by the Contractor to use as a landfill. The Contractor shall verify whether the selected disposal facility is compliant with those applicable standards as mandated by definition of the contaminant and whether the disposal 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 Contractor shall be responsible for coordinating permits with the IEPA. The use of a Contractor selected landfill shall in no manner delay the construction schedule or alter the Contractor's responsibilities as set forth.

669.06 Non-Special Waste Certification. An authorized representative of the Department shall sign and date all non-special waste certifications. The Contractor shall be responsible for providing the Engineer with the required information that will allow the Engineer to certify the waste is not a special waste.

(a) Definition. A waste is considered a non-special waste as long as it is not:

(1) a potentially infectious medical waste;

(2) a hazardous waste as defined in 35 IAC 721;

(3) an industrial process waste or pollution control waste that contains liquids, as determined using the paint filter test set forth in subdivision (3)(A) of subsection (m) of 35 IAC 811.107;

(4) a regulated asbestos-containing waste material, as defined under the National Emission Standards for Hazardous Air Pollutants in 40 CFR 61.141;

(5) a material containing polychlorinated biphenyls (PCB's) regulated pursuant to 40 CFR Part 761;

(6) a material subject to the waste analysis and recordkeeping requirements of 35 IAC 728.107 under land disposal restrictions of 35 IAC 728;

(7) a waste material generated by processing recyclable metals by shredding and required to be managed as a special waste under Section 22.29 of the Environmental Protection Act; or

(8) an empty portable device or container in which a special or hazardous waste has been stored, transported, treated, disposed of, or otherwise handled.

(b) Certification Information. All information used to determine the waste is not a special waste shall be attached to the certification. The information shall include but not be limited to:

(1) the means by which the generator has determined the waste is not a hazardous waste;

(2) the means by which the generator has determined the waste is not a liquid;

(3) if the waste undergoes testing, the analytic results obtained from testing, signed and dated by the person responsible for completing the analysis;

(4) if the waste does not undergo testing, an explanation as to why no testing is needed;

(5) a description of the process generating the waste; and

(6) relevant material safety data sheets.

669.07 Temporary Staging. The Contractor shall excavate and dispose of all waste material as mandated by the contaminants without temporary staging. If circumstances require temporary staging, he/she shall request in writing, approval from the Engineer.

When approved, the Contractor shall prepare a secure location within the project area capable of housing containerized waste materials. The Contractor shall contain all waste material in leak-proof storage containers such as lined roll-off boxes or 55 gal (208 L) drums, or stored in bulk fashion on storage pads. The design and construction of such storage pad(s) for bulk materials shall be subject to approval by the Engineer. The Contractor shall place the staged storage containers on an all-weather gravel-packed, asphalt, or concrete surface. The Contractor shall maintain a clearance both above and beside the storage units to provide maneuverability during loading and unloading. The Contractor shall provide any assistance or equipment requested by the Engineer for authorized personnel to inspect and/or sample contents of each storage container. All containers and their contents shall remain intact and undisturbed by unauthorized persons until the manner of disposal is determined. The Contractor shall keep the storage containers covered, except when access is requested by authorized personnel of the Department. The Engineer shall authorize any additional material added to the contents of any storage container before being filled.

The Contractor shall ensure the staging area is enclosed (by a fence or other structure) to ensure direct access to the area is restricted, and he/she shall procure and place all required regulatory identification signs applicable to an area containing the waste material. The Contractor shall be responsible for all activities associated with the storage containers including, but not limited to, the procurement, transport, and labeling of the containers. The Contractor shall clearly mark all containers in permanent marker or paint with the date of waste generation, location and/or area of waste generation, and type of waste (e.g., decontamination water, contaminated clothing, etc.). The Contractor shall place these identifying markings on an exterior side surface of the container. The Contractor shall separately containerize each contaminated medium, i.e. contaminated clothing is placed in a separate container from decontamination water. Containers used to store liquids shall not be filled in excess of 80 percent of the rated capacity. The

Contractor shall not use a storage container if visual inspection of the container reveals the presence of free liquids or other substances that could classify the material as a hazardous waste in the container.

The Department will not be responsible for any additional costs incurred, if mismanagement of the staging area, storage containers, or their contents by the Contractor results in excess cost expenditure for disposal or other material management requirements.

669.08 Underground Storage Tank Removal. For the purposes of this section, an underground storage tank (UST) includes the underground storage tank, piping, electrical controls, pump island, vent pipes and appurtenances.

Prior to removing an UST, the Engineer shall determine whether the Department is considered an "owner" or "operator" of the UST as defined by the UST regulations (41 Ill. Adm. Code Part 176). Ownership of the UST refers to the Department's owning title to the UST during storage, use or dispensing of regulated substances. The Department may be considered an "operator" of the UST if it has control of, or has responsibility for, the daily operation of the UST. The Department may however voluntarily undertake actions to remove an UST from the ground without being deemed an "operator" of the UST.

In the event the Department is deemed not to be the "owner" or "operator" of the UST, the OSFM removal permit shall reflect who was the past "owner" or "operator" of the UST. If the "owner" or "operator" cannot be determined from past UST registration documents from OSFM, then the OSFM removal permit will state the "owner" or "operator" of the UST is the Department. The Department’s Office of Chief Counsel (OCC) will review all UST removal permits prior to submitting any removal permit to the OSFM. If the Department is not the "owner" or "operator" of the UST then it will not register the UST or pay any registration fee.

The Contractor shall be responsible for obtaining all permits required for removing the UST, notification to the OSFM, using an OSFM certified tank contractor, removal and disposal of the UST and its contents, and preparation and submittal of the OSFM Site Assessment Report in accordance with 41 Ill. Adm. Code Part 176.330.

The Contractor shall contact the Engineer and the OSFM's office at least 72 hours prior to removal to confirm the OSFM inspector's presence during the UST removal. Removal, transport, and disposal of the UST shall be according to the applicable portions of the latest revision of the "American Petroleum Institute (API) Recommended Practice 1604".

The Contractor shall collect and analyze tank content (sludge) for disposal purposes. The Contractor shall remove as much of the regulated substance from the UST system as necessary to prevent further release into the environment. All contents within the tank shall be removed, transported and disposed of, or recycled. The tank shall be removed and rendered empty according to IEPA definition.

The Contractor shall collect soil samples from the bottom and sidewalls of the excavated area in accordance with 35 Ill. Adm. Code Part 734.210(h) after the required backfill has been removed during the initial response action, to determine the level of contamination remaining in the ground, regardless if a release is confirmed or not by the OSFM on-site inspector.

In the event the UST is designated a leaking underground storage tank (LUST) by the OSFM's inspector, or confirmation by analytical results, the Contractor shall notify the Engineer and the DESU. Upon confirmation of a release of contaminants from the UST and notifications to the Engineer and DESU, the Contractor shall report the release to the Illinois Emergency Management Agency (IEMA) (e.g., by telephone or electronic mail) and provide them with whatever information is available ("owner" or "operator" shall be stated as the past registered "owner" or "operator", or the IDOT District in which the UST is located and the DESU Manager);

The Contractor shall perform the following initial response actions if a release is indicated by the OSFM inspector:

(a) Take immediate action to prevent any further release of the regulated substance to the environment, which may include removing, at the Engineer's discretion, and disposing of up to 4 ft (1.2 m) of the contaminated material, as measured from the outside dimension of the tank;

(b) Identify and mitigate fire, explosion and vapor hazards;

(c) Visually inspect any above ground releases or exposed below ground releases and prevent further migration of the released substance into surrounding soils and groundwater; and

(d) Continue to monitor and mitigate any additional fire and safety hazards posed by vapors and free product that have migrated from the UST excavation zone and entered into subsurface structures (such as sewers or basements).

The UST excavation shall be backfilled according to applicable portions of Sections 205, 208, and 550 with a material that will compact and develop stability. The material shall be approved prior to placement. All uncontaminated concrete and soil removed during tank extraction may be used to backfill the excavation, at the discretion of the Engineer.

After backfilling the excavation, the site shall be graded and cleaned.

669.09 Regulated Substance Final Construction Report. Not later than 90 days after completing this work, the Contractor shall submit a Regulated Substance Final Construction Report (RSFCR) to the Engineer using form BDE 2733 and required attachments. The form shall be signed by an Illinois licensed Professional Engineer or Professional Geologist.

669.10 Method of Measurement. Non-special waste, special waste, and hazardous waste soil will be measured for payment according to Article 202.07(b) when performing earth excavation, Article 502.12(b) when excavating for structures, or by computing the volume of the trench using the maximum trench width permitted and the actual depth of the trench.

Groundwater containerized and transported off-site for management, storage, and disposal will be measured for payment in gallons (liters).

Backfill plugs will be measured in Cubic Yards (Cubic Meters) in place, except the quantity for which payment will be made shall not exceed the volume of the trench, as computed by using the maximum width of trench permitted by the Specifications and the actual depth of the trench, with a deduction for the volume of the pipe.

Engineered Barriers will be measured for payment in Square Yards (Square Meters).

669.11 Basis of Payment. The work of preparing, submitting and administering a Regulated Substances Pre-Construction Plan will be paid for at the contract lump sum price for REGULATED SUBSTANCES PRE-CONSTRUCTION PLAN.

On-site monitoring of regulated substances, including completion of form BDE 2732 for each day of work, will be paid for at the contract unit price per calendar day, or fraction thereof, for ON-SITE MONITORING OF REGULATED SUBSTANCES.

The installation of engineered barriers will be paid for at the contract unit price per Square Yard (Square Meter) for ENGINEERED BARRIER.

The work of removing a UST, soil excavation, soil and content sampling, and the excavated soil, UST content, and UST disposal will be paid for at the contract unit price per each for UNDERGROUND STORAGE TANK REMOVAL.

The transportation and disposal of soil and other materials from an excavation determined to be contaminated will be paid for at the contract unit price per cubic yard (cubic meter) for NON-SPECIAL WASTE DISPOSAL, SPECIAL WASTE DISPOSAL, or HAZARDOUS WASTE DISPOSAL.

The transportation and disposal of groundwater from an excavation determined to be contaminated will be paid for at the contract unit price per Gallon (Liter) for SPECIAL WASTE GROUNDWATER DISPOSAL or HAZARDOUS WASTE GROUNDWATER DISPOSAL. When groundwater is discharged to a sanitary or combined sewer by permit, the cost will be paid for according to Article 109.05.

Backfill plugs will be paid for at the contract unit price per Cubic Yard (Cubic Meter) for BACKFILL PLUGS.

Payment for temporary staging, if required, will be paid for according to Article 109.04.

Payment for accumulated stormwater removal and disposal will be according to Article 109.04. Payment will only be allowed if appropriate stormwater and erosion control methods were used.

Payment for decontamination, labor, material, and equipment for monitoring areas beyond the specified areas, with the Engineer's prior written approval, will be according to Article 109.04.

The sampling and testing associated with this work will be paid for as follows.

(a) BETX Soil/Groundwater Analysis. When the contaminants of concern are gasoline only, soil or groundwater samples shall be analyzed for benzene, ethylbenzene, toluene, and xylenes (BETX). The analysis will be paid for at the contract unit price per Each for BETX SOIL ANALYSIS and/or BETX GROUNDWATER ANALYSIS using EPA Method 8021B.

(b) BETX-PNAS Soil/Groundwater Analysis. When the contaminants of concern are middle distillate and heavy ends, soil or groundwater samples shall be analyzed for BETX and polynuclear aromatics (PNAS). The analysis will be paid for at the contract unit price per Each for BETX-PNAS SOIL ANALYSIS and/or BETX-PNAS GROUNDWATER ANALYSIS using EPA Method 8021B for BETX and EPA Method 8310 for PNAs.

(c) Priority Pollutants Soil Analysis. When the contaminants of concern are used oils, soil samples shall be analyzed for priority pollutant VOCs, priority pollutants SVOCs, and priority pollutants metals. The analysis will be paid for at the contract unit price per Each for PRIORITY POLLUTANTS SOIL ANALYSIS using EPA Method 8260B for VOCs, EPA Method 8270C for SVOCs, and using an ICP instrument and EPA Methods 6010B and 7471A for metals.

(d) Priority Pollutant Groundwater Analysis. When the contaminants of concern are used oils, non-petroleum material, or unknowns, groundwater samples shall be analyzed for priority pollutant VOCs, priority pollutants SVOCs, and priority pollutants metals. The analysis will be paid for at the contract unit price per Each for PRIORITY POLLUTANTS GROUNDWATER ANALYSIS using EPA Method 8260B for VOCs, EPA Method 8270C for SVOCs, and EPA Methods 6010B and 7470A for metals.

(e) Target Compound List (TCL) Soil Analysis. When the contaminants of concern are unknowns or non-petroleum material, soil samples shall be analyzed for priority pollutant VOCs, priority pollutants SVOCS, priority pollutants metals, pesticides, and Resource Conservation and Recovery Act (RCRA) metals by the toxicity characteristic leaching procedure (TCLP). The analysis will be paid for at the contract unit price per Each for TCL SOIL ANALYSIS using EPA Method 8260B for VOCs, EPA Method 8270C for SVOCs, EPA Method 8081 for pesticides, and ICP instrument and EPA Methods 6010B, 7471A, 1311 (extraction), 6010B, and 7470A for metals.

(f) Soil Disposal Analysis. When the waste material for disposal requires sampling for disposal acceptance, the samples shall be analyzed for TCLP VOCs, SVOCs, RCRA metals, pH, ignitability, and paint filter test. The analysis will be paid for at the contract unit price per Each for SOIL DISPOSAL ANALYSIS using EPA Methods 1311 (extraction), 8260B for VOCs, 8270C for SVOCs, 6010B and 7470A for RCRA metals, 9045C for pH, 1030 for ignitability, and 9095A for paint filter.

The work of preparing, submitting and administering a Regulated Substances. Final Construction Report will be paid for at the contract Lump Sum price REGULATED SUBSTANCES FINAL CONSTRUCTION REPORT."

REMOVAL OF EXISTING STRUCTURES

Description. This work shall consist of removal of various bridge structures in accordance with Section 501 of the Standard Specifications for Road and Bridge Construction except as herein modified, as shown on the Plans, in compliance with the special provision for Maintenance of Navigation, all project permits and as directed by the Engineer. The structures to be removed are described as follows:

REMOVAL OF EXISTING STRUCTURE NO. 1. This structure is defined as US Route 150 Eastbound over the Illinois River (SN 090-0070) and the Tazewell and Peoria Railroad. The structure is approximately 4,745 feet long and 33 feet-2 inches wide on Concrete piers. The overall structure includes three structure types: the West abutment to Pier 5 and Pier 16 to the East abutment are steel continuous multi-girder systems with concrete decks; Pier 5 to Pier 10 and Pier 13 to Pier 16 are a deck trusses with floor beam systems and concrete decks; and Pier 10 to Pier 13 is a cantilever through truss with concrete deck over the main Illinois River shipping channel.

REMOVAL OF EXISTING STRUCTURE NO. 2. This structure is defined as US Route 150 Eastbound over IL Route 29 (SN 072-0167). This structure is a composite, 4 span continuous wide flange steel beam bridge, 195 feet long, 33 feet-6 inches wide, on Concrete piers with a reinforced concrete deck.

REMOVAL OF EXISTING STRUCTURE NO. 3. This structure is defined as existing Ramp E over the Tazewell and Peoria Railroad and a portion of the Illinois River (Existing SN 090-0070). This structure is a steel continuous multi-girder system, 1,098 feet long, 28 feet wide on Concrete piers with a reinforced concrete deck. The removal limits are from the west abutment to approximately Station 2114+13 (US 150 alignment attached to Structure No. 1).

REMOVAL OF EXISTING STRUCTURE NO. 4. This structure is defined as an existing Reinforced Concrete Double Box Culvert carrying Ramp SW over an unnamed stream in Tazewell County (SN 090-2013). The structure includes two, 8-foot x 10 foot cells with headwalls.

Removal of the structure numbers 1, 2 and 3 shall be defined by the sequence of construction as shown in the plans. Structure number 4 may be removed upon the completion and opening of new Ramp SW.

The scope of this item shall also include removal and disposal of miscellaneous items appurtenant to the structure, including but not limited to bridge expansion joint materials and anchorages, reinforcing steel, railings, drainage system components, bearings, lighting, conduit, wiring and other appurtenances not separately identified in other plans. Pile extraction shall also be included with this item. Structure excavation, including in-stream and out-of-stream work, required for the removal of structures and the necessary backfilling shall be included in this item. Coordination with the removal and/or re-grading of the adjacent existing approach roadways shall also be included in this item. Removal of the bridge approach pavement will be paid for separately as APPROACH SLAB REMOVAL.

Existing Plans. Available plans for the existing structure will be posted on the IDOT website for bidding for the US 150 Eastbound McClugage Bridge Replacement or are available for examination at the IDOT District Four Office in Peoria, Illinois by prior appointment. The completeness of these plans is not guaranteed, and no responsibility is assumed by the Department for their accuracy. Information is furnished for whatever value may be derived by the Contractor and is to be used solely at the Contractor’s risk.

Submittals. Demolition plans, procedures and timelines for each individual structure shall be prepared and sealed by an Illinois Licensed Structural Engineer and submitted to the Engineer for review and approval. Such plans, procedures and timelines shall also be subject to review and approval of the IDOT Bureau of Bridges and Structures, US Coast Guard and US Army Corps of Engineers (if applicable) and the Tazewell and Peoria Railroad (if applicable). Structural plans and procedures for any proposed temporary structures used to facilitate access shall be prepared and sealed by an Illinois Licensed Structural Engineer. (Refer to the Special Provision "Temporary Facilities Installed by Contractor.") The Contractor is advised that the existing SN 090-0070 contains members that are in a deteriorated condition with reduced load carrying capacity. It is the Contractor's responsibility to account for the condition of the existing structure when developing construction procedures for the complete removal or partial removal, or replacement of the structure.

River currents and drainage patterns. In the event removed material is deposited into any portion of the Illinois River or unnamed creek, it shall be removed in accordance with applicable permitting requirements. Debris in the Illinois River shipping channel shall be removed in accordance with US Coast Guard and US Army Corps of Engineers permit requirements.

For Structures No. 1 and No. 3, The existing concrete deck shall be removed prior to structural steel removal in the spans over the river. The contractor shall take the necessary precautions to eliminate concrete from entering the river. Any concrete from the removal of the existing bridge in the river shall be removed from the river bed to the satisfaction of the Engineer.

Structure excavation required for removal of structures and the necessary backfilling shall be done in accordance with Section 502 of the Standard Specifications.

Tree removals will be paid for separately.

Excess dredged material shall not be used on site. It is to be removed and disposed of according to Article 202.03 of the Standard Specification for Road and Bridge Construction.

Where extraction of existing piles is necessary due to conflicts with proposed deep foundations, the work shall conform in every respect to all environmental, state and local regulations regarding construction requirements, the protection of adjacent properties, as well as noise control. The Contractor shall submit a list of equipment and methods he proposes to use for the removal and disposal of the existing piles to the Engineer of review. All materials removed under this item shall become the property of the Contractor and shall be disposed of by the Contractor according to Article 202.03 of the Standard Specifications. Prior to commencing work under this item, the Contractor shall verify the location of existing utilities and adjacent facilities. Extraction of the pile shall be executed in such a manner so as not to cause any settlement or damage to existing utilities and/or adjacent facilities. Any damage to existing utilities and/or adjacent facilities shall be repaired at the Contractor's expense. All piles shall be extracted to their full lengths.

Maintenance of Traffic

Traffic on the adjacent new US 150 Eastbound Bridge and on the existing US 150 Westbound Bridge shall be maintained and protected during removal of the existing structure.

River traffic using the Illinois Waterway system in the Illinois River shall be maintained and protected during removal of the existing structures.

Rail traffic on the Tazewell and Peoria Railroad shall be maintained and protected during removal of the existing structure.

Water flow through the unnamed stream shall be maintained and protected during the removal of the existing box culvert. Debris must be removed from the channel each day.

In the event that explosive demolition methods are used to remove any of the bridges, proper precautions and permits must be secured in advance. Additional requirements will apply. Closures of the roadways, river shipping channel, and railroad lines must be coordinated with proper authorities. Blast protection of the new structure shall be part of the demolition plan, primarily of protecting structural elements, integrity of the deck and of both painted and unpainted surfaces. Any damage of the new structure incurred during removal of the existing structure, shall be repaired by the Contractor at no additional cost to the Department.

Method of Measurement. The removal of structures will be paid as Each, for Each location specified to the limits shown on the plans and as described herein.

Basis of Payment. This work will be paid for at the contract unit price per Each for REMOVAL OF EXISTING STRUCTURES, of the number indicated which payment shall constitute full compensation for all labor, materials, tools and equipment required for removal and disposal of existing structure and incidental items, as detailed in the plans, described herein and as directed by the Engineer.

Tree removals required for removal of existing bridge will be paid for separately.

COMPLIANCE WITH LOCAL LAWS, ORDINANCES AND REGULATIONS (CITY OF PEORIA)

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

The storage or staging of any materials or equipment on the public right-of-way outside of the project limits must be coordinated with the City of Peoria.

The Contractor may contact the City of Peoria Public Works Department, which is located at 3505 North Dries Lane Peoria, IL 61604 to discuss the use of areas located outside the right-of-way.

The Contractor shall contact Mr. Scott Reeise, Director of Public Works, at (309) 494-8800, prior to the start of any work involving staging/storage of equipment and/or materials at locations outside of the project right of way.

CONTRACTOR STAGING AREA

Description: The infield location at the US 150/US 24/IL 116 interchange bounded by eastbound US 150, the loop ramp that conveys traffic from southbound IL Route 116 to eastbound US 150, and the existing SW Ramp may be made available to the Contractor, at their option, to store materials, equipment, and articles of construction during the construction of the project. Additionally, the area bounded by IL 29, the Tazewell and Peoria RR, Eureka Street extended and Ramp E may also be made available on a more limited basis to the Contractor, at their option to store material, equipment and articles of construction during the project. This area is also the location of the West Trail Parking Lot that is a part of the project that must be constructed and opened as per the project schedule. Exact locations of this area will marked in the field.

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

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

The area designated on the plans as Staging Area is the approximate footprint available to the Contractor for their use. The Contractor shall be responsible for determining the actual area and shall submit any revisions to the Staging Area for the approval of the Engineer.

Portions of the Staging Area may be within the floodplain boundaries. Storage of erodible materials within any floodplain shall not be allowed.

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

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

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

At no time shall the Contractor be allowed direct access to or from the Staging Area from the US 150 mainline pavement. At no time shall the Contractor be allowed to directly cross any ramp or mainline pavement to obtain access to or from the Staging Area. The Staging Area shall be closed to access for construction vehicles during winter shutdown if no construction activity is happening during this timeframe. Should the Contractor fail to adhere to these roadway restrictions, the Staging Area shall be deemed unsafe for the commuting public by the Department and it shall be the Contractor's responsibility to dismantle and restore the site.

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

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

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

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

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

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

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

Construction Requirements: Removal: The Contractor shall remove and dispose of all equipment, debris, and material brought to the site, including, but not limited to stone, fabric and concrete.

Protection of existing plant material shall comply with Article 201.05 of the Standard Specifications. Removal and disposal shall comply with Article 202.03 of the Standard Specifications.

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

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

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

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

Basis of Payment: All labor, material and equipment required to construct, maintain, remove and restore the Staging Area, provide traffic control at the Staging Area, and restore the new SW Ramp mainline and shoulders, if required, will not be paid for separately but shall be included in the cost of the contract.

COOPERATION WITH OTHER CONTRACTORS

Contract 68D85 for the rehabilitation of S.N. 090-0071 and S.N. 090-0072 carrying US 150/US 24 over IL Route 116 at the US 150/US24/IL Route 116 Interchange in Tazewell County was let on November 9, 2018 and is currently under construction.

Contract 68D22 for the resurfacing of IL Route 29 (Adams Street) from Eureka Street to Abington Street in Peoria was let on March 8, 2019. This project will be constructed during the 2019 construction season.

Contract 89723 for the rehabilitation of the railroad structure that spans US 150 just west of this project will be let on June 14, 2019.

A cooperative effort is required with those Contractors in coordinating traffic control signing, traffic management and progression, and work at or near each project.

CRITICAL PATH SCHEDULE

The construction of this project will be planned and recorded with a conventional Critical Path Method (CPM) as specified in Article 108.02 of the Standard Specifications and the following:

The Contractor is responsible for preparing the initial schedule in the form of an activity on arrow diagram which shall include activity description and duration, two copies shall be submitted to the Engineer at the preconstruction meeting. The construction time, as determined by the schedule shall not exceed the specified contract time. The schedule shall be updated the first of each month, when there is a delay in completion of any critical activity, or when the contract is modified causing additions, deletion or revision of activities required.

As determined by CPM analysis, only delays in activities which affect milestone dates or contract completion dates will be considered for a time extension.

If the Contractor does seek a time extension of any milestone or contract completion date, he/she shall furnish documentation as required by the Engineer to enable him to determine whether a time extension is appropriate under the terms of the contract.

INTERIM COMPLETION DATES AND WORKING RESTRICTIONS

The Contractor should note that this provision is based on an expedited work schedule. The following construction shall be completed, at a minimum, by the interim completion date specified for each construction season.

Construction Season 1 – Contract Award to November 30, 2019

The Contractor will schedule their operations to complete the pavement widening for the new alignment at Ramp B at the US 150/ IL Route 29 interchange in Peoria as shown in the Construction Staging section of the plans. A minimum of one through lanes on eastbound US 150 is required to remain open at all times for this construction.

Should the Contractor fail to complete this work by the November 30, 2019 interim completion date, or within such extended time allowed by the Department, the Contractor shall be subject to the provisions outlined in Article 108.09 of the Standard Specifications.

In addition, the Contractor will schedule their operations to begin work on the first half of S.N. 072-0250, which is the eastbound US 150 structure over IL Route 29 in Peoria, as shown in the Construction Staging section of the plans. Construction on this structure may continue into the Winter Shutdown period provided that there is a minimum of two through lanes on eastbound US 150 and a single lane in both the northbound and southbound lanes of IL Route 29 open at all times with the exception that 2 lanes shall be open on southbound IL Route 29 in the AM peak traffic (7:00 A.M. to 9:00 A.M.) and 2 lanes shall be open on northbound IL Route 29 in the PM peak traffic (4:00 P.M. to 6:00 P.M.).. The lane restrictions will be allowed only if workers are present and the closure(s) is necessary to accommodate the work.

Winter Shutdown December 1, 2019 to March 31, 2020

The Contractor shall schedule their operations to provide for all roadway, ramps and bridge lanes and shoulders to be open to traffic, with the exception of the lane restrictions as noted for the work being completed on the first half of S.N. 072-0250 during this winter shutdown period. The lane restrictions for the S.N. 072-0250 work will be allowed only if workers are present and the closure(s) is necessary to accommodate the work.

The Contractor shall schedule their operations to complete the construction of the first half of S.N. 072-0250 by March 31, 2020.

Should the Contractor fail to complete this work by the March 31, 2020 interim completion date, or within such extended time allowed by the Department, the Contractor shall be subject to the provisions outlined in Article 108.09 of the Standard Specifications.

Construction Season 2 - April 1, 2020 to November 30, 2020

The Contractor shall schedule their operations to complete the placement of embankment on eastbound US 150 and SW Ramp in Tazewell County as shown in the Construction Staging section of the plans.

All roadway, ramps and bridge lanes and shoulders shall remain open at all times. No temporary or permanent lane closures or lane reductions shall be allowed during this construction season.

Should the Contractor fail to complete this work by the November 30, 2020 interim completion date, or within such extended time allowed by the Department, the Contractor shall be subject to the provisions outlined in Article 108.09 of the Standard Specifications.

Winter Shutdown December 1, 2020 to March 31, 2021

The Contractor shall schedule their operations to provide for all roadway, ramps and bridge lanes and shoulders to be open to traffic at all times.

Day-only single lane and/or shoulder closure or lane reductions will be permitted for one lane of traffic on eastbound US 150, northbound and southbound IL Route 29 and southbound IL Route 116 beginning on March 1, 2021 provided that the roadway is clear and forecast is favorable and pending approval of the Engineer. The day-only closure will be allowed only if workers are present and the closure is necessary to accommodate the work. Traffic control shall be provided for the lane and/or shoulder closure or reduction as specified by the Engineer.

Construction Season 3 – April 1, 2021 to November 30, 2021
Winter Shutdown December 1, 2021 to March 31, 2022

The Contractor shall schedule their operations to complete the construction of S.N. 090-0180, which is the eastbound US 150 structure over the Illinois River. This includes the Ramp E structure in Peoria, the tie-ins of S.N. 090-0180 with the half constructed S.N. 072-0250 in Peoria and eastbound US 150 in Tazewell County. Traffic will be shifted from the existing eastbound US 150 structure to the new eastbound US 150 structure (S.N. 090-0180) on or before the completion of the Winter Shutdown period given as March 31, 2022, or within such extended time allowed by the Department.

In addition, the Contractor will schedule their operations to begin work on the second half of S.N. 072-0250, which is the eastbound US 150 structure over IL Route 29 in Peoria, as shown in the Construction Staging section of the plans. Construction on this structure may continue into the Winter Shutdown period provided that there is a minimum of two through lane on eastbound US 150 and a single lane in both the northbound and southbound lanes of IL Route 29 open at all times with the exception that 2 lanes shall be open on southbound IL Route 29 in the AM peak traffic (7:00 A.M. to 9:00 A.M.) and 2 lanes shall be open on northbound IL Route 29 in the PM peak traffic (4:00 P.M. to 6:00 P.M.). The lane restrictions will be allowed only if workers are present and the closure(s) is necessary to accommodate the work.

The Contractor shall schedule their operations to provide for all roadway, ramps and bridge lanes and shoulders to be open to traffic, with the exception of the lane restrictions as noted for the work being completed on the second half of S.N. 072-0250, which is the eastbound US 150 structure over IL Route 29 in Peoria, during the Winter Shutdown period. The lane restrictions will be allowed only if workers are present and the closure(s) is necessary to accommodate the work.

Construction Season 4 – April 1, 2022 to November 30, 2022

The Contractor shall schedule their operations to complete the construction of the second half of S.N. 072-0250, which is the eastbound US 150 structure over IL Route 29 in Peoria, and all remaining construction work to complete the project on or before November 30, 2022, or within such extended time allowed by the Department.

In addition, the Contractor will schedule their operations to begin demolition of the existing eastbound US 150 structure as shown in the Bridge Demolition section of the plans. Demolition of this structure may continue into the Winter Shutdown period.

Winter Shutdown December 1, 2022 to March 31, 2023

The Contractor shall schedule their operations to provide for all roadway, ramps and bridge lanes and shoulders to be open to traffic at all times.

The Contractor shall schedule their operations to complete the demolition of the existing eastbound US 150 structure by March 31, 2023.

Should the Contractor fail to complete this work by the March 31, 2023 final completion date, or within such extended time allowed by the Department, the Contractor shall be subject to the provisions outlined in Article 108.09 of the Standard Specifications.

NOISE RESTRICTIONS

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

Several residences are located in close proximity to the project site. Construction will be permitted 24 hours a day; however, in no case will pavement breaking, sawing (except in cases of sawing joints for newly poured PCC Pavement)pile driving, or other high noise volume operations be allowed between 10:00 P.M. and 7:00 A.M. unless approved by the Engineer.

REMOVAL AND SETTING OF BRIDGE BEAMS

The removal, delivery and erection of bridge beams for S.N. 072-0250 which is the eastbound US 150 structure over IL Route 29, on the project shall be limited to the hours of 8:30 P.M. to 5:30 A.M. on weekdays or weekends beginning at 8:30 P.M. Friday and extending to 5:30 A.M. on Monday or as specified by the Engineer.

The Contractor may temporarily stop traffic on eastbound US 150 and/or northbound and southbound IL Route 29 for a maximum of 20 minutes at a time to remove or set the beams. The Engineer shall be notified a minimum of seven (7) calendar days prior to work operations that will stop traffic.

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

PROSECUTION OF WORK

In order to assure the timely completion of the work involved in this project, it may be necessary for the Contractor to work extended work hours including weekends and winter seasons.

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

TEMPORARY FACILITIES INSTALLED BY CONTRACTOR

Description. This work shall consist of all labor, materials and equipment necessary to provide and subsequently remove temporary facilities required and installed by the contractor to enable access to work areas during construction.

General Construction Requirements. All means and methods employed for the installation and subsequent removal of temporary facilities to be installed by the Contractor for access or for any other reason shall be in compliance with all project permits.

The plans for temporary facilities shall be submitted to the Engineer for review and acceptance prior to starting the work. Review, acceptance and/or comments by the Department, USACE,ILEPA, IDNR and the USCG shall not be construed to guarantee the safety 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, USACE, ILEPA, IDNR nor the USCG. The Contractor is responsible for meeting all IDOT, USACE and the USCG requirements. No additional compensation or time will be allowed for USACE or USCG restrictions. The plans shall be submitted 90 days prior to beginning work.

The Contractor shall not proceed with work until written approval from each of the approval agencies has been received. Approval agencies are IDOT, USACE, ILEPA, IDNR and the USCG. Significant changes to the plans in the field must be approved by the Engineer.

The Contractor may elect to use a temporary work bridge, temporary causeway or other temporary structure in the river and floodplains to facilitate construction. The construction of the River Bridge may take place during periods of high water. The Contractor shall consider the effects of scour on any temporary substructures and on the existing and proposed bridge foundations. The Contractor shall consider the effects of high flood waters on any temporary superstructures and ensure that any temporary means does not impact or adversely affect the existing or proposed substructures.

If temporary barges, work bridges, or platforms are used for access in the river, the Contractor shall keep the navigation waterway clear and open in compliance with the project permits.

After a temporary work bridge, platform or any other facility is no longer needed, it shall be removed per Article 513.08 of the Standard Specifications for Road and Bridge Construction.

Haul roads may constitute part of the temporary facilities installed and subsequently removed by the contractor. Haul roads shall be constructed with materials (i.e., coarse aggregate) meeting the requirements of Article 1004.04 of the Standard Specifications, except if pit run gravel is used, prior approval of the source may be required by the Engineer. Upon completion of the work, the haul road shall be removed, and the floodplains returned to their original contours or the contours called for in the plans.

Submittals. If the Contractor elects to use a temporary work bridge, structural plans and procedures shall be prepared and sealed by an Illinois Licensed Structural Engineer (SE), and submitted to the Engineer for review and approval.

Basis of Payment. Temporary facilities installed by the Contractor and their subsequent removal will not be measured nor paid for separately but shall be considered as included in the unit cost of the various related pay items in the contract.

MAINTENANCE OF NAVIGATION

Description: This work shall consist of setting up work procedures, methods of protection, and scheduling work so as to maintain navigation through the bridge site to the satisfaction of the United States Coast Guard (USCG).

Materials. All lights, signs, and day markers shall conform to the applicable USCG regulations.

Construction Methods. The Contractor shall submit within four (4) weeks of award, a PLAN OF OPERATIONS that will be forwarded to the USCG by the Engineer. The PLAN OF OPERATIONS shall include a schedule of construction site activities.

The PLAN OF OPERATIONS which shall outline all of the operations affecting the waterway, including but not limited to, contractor activities to facilitate bridge construction and removal, which may include cofferdam installation, maintenance and removal, temporary causeway installation maintenance and removal (if applicable), steel erection, use of falsework, other obstructions or other temporary construction activities, demolition of the existing superstructure, demolition of the existing substructure elements, salvaging existing items, navigation light work, painting, concrete placement, or which will encroach upon navigation clearances that must be approved by the USCG.

The contractor shall so conduct his work that the free navigation of the waterway shall not be unreasonably interfered with; that the present navigation depths shall not be impaired; and that the channel through the structure shall be promptly cleared of all falsework, piling or other obstructions placed therein or caused by the bridge, to the satisfaction of the USCG. At no time shall falsework be used in the navigation channel and no more than 48 hours will be allowed for navigational channel closures.

Should the Contractor chose to construct a temporary causeway, it must be removed to the pre-construction contours following completion of the new bridge. The removal of the existing piers must be done to an elevation of two feet below the existing ground elevation, with the exception of the piers adjacent to the navigation channel, which would be removed to 12' feet below normal pool elevation.

The plan shall also include details of all floating equipment and/or vessels that will be utilized, including size (dimensions), location and length of time, including calendar dates that such equipment will be on the waterway. Location shall be interpreted to mean the positioning of any and all vessels or temporary aggregate causeway in the waterway with respect to the bridge and the navigable channel. Method of anchorage or stabilization of all floating equipment, and location of mooring sites if applicable, shall be specified in the PLAN OF OPERATIONS. The USCG will review the plan and provide comment to the Engineer within 45 days of receipt of said plan.

During construction of the new bridge, a temporary navigation construction clearance of 315-feet must be maintained to aide in navigation activities. To facilitate this reduction, a tug with a minimum of 1200 horsepower must be provided to assist vessels through the bridge on demand. It must be available 24 hours per day, 7 days per week during the times of the temporary restricted opening. The boat may also be used as a Contractor workboat, provided that the assistance of commercial tows through the area takes priority over the Contractor's normal usage.

All correspondence with the USCG shall be coordinated through the Engineer who will forward the material to the following Coast Guard office:

District Commander
Attention: Eric Washburn, Bridge Administrator
United States Coast Guard
Eighth U.S. Coast Guard District
1222 Spruce Street St. Louis, MO 63103-2832
Phone: (314) 539-3900

All correspondence should reference the construction site as "Proposed US Route 150 Eastbound (McClugage Bridge) Replacement, Mile 165.81, Illinois Waterway."

Activities in the Navigation Channel: A reasonable time limit will be allowed by the USCG for the Contractor's operations in the navigation channel for activities including but not limited to clearing the navigation channel of demolition debris and restoring the navigation channel to full navigation capability. The amount of time allowed for work in, or closure of, the navigation channel for the Contractor's activities in the river and navigation channel will be determined by the USCG after the USCG review of the PLAN OF OPERATIONS. River traffic cannot be detoured to another span. If the USCG requires revisions or additional information, the Engineer will direct the Contractor to furnish the additional information for resubmittal (by the Engineer) to the USCG.

Deconstruction of the bridge using standard types of equipment, selectively limiting the amount of material deposited in the river. Any material accidently falling into the river must be removed and disposed out of the waterway. Closures of the navigational channel will be limited to 48 hours for this method of removal.

Deconstruction of the bridge using explosive demolition requires closure of the navigational channel to retrieve debris. Closures of the navigational channel for this method of removal is limited to 24 hours.

Notification of Commencement of Work: The Contractor shall notify the Coast Guard two (2) weeks prior to commencing any work that includes any of the activities in the PLAN OF OPERATIONS approved by the USCG.

The Contractor shall notify the USCG when construction work has reached a point where contractor construction activities in the PLAN OF OPERATIONS are complete, but in no case, later than 90 days after the bridge has been opened to highway traffic.

The purpose of this clause is to provide advance warning to commercial and other vessels utilizing the Illinois Waterway. Upon notification of schedule of work, the USCG will issue a NAVIGATIONAL ALERT for the Illinois Waterway. The USCG and the Engineer must be notified immediately of any change in anticipated work schedules. The USCG and the Engineer shall be promptly notified when work is completed, and all floating equipment has been withdrawn from the waterway.

Execution of Work over a Navigable Waterway – United States Coast Guard Requirements:

a) Work shall be conducted in a manner that does not interfere with the free flow of navigation.

b) The navigational clearances meeting the approval of the USCG shall be maintained at all times. As a minimum, the existing navigational clearances shall be maintained at all times, unless otherwise approved by the USCG.

c) Navigable depths shall not be impaired at any time. The channel through the structure shall be promptly cleared of all falsework, piling, or all other obstructions placed therein or caused by the construction or demolition of the bridge. The Contractor shall continually work in a diligent manner to meet these requirements until obstructions are cleared. The Contractor shall cooperate with the USCG and other agencies including the U.S. Army Corps of Engineers in meeting the requirements to sweep the channel clean of construction and demolition debris. No temporary construction will be permitted within the clear navigation channel without USCG approval.

d) Safety measures shall be implemented and exercised at all times to prevent accidental dropping of spark producing and/or flame producing particles or objects onto barges and vessels. All welding, flame cutting, and any other tasks having spark-producing potential shall cease when vessels are passing beneath the bridge.

e) A contingency plan in the event of personnel absences or failure of equipment, and provisions for back up equipment and qualified personnel to operate the equipment shall be included when requested by the USCG.

f) Radio communication shall be provided to assure coordination and adjustment of work activities with the approach and passing of commercial vessels, and any other maritime vessels utilizing radio communication to coordinate passage through the site.

g) The Contractor shall furnish and display such lights and danger signals upon all of his floating plant, buoys, and temporary and permanent construction as may be required for guiding and warning boats. The Contractor shall in addition, comply with all applicable regulations of the USCG. While the existing or new navigation lights on the bridge are inoperative, the contractor shall display suitable temporary navigation lights in accordance with the PLAN OF OPERATIONS. The Contractor is responsible for supplying any electrical power necessary for temporary lights and signals during construction. The Contractor shall verify that all navigational lights are functional and unobstructed at the completion of each work day.

h) Floating equipment must yield the right of way to commercial vessels.

i) Floating equipment shall display lights and signals as specified by INLAND NAVIGATIONAL RULES of 1980, copies of which are available from the United States Coast Guard.

j) A PROJECT INFORMATION RECORD document shall be executed by the Contractor at the Preconstruction Meeting and a copy thereof shall be immediately submitted to the USCG office listed above. The USCG and the Engineer shall be promptly notified of any subsequent changes in the information provided thereon. A copy of the PROJECT INFORMATION RECORD document is included in these special provisions.

Basis of Payment. This item will be paid for at the contract Lump Sum price for MAINTENANCE OF NAVIGATION, which price shall be considered as full payment for all costs incurred by the Contractor in connection with the work as described herein.

TRAFFIC CONTROL AND PROTECTION (SPECIAL)

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

This work shall be completed in accordance with Article 107.14 and Section 701 of the Standard Specifications, the staging details and notes in the plans, applicable Highway Standards, applicable District Four Standards, the Special Provisions and as specified herein.

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

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

Method of Measurement: All traffic control (except Temporary Pavement Markings) indicated on the traffic control plan details and specified in the Special Provisions will be measured for payment on a Lump Sum basis. No additional compensation will be made for any alterations, modifications or additions necessary to accommodate the traffic control to construct the various work items shown in the plans.

Basis of Payment: All traffic control and protection (including pedestrian) will be paid for at the contract Lump Sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

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

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

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

Changeable message signs not referenced within a traffic control and protection highway standard will be measured for payment separately.

TEMPORARY INFORMATION SIGNING

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

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

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

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

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

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

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

GENERAL CONSTRUCTION REQUIREMENTS

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

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

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

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

Method of Measurement: This work shall be measured for payment in Square Feet (Square Meters) edge-to-edge (horizontally and vertically).

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

Basis of Payment: This work shall be paid for at the contract unit price per Square Foot (Square Meter) for TEMPORARY INFORMATION SIGNING.

REMOVE TEMPORARY CONCRETE BARRIER, STATE OWNED

Description: This work shall consist of removing existing temporary concrete barrier and all hardware attached to the barrier. The Contractor shall use caution when salvaging the temporary concrete barrier and pin connections. The temporary concrete barriers shall be taken to the IDOT Peoria West Storage Lot, 6500 W. US Highway 150, Edwards, IL 61528. or another location as directed by the engineer. Mr. Keenan Gruttershall be contacted at 309-693-5126 prior to the removal operation to coordinate the final placement of the temporary concrete barriers in the maintenance yard. The Contractor is responsible for providing equipment to unload the wall at the maintenance facility and shall stack the barrier wall no more than two units high.

Method of Measurement: This work will be measured for payment in Feet in place at the project site along the centerline of the barrier.

Basis of Payment: This work will be paid for at the contract unit price per Foot for REMOVE TEMPORARY CONCRETE BARRIER, STATE OWNED.

MODULAR GLARE SCREEN SYSTEM (SPECIAL)

Description: This work shall consist of furnishing, installing, maintaining, and removing a temporary modular glare screen system on top of existing concrete and aluminum bridge parapet barriers.

All materials to be used shall meet the requirements of Article 638.02 of the Standard Specifications.

All work shall be performed in accordance with the appropriate Articles of Section 638 of the Standard Specifications, and in accordance with the highway standards provided and as directed by the Engineer.

Modular glare screen system will be measured for payment in feet (meters) in place, along the centerline of the modules.

Basis of Payment: This work will be paid for at the contract unit price per Foot (Meter) for MODULAR GLARE SCREEN SYSTEM (SPECIAL). which price shall include all required equipment, materials and labor necessary to complete this work.

CONTRACTOR ACCESS

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

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

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

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

MAINTENANCE OF ROADWAYS

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

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

WATER TRANSPORTATION FOR ENGINEER

Description. The Contractor will provide a safe, serviceable, 40 HP minimum motor powered boat and an adequate dock for the exclusive use of the Engineer, representatives of the Department of Transportation or representatives of the Federal Highway Administration in the control of work. The boat will be operated by the Department of Transportation personnel and shall be available for use during all periods when work is in process. The Contractor shall provide training and instruction to IDOT personnel on the boat's operation and controls. The boat shall be a minimum 18' in length. The boat shall be equipped with six life jackets, running lights for nighttime operation, two paddles, and an anchor capable of preventing drift in the case of motor failure and shall be provided with bumpers to protect the side while landing at barges or docks. The boat shall also be equipped with a throwable life line such as a floating ring. The Contractor shall provide the Engineer with a minimum of three sets of ignition and lock keys.

Additional items associated with the boat and/or maintenance of the boat such as gas, oil, filters, and lubrication shall be the responsibility of the Contractor. The boat shall be licensed to operate on the Illinois River and shall meet the approval of the Engineer.

Insurance shall be provided by the contractor meeting the requirements of Article 107.27 of the Standard Specifications for Road and Bridge Construction. IDOT shall be named as an additional insured on the policy. A copy of the required boat insurance shall be submitted to the IDOT prior to the performance of any work.

Basis of Payment. The cost of furnishing a boat and dock with proper equipment, including all operating expenses including insurance and maintenance will be paid for at the contract unit price per Calendar Month, or fraction thereof, for WATER TRANSPORATION FOR ENGINEER.

ENGINEER'S FIELD OFFICE, TYPE A (SPECIAL)

This item shall consist of furnishing and maintaining an Engineer's Field Office as specified in Article 670.01 of the Standard Specifications and herein.

The field office shall be within a one-mile radius of the project site and be approved by the Engineer. The office shall also have a ceiling height of not less than 2m (7 ft.) and a floor space of not less than 185 sq. m (2,000 sq.ft.). The office shall be provided with sufficient heat, natural or artificial light and air conditioning. Doors and windows shall be equipped with locks approved by the Engineer.

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

2. Sanitary facilities shall include hot and cold potable running water, lavatory and toilet as an integral part of the office.

3. Solid waste disposal consisting of ten waste baskets and an outside trash container of sufficient size to accommodate a weekly provided pick-up service. Weekly garbage pick-up service shall be provided.

4. The Contractor shall provide the following equipment and furniture meeting the approval of the Engineer.

   a. Eight desks with minimum working surface 1.8m x 1.2m (72 in. x 48 in.) each.

   b. Two desks with minimum working surface 1.1 m x 750 mm (42 in. x 30 in.) with height adjustment of 585 to 750 mm (23 in. to 30 in.) for computer use.

   c. Ten non-folding office chairs on wheels with upholstered seats, arm rests and backs.

   d. One 4-post drafting table with minimum top size of 950mm x 1.2m (37½ in. x 48 in.). The top shall be basswood or equivalent and capable of being tilted through an angle of 50 degrees. One adjustable height drafting stool with upholstered seat and back shall also be provided.

   e. Three freestanding file cabinets with locks, legal size, four drawers, with an Underwriter's Laboratories insulated file device 350 degrees one-hour rating.

   f. Fifteen folding chairs or stackable chairs.

   g. One equipment cabinet with lock of minimum dimension of 1100mm (44 in.) x 600mm (24in.) x 750mm (30 in.) deep. The walls shall be of steel with a 2mm minimum thickness with concealed hinges and enclosed lock constructed in such a manner as to prevent entry by force. The cabinet assembly shall be permanently attached to a structural element of the office in a manner to prevent theft of the entire cabinet.

   h. One office-style refrigerator with a minimum size of 0.4 cubic meters (16 cu ft.) with a freezer unit.

   i. Four electric desk type tape printing calculators and four pocket scientific notation calculators with a 1000-hour battery life.

   j. Two telephones, including at least one cordless phone, and one telephone answering machine. One telephone shall have speaker phone capability. Two telephone lines shall be provided including one for the fax machine. Additional features on the voice line shall include caller ID and 3-way calling.

   k. One photocopy machine (including maintenance and operating supplies) capable of copying field books. Supply paper and trays for 215mm x 280mm (8-1/2 in. x 11 in.); 215mm x 355mm (8-1/2 in. x 14 in.); and 280mm x 430mm (11 in. x 17 in.) sizes. The copier shall be complete with automatic feed and sorter. The machine shall be capable of scanning, copying and printing in color. The machine shall also be capable of being connected to multiple computers in the office via Wi-Fi connection and have the ability to print pdf files from a USB drive.

   l. One telecommunication fax machine, including maintenance and operating supplies. The fax machine shall use plain paper. One table for the fax machine.

m. One electric water cooler dispenser that is capable of producing hot and cold water.

n. One first-aid cabinet, fully equipped and resupplied as needed.

o. Two dry-erase marker boards minimum size 700 mm x 1.0 m (28 in. x 40 in.) with markers and erasers.

p. Four bulletin boards minimum size 700 mm x 1.0 m (28 in. x 40 in.)

q. One microwave oven (minimum size 1.6 cu. ft.).

r. One conference table or group of tables which can be arranged together to create a table that will seat at least 15 people.

s. One storage cabinet minimum size 450 mm (18 in.) wide x 300 mm deep (12 in.) x 1500 mm (60 in.) with four adjustable shelves.

t. Bookshelves - A minimum of 300mm (12 in.) deep and a minimum total available length of 15 m (50 ft.).

u. 3-6-foot folding tables.

v. One electric paper shredder.

w. One rain gauge and weather radio.

5. The office space shall be maintained and kept in a clean condition, and free of insects androdents, at all times. The Contractor shall provide janitorial and/or cleaning service a minimum of once a week. Windows should be cleaned as directed by the Engineer. Maintenance shall include, but not be limited to, paper towels, soap, toilet paper, and other necessary supplies. No additional compensation will be allowed for providing this service, but it shall be included in the item ENGINEER'S FIELD OFFICE, TYPE A (SPECIAL).

6. An electronic security system that will respond to any breach of exterior doors and windows with an on-site alarm shall be provided. The Contractor shall be responsible for security of the field office building and is liable for damages incurred because of vandalism, theft and other criminal activities. Broken windows shall be replaced at no additional cost.

7. The Contractor will be responsible for systems maintenance and repairs, which shall include the heating, cooling, sanitary, and water distribution systems and light bulb replacements.

8. Fire extinguishers meeting the local municipalities' requirements shall be provided.

9. Window Shades or blinds shall be provided for all windows, as directed by the Engineer.

10. The Contractor shall be responsible for snow removal from parking areas and sidewalks surrounding the building.

11. The Contractor shall pay the cost of any building or equipment inspections by the local municipality. The Contractor shall also pay all costs to comply with the maintenance type inspection findings.

12. The Contractor shall provide a high-speed internet service connection with a download speed of a minimum of 25 Mb/sec. Additionally, a wireless router capable of supplying adequate signal to the field office shall be provided.

13. The Contractor shall provide a minimum of ten (10) keys to the office door(s).

Basis of Payment. The building, fully equipped as specified herein and accepted by the Engineer, will be paid for monthly until the building is released by the Engineer. The Contractor will be paid the contract bid price Each Month, provided the building is maintained, equipped, and utilities furnished. The building, fully equipped and maintained as specified herein, will be paid for at the contract unit price per Calendar Month or fraction thereof for ENGINEER'S FIELD OFFICE, TYPE A, (SPECIAL). This price shall include all utility costs and shall reflect the salvage value of the building, equipment and furniture which becomes the property of the Contractor after release by the Engineer, except that the Department will pay that portion of each monthly long-distance telephone bill in excess of $50.

ENGINEER'S FIELD LABORATORY (SPECIAL)

Description: This item shall consist of furnishing and maintaining an Engineer's Field Laboratory as specified in Article 670.01 of the Standard Specifications and herein.

The field laboratory shall have a ceiling height of not less than 2 m (7 ft.) and a floor space of not less than 35 sq. m (380 sq.ft.). The laboratory shall be provided with sufficient heat, natural and artificial light and air conditioning. Sanitary facilities shall include hot and cold potable running water, lavatory and toilet as an integral part of the office. Doors and windows shall be equipped with locks approved by the Engineer. The lab shall be adjacent to, or integral with, the field office. The Engineer's Field Laboratory shall be equipped with an electronic security system that will respond to any breach of exterior doors and windows with an on-site alarm will be provided.

The Contractor shall be responsible for the security of the field office building and is liable for damages incurred because of vandalism, theft, and other criminal activities. Broken windows shall be replaced at no additional cost.

The Contractor will be responsible for systems maintenance and repairs, which shall include the heating, cooling, sanitary, and water distribution systems and light bulb replacements.

Windows shall be equipped with exterior screens to allow adequate ventilation. Window shades or blinds shall be provided for all windows, as directed by the Engineer. Fire extinguishers meeting the local municipalities' requirements shall be provided.

The Contractor shall be responsible for snow removal from parking areas and sidewalks surrounding the building.

The Contractor shall pay the cost of any building or equipment inspections by the local municipality. The Contractor shall also pay all costs to comply with the maintenance type inspection findings.

The lab space shall be maintained and kept in a clean condition, and free of insects and rodents, at all times. The Contractor shall provide janitorial and/or cleaning service a minimum of once a week. Windows should be cleaned as directed by the Engineer. Maintenance shall include, but not be limited to, paper towels, soap, toilet paper, and other necessary supplies.

No additional compensation will be allowed for providing this service, but it shall be included in the item ENGINEER'S FIELD LABORATORY (SPECIAL).

In addition, the following equipment and furniture meeting the approval of the Engineer shall be furnished:

(a) Four desks with minimum working surface 1.8 m x 1.2 m (72 in. x 48 in.) each and five non-folding chairs with upholstered seats, arm rests and backs

(b) One microwave oven (minimum size 1.6 cu.ft.)

(c) One microwaveable tray

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

(e) Two pocket scientific notation calculators with a 1000-hour battery life

(f) One first-aid cabinet fully equipped and resupplied as necessary

(g) One service sink and water supply for testing purposes

(h) One work bench 900 mm x 3 m x 900 mm (3 ft. x 10 ft. x 36 in.) high with drawers and cabinets below and three 110-volt, 20-amp outlets above the bench

(i) A digital scale of at least 11.5 kg (25 lbs.) capacity sensitive to 0.1 g (0.003 oz.)

(j) Cleaning supplies as necessary

(k) A uniform, rigid foundation, such as provided by a cube of concrete weighing not less than 90 kg (200 lbs.), for use when performing soil proctor tests

(l) One photocopy machine with automatic feed capable of reproducing prints up to legal size [215 mm x 355 mm (8 1/2 in. x 14 in.)], including maintenance and reproduction paper

(m) One electric water cooler dispenser capable of producing hot and cold water.

(n) Bookshelves a minimum of 300 mm (12 in.) deep and a minimum total available length of 10m (30 ft.)

(o) One equipment cabinet of minimum inside dimension of 1,500 mm (60 in.) high x 900 mm (36 in.) wide x 750 mm (30 in.) deep

(p) One office-style refrigerator with a minimum size of 0.4 cubic meters (16 cu ft.) with a freezer unit

(q) One dry-erase marker board minimum size 700 mm x 1.0 m (28 in. x 40 in.) with markers and erasers

(r) One bulletin board minimum size 700 mm x 1.0 m (28 in. x 40 in.)

(s) A cabinet or vault shall be provided for the nuclear density equipment which shall have a suitable barrier system of concrete, steel, lead, or other radiation barrier material and shall remain at the job site. It shall have a dimension capable of holding two nuclear gauges being stored at the job site and shall have a lock for security to prevent intruders from gaining access to the equipment. All walls and doors of the unit shall be sufficient thickness to prevent any radiation leakage from the equipment should a malfunction occur which would allow this leakage. A grounded outlet or power supply shall be located adjacent to the unit.

(t) If the lab is separate from the field office or has a lockable door separating it from the field office, the Contractor shall supply a minimum of 10 keys to the Engineer.

(u) The Contractor shall provide a high-speed internet service connection with a download speed of a minimum of 25 Mb/sec. Additionally, a wireless router capable of supplying adequate signal to the field laboratory shall be provided.

Basis of Payment. The building, fully equipped as specified herein and accepted by the Engineer, will be paid for monthly until the building is released by the Engineer. The Contractor will be paid the contract bid price Each Month, provided the building is maintained, equipped, and utilities furnished. The building, fully equipped and maintained as specified herein, will be paid for at the contract unit price per Calendar Month or fraction thereof for ENGINEER'S FIELD LABORATORY (SPECIAL). This price shall include all utility costs and shall reflect the salvage value of the building, equipment and furniture which becomes the property of the Contractor after release by the Engineer, except that the Department will pay that portion of each monthly long-distance telephone bill in excess of $50.

The Contractor shall be responsible for the repair and maintenance of the field lab. No extra payment will be made for systems maintenance, repairs or for damages incurred as a result.

FALCON PROTECTION

Description: This work shall consist of furnishing, installing, maintaining and removing Falcon Protection on all spires of both the existing eastbound US 150 (McClugage) Bridge (S.N. 090-0070) and the westbound US 150 (McClugage) Bridge (S.N. 090-0115). Peregrine Falcons have been observed nesting on the spires of the eastbound US 150 Bridge.

Falcon Protection shall be installed over each peak spire of both Eastbound and Westbound US 150 bridges over the Illinois River to prevent a falcon(s) from nesting during this project.

Falcon Protection shall consist of Heavy Delta Knotless Netting, ½" inch square mesh netting, UV stabilized polypropylene or equivalent, minimum breaking strength of 250 pounds per foot by tensile strength test method ASTM D 4595, and have a NON translucent color and will be installed prior to February 1st or after August 31st of the construction year so as to prevent a falcon(s) from landing or nesting on the bridges. The Falcon Protection shall extend from the top cross-beam of each spire to a location beneath the connecting splice plates as shown in the Falcon Netting detail contained herein. Refer to Exhibits 1 and 2 in this document.

In addition, it is the Contractor's responsibility to ensure that all splice plate connection cavities within the netted area of each bridge are enclosed so as to prevent a falcon(s) from nesting in them. If a falcon(s) is able to nest on or within any spire, they cannot be disturbed, harmed or harassed without an Incidental Take Authorization which takes a minimum of 6 months to acquire.

All bridge construction work within a minimum of 400 feet of a nest shall be stopped during the time period from February 1st through August 31st, or until such time is deemed safe, if a falcon(s) is nesting on either bridge. Any delay this creates shall not release the Contractor from any completion day or working day requirements.

Navigation fixtures (lights, conduits, etc.) shall not be used to secure the Falcon Protection in place. The Falcon Protection shall not be installed in a manner that obscures, blocks, covers or otherwise prohibits riverboat traffic from viewing the navigation lighting on the structure. All Coast Guard fines and penalties deriving from obscured navigation lighting shall be solely the Contractors responsibility and no additional compensation from the State shall be allowed.

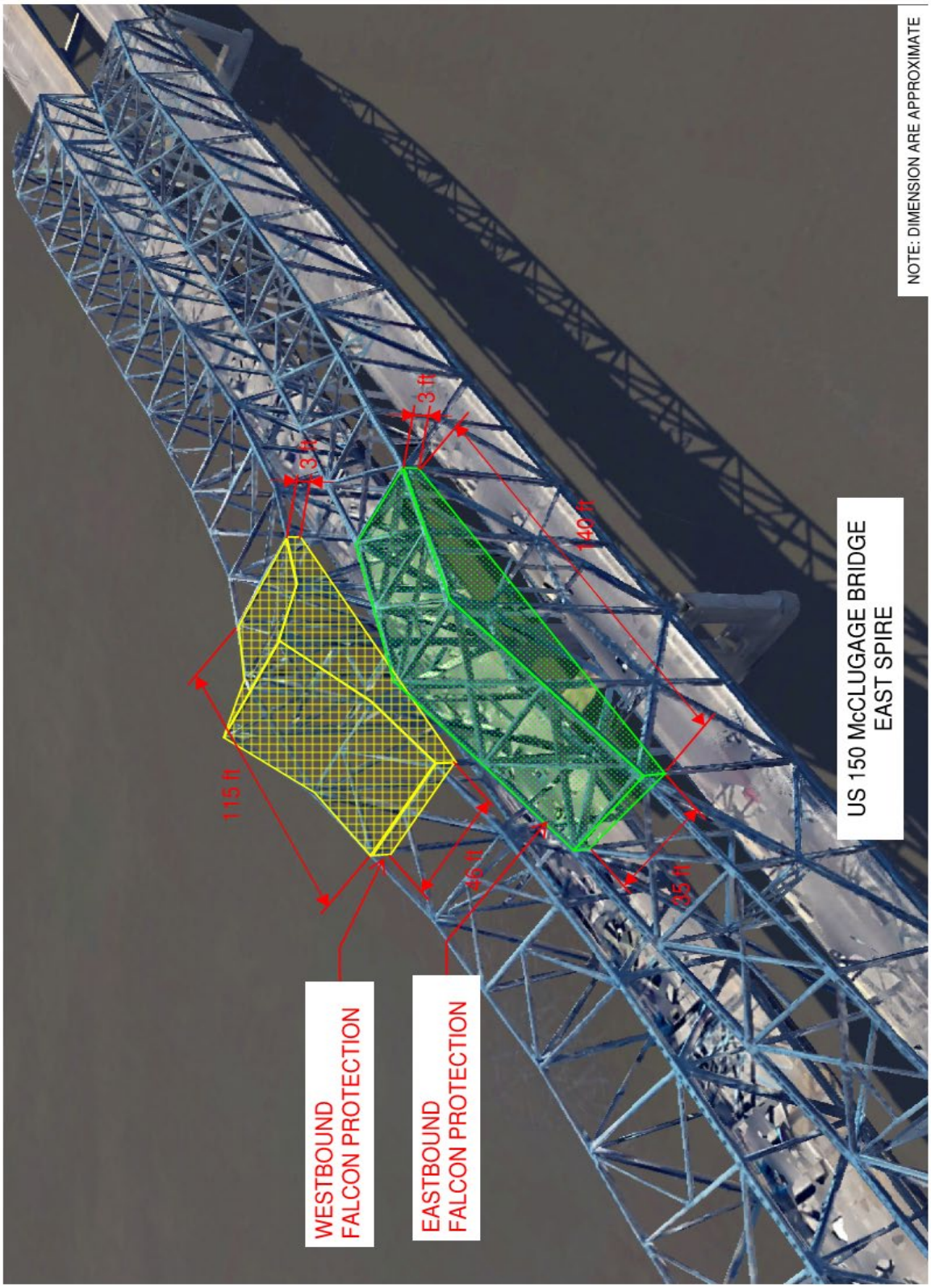
The Falcon Protection shall remain in place until all work on the new eastbound US 150 (McClugage) Bridge and roadways is completed.

<u>If a falcon(s) is observed nesting on either bridge, the Engineer shall immediately be notified and all work within 400 feet of the nest shall be halted until the Engineer determines a course of action</u>.

<u>Method of Measurement</u>. This work will be measured per Each location, where each is defined as an individual spire location.

<u>Basis of Payment</u>. This work will be paid for at the contract unit price, per Each, for FALCON PROTECTION, which price shall include all labor, equipment and material necessary to install, maintain and remove all netting and appurtenances required to shield each spire.

EAST PEAKS


NOTE: DIMENSION ARE APPROXIMATE
US 150 McCLUGAGE BRIDGE
EAST SPIRE
3 ft
3 ft
140 ft
115 ft
46 ft
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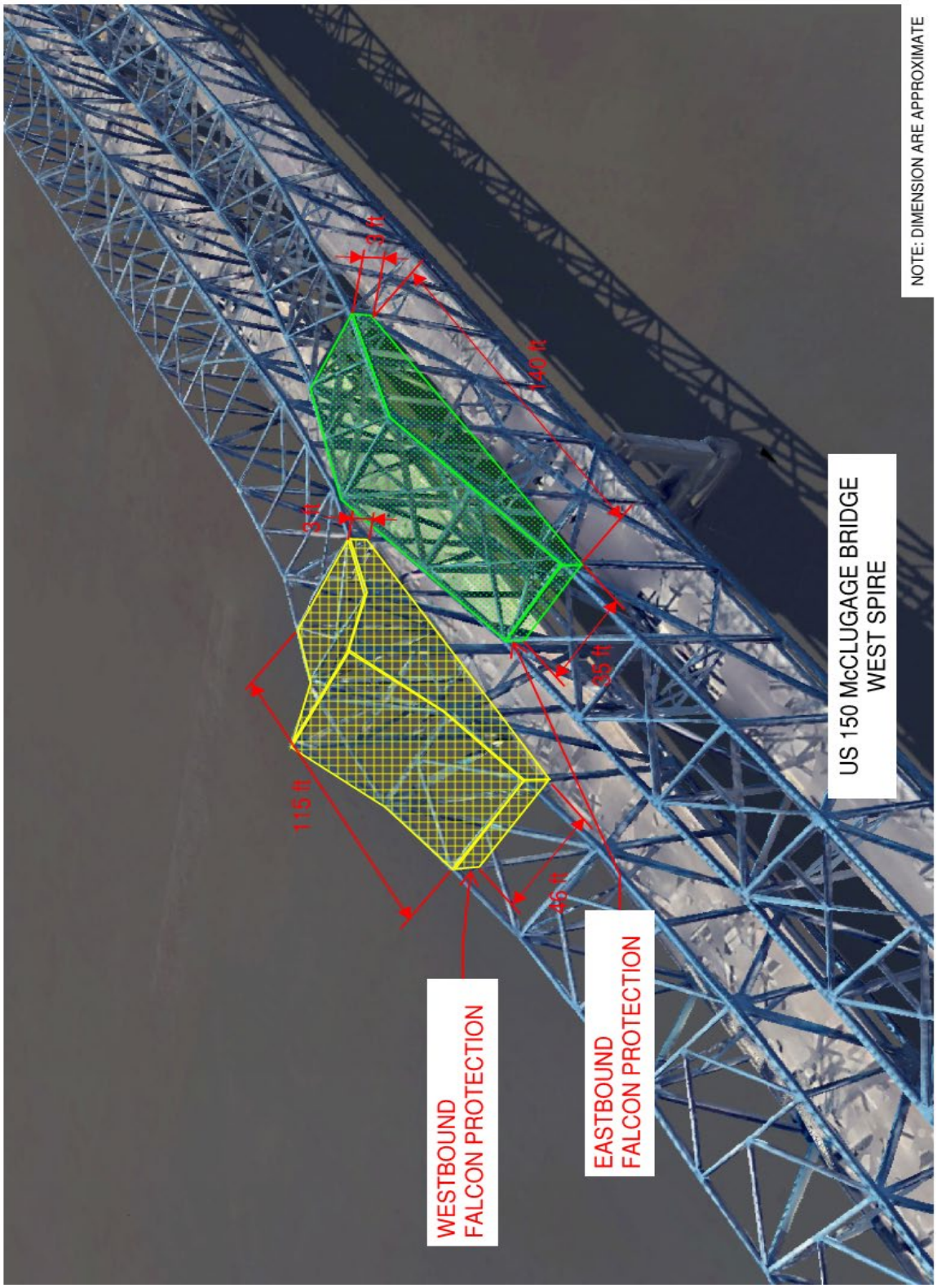
WESTBOUND
FALCON PROTECTION
EASTBOUND
FALCON PROTECTION

WEST PEAKS


NOTE: DIMENSION ARE APPROXIMATE
US 150 McCLUGAGE BRIDGE
WEST SPIRE
3 ft
140 ft
2 ft
95 ft
115 ft
46 ft
WESTBOUND
FALCON PROTECTION
EASTBOUND
FALCON PROTECTION

STAGED EMBANKMENT CONSTRUCTION

Design analyses predict large settlements and slope instability for the proposed embankment at the eastern approach to the Illinois River Bridge. Staged embankment construction is required to allow subgrade soil consolidation and strength gain before fill is placed to its maximum height. The restrictions in this special provision shall apply to the proposed US 150 EB embankment between the Illinois River and Sta. 2162+00.

Construction Requirements: Install settlement platforms and settlement monitoring points in accordance with the Settlement Platforms special provision before placing any embankment fill. Survey and record initial readings on these devices. Contractor and Engineer shall perform visual inspection of adjacent EB US 150 pavement, bridge approach slab, and bridge abutment. Document any signs of prior detrimental settlement for comparison to future inspections.

FIRST STAGE

Place sand drainage blanket and wick drains. Begin settlement monitoring program and take readings at the intervals defined in the special provisions throughout the remainder of the construction period. Place embankment fill up to Elevation 460.00 as shown on the plans.

Suspend further embankment construction while waiting for approximately 75% consolidation of the subgrade soil layers at Sta. 2157+45 under the first stage. Waiting period is 90 calendar days with wick drains installed per plans, 110 days without wick drains.

First Stage Estimated Settlements

Location	Total Settlement (U=100%)	End of Stage Settlement	With Wicks		No Wicks	
			t_{50}	t_{90}	t_{50}	t_{90}
Sta. 2157+45, 35' RT	7.4 in	5.4 in	24	260	27	350
Sta. 2158+50, 12' RT	3.8 in	2.6 in	35	220	44	300
Sta. 2161+50, 40' RT	2.9 in	2.7 in	12	80	13	90

After waiting period, complete verification boring to confirm strength gain of native soil. Construction of embankment may resume upon approval of verification boring results by Engineer.

SECOND STAGE

Place embankment fill up to bottom of pavement. Wait for settlement rate to taper off to tolerable levels before placing final pavement. Settlement times in table below are from completion of second stage embankment, assuming second stage is completed between 250 and 140 days after first stage.

Total Estimated Settlements

Location	Total Settlement (U=100%)	With Wicks		No Wicks	
		t_{90}	t_{95}	t_{90}	t_{95}
Sta. 2157+45, 35' RT	12.0 in.	160 - 200	290 - 340	250 - 290	440 - 480
Sta. 2158+50, 12' RT	7.3 in.	240 - 260	370 - 390	240 - 260	370 - 390
Sta. 2161+50, 40' RT	4.4 in.	26 - 35	52 - 63	44 - 47	80 - 85

Bridge abutment and temporary pavement may be constructed before second stage settlement period is complete.

Basis of Payment: This work will not be measured or paid for separately but shall be considered as included in the unit prices for other related items.

SETTLEMENT PLATFORMS

Settlement platforms shall be erected at the locations listed below. The settlement platforms shall be constructed according to the details in the plans and Section 204 of the Standard Specifications.

Settlement Platforms

#1 Sta. 2157+45, 35' RT
#2 Sta. 2158+50, 12' RT
#3 Sta. 2161+50, 40' RT

Settlement monitoring points shall be marked or attached to the existing bridge at the locations listed below.

Settlement Monitoring Points

A. Sta. 2157+06, 35' LT Back side of bridge approach parapet at bridge abutment
B. Sta. 2157+36, 35' LT Top of bridge approach slab

Settlement readings will be taken by the Engineer on a weekly basis.

Basis of Payment: This work will be paid for at the contract unit price per Each for SETTLEMENT PLATFORMS complete in place and includes all labor, material and equipment necessary to complete the work.

Settlement monitoring points will not be measured for payment but will be considered included in this work.

SAND DRAINAGE BLANKET

The work of this item consists of furnishing all materials and equipment necessary for the construction of a sand drainage blanket to form a horizontal drainage layer between the proposed embankment and the existing or prepared ground surface.
Materials: The sand for the drainage blanket shall conform to Section 1003 of the Standard Specifications. The gradation shall be FA 1, FA 2, FA 6 or FA 20 Class A or B quality, except that the percentage passing the No. 200 sieve shall be a maximum of 6 percent.

The crushed stone and/or crushed gravel for drainage blanket protection shall conform to Section 1004 of the Standard Specifications. The gradation shall be CA 1.

Construction Requirements: The sand drainage blanket shall be constructed to the thickness and within the lines and grades shown on the plans. Sand shall be placed or spread into loose lifts and compacted in a manner approved by the Engineer.

The edge of the sand blanket at the toe of the slope shall be protected with a layer of crushed stone and/or crushed gravel as shown on the plans. The drainage blanket protection shall be maintained until the second stage embankment settlement period has ended and paving is complete. At that time, the drainage blanket protection shall be removed or incorporated into the embankment.

Final cover of the drainage layer shall be topsoil, french drain, or riprap as shown on the plans.

Method of Measurement: The sand drainage blanket will be measured as Cubic Yards of sand, crushed stone and/or crushed gravel placed and no allowance will be made for any material placed outside the lines specified on the plans or as directed by the Engineer.

Filter fabric and riprap used in french drains will not be measured but will be included in the cost of this work. Riprap and topsoil will be measured under other items of work.

Basis of Payment: The sand drainage blanket will be paid for at the contract unit price per Cubic Yard of SAND DRAINAGE BLANKET.

WICK DRAINS

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

Submittals:

Within two weeks of the preconstruction meeting, the Contractor shall submit to the Engineer the following for review:

1. Details of the equipment, sequence, and method of installation.

2. Wick Drain samples indicating the source of the materials.

3. List of a minimum of three projects of similar size and scope, where the same type of wick drains was installed, including details of the performance on those projects.

4. Manufacturer's literature documenting the physical and mechanical properties of the wick drains recommended, including a letter of certification from the manufacturer documenting test results indicating that the required wick drain materials are in accordance with this specification.

Four weeks prior to installation, the Contractor shall submit the wick drain detailed drawings to the Engineer for review. The detailed plans shall indicate the wick drain layout and spacing, within the limits as shown on the plans and tied to the roadway alignment baseline. Top and bottom elevations of the wick drains shall also be listed on the plan.

At the end of each working day, the Contractor shall supply a daily summary of the wick drain installation. The summary shall include the drain type, locations, and quantity, (i.e. length to the nearest 4 inches). In addition, the documentation shall include any field adjustments, and splicing information at each location.

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

1. Wick drains shall be of newly-manufactured materials and shall consist of a core enclosed in, or integrated with, a jacket. The jacket shall allow free passage of pore water to the core without loss of soil material or piping. The core shall provide continuous vertical draining

2. The wick drains shall be a pre-fabricated band-shaped drain with an aspect ratio (width divided by thickness) not exceeding 50.

3. The jacket material shall be a synthetic non-woven geotextile capable of resisting all bending, punching, and tensile forces imposed during installation and during the design life of the wick drain, including localized damage (e.g. punching through the filter by sand/gravel particles).

4. The jacket shall be sufficiently rigid to withstand lateral earth pressures due to embedment and surcharge so that the vertical flow capacity through the core will not be adversely affected.

5. The jacket shall be sufficiently flexible to bend smoothly during installation and induced consolidation settlement without damage.

6. The jacket shall not undergo cracking and peeling during installation of the wick drain.

7. The jacket shall conform to the following additional criteria:

Test Property	Test Method	Minimum Value*
Grab Tensile Strength	ASTM D4632	80 lbs.
Trapezoidal Tear	ASTM D4533	25 lbs.
Puncture Strength	ASTM D4833	50 lbs.
Mullen Burst Strength	ASTM D3786	130 psi

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

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

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

Assembly:

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

The assembled wick drain shall be resistant against wet rot, mildew, bacterial action, insects, salts in the groundwater, acids, alkalis, solvents, and any other significant ingredients in the site groundwater.

One single type of assembled wick drain should be used on the project unless otherwise directed by the Engineer.

The assembled wick drain shall have a minimum equivalent diameter of 2.1 inches using the following definition of equivalent diameter:

$D_W = (A + B)/2$
D_W = diameter of a circular drain equivalent to the band shaped drain
A = width of a band shaped drain
B = thickness of a band shaped drain

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

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

Wick drains shall be staked out by the Contractor. The locations of the wick drains shall not vary by more than 6" inches from the locations on the drawings, as specified, or as directed by the Engineer. Wick drains that are out of their proper location by more than 6" inches, are damaged during installation, or are improperly completed, will be abandoned in-place and no compensation will be allowed for any material furnished or for work performed on such wick drains.

The Engineer may vary the depths, spacing, or the number of wick drains to be installed, and may revise the plan limits for this work, as necessary.

The drainage wick shall be installed using a mandrel or sleeve that is continuously vibrated or statically pushed into the soil. The sleeve shall protect the wick material from tears, cuts, or abrasion during installation, and shall be retracted after each drainage wick is installed. The sleeve shall be rhombic or rectangular in shape, and of a cross-sectional area not to exceed 10 square inches. To minimize disturbance to the subsoil, the sleeve shall not be advanced into the subsoil using impact methods. In no case will alternate raising and lowering of the mandrel be permitted. Raising of the mandrel will only be permitted after completion of a wick drain installation. The equipment must be carefully checked for plumbness prior to advancing each wick, and must not deviate more than one inch per five feet from vertical.

Wick drains shall completely penetrate the compressible soft to stiff clay overburden at the site.

The Contractor is permitted to use augering or other methods to loosen stiff upper fill soils, such as existing pavement fragments or granular sub-bases, prior to wick drain installation. No additional compensation will be made for augering or loosening of the existing fill soils.

Where obstructions other than existing pavement fragments or existing granular sub-bases are encountered below the working surface, which cannot easily be removed or penetrated using normal and accepted procedures, the Contractor shall complete the wick drain from the elevation of the obstruction to the working surface and notify the Engineer immediately.

Splices or connections of wick drain material shall be done by stapling in a workman-like manner so as to assure structural and hydraulic continuity of the wick drain. The jacket and core shall be overlapped a minimum of 6-inches at any splice. A maximum of one splice per drain installed will be permitted, unless otherwise directed by the Engineer.

The installed wick drains shall be neatly cut at its upper end at the working surface at each drain location.

Quality Assurance:

Prior to the installation of wick drains within the designated areas, the Contractor shall demonstrate his equipment, methods, and materials, to produce a satisfactory installation in accordance with these specifications. For this purpose, the Contractor shall install 6 trial wick drains totaling approximately 240 linear feet at locations designated by the Engineer. Payment will be made at the bid price per for wick drains. Payment will not be made for unsatisfactory trial wick drains.

Approval by the Engineer of the method and equipment to install the trial wicks shall not necessarily constitute acceptance of the means and methods for the remainder of the project. If, at any time, the Engineer considers that the method of installation does not produce a satisfactory wick, the Contractor shall alter his method and/or equipment as necessary to comply with these specifications.

Wick drain materials shall be labeled or tagged in such a manner that the information for sample identification and other quality control purposes can be read. As a minimum, each roll shall be identified by the manufacturer as to lot or control numbers, individual roll number, date of manufacture, manufacturer and product identification of the jacket and core.

The Contractor shall provide the Engineer with suitable means of making a linear determination of the quantity of wick material used in each wick location. During installation, the Contractor shall provide suitable means of determining the depths of the wick drains at any given time.

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

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

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

SOIL SAMPLING AND TESTING

Description: This work shall consist of all labor, materials, equipment and services necessary to collect subsurface soil samples and perform geotechnical testing on the samples. The tests are intended to provide verification of soil strength gain after settlement of the first stage of embankment.

Prequalification: This work shall be performed by a subcontractor or engineering consultant with prequalification in Subsurface Explorations and/or Geotechnical Services – General Geotechnical Services. Prequalification shall be based on the current List of Prequalified Engineering Consultant Firms as published by the IDOT Bureau of Design and Environment.

Construction Requirements: Drilling, sampling, laboratory testing, and reporting shall be in accordance with the IDOT Geotechnical Manual.

A soil test boring shall be drilled through the first stage of the proposed embankment after the settlement period has completed. Boring shall be located within 10' feet of the location shown on the plans. Contractor shall adjust location to avoid interference with installed wick drains and survey as-drilled location for station, offset and ground elevation.

Borings shall be advanced using auger or rotary techniques. Standard Penetration Test (AASHTO T 206) samples shall be performed at 2.5' feet intervals between the embankment surface and the bottom of the sand drainage blanket. Three-inch (3") diameter Shelby tubes (AASHTO T 207) shall be collected continuously (at 2' feet intervals) between the bottom of the sand drainage layer and Elevation 410.

Testing shall consist of:

- Rimac unconfined compressive strength tests and natural moisture content (Illinois Modified AASHTO T 265) on all SPT samples.

- Unconfined compression test (AASHTO T 208) on representative samples from Shelby Tubes with a minimum of 2 tests per Shelby Tube.

- Natural moisture content (Illinois Modified AASHTO T 285) at 6 inch intervals from Shelby Tube samples.

Final boring log shall be prepared using IDOT BBS Form 137 or equal. Shelby Tube Test Results shall be reported on Form BMPR SL24 or equal.

Submittals: Submit final, typed boring log and lab test report no later than ten (10) days after completion of boring.

Basis of Payment: The work under this special provision will be paid for at the contract unit price per Each for SOIL SAMPLING AND TESTING. Each will be defined as a single soil boring of the depth indicated, including all drilling, sampling, testing, and reporting.

TEMPORARY PAVEMENT REMOVAL

Description: This work shall be performed in accordance with Section 440 of the Standard Specifications, except as herein modified.

Method of Measurement: This work shall be measured for payment in Square Yards, regardless of the type of temporary pavement removed.

Basis of Payment: This work shall be paid for at the contract unit price, per Square Yard for PAVEMENT REMOVAL.

APPROACH SLAB REMOVAL

Description: This work shall consist of furnishing all labor, materials, and equipment necessary for the removal of the existing reinforced concrete bridge approach slabs at the locations shown on the plans and/or directed by the Engineer. This work shall be done in accordance with applicable portions of Section 440 of the Standard Specifications or as otherwise directed by the Engineer.

The existing bridge approach slabs are a minimum of 20' feet in length from the end of the vaulted span pile cap at each abutment location and span the full width of the existing roadway. The median is included as part of the slab. The approach slabs consists of reinforced concrete pavement approximately 10½" inches thick and varies to 16½" inches thick along the longitudinal edges. Beyond the 20' feet in length, the approach slab is reinforced with welded wire fabric.

It shall be the responsibility of the Contractor to determine the thickness of the existing pavement structure, including overlays, and any appurtenances to be removed, and the extent to which they are reinforced. No additional compensation shall be allowed because of variations from assumed thickness or quantity of reinforcement.

The approach slabs, including overlays, shall be removed in their entirety. Where the subbase will remain, voids resulting from these removals shall be backfilled with compacted aggregate subgrade, 12" inches to the proposed subgrade elevations.

Method of Measurement: APPROACH SLAB REMOVAL will be measured for payment in-place and the area computed in Square Yards.

Basis of Payment: This work will be paid at the contract unit price per Square Yard for APPROACH SLAB REMOVAL measured in place, which price shall be considered payment in full for all labor, equipment, materials, removal and disposal, including any backfill as specified.

TEMPORARY INLET DRAINAGE TREATMENT
Effective January 1, 1997

Description: This work shall consist of providing temporary drainage of the pavement as shown on the plans.

Basis of Payment: This work will not be paid for separately but shall be included in the cost of the inlet.

DRAINAGE STRUCTURES, TYPE 1, SPECIAL

This work shall consist of constructing drainage structures with one Type 20 Frames and Grates for each structure. This work shall be performed as detailed on the plans and according to Section 602 of the Standard Specifications. This work will be paid for at the contract unit price per Each for DRAINAGE STRUCTURES, TYPE 1 SPECIAL.

DRAINAGE STRUCTURES, TYPE 2, SPECIAL

This work shall consist of constructing drainage structures with two Type 22 Frames and Grates for each structure. This work shall be performed as detailed on the plans and according to Section 602 of the Standard Specifications. This work will be paid for at the contract unit price per Each for DRAINAGE STRUCTURES, TYPE 2 SPECIAL.

MANHOLE FRAMES TO BE ADJUSTED.

This work shall consist of adjusting the existing structure within the median at Station 2163+60. Contractor shall remove top of manhole structure and frame as necessary to meet new design grades and replace lid with Type 1, Open Lid. This work shall be performed as detailed on the plans and according to Section 603 of the Standard Specifications. This work will be paid for at the contract unit price per Each for MANHOLE FRAMES TO BE ADJUSTED.

PROPOSED STORM SEWER CONNECTION TO EXISTING STORM SEWER

Description: This work shall include the permanent connection of proposed storm sewers to existing storm sewer on the plans in accordance with the applicable portions of Section 550 of the Standard Specifications and as specified herein.

The Contractor shall be responsible for field verification of proposed invert connection locations prior to commencing any storm sewer work. Connections to existing storm sewers shall provide a clean fit and a concrete collar provided as necessary or as directed by the Engineer.

Basis of Payment: This work will be measured and paid for at the contract unit price per Each for PROPOSED STORM SEWER CONNECTION TO EXISTING STORM SEWER, which price shall be payment in full for all labor, material and equipment necessary to complete all the work as specified, including excavation, backfill, concrete collar and trench backfill.

PROPOSED STORM SEWER CONNECTION TO EXISTING MANHOLE

Description: Proposed storm sewers shall be connected to existing storm sewer structures at the locations shown on the plans in accordance with the applicable portions of Sections 550 and 602 of the Standard Specifications. The existing pipe to be removed for the placement of the proposed storm sewers shall be paid for as shown on the plans.

Method of Measurement: This work will be measured for payment per Each.

Basis of Payment: Payment for this work shall be at the contract unit price per Each for PROPOSED STORM SEWER CONNECTION TO EXISTING MANHOLE, which will include all labor, material, and equipment necessary to complete this item of work.

TEMPORARY CONNECTION TO EXISTING STORM SEWER

Description: Proposed storm sewers shall be connected to existing storm sewer to maintain storm water flow in the temporary condition to allow for staged construction of the proposed storm sewer. Work shall be in accordance with the applicable portions of Sections 550 of the Standard Specifications.

This work shall include placement and removal of temporary pipe necessary to make connections to existing storm sewer. The existing pipe to be removed for the placement of the proposed storm sewers shall be paid for as shown on the plans.

This work shall include temporary pumping of storm water from drainage structures as directed by the Engineer if a rain event occurs before temporary connections can be made. Pumping shall continue until the connection is made. No additional compensation will be allowed for pumping.

Prior to beginning work the Contractor shall field verify the location and grade of existing storm sewer and notify the Engineer if field conditions vary from the plans.

Method of Measurement: This work will be measured for payment per Each location of a temporary connection, including any pumping of storm water if necessary.

Basis of Payment: Payment for this work shall be at the contract unit price per Each for TEMPORARY CONNECTION TO EXISTING STORM SEWER, which will include all labor, material, and equipment necessary to complete this item of work.

REMOVE CONCRETE END SECTION

Description: This work shall consist of removing concrete end sections in accordance with applicable portions of Section 501 of the Standard Specifications except as modified herein.

Method of Measurement: This work will be measured for payment per Each, regardless of size.

Basis of Payment: Payment for this work shall be at the contract unit price per Each for REMOVECONCRETE END SECTION, which will include all labor, material, and equipment necessary to complete this item of work.

ABANDON AND FILL EXISTING STORM SEWER

Description: This work shall consist of filling storm sewers to be abandoned as shown on the plans or as directed by the Engineer, with Controlled Low Strength Material (CLSM) meeting the requirements of Articles 593.02, 593.03, and 593.04 and Section 1019 of the Standard Specifications. Existing storm sewer pipe ends shall be securely sealed in accordance with Article 605.03.

Materials: CLSM shall meet the requirements of Section 1019 of the Standard Specifications.

Construction Requirements: The storm sewer pipe shall be plugged on both ends with Class SI concrete or brick and mortar. The plug shall be adequate to withstand the hydrostatic load created during the filling operation. If the plugs fail during construction, the Contractor shall be responsible for the cost of repairing the pipe plugs and filling the remainder of the storm sewer.

The Contractor shall be responsible for removing any debris associated with this work from the downstream storm sewer.

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.

Basis of Payment: This work shall be measured in place and paid for at the contract unit price per Foot for ABANDON AND FILL EXISTING STORM SEWER.

INLETS TO BE ADJUSTED WITH NEW FRAME AND GRATE (SPECIAL)

Description: Inlet 138 shall be temporarily adjusted with a new flat slab top and new Type 5 frame with open lid to allow for maintenance of traffic during staged construction, and adjusted to final grade with a new Type G-1 frame and grate upon the completion of work on Ramps A and B. Work shall be in accordance with the applicable portions of Sections 602 of the Standard Specifications.

Method of Measurement: This work will be measured for payment per Each.

Basis of Payment: Payment for this work shall be at the contract unit price per Each for INLETS TO BE ADJUSTED WITH NEW FRAME AND GRATE (SPECIAL), which will include all labor, material, and equipment necessary to complete this item of work.

DRAINAGE STRUCTURE ADJUSTMENT (SPECIAL)

Description: The existing drainage structure at US150 Station 2104+31, 29' RT shall be temporarily adjusted to allow for maintenance of traffic during staged construction. The existing drainage structure includes two existing frames and grates, adjustment of both shall be included in this work. Work shall be in accordance with the applicable portions of Sections 602 of the Standard Specifications.

Method of Measurement: This work will be measured for payment per Each.

Basis of Payment: Payment for this work shall be at the contract unit price per Each for DRAINAGE STRUCTURE ADJUSTMENT (SPECIAL), which will include all labor, material, and equipment necessary to complete this item of work.

DRAINAGE STRUCTURE TO BE REMOVED

Description:

This work shall consist of removing existing inlets and drainage structures in accordance with applicable portions of Section 605 of the Standard Specifications and as directed by the Engineer.

Method of Measurement: This work will be measured for payment per Each.

Basis of Payment: Payment for this work shall be at the contract unit price per Each for DRAINAGE STRUCTURE TO BE REMOVED, which will include all labor, material, and equipment necessary to complete this item of work.

AGGREGATE BASE COURSE, TYPE CA-7

Description: This work shall consist of constructing open graded aggregate base for permeable concrete paver pavement in accordance with the plans and applicable portions of section 351 of the Standard Specifications except as modified herein.

Materials: Modify (a) Coarse Aggregate to specify CA 7

Coarse aggregate shall be washed with less than 2% passing the No. 200 Sieve.

Construction Requirements: Delete 351.04

Modify the first sentence in the second paragraph of 351.05 to: Moisten, spread, and compact the aggregate base material on the prepared infiltration aggregate layer in one lift 4" in. thick when compacted.

Moisture requirements shall be in accordance with Type B.

Material shall be stockpiled such that material is free from standing water, uniformly graded, free from organic material, sediment, or debris.

Care shall be taken not to crush the aggregate during compaction.

The work shall be protected from sediment deposition and damage. Aggregate base materials contaminated with sediment shall be removed and replaced with clean material and compacted in a manner approved by the Engineer.

Surface tolerance of the compacted aggregate base shall not deviate by more than ±1" in. over a 10'-foot straight edge.

Method of Measurement: This work will be measured for payment per Ton.

Basis of Payment: Payment for this work shall be at the contract unit price per Cubic Yard for AGGREGATE BASE COURSE, TYPE CA-7 which will include all labor, material, and equipment necessary to complete this item of work.

INFILTRATION AGGREGATE

Description: This work shall consist of constructing open graded infiltration aggregate layer for permeable concrete paver pavement in accordance with the plans and applicable portions of Section 351 of the Standard Specifications except as modified herein.

Materials: Modify (a) Coarse Aggregate to specify CA 1

Coarse aggregate shall be washed with less than 2% passing the No. 200 Sieve.

Construction Requirements: Delete 351.04

Subgrade excavation of the permeable concrete paver pavement area shall be performed from the sides and outside of the footprint of the infiltration area where possible. If it is necessary to work in the infiltration area excavation shall be accomplished using low-impact earth-moving equipment without rubber tires within 6" in. of final subgrade elevation to prevent compaction of the underlying soils.

Subgrade soils shall not be compacted unless determined by the Engineer to be weak soils or unsuitable soils. Soils determined to be unsuitable shall be prepared in accordance with Section 301 of the standard specifications or as directed by the Engineer.

Native subgrade soils along the bottom and sides of the permeable concrete paver pavement system excavation shall be scarified or tilled to a depth of 3" in. to 4" in. prior to the placement of filter fabric (where required) or aggregate layers.

Subgrade soils shall be graded level to ±¾" of the grades shown on the plans. The subgrade shall generally be flat with slopes not to exceed 0.5% except along the 1:1 slopes of the subgrade berms as shown on the plan.

Subgrade soil preparation shall be approved by the Engineer and free of standing water prior to placement of infiltration aggregate.

Modify the first sentence in the second paragraph of 351.05 to: Moisten, spread, and compact the aggregate base material on the soil subgrade in lifts a maximum of 8" in. thick when compacted.

Moisture requirements shall be in accordance with Type B.

Material shall be stockpiled such that material is free from standing water, uniformly graded, free from organic material, sediment, or debris.

Care shall be taken not to crush the aggregate during compaction.

Care shall be taken not to wrinkle or fold the filter fabric (where required) or damage pipe underdrains during placement and compaction of the aggregate material.

The work shall be protected from sediment deposition and damage. Infiltration aggregate materials contaminated with sediment shall be removed and replaced with clean material and compacted in a manner approved by the Engineer.

Surface tolerance of the compacted infiltration aggregate layer shall not deviate by more than +/- 2 1/2 in. over a 10 foot straightedge.

Method of Measurement:
This work will be measured for payment per Cubic Yard of infiltration aggregate measured in place.

Basis of Payment: Payment for this work shall be at the contract unit price per Cubic Yard for INFILTRATION AGGREGATE which will include all labor, material, and equipment necessary to complete this item of work.

Subgrade soil preparation will not be paid for separately but shall be included in the unit cost of this item unless the material is determined to be weak or unsuitable. Additional work required to prepare weak or unsuitable subgrade in accordance with section 301 will be paid for according to article 109.04 of the Standard Specifications.

Excavation required to obtain subgrade elevations will be paid for separately at the unit price per Cubic Yard for EARTH EXCAVATION.

BEDDING MATERIAL (SPECIAL)

Description: This work shall consist of constructing proposed open graded bedding for permeable concrete paver pavement in accordance with all applicable portions of the specifications and plans.

Materials: Bedding Materials (Special) shall be in accordance with all applicable portions of 1004 except as modified below:

1004.05 add to table: Bedding Material (Special) – CA-20, Material shall be washed with less than 2% passing the No. 200 Sieve.

Construction Requirements: Material shall be stockpiled such that material is free from standing water, uniformly graded, free from organic material, sediment, or debris.

Bedding material shall not be installed in the rain or snow, and frozen bedding materials shall not be installed.

Moisten, spread, and screed the bedding material on the prepared aggregate base course layer.

Fill voids left by removed screed rails with bedding material and smooth to conform to adjacent screeded bedding material.

Bedding materials contaminated with sediment shall be removed and replaced with clean material.

The surface tolerance of the screeded bedding layer shall be +/- 3/8 inch over a 10 foot straightedge.

Pedestrian and vehicular traffic shall not be allowed on the screeded bedding layer before paving unit installation begins.

Method of Measurement: This work will be measured for payment per Cubic Yard.

Basis of Payment: Payment for this work shall be at the contract unit price per Cubic Yard for BEDDING MATERIAL (SPECIAL) which will include all labor, material, and equipment necessary to complete this item of work.

INSPECTION WELLS

Description: This work shall consist of constructing inspection wells to monitor pervious concrete paver pavement infiltration layer in accordance with the plans and applicable portions of the Standard Specifications.

Materials:	Article
Perforated Corrugated Polyvinyl Chloride (PVC) Pipe	1040.03
Controlled Low Strength Material	1019
Gray Iron Castings	1006.14
Ductile Iron Castings	1006.15

Construction Requirements: The work shall be performed in accordance with the project plan details. Install perforated vertical PVC pipe fitted with a lockable cap. Perforated PVC pipe shall extend vertically into the subgrade. Cast Iron frame and lid shall be installed flush with concrete paver pavement surface.

Method of Measurement: This work will be measured for payment per Each.

Basis of Payment: Payment for this work shall be at the contract unit price per Each for INSPECTION WELLS which will include all labor, material, and equipment necessary to complete this item of work.

PIPE UNDERDRAINS (SIZE SPECIFIED) (MODIFIED)

Description: This work shall consist of constructing pipe underdrains of the required inside diameter, in accordance with applicable portions of Section 601 of the Standard Specifications except as modified herein.

Pipe Underdrains (Modified) shall be designated as Type 2.

Type	Description
Pipe Underdrains, Type 2	A perforated pipe, without fabric, installed in the aggregate layers under permeable concrete paver pavement backfilled with coarse aggregate.

Materials

Modify (c)(6) Coarse Aggregate for Bedding and Backfill to specify……...CA 1 and CA 7

Pipe Underdrain Installation

Add: PIPE UNDERDRAINS (MODIFIED) shall be placed in the aggregate layers under permeable concrete paver pavement in accordance with the plans and outletted at all low points in the flow line of the underdrain using PIPE UNDERDRAIN (SPECIAL) according to the plans and details.

Delete paragraph (c).

Method of Measurement: All fitting for PIPE UNDERDRAINS (MODIFIED) shall be included in the unit cost per Foot for PIPE UNDERDRAINS (MODIFIED).

Basis of Payment: Payment for this work shall be at the contract unit price per Foot for PIPE UNDERDRAINS (MODIFIED) of the diameter specified which will include all labor, material, and equipment necessary to complete this item of work.

CONCRETE CURB, (SPECIAL)

Description: This work shall be performed in accordance with Section 606, Article 606.07 of the Standard Specifications except as herein modified.

The Concrete Curb shall be constructed at the locations, as shown on the plans and as directed by the Engineer. The depth of curb may vary from the standard and must match the bottom of the various pavement types as shown on the plans. In some cases, the top of curb will be flush with the top of pavement.

Method of Measurement: This work shall be measured for payment in Feet along the face of the concrete curb, including drainage castings.

Basis of Payment: This work will be paid for at the contract unit price, per Foot for CONCRETE CURB, (SPECIAL).

CONCRETE MEDIAN ,TYPE SB (SPECIAL)

Description: This work shall be performed in accordance with Section 606, Article 606.09 of the Standard Specifications except as herein modified.

The Concrete Median shall be constructed at the locations, as shown on the plans and as directed by the Engineer. Dimensions will vary from the standard and must match the transition lengths and existing median to remain as shown on the plans.

Method of Measurement: This work shall be measured for payment in place and the area computed in Square Feet.

Basis of Payment: This work will be paid for at the contract unit price, per Square Foot for CONCRETE MEDIAN, TYPE B, (SPECIAL).

CONCRETE GUTTER, TYPE A (SPECIAL)

Description: This work shall be performed in accordance with Section 606, Article 606.07 of the Standard Specifications except as herein modified.

The Concrete Gutter shall be constructed at the locations, as shown on the plans and as directed by the Engineer. Dimensions will vary from the standard and must match the transition lengths as shown on the plans.

Method of Measurement: This work shall be measured for payment in Feet along the flow line of the gutter including drainage castings.

Basis of Payment: This work will be paid for at the contract unit price, per Foot for CONCRETE GUTTER, TYPE A, (SPECIAL).

CONCRETE BARRIER BASE (SPECIAL)

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

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

Method of Measurement: Concrete Barrier Base (Special) will be measured for payment in Feet along the centerline of the base.

Basis of Payment: This work will be paid for at the contract unit price per Foot for CONCRETE BARRIER BASE (SPECIAL).

CHAIN LINK FENCE (SPECIAL)

Description: This work shall be performed in accordance with Section 664 of the Standard Specifications as shown on the plans, as directed by the Engineer and as herein modified.

Construction: The fence shall be 8 feet in height, with 3 strand angled barbed wire on top. The Contractor must coordinate with the Engineer and the Illinois American Water Company for the exact locations.

Materials: The fence material components shall meet the requirements of Article 1006.27. Barbed wire shall meet the requirements of Article 1006.28 (b). Method of Measurement: Chain Link fence will be measured for payment in feet, along the top of the fence from center to center of end posts.

Basis of Payment: This work will be paid for at the contract unit price, per Foot, for CHAIN LINK FENCE, (SPECIAL), of the height and as configured herein.

CHAIN LINK FENCE REMOVAL (SPECIAL)

Description: This work shall be performed in accordance with Article 201.01 of the Standard Specifications except as herein modified.

The fence to be removed will be determined by the Engineer and the Illinois American Water Company. Removal will include fabric, barbed wire, posts, associated hardware and foundations as well as any associated clearing needed along the line of installation of the new fence. All removed material shall be the property of the contractor, removed from the site and properly disposed of. Holes from post removal shall be backfilled with CA-6 material or suitable substitute.

Method of Measurement: Chain Link fence removal will be measured for payment in Feet, along the top of the fence from center to center of end posts.

Basis of Payment: This work will be paid for at the contract unit price, per Foot, for CHAIN LINK FENCE REMOVAL, (SPECIAL).

PORTLAND CEMENT CONCRETE SIDEWALK, 5" INCH, SPECIAL

Description: This work shall consist of the installation of PORTLAND CEMENT CONCRETE SIDEWALK, 5", SPECIAL inch in accordance with Section 424 of the Standard Specifications except as herein modified.

The surface grooves noted in Section 424.06 shall be sawcut rather than hand tooled. The grooves shall be constructed at 10'-foot maximum intervals transversely. A centerline groove shall also be sawcut.

Method of Measurement: This work shall be measured in Square Feet.

Basis of Payment: This work shall be paid for at the contract unit price, per Square Foot, for PORTLAND CEMENT CONCRETE SIDEWALK, 5" INCH, SPECIAL.

AGGREGATE FOR TEMPORARY ACCESS

Description: This work shall be performed in accordance with Section 402 of the Standard Specifications and at the locations shown on the plans except as herein modified:

Temporary access shown on the plans includes locations that lead to the Illinois River. The Contractor shall allow access to the river for the Tri-County Search and Rescue team as well as municipal and state emergency response units. The Contractor shall notify all workers on the site of this requirement and need for cooperation and shall provide Contractor emergency contacts for use by emergency responders units with contact information to allow access.

REMOVE IMPACT ATTENUATORS, NO SALVAGE

Description: This work shall consist of the removal of existing impact attenuators at the locations shown on the plans and as directed by the Engineer. This work shall be performed in accordance with Section 643 and Section 706 of the Standard Specifications except as here in modified.

Removal of the existing impact attenuators shall be done in accordance with Article 706.08. All material removed material shall be declared surplus and removed per Article 202.03. Removal shall include any previously installed base or anchoring materials.

Method of Measurement: This work shall be measured for payment per Each location, regardless of the type of attenuator to be removed.

Basis of Payment: This work shall be paid for per Each location for REMOVE IMPACT ATTENUATOR, NO SALVAGE.

COFFERCELL

Description: A Coffercell shall be defined as a permanent precast structure, consisting of engineered components, designed to isolate the work area from water to enable construction of the permanent footing under dry conditions based on the top of coffercell elevation as specified in the plans.

The Contractor shall submit a coffercell plan for each coffercell to the Engineer for review and approval a minimum of 60 days prior to the start of pier footing construction. Coffercells shall not be installed without the Engineer's approval. Work shall not be performed in flowing water except for the installation of the coffercell. The coffercell shall be primarily composed of concrete elements that may be precast as a whole and floated into place or precast in modules and assembled in place. All structural material for the coffercell shall conform to IDOT Standard Specifications. Minimum reinforcing steel clearances shall be in accordance with the latest AASHTO LRFD Bridge Design Specifications. The coffercell shall be supported on the drilled shafts and designed to carry the weight of the wet concrete footing pour until the footing is hardened. The coffercell plan shall address the following:

(a) The Contractor shall submit a coffercell plan which addresses the proposed methods of construction; proposed materials for construction; the construction sequence including staging; installation methods; methods for adjustments in the field; dewatering methods; a quality control plan; effluent water control measures; and the best management practices to prevent introduction of foreign material into the aquatic environment. For coffercells, it is anticipated the design will be based on the top of coffercell elevation listed in the plans. The Contractor shall assume all liability, financial or otherwise, for a coffercell designed for an elevation lower than the top of coffercell elevation listed in the plans. The Contractor’s submittal shall include detailed drawings, calculations and installation method, prepared and sealed by an Illinois Licensed Structural Engineer.

(b) The Coffercell plan shall detail the methods of casting, transporting, lifting, picking and placing of coffercell components in the field as well as designate any staging and precasting locations.

(c) The Coffercell plan shall detail the methods of sealing around the drilled shaft casings to ensure a sealed dry coffercell for installation and placement of the footing reinforcement and concrete in the dry.

(d) The Coffercell plan shall detail positive connectivity of the permanent coffercell to the proposed footing through reinforcing and/or multiple shear keys with appropriate calculations to justify connectivity such that the coffercell will remain a permanent part of the footing for the life of the structure. No component of the coffercell other than epoxy coated steel reinforcing bars shall extend into the substructure concrete without written approval of the Engineer. Reinforcing steel extending into the substructure shall not interfere with the footing reinforcement detailed in the plans.

(e) The Coffercell plan shall detail the limits of the coffercell. The coffercell is limited to a maximum width of 2' feet on any side of the footing. The exposed exterior faces of the coffercell shall be concrete. The exterior face of the coffercell on all sides shall be smooth and not vary in width. The thickness and surface of the bottom of the coffercell may vary and shall be within justifiable limits subject to approval by the Engineer.

(f) The Coffercell shown in the plans and specified in this Special Provision is for a precast coffercell. The Contractor may elect to utilize a coffercell with removable watertight steel forms or a combination of a precast bottom and removable watertight steel side forms. If the Contractor elects to utilize removable watertight steel forms or a combination of a precast bottom and removable watertight steel side forms, the top of the pier footing shall be modified to not provide the 1'–0" x 2'–0" (max) overhang shown in the plans and the CDWE shall be raised to Elevation 450.50 while maintaining the 13'–0" footing thickness detailed in the plans. In addition to the submittal requirements listed in the sections above that are applicable, the Contractors coffercell submittal shall include the top of footing modifications including any reinforcement modifications at the top of the footing, plans and sealed design calculations for the watertight steel forms and all other temporary components for the watertight steel forms. If the Contractor elects to use watertight steel forms or a combination of a precast bottom and removable watertight steel side forms for the coffercell, this work shall be at no additional cost to the Department.

Basis of Payment: All work associated with furnishing and installing a coffercell when specified will be paid for at the contract unit price per Each for COFFERCELL, at the locations specified.

FABRICATION AND ERECTION OF COMPLEX STEEL STRUCTURES

Description: This work shall consist of fabrication and erection for the steel tied arch span. In addition to the requirements of Article 505, the following shall apply.

The Contractor or sub-Contractor performing the erection of the steel tied arch span is herein referred to as the Erection Contractor.

The Contractor or sub-Contractor performing the fabrication of the steel tied arch span is herein referred to as the Fabrication Contractor.

Erection Contractor Qualifications: Only Erection Contractors meeting the requirements of the AISC Quality Certification Program, "Certified Structural Steel Erector (CSE)" with "Bridge Erection Endorsement", or approved equal, may be used to erect the steel tied arch span. Prior to approval for fabrication, the results of the latest AISC certification review shall be made available to the Engineer for review.

Fabrication Contractor Qualifications: Only Fabrication Contactors meeting the requirements of the AISC Quality Certification Program, "Certified Steel Bridge Fabricator – Advanced Bridge (ABR)" with "Fracture Critical Member Endorsement (FC)", or approved equal, may be used to fabricate the steel tied arch span. Prior to approval for fabrication, the results of the latest AISC certification review shall be made available to the Engineer for review.

Fabrication: All fabrication and welding, welder qualifications, welding procedure qualification, and inspection of welds shall be performed in accordance with AASHTO/AWS D1.5 Bridge Welding Code; Article 505 of the Standard Specifications; and the requirements herein.

Prior to the start of qualifying welders, tackers, welding operators, and welding procedures, the Fabrication Contractor and the Engineer shall have a conference to ensure that agreement has been reached regarding the details of the procedures, the sequence of welding to be followed, the handling of materials to be inspected, the status of qualifications for welders and welding operators, and the approval of electrodes, wire, flux, and other welding materials and equipment. It shall be the Contractor’s responsibility to call this conference at their fabricating plant at a time mutually convenient to all parties concerned.

One copy of the proposed welding procedures giving complete details for each type and thickness of joint to be used on the project, whether prequalified or subject to qualification tests, shall be submitted to the Engineer for approval prior to or at the time of submitted shop drawings. The shop drawings submitted shall indicate the welding procedure to be used for each joint. No fabrication, preparation work or welding shall commence until the fabricator receives approved shop drawings, welder qualifications, and weld procedures.

Minimizing the distortion during welding is the responsibility of the contractor. Welding fabrication sequences shall be shown on the shop drawings. Review and comment by the Engineer on the sequences does not relieve the contractor of his responsibility to fabricate the work within the tolerances specified in the AASHTO/AWS D1.5 Bridge Welding Code and herein.

No temporary or permanent welds, if not shown on the shop drawings or permitted in the specifications, shall be made without specific written authorization by the Engineer. Tack welds on fills shall not be permitted.

Permanent tack welds which will be fully incorporated into a final weld, shall be allowed at the discretion of the fabricator. Permanent tack welds shall be placed back about 3" from the ends of the final welds so that the final welds are not started or ended on a tack weld.

Temporary tack welds used for fitting purposes shall not be used. If temporary tack welds are determined by the Contractor to be necessary, it shall be approved by the Engineer.

The Engineer shall be informed about all surface defects and fabrication damages that gouge over 1/8" and a repair detail shall be submitted to the Engineer for approval. Miscellaneous and inadvertent arc strikes on the steel shall be avoided. If such strikes occur, they shall be ground flush and tested for cracks using either Liquid Penetrant or Magnetic Particle testing

Do not begin the repair of defects in the base metal, weld metal, or fabricated materials and members until the proposed corrective procedure has been approved by the Engineer.

Do not heat straighten, mechanically straighten, or distort steel plate or member until proposed procedure is approved by the Engineer.

Holes, penetrations, welds, bolts and other connections to the members of the steel tied arch span to accommodate conduits, junction boxes and other items related to lighting and electrical plans or similar miscellaneous features shall be detailed in the shop drawings and approved by the Engineer.

Shop Assembly: Article 505.05 of the Standard Specifications shall be modified as follows:

The Contractor is to develop a shop assembly plan that satisfies the fabrication and erection tolerances needed to produce a final structure meeting the specified lines and grades defined in the plans.

The shop assembly plan shall be based on the actual erection sequence and fabrication geometry specified by the Erection Contractor, and shall define the necessary fabrication and erection tolerances to attain fit-up.

At a minimum, a progressive assembly method shall be used as follows:

- Full length assembly of each arch rib (with knuckles).

- Full length assembly of the floor system, with assembly sections that include both tie girders (with knuckles), transverse floor beams and longitudinal stringers.

The progressive assembly method is to include at least three sections defined by arch rib or tie girder bolted splice locations. Each assembly is to include least one section from the previous assembly plus at least two more at the advancing end. The sequence of assembly can start at any location and can proceed in any or both directions.

Assemblies are to be based on the fabrication geometry, either in a horizontal laydown or blocked position.

Bolt holes for all field connections of arch rib, tie girder, floor beam, and stringer members shall be subpunched (or subdrilled) and reamed (or drilled) full size in assembly. Holes may be drilled in assembly ("from the solid") instead of being subpunched (or subdrilled) and reamed (or drilled). Drilling in assembly shall be done with the material in the same configuration required for reaming. The accuracy of each assembly shall be approved by the Engineer before holes are reamed (or drilled) full size.

The shop assembly plan is to define a procedure for shop assembly of the arch rib braces to the arch ribs.

All arch rib and tie girder coordinate work points for fabricated shape of each arch shall be surveyed, recorded and submitted to the Engineer for approval.

Do not ship fabricated material until the Engineer has approved the fabricated geometry.

The shop assembly plan 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. The Contractor is solely responsible for attaining fit-up in the shop and during erection. Changes to the shop assembly plan must be approved and accepted by the Engineer for the Department.

Erection Plan: The Erection Contractor shall retain the services of an Illinois Licensed Structural Engineer, experienced in the analysis and preparation of curved steel girder erection plans, for the completion of a project-specific erection plan. The structural engineer, herein referred to as the Erection Engineer, shall sign and seal the erection plan, drawings, and calculations for the proposed erection of the structural steel.

The erection plan shall be complete in detail for all phases, stages, and conditions anticipated during erection. The erection plan shall include structural calculations and supporting documentation necessary to completely describe and document the means, methods, temporary support positions, and loads necessary to safely erect the structural steel in conformance with the contract documents and as outlined herein. The erection plans shall address and account for all items pertinent to the steel erection including such items as sequencing, falsework, temporary shoring and/or bracing, girder stability, crane positioning and movement, means of access, pick points, girder shape, permissible deformations and roll, interim/final plumbness, cross frame/diaphragm placement and connections, bolting and anchor bolt installation sequences and procedures, and blocking and anchoring of bearings. The Erection Contractor shall be responsible for the stability of the partially erected steel structure during all phases of the steel erection.

The Erection Contractor shall specify the actual erection sequence to be used in the Erection Plan.

Deflection geometry for dead loads and the construction sequence assumed for design is provided in the contract plans. The Erection Engineer shall consider this geometry, the actual erection sequence specified by the Erection Contractor, the tolerances necessary for construction, and specify the fabrication geometry.

The Erection Engineer shall provide structural calculations of the tied arch span confirming final forces and stresses, including any locked-in stresses resulting from erection, within the tied arch members are adequate for all strength, service and extreme event limit states in the final condition.

The erection plan shall also include, but not necessarily be limited to:

- Documentation of any temporary river traffic shut-down for floating in the tied arch or other operations, the sequence and manner for moving the tied arch to the final position and transferring loads to the permanent bearings. Documentation shall demonstrate conformance with all permit requirements and limitations.

- The sequence and provisions for casting the deck slab.

- Details of the disposition and use of special erection equipment, falsework, jacking equipment, temporary bracing and the like, including all loads or reactions from such equipment applied to the structure during erection and sequences and timings of these effects in accordance with the erection schedule.

- Documentation of the proposed location, limits and remediation of the temporary staging work areas.

- Methods and procedures for verifying and correcting any discrepancies in the surveyed panel point locations after completion of erection of the steel superstructure and all dead load has been placed on the structure.

- Provide cable hanger installation forces along with forces at each intermediate step during construction, and a final force after construction is complete,

The structural calculations shall also include, but not necessarily be limited to:

- The calculated forces and stresses in the structural steel and deck slab produced with the Contractor’s proposed sequence and method of erection.

- Minimum and maximum vertical and horizontal reactions at all temporary support locations.

- Design of any temporary foundations required to support falsework.

- Design of all falsework and temporary bracing and subsequent temporary connections to the permanent structure.

- Verification that the permanent structure is not overstressed during erection, including any forces applied to the permanent piers or adjacent structures.

The erection plans, calculations and procedures shall be submitted as one package 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.

Survey: The Erection Contractor shall be responsible for conceiving a system of monitoring points that allows for verification of all Arch Rib and Tie Girder Work Points during erection. At a minimum, verification shall include comparing monitoring points relative relationship with the dimensions measured during shop assembly and to the geometry calculated by the Erection Engineer.

The Contractor shall record the station, offset and elevation of these points and calculate the location of the theoretical work points. All surveys shall be performed in the early morning hours to limit the differential effects of the sun. All erection equipment, deck formwork and other items affecting the deflected shape of the structure shall be removed from the structure for the duration of these surveys.

In addition to critical stages of erection as defined by the Erection Engineer, surveys shall be done at a minimum:

- After all superstructure steel and hangers have been erected, all temporary bracing has been removed and the structure is resting on its final bearing supports.

- After all dead loads have been placed on the structure.

The results of the surveys shall be reviewed by the Erection Engineer to either verify the acceptability of the geometry or to propose corrective measure. Survey data and the Erection Engineer's review shall be submitted to the Engineer for review.

Basis of Payment: This work shall not be paid for separately but shall be included in the applicable pay items according to Article 505.13 of the Standard Specifications.

BRIDGE FENCE RAILING (SPECIAL)

Description: This work shall consist of all labor, materials and equipment necessary to fabricate, furnish and erect bridge fence railing as shown in the plans, specified herein, and as directed by the Engineer. Work shall be in accordance with Sections 505, 506 and 509 of the Standard Specifications.

Materials: Structural Steel shall conform to the requirements of AASHTO M270, Grade 36, unless indicated otherwise on the plans. Tubular steel members shall conform to the requirements of ASTM A 500, Grade B. All structural steel rail elements, including posts, railing splices, anchor devices, plates and fasteners shall be galvanized and painted in accordance with the Special Provision, "Hot Dip galvanizing for Structural Steel". Chain link fabric, ties and tensioning components shall be vinyl coated in accordance with Section 509. The color of all rail components shall be blue, Munsell No. 10B 3/6.

During manufacture, transport and erection Bridge Fence Railing (Special) shall be protected from scratching, denting or other defects that may affect durability and appearance. Damaged coatings shall be repaired in accordance with Section 506.

Method of Measurement: This work shall be measured for payment in place in Feet for BRIDGE FENCE RAILING (SPECIAL). The length measured will be the overall length along the top of the longitudinal railing member through all posts and gaps.

Basis of Payment: This work will be paid for at the contract unit price per Foot for BRIDGE FENCE RAILING (SPECIAL).

HANGER ASSEMBLIES FOR TIED ARCH SPAN

Description: Work described in this Section applies to the entire hanger assembly system for the tied arch span. The hanger assemblies shall be comprised of a stay cable system in accordance with these specifications and the details provided on the plans.

The Work shall consist of designing, furnishing, fabricating, testing, storing, installing, monitoring, stressing, re-stressing, adjusting, and completing the assembly of all components of the complete stay cable system, including cable vibration suppression system and repair and/or replacement of damaged components, if necessary. The stay cable system shall allow control of the tension of the stay cable and facilitate future replacement that does not limit operation of the bridge or compromise bridge integrity.

The complete stay cable system includes, but is not limited to, main tensile elements, selected strand sheathing and/or strand coating, complete anchorage components, wedges, bearing plates, guide pipes, sealing components, stay cable vibration suppression system and components, corrosion protection provisions, temporary corrosion protection provisions during storage and construction, stay cable pipe, elastomeric boots, bolts, nuts, washers, clamping bands, erection devices and equipment, and all permanent and incidental materials and labor necessary to complete the stay cable system in accordance with the Contract requirements. The stay cable system shall allow control of the tension of the individual strands and future strand replacement. The system should provide independency for the strands regarding anchoring, corrosion protection, installation, tensioning, and replacement.

References:

Sponsor	Number	Subject
PTI	6th Ed	Recommendations for Stay Cable Design, Testing and Installation
ASTM	A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM	A307	Specification for Carbon Steel Bolts and Studs
ASTM	F3125	Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions
ASTM	A709	Standard Specification for Structural Steel for Bridges
ASTM	G14	Standard Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test)
ASTM	G20	Standard Test Method for Chemical Resistance of Pipeline Coatings
ASTM	C864	Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
ASTM	D4976	Standard Specification of Polyethylene Plastics Molding and Extrusion Materials
ASTM	D4101	Standard Specification for Propylene Plastic Injection and Extrusion Materials

Standards:

Stay cables are to be provided and tested in accordance with the PTI Guide Specification, "Recommendations for Stay Cable Design, Testing and Installation". This Section and the PTI "Recommendations for Stay Cable Design, Testing and Installation" are intended to be complementary. In case of conflict between this Section and the PTI "Recommendations for Stay Cable Design, Testing and Installation", this Section shall govern.

The following exceptions to the PTI Guide Specification, "Recommendations for Stay Cable Design, Testing and Installation" are applicable:

1. If HDPE cable pipe is used, it shall be co-extruded with a white colored outer layer (final color to be approved by IDOT and coordinated with Section 506 of the Standard Specifications). The outer light colored layer shall have an ultraviolet resistance equivalent to black pipe produced with not less than 2% carbon black. The interior layer shall be black, weather resistant, and contain not less than 2% carbon black. The co-extruded layer shall be fully bonded and the outer layer shall be a minimum of 1/16"-inch thick.

Submittals:

Shop drawings showing all dimensions, materials, and operations for fabrication of the stay cable system components shall be submitted to the Engineer for Acceptance. Shop drawings shall show the strand pattern for each cable. The Contractor shall provide detailed procedures that are recommended by the Supplier for installing all components, insertion of the strands, installation of wedges, stressing and filling of the cable void. Complete shop drawings with supporting calculations shall be submitted showing all equipment (jack, stressing chair, etc.) and procedures required for stay cable force adjustments and for complete de-tensioning. No installation will be permitted by the Engineer for any portion of the production stay cables or anchor assemblies until all required submittals of procedures and test reports are made and found to fully conform to the requirements of the Contract Documents.

Quality Control – Manufacturing of Stay Cables:

The Contractor is responsible for installing stay cable material in an undamaged condition. In order to assure that only conforming material is introduced into the Work, the Contractor shall develop a comprehensive Quality Control program that covers the procurement, packaging, transport, delivery and storage of all stay cable materials and components of the stay cables. This program shall include, but not be limited to, all procedures and practices necessary for the final installation of stay cables that meet the requirements of this Section and Section 6 of the PTI "Recommendations for Stay Cable Design, Testing and Installation" without residual damage to any component of the stay cable system.

As a minimum, the Quality Control program shall include the following items:

1. Packaging and shipping for main tension elements and all protective materials.

2. Records for traceability and shelf life of all materials.

3. Inspection of materials to assure conformance to this Section and to assure the materials are undamaged as they are installed on the bridge.

4. Limitations on storage and handling, including time periods for storing materials, temperature and humidity limitations for materials, temporary corrosion protection, and any limitation on temporary storage or protection that shall be permitted to affect performance of the completed stay design.

5. Coiling limitations for materials subject to set or plastic deformations, including prefabricated cables, HDPE pipe, Polyethylene-sheathed strand.

6. Limitations on coatings, repairs of coating damage, and supplemental protection for coated materials.

The Quality Control program shall be submitted to the Engineer and IDOT for review. Review by the Engineer and IDOT does not relieve the Contractor from the responsibility for the accuracy and adequacy of the Work.

The Quality Control program shall be approved by the Engineer and IDOT prior to procuring any stay cable materials.

Permanent records shall be established and maintained by the Contractor for all procurement, inspection, sampling, testing and installation in accordance with the requirements of Section 6 of the PTI "Recommendations for Stay Cable Design, Testing and Installation".
Materials:

1. Steel – All steel products to be used or supplied in connection with the stay cable system shall conform to the requirements of PTI Recommendations.

2. Strand – Strand for stay cables shall be 0.60" or .62" in diameter, Grade 270, fy = .9fs, weldless grade, low relaxation, seven wire strands conforming to the requirements of ASTM A416 "Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete," except that it shall be coated with a corrosion inhibiting material. During the process of manufacture of individual wires for "weldless" strand, welding is permitted only prior to or at the site of the last thermal treatment of the rod, for example, patenting or controlled cooling. There shall be no welds in the wire after it has been drawn through the first die in the wire drawing process.

   Strand coating shall be of the "filled" type where the interstitial space between individual wires is completely filled with the coating or corrosion inhibiting material meeting the requirements of the PTI Recommendations.

   Strands shall be individually sheathed with a corrosion inhibiting material. Acceptable sheathing includes High Density Polyethylene (HDPE) or High Density Polypropylene (HDPP) meeting the requirements of the PTI "Recommendations for Stay Cable Design, Testing and Installation" or otherwise as certified in accordance with the PTI Recommendations.

   The amount of corrosion inhibiting material shall be sufficient to ensure complete filling of the annular space between the individual wires of the strand and the sheathing material.

   The coating, corrosion inhibiting material, and the sheathing shall extend over the entire length of strand. No welds or joints shall be present in the finished strand.

   a. Strand Coating in the Vicinity of Wedges – The strand coating must be removed in the vicinity of the wedges. The Contractor shall provide recommendations for equipment and procedures required to do so that will not damage the strand. The actual procedures to be used by the Contractor during production must be similarly used for the acceptance testing. The Contractor shall also propose an acceptable method for providing temporary and permanent corrosion protection of the area where coating has been removed in order to accommodate the wedge grips. The Contractor’s system shall be qualified in accordance with Section 4.1 of the PTI "Recommendations for Stay Cable Design, Testing and Installation".

3. External Pipe and Cable Guide Pipe – Pipe sections shall meet the requirements of Section 3.5 of the PTI "Recommendations for Stay Cable Design, Testing and Installation."

4. Galvanized Components – Bearing Plates and all exposed carbon steel elements of the stay cable system shall be galvanized per ASTM A123.

5. Elastomeric Components – Elastomeric components, such as boots, shall be manufactured of the thickness, shapes and hardness required by the Contractor's stay cable system design. The sole polymer used to manufacture the components shall be 100% virgin chloroprene, which shall be not less than 60% by volume of the total compound. The elastomer shall meet the requirements of ASTM C864.

6. Cap Screws and Bolts – Material for cap screws, used in the cable anchorages, shall be high-strength, low alloy structural steel conforming to ASTM A307. High strength bolts, used in the cable anchorages, shall conform to ASTM F3125 Grade A325.

7. Washers and Shims – Material for split washers and split shims, if used in the cable stay anchorage, shall be high-strength, low alloy structural steel conforming to ASTM A709, Grade 50. All split washers and split shims shall be designed with a positive closure detail that will prevent shim loss upon unloading.

8. Material Storage – The storage facility provided by the Contractor shall provide indoor, protected space for weather sensitive materials. The storage facility shall provide appropriate temperature-controlled space for any and all materials that are temperature sensitive in nature. The Contractor is responsible for all stay cable system materials (including cost of leasing storage facility). The Contractor will allow immediate access to the Engineer and IDOT personnel to inspect the storage facility at any time during its use.

Component Requirements:

1. Stay cable system components shall meet the requirements as specified in the acceptance testing of the system. The cable anchor assembly shall consist of an externally threaded steel socket, anchor head, load bearing nut, and protective cap. It must allow for complete de-tensioning of the cables and subsequent removal of the anchorage components (except the load bearing nut) through the guide sleeve. The assembly shall pass, without failure of any component of the support testing outlined elsewhere in these requirements.

2. The anchorage assembly and components shall be protected at all times against corrosion, particularly the wedges and wedge holes. Corrosion protection measures shall be shown on the shop drawings and shall include temporary corrosion protection of areas (if any) where coating is intentionally removed for wedge contact. The permanent protection system shall include a stainless steel or galvanized cap to protect the exposed wedge plate and wedges from corrosion. The wedge plate and exposed strand shall be coated with a suitable grease/wax at completion.

3. The threaded portion of the socket shall be of sufficient length for installation of the cable and future force adjustment of ±2.5% simultaneously in all cables without the use of shims. The assembly shall have a capacity equal to the guaranteed ultimate strength of the cable. Calculations shall be submitted to the Engineer and IDOT showing the service stresses in all load bearing components of the assembly.

4. Requirements for Anchorages – The two ends of a stay cable are called the anchorage zones. An anchorage zone consists of:

    - The anchorage head: The systems consisting chiefly of an intermediary mechanical part designed to secure the strands of the cable and transmit their force to the attaching parts of the structure (deck crossbeam, gussets, anchor box, etc.),

    - The transition zone: Extends from the anchorage head to the start of the free length of the stay cable (cable and protective barriers); the transition zone is where the strands fan out, and may comprise deviators, transverse guide systems, internal/external dampers, and sealing systems.

    The stay cable supplier shall submit to the Engineer the assembly drawings for the sizes and types of anchorages used in the project, showing all dimensions and materials of the main components. The stay cable system proposed shall be a proven solution complying with all qualification and testing requirements of Chapter 4 of the PTI "Recommendations for Stay Cable Design, Testing, and Installation."

    All tests required by this Section whether performed for previous projects or performed for this project must be carried out or witnessed and approved by third parties.

    All stay cable systems shall provide for the future addition of at least 5% of capacity through the installation of additional strands in the existing cable without requiring cable and/or anchorage replacement. When specifying cable anchorage capacities, any group three (3) adjacent cables shall have the ability to add 5% capacity globally (thereby allowing some individual cables to be initially installed at or near anchorage capacity).

    a. Transfer of Stay Force

        Stay cable anchorages shall be designed to individually anchor each strand by a reversible means. Hard material (resin) filling or cement grouting shall not be allowed in the anchorage area.

        The anchorage device shall be capable of transmitting the full ultimate tensile force of the cable. All other components such as bearing plates, recess tubes, steel flanges, and deviators shown on the drawings shall be of suitable type and sufficient strength for the intended use.

        The stay cable supplier shall submit to the Engineer, upon his request, calculations for the justification of these components as well as results of full-scale fatigue, static and water tightness tests.

b. Filtering Out Angular Deviations

The anchorage shall comprise cable guide systems in order to prevent significant bending stresses due to angular deviations of the strand to extend to the anchorage device or wedges. The design of the cable guide system must take account of transverse and flexural forces resulting from:

1. Cable deformations caused by catenary effects and wind oscillations at service and maximum wind speed;

2. Deck and pylon anchorage rotation under live loads;

3. Inaccuracy of anchorage placing and shuttering tube misalignment;

4. Permanent angles due to the fanning out of the strands;

5. Bending of strand in the anchorage head due to manufacturing tolerances of anchorage parts.

Guide deviators placed in the transition area, imposing a transverse force on the structure ahead of the stay anchorage in the above cases, are not allowed. The anchorage shall be capable of handling by itself the following combination of deviation angles, as a minimum, without damaging the cable:

1. ±20 milliradians static angle or the installation tolerances of the connecting parts (shuttering tube misalignment), whichever is greater;

2. ±10 milliradians dynamic angle.

The stay cable supplier shall document the adequacy of anchorages to limit stresses in strands to acceptable levels through full scale testing.

c. Possibility of Tension Adjustment

All stays cables shall have the capability for force adjustments achieved by re-positioning the anchorage with respect to the structure.

This tension adjustment shall be made by means of a threaded tube and ring nut assembly. The use of shims to provide for stay tension adjustments is not permitted.

The adjustment amplitude shall be sufficient to account for the following:

1. uncertainty regarding the "neutral" position of the anchorages;

2. uncertainty of the construction loadings and of the stiffness of the structure (deck and tower);

3. uncertainty of the unstressed length, tension, and temperature of the stay cable;

4. extension of the stay cable to attain the required preloading;

5. provision for future increase in dead load (overlay/ resurfacing, widening), etc.;

6. provision for future increase in the live load;

7. deformation of the structure resulting from concrete creep and shrinkage or constructional inaccuracies, corresponding to mid-span deck deflection of L/1000 where L is the length of the relevant stay;

8. a safety factor to the satisfaction of the Engineer.

d. Possibility of Directional Adjustment

The orientation of connecting parts and anchorage heads must take account of the ideal cable-stay alignment (catenary) under the service conditions of the unloaded structure.

The anchorages must be capable of accepting static angular deviations in excess of the installation tolerances of the connecting parts.

Stay cable anchorages shall be designed to individually anchor each strand by a reversible means. Hard material (resin) filling or cement grouting shall not be allowed in the anchorage area.

The anchorage device shall be capable of transmitting the full ultimate tensile force of the cable. All other components such as bearing plates, recess tubes, steel flanges and deviators shown on the drawings shall be of suitable type and sufficient strength for the intended use.

The stay cable supplier shall submit to the Engineer, upon his request, calculations for the justification of these components as well as results of full-scale fatigue, static and water tightness tests.

Cable Damping Requirements:

This Work shall consist of the design, installation, and testing of a stay cable vibration suppression system when required as specified herein. The stay cable system shall include a vibration suppression system consisting of one or more overlapping systems (dampers (other than neoprene washers), cross ties, and/or cable surface modifications). The vibration suppression system shall provide a minimum damping ratio (percent of critical) calculated as (200 + L)/1200, where L is the stay cable length in feet, or higher damping as required to meet the performance specifications.

The Contractor shall design and construct the stay cable system to prevent excessive vibration of stay cables due to all effects of operating and environmental loadings over the range of temperature associated with steel design in the AASHTO LRFD Bridge Design Specifications. Excessive vibration is defined at two levels:

- Vibration which exceeds L/1200 under normal operating conditions, which includes rain-wind excitation and normal wind conditions up to and including 25 m.p.h.

- Vibration under any service, strength or extreme loading condition that causes damage to or fatigue failure of any strand, cable, appurtenance or bridge component. The acceptable level of vibration and displacement for strength and fatigue limit states shall be established by test.

The Contractor shall establish displacement criteria for service, strength and extreme load vibration levels, in addition to the normal operating criteria noted above, that are based on and consistent with cable testing and detailed analysis of cables and bridge components and submit criteria to IDOT for approval. The Contractor shall, in all cases, provide at least a mass-damping parameter in conformance with the commentary of Section 5.2.3.2 of the PTI "Recommendations for Stay Cable Design, Testing and Installation".

The Contractor shall warrant construction of the stay cable damping system for a period of five (5) years from date of final acceptance of the bridge. The Contractor shall modify damping system(s), cable surface treatment and cable stiffening ropes as required to achieve the performance requirements for cable vibration at no additional cost to IDOT. The Contractor will replace or repair to like-new condition all cable elements, appurtenances, or bridge components damaged by cable vibration or damaged by other environmental loading conditions in combination with cable vibration for the duration of the warranty period.

The Contractor shall have an independent laboratory perform on site testing before and after installation of the suppression system to verify that the additional damping provided by the system meets the specified value. The Contractor shall also propose a detailed pre-installation qualification plan for the suppression system to demonstrate through physical testing that the system will meet these requirements. The pre-installation qualification plan shall provide detailed methods for remedy of damping value if the post-installation testing indicates that the required additional damping value has not been achieved for each stay cable. Following completion of these tests, the Contractor shall submit to IDOT a Cable Damping Evaluation Report that demonstrates that the performance of the vibration suppression system meets or exceeds the required performance level.

Provisions shall be made by the Contractor to facilitate rapid introduction of temporary suppression measures for stay cable susceptible to vibrations during construction. The cables shall be monitored for vibrations. Monitoring shall take place during erection at the time of major wind events and under the combined action of wind and rain.

Testing (General):

An independent testing laboratory (or laboratories) selected by the Contractor and submitted to IDOT shall test all materials, strands and cable specimen assemblies required for both the initial acceptance-testing phase and the stay cable component fabrication/production phase. The Contractor shall be responsible for all coordination between the Contractor's laboratory (or laboratories), Contractor's supplier(s), and IDOT representatives.

The Contractor shall furnish, and make available for IDOT review, all materials and written test procedures, as prepared by the Contractor's supplier(s). Each component of the assembly, including items such as wedges, shall have an AASHTO or ASTM material and test specification. The Contractor's supplier(s) and laboratory (or laboratories) shall prepare separate reports. Each of these reports shall independently describe all the testing data and testing results. All reports shall be submitted by the Contractor to IDOT within 14 days of completing each test as independent records of the testing. The Contractor shall be responsible for subcontracting and coordinating with the Contractor's laboratory (or laboratories) and Contractor's supplier(s) for all testing laboratory services.

Material or cable-supported bridge system components tested during the acceptance-testing phase shall not be incorporated into the actual structure. All items, which comprise the permanent production stay cable system, shall be identical in nature, origin, and composition to those that were the basis of the stay cable system acceptance tests. The Contractor's supplier(s) shall provide written and detailed recommendations to the Contractor regarding storage, handling, transporting, assembly, stressing, and re-stressing of the cable-supported bridge system components that conform to PTI, as a minimum standard. The Contractor's supplier(s) shall simultaneously provide copies of all such recommendations directly to IDOT for the project files.

Cable Testing:

The Contractor is responsible for delivery of all materials to the laboratory and fabrication of test specimens in a timely fashion. Fabrication of any anchors, components or stay cable strands for permanent installation in the structure shall not begin until all initial phase tests are successfully completed and written approval is given by the CQC Manager. The Contractor shall also allow for review and comment of materials and test specimens by the Engineer prior to fabrication.

The Contractor shall provide an initial proposed schedule for the cable system testing that includes the following milestones:

- Delivery of materials and conducting the first axial fatigue test on a specimen. Upon completion of this test the leak test shall be performed on the specimen. This specimen will not be tested for ultimate post-fatigue strength and static load testing.

- Delivery of materials and conducting base strand tests and single strand friction tests.

- Delivery of materials and conducting the second axial fatigue test. This specimen will be tested for ultimate post-fatigue strength and static load testing.

1. Acceptance of Prior Tests of Cables – When the cable tests (or similar cable tests) have been conducted for previous projects on specimens identical in material supply, design and details to those proposed for this project, the previous tests may, at IDOT's sole discretion, be used as the basis for cable-supported bridge system approval for this project. However, the quality control tests outlined in Section 3.2 of the PTI "Recommendations, Support Cable Design, Testing and Installation" shall establish that the strand supplied for this project has fatigue characteristics equal or better than the strand used in the acceptance tests of the support cable (or stay cable) specimens in the previous project. Further, the load bearing anchorage and wedge hardware shall be the same as in the previous tests.

2. Individual Sheathing Acceptance Test – HDPE, HDPP and corrosion inhibiting material shall meet the requirements of the PTI "Recommendations, Support Cable Design, Testing and Installation." The resultant acceptable values of the primary properties for HDPE and HDPP material shall be tested and meet the requirements of the values found in Table 3.2 of the PTI "Recommendations, Support Cable Design, Testing, and Installation."

    a. HDPE Sheathing Requirements – The Contractor shall furnish to the Engineer a certified test report prepared by an independent laboratory documenting compliance of the HDPE with the following requirements:

        - HDPE material shall meet the specific requirements of ASTM D 4976 "Standard Specification of Polyethylene Plastics Molding and Extrusion Materials"

- The material shall be UV stabilized and suffer no property degradation for a minimum exposure period of six (6) months. In applications where the PE sheathed strand may be exposed to UV radiation for periods in excess of six (6) months, the requirements of Section 3.5.3.2C of the PTI "Recommendations for Stay Cable Design, Testing and Installation" shall apply.

- HDPE material shall not react with the pre-stressing steel corrosion inhibiting coating material or any other material it is permitted to come in contact with as part of the stay cable sheath and shall be free of water soluble chloride.

- HDPE material shall be chemically stable without embrittlement or softening over the anticipated exposure temperature and service life of the structure.

b. HDPE Sheathing Requirements – The Contractor shall furnish to the Engineer a certified test report prepared by an independent laboratory documenting compliance of the HDPE with the following requirements:

- HDPP material shall meet the requirements of ASTM D 4101 "Standard Specification for Propylene Plastic Injection and Extrusion Materials."

- The material shall be UV stabilized and suffer no property degradation for a minimum exposure period of six (6) months.

- HDPP material shall not react with the pre-stressing steel corrosion inhibiting coating material or any other material it is permitted to come in contact with as part of the stay cable sheath and shall be free of water soluble chloride.

- HDPP material shall be chemically stable without embrittlement or softening over the anticipated exposure temperature and service life of the structure.

3. Coating Test Requirements for all Strand – The Contractor shall furnish to the Engineer for review and comment, a test report prepared by an independent laboratory documenting compliance with the following tests:

a. Chemical Resistance. The chemical resistance of the coating shall be evaluated in accordance with ASTM G 20 by immersing coated strands in each of the following: distilled water, a 3 M (Molar) aqueous solution of CaCl2, a 3 M (Molar) aqueous solution of NaOH, and a solution saturated with Ca(OH)2. Tests with specimens without holidays and specimens with intentional 0.25" diameter holes drilled through the coating shall be performed at 75±4° Fahrenheit. Minimum test time shall be forty-five (45) days. The coating must not blister, soften, lose bond, nor develop holidays during this period. The intentionally made holes shall exhibit no undercutting during the 45-day period.

b. Chloride Permeability. The chloride permeability characteristics of the films of cured coatings having the minimum thickness as proposed for use shall be measured by the methods outlined in FHWA RD 74 18. The test shall be performed at 75±4° Fahrenheit for forty-five (45) days. The accumulative concentration of chloride ions permeating through the film shall be less than 0.0039" inches of total penetration.

c. Impact Test. The resistance of a strand coating to mechanical damage shall be determined by the falling weight test. A test apparatus similar to that described in ASTM G 14 shall be used along with a 4 lb tup. Impact shall occur on the crown areas on the coated strand. The test shall be performed at 70° F. With an impact of 80 in-lbf, no shattering, cracking, or bond loss of the coating shall occur except at the impact area, that is, the area permanently deformed by the tup.

d. Salt Spray Fog Test. Coated strand specimens shall be tensioned to 70% of the maximum ultimate tensile strength and exposed to salt fog for 3,000 hours in accordance with ASTM B117. Care shall be taken to protect the end anchorage used from salt fog or corrosion so as not to influence the test results. Observation for signs of corrosion shall be made and recorded every 250 hours. After 3,000 hours of exposure, no evidence of rust shall be present, and the specimen shall be holiday free. After the salt spray test is completed, the specimen shall undergo a tensile strength test, in accordance with AASHTO T244 to determine if the ultimate tensile strength of the strand has been affected. The tensile strength of the strand after being exposed to the salt spray shall satisfy the requirements of Section 6, ASTM A416. No cracks visible to the unaided eye shall occur in the HDPE or HDPP up to an elongation of 1% (yield point). Results from previous tests for a current project may be submitted for acceptance provided the testing complied with all of the procedures and requirements mentioned above.

   The Contractor shall have an independent testing laboratory perform project specific tests defined in tests 1 through 3 above. The Contractor shall submit the certified test results from the independent testing laboratory that all aspects of these requirements have been met. All above tests shall be completed prior to completion of the testing of specimens and shall show that all strand requirements are met by the individually sheathed strand to be supplied. The Laboratory shall perform tests on all material, strands and cable specimen assemblies required for both the acceptance testing phase and the cable component fabrication/production phase as defined by the Strand Acceptance Test and Fatigue Strength Testing of Cables of this Section. The Contractor is responsible for the supply and delivery of all testing materials to the laboratory. Coated strand represented by test samples that do not meet all requirements of the Contract shall be rejected.

4. Strand Acceptance Test

The following conditions shall be met:

a. One (1) 16-foot long sample strand shall be taken for every ten (10) tons of strand produced from each heat of steel. This sample shall be used for both fatigue and ductility testing.

b. All strands and test samples shall be marked in such a manner to ensure traceability during production, transit, storage and testing.

c. The test strands shall be protected from failure in the gripping zone. Should any test strand fail in the gripping zone, the test will be discarded and another test specimen made from the same sample.

d. One test for each manufactured length shall be made for the following:

- Minimum guaranteed ultimate tensile strength: f's = 270 ksi
- Minimum yield strength: f'y = 0.90 f's
- Young's Modulus: E = 28,600 ksi ±5%

Strand shall be fatigue tested as follows:

a. One tensile fatigue test shall be conducted on an approximately 4' long test specimen from each sample. Minimum length shall be 36" face-to-face of grips.

b. The test strand shall withstand without wire failure 2 million cycles of stress variation from 98.6 ksi to 121.5 ksi.

c. After successful completion of the fatigue testing, each test specimen shall withstand a minimum static load of 95% of the guaranteed ultimate tensile strength of the strand without wire failure.

d. Rejection Criteria: If the first valid test strand from each sample fails, two additional tests shall be made from the same samples. If failure occurs in either of these tests, the strand represented by that sample shall be rejected. Retesting shall not be permitted.

e. A "one-pin" ductility test shall be conducted on each sample. The details and method of the test shall be as defined in Appendix "A" of the PTI "Recommendations for Support Cable Design and Testing and Installation." For acceptance, the tensile force in the sample during the one-pin test shall equal at least 80% of the tested ultimate strength of the sample.

The above strand acceptance tests shall be performed for materials to be incorporated into the stay cable test specimens and for production materials to be incorporated into the permanent structure.

5. Fatigue Strength Testing of Cables

    a. Test Specimens – For the live end anchor of the stay system, three (3) complete, fully assembled stay cable specimens with multiple strands shall be fabricated for axial load testing in accordance with Section 4.2 of PTI "Recommendations, Support Cable Design, Testing and Installation". The three testing specimens shall represent the largest, the smallest and the average sizes of the proposed production cables. Each specimen shall be fully representative of all materials, details, number of strands, fabrication and assembly procedures proposed for production anchorages. One of the fully assembled stay cable specimens shall be tested in accordance with Section 4.1 of PTI "Recommendations, Support Cable Design, Testing and Installation" unless prior testing of the identical stay system is approved by the Engineer and IDOT in lieu of project specific testing.

Handling and Inspection:

1. Strand

    The Engineer and IDOT shall have unrestricted access to all manufacturing, fabrication, and testing performed at the supplier's facilities, laboratories and shipping and storage facilities. The Contractor shall furnish to the Engineer for approval, complete test reports and certificates that are prepared by the Supplier for the strand from each production lot number, including stress-strain curves and modulus of elasticity of the coated strand. The strand will be furnished in coils and shall have padded contact areas, wherever possible. Each coil will identify the cable into which it is to be installed and the length of strand on the coil. Each coil shall be protected by a supplier-approved method to ensure a uniformly sheathed and coated strand having no adhering foreign matter or damage to the coating, including that from ultraviolet exposure. The ends of the strand shall be sealed at all times. At all times, the strand shall be properly stored in a weatherproof enclosure. A weatherproof enclosure shall be considered to be a fully enclosed building complete with floor or a fully enclosed container with wooden or metal roof, sides and floor capable of protecting the strand reels and packing from exposure to rain, wind, snow/ice and sunlight. All strands shall similarly be shipped in closed bed trucks or containers to avoid exposing packing to weather. Each coil shall also be marked with the order number, coil number and heat number. The starting end of each coil shall also be marked. The Contractor shall minimize unnecessary bends in the field when uncoiling strands. Handling resulting in sharp kinks or short radius bends less than the spool radius shall be cause for rejection. If, as determined by the Engineer, the kink or short radius bend was inherent in the coil, it shall be immediately replaced by the Contractor.

    All systems for handling coated strands shall have added contact areas. All bundling bands shall be padded or suitable banding shall be used to prevent damage to the coating. All reels of coated strand shall be lifted with a strong back, spreader bar, multiple supports, or a platform bridge to prevent abrasion. The reels and strand shall not be dropped or dragged.

All strand ends shall be sealed with approved patching materials by the end of the same day that the strand is cut.

Any damage to the coating shall be repaired by the Contractor utilizing project approved materials, procedures and personnel. It is imperative that the strand coating be undamaged over the full length of cable in order to provide long-term protection to the strands.

2. Sheathing

   The Contractor shall use padded points of contact during storage, handling, fabrication and erection. Care shall be taken at all stages of the construction process to avoid damage to the finish. The Contractor shall immediately repair any damage to the surface finish. The visible grain of the finish shall be uniform in appearance and direction.

   These handling/finish requirements shall also apply to exposed portions of any guide pipes.

3. Anchorage and Miscellaneous Components

   The anchorage components and miscellaneous components shall remain in their original shipping containers as supplied by the Supplier until ready for immediate use unless specified otherwise by the Supplier. These components shall be kept in appropriate weatherproof enclosures. During handling, fabrication, erection and all construction operations, the Contractor shall use the utmost in care to protect the components from any damage. Any and all damage shall be repaired by the Contractor utilizing previously approved procedures for this project and/or shall replace damaged components.

Fabrication of Stay Cables:

1. Cables shall be fabricated in a manner consistent with the design and testing requirements for the cable-supported bridge system as indicated in this Section. Appropriate measures shall be taken to ensure that all strands are installed parallel to each other.

2. The Contractor shall develop and implement procedures to assure that stay cable components will not be damaged during handling. All stay cable components shall be protected from corrosives, heat, abrasion and other harmful effects throughout the fabrication and installation.

3. Spreader bars and slings or other appropriate devices shall be used to handle all cable and sheathing components. Slings or similar devices shall be positioned on the cable to carry both the anchor and adjacent cable in a tangent position, preventing bending of the cable at the anchor. Slings and spreader devices shall be padded to prevent damage to the cable sheath.

4. All damage to cables or any components thereof shall be evaluated and remedied by the Contractor, to the satisfaction of the Engineer, prior to installation of the cable. Damaged strand shall be replaced. Damage to non-load carrying components shall be repaired or replaced to the Engineer's satisfaction prior to the installation of the cables. Any damage occurring after installation shall similarly be evaluated and immediately remedied by the Contractor to the satisfaction of the Engineer.

5. Storage, handling, fabrication, assembly, erection, stressing and completion of all stay cable system components shall follow without deviation the procedures, details, methods and equipment used as presented in the Contractor's approved shop drawings and detailed, step by step erection manual.

6. Guide Sleeve and Bearing Plate. The Contractor shall install and align the guide sleeve and bearing plate assemblies during construction. The manual of geometric controls to be developed by the Contractor for The Engineer's review and comment shall include a detailed survey and alignment procedures for such alignment. The construction manual shall include detailed equipment and procedures used to secure the guide sleeve and bearing plate assemblies during concrete placement and curing.

7. The Contractor shall follow the approved welding details and procedures. All fusion welds of HDPE pipe shall conform to ASTM D2657. Welding of steel pipe, if used, shall conform to AWS B2.1 and AWS D1.5. All pipe splices shall develop the full yield strength of the pipe cross section.

8. No welding of the pipe shall take place with the coated strands inside. Finishing of all welds to the required finish shall principally occur prior to installation of the strands into the pipe. Any remaining finish repair to the weld or other areas shall be conducted in a manner that will not heat the pipe at any point to more than 150° Fahrenheit.

9. Strand Installation. Installation of strands shall follow the fully engineered procedures contained in the Contractor's shop drawings and detailed step-by-step erection manual. Deviations from procedures, methods, details or equipment shall not be permitted. The resulting installed strands shall be parallel and damage free.

10. Anchorage and Miscellaneous Components. The anchorage components and miscellaneous components shall be installed following the fully engineered procedures contained in the Contractor's shop drawings and detailed step-by-step erection manual. Deviations from procedures, methods, details or equipment shall not be permitted. The installed anchorage and miscellaneous components shall be damage free. Flame cutting of strands is not permitted.

Cable Stressing:

1. Accurate calibration of the cable jacks and gauges is critical to the geometry control of the structure and the resulting state of stress in the structure. Jacks and gauges for cable installation shall be match calibrated using a load cell or calibrated static load machine by an independent testing agency within one month prior to the beginning of the cable installation, and every six (6) months thereafter, for the duration of the cable installation. Calibration shall be accomplished with the jack actively applying load to the machine, not the machine applying load to the jack. Prior to use after each calibration, each field gauge shall be calibrated against the master gauge for reference purposes. Any internal work performed on the jack shall require recalibration.

2. The detailed cable installation procedure, contained as part of the erection manual, shall prescribe force, cable elongation and deck elevations for each jacking operation, and shall establish the priority of force or geometry for control of the jacking operation. This procedure shall stipulate the permissible variance between force and elongation and deck elevation for each cable to be installed.

3. The cable stressing procedures shall include detailed provisions for monitoring the installation of each cable.

4. Permanent records shall be established by the Contractor for each cable installation. Such records shall include survey records; date, time and ambient temperatures; cable forces; cable elongation measurements; ring nut setting; deck loading conditions; and all other special notations necessary and sufficient to establish the conditions under which the cable was installed. This record shall include the as built profile grade elevation of the deck along each web and atop each cable anchor block immediately prior to and immediately after each stressing operation. Copies of this data shall be provided by the Contractor to the Engineer within twenty-four (24) hours of completing each cable stressing operation.

Supplemental Protection for stay cables and stay cable components:

1. A supplemental waterproof protection system shall be provided near deck level to prevent snow, ice, rain and other deleterious substances from coming into contact with the stay cable (defined for purposes of this requirement to be the individual strands and the stay cable pipe enclosing the strands) and with the stay cable end anchorage. Such protection shall extend from the lower anchorage to a height of ten feet above the top of the barrier rail.

2. In addition, a vandal resistant sleeve, pipe or other protection shall be provided from the lower anchorage to a height of ten feet above the top of the top deck surface. The vandal resistant sleeve may be part of the supplemental waterproof protection system.

3. Both protection systems shall include provisions for removal and replacement to facilitate inspection.

4. The details of both supplemental protection systems shall be submitted to the Engineer for Acceptance including a list of reusable components for each protection system.

Painting: All ferrous metal surfaces, other than stainless steel and hot dipped galvanized surfaces of the stay cable system, shall be painted with an approved zinc primer and top coats. Finish coat color shall match the white color of the cable sheathing. Bearing plates, guide pipes, and tower deviation pipes shall be galvanized in accordance with AASHTO M 111M (ASTM A123M), Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, six (6) kilograms per square meter.

Basis of Payment: All work associated with the hanger assemblies specified in this Section shall be paid for at the Lump Sum price for HANGER ASSEMBLIES FOR TIED ARCH SPAN.

DRAINAGE SYSTEM (SPECIAL)

Description. This work shall consist of furnishing and installing a bridge drainage system as shown on the plans, including all piping, fittings, support brackets, inserts, bolts, and splash blocks when specified.

Material. The pipe and fittings shall be reinforced fiberglass according to ASTM D 2996 RTRP with a 30,000 psi minimum short-time rupture strength hoop tensile stress. The reinforced fiberglass shall also have an apparent stiffness factor at 5 percent deflection exceeding 200 cu in.-lbf/sq. in. and a minimum wall thickness of 0.10 in. The adhesive for joining pipe and fittings shall be as recommended by the manufacturer. All pipe supports and associated hardware shall be hot dip galvanized according to AASHTO M 232. The fiberglass pipe and fittings furnished shall be pigmented throughout, or have a resin-rich pigmented exterior coat, specifically designed for overcoating fiberglass, as recommended by the manufacturer. The color shall be as specified by the Engineer. The resin in either case shall have an ultraviolet absorber designed to prevent ultraviolet degradation. The ultraviolet protection shall be designed to withstand a minimum of 2,500 hours of accelerated weathering when tested in conformance with the requirements in ASTM Designation: G 154. Lamps shall be UV-8 (313 nm wavelength). The resting cycle shall be 4 hours of ultraviolet exposure at 140°F, and then 4 hours of condensate exposure at 120°F. After testing, the surface of the pipe shall exhibit no fiber exposure, crazing, or checking, and only a slight chalking or color change. The supplier shall certify the material supplied meets or exceeds these requirements.

Hollow structural steel tubing shall conform to ASTM A500, Grade B and shall be galvanized according to AASHTO M 111. All plates and bars shall conform to the requirements of AASHTO M270, Grade 36 and shall be galvanized according to AASHTO M 111. All hardware, bolts, nuts and washers shall be hot dipped galvanized according to AASHTO M 232.

Design. The Contractor shall submit shop drawings showing the proposed layout and details to the Engineer for approval prior to commencing work.

Installation. All connections of pipes and fittings shown on the plans to facilitate future removal for maintenance cleanout or flushing shall be made with a threaded, gasketed coupler or a bolted gasketed flange system. Adhesive bonded joints will be permitted for runs of pipe between such connections. The end run connection shall feature a minimum nominal 8 in. female threaded fiberglass outlet. Straight runs may utilize a 45 degree reducing saddle bonded to the pipe. The female outlet shall be filled with a male threaded PVC plug.

Runs of pipe shall be supported at spacings not exceeding those recommended by the manufacturer of the pipe. Supports that have point contact or narrow supporting areas shall be avoided. Standard slings, clamps, clevis hangers and shoe supports designed for use with steel pipe may be used. A minimum strap width for hangers shall be 1 1/2 in. for all pipe under 12 in. in diameter and 2 in. for diameters 12 in. or greater. Straps shall have 120 degrees of contact with the pipe. Pipes supported on less than 120 degrees of contact shall have a split fiberglass pipe protective sleeve bonded in place with adhesive.

All reinforced fiberglass pipe, fittings, and expansion joints shall be handled and installed according to guidelines and procedures recommended by the manufacturer or supplier of the material.

Damaged hot-dip galvanized coatings shall be repaired in accordance with the requirements of ASTM A780. Field welding, when allowed, will be accomplished by either masking off the area to be welded prior to hot-dip galvanizing or grind off the galvanizing prior to welding. Coordinate the masking material with the hot-dipped galvanizer. Touch up the welded area per ASTM A 780.

Basis of Payment. This work will be paid for at the contract Lump Sum price for DRAINAGE SYSTEM (SPECIAL).

VERTICAL CLEARANCE GAUGE

Description: This work shall consist of all labor, materials and equipment necessary to furnish and install the vertical clearance gauges as shown in the plans, specified herein, and as directed by the Engineer. The gauges indicate the vertical clearance between the low steel of the bridge spans above the navigation channel and the level of the water, measured to the bottom of the foot marks and read from top to bottom. The locations of the gauges are shown in the plans.

Construction Requirements:
The gauges shall meet the applicable U.S. Coast Guard requirements, including Title 33 "Navigation and Navigable Waters", Part 118 "Bridge Lighting and Other Signals" of the Code of Federal Regulations (33 CFR 118). The CFR is available online at: http://www.ecfr.gov and the U.S. Coast Guard "Bridge Lighting and Other Signals" is available online at:

http://www.uscgaan.com/cd/bridge/BridgeLightingManual.pdf

The navigation clearance gauges shall be painted on the pier using a two-component high performance epoxy paint system for use in exterior marine applications that is chemical, abrasion, chalking and bleeding resistant. The product shall be applied in accordance with the manufactures written recommendations. In addition to the manufactures surface preparation requirements, a light sandblast shall be given to the area to be painted to remove all form oil, grease, dirt and existing paint prior to application. The background area shall be painted white with two coats at the rate of 200 square feet per gallon. The numbers and foot marks shall be painted black and applied over the white background using one coat. The paint shall not be applied until the pier concrete has cured for a minimum of 28 days.

Prior to painting the clearance markings, the clearance shall be verified on both bridges (SN 090-0115 and SN 090-0180) by measuring the vertical clearance relative to the low steel of each bridge span above the navigation channel. The lowest measured vertical clearance of either bridge shall be utilized for both vertical clearance gauges.

Submittals: Product data for the paint system, shall be submitted to the Engineer for approval prior to application.

Basis of Payment: This work will be paid at the contract unit price per Each for VERTICAL CLEARANCE GAUGE.

SEEDING, CLASS 5C – MONARCH AND POLLINATOR MIXTURE (BDE)
Effective: April 1, 2017

Add the following seeding mixture to Table 1 of Article 250.07 of the Standard Specifications as follows:

"Table 1 - SEEDING MIXTURES

Class - Type		Seeds	lb/acre (kg/hectare)
5C	Monarch and Pollinator Mixture	Milkweed Mixture (Below) 6/	4 (4)
		Pollinator Mixture (Below) 6/	3 (3)"

Milkweed Mixture - Mixture not exceeding 50% by weight pure, live seed of any one species of the following:

Species:

Asclepias incarnata (Swamp Milkweed)

Asclepias sullivantii (Prairie Milkweed)

Asclepias syriaca (Common Milkweed)

Asclepias verticillata (Whorled Milkweed)

Asclepias tuberosa (Butterfly Milkweed)

Pollinator Mixture – Mixture not exceeding 20% by weight pure, live seed of any one species of the following:

Species:

Echinacea purpurea (Purple Coneflower)

Gaillardia x grandiflora (Blanket Flower)

Liatris pycnostachya (Prairie Blazing Star)

Monarda fistulosa (Prairie Bergamot)

Rudbeckia hirta (Black-Eyed Susan)

Symphyotrichum novae-angliae (New England Aster)

Revise Article 1081.04(c)(7) of the Standard Specifications to read:

"(7) Native Grass, Forb, and Monarch and Pollinator Mixture. The seed quantities indicated per acre (hectare) for Prairie Grass Seed in Classes 3, 3A, 4, 4A, 6, and 6A in Article 250.07 shall be the amounts of pure, live seed per Acre (Hectare) for Each species listed. Seed which has actual pure, live seed yield according to tests less than the intended yield, will have the specified quantity adjusted to meet the intended pure, live seed yields.

Thirty days prior to the time of seeding, the Contractor shall provide for the approval of the Engineer, a written description for the Forbs and Monarch and Pollinator seed mix showing the percentage by weight (mass) of each of the kinds of seed. This description shall also include 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 (kg) of each of the kinds of seed to be furnished. The monarch and pollinator species shall be of Illinois origin or from a bordering state."

PARK BENCH

Description: This work shall consist of furnishing and installing decorative metal PARK BENCH at the locations specified in the Contract plans, as specified herein and as directed by the Engineer. The Contractor is responsible for furnishing and installing new Park Benches according to the details in the plans, and for any damage incurred to Park Benches during installation.

General: Each bench will be placed at the location indicated in the plans. The locations will be field marked and verified for approval by the Engineer. Anchor bolts must be drilled and grouted into the concrete base for pavers, concrete wearing surface or concrete sidewalk.

Size: Benches shall be a standard 6-foot length

Material: Materials shall be steel or cast iron in construction as specified in the plans. All fasteners shall be stainless steel. Material shall include anchor bolts, nuts and concrete inserts in accordance with Article 1006.31 (a) of the Standard Specifications.

Color and Coating: Black

All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are then fully cured to coating manufacturer’s specifications. The thickness of the resulting finish averages 8-10 mils (200-250 microns).

Hot-dip galvanize before powder coating. Hot-dip galvanizing shall be performed by an experienced qualified firm. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The hot dip process shall follow ASTM D7803: Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating.

Concrete for bench foundations shall be Class SI in accordance with Section 1020 of the Standard Specifications.

Submittals: Submit manufacturer's technical data for the manufactured product, including certification that each product complies with the specified requirements. In accordance with the Standard Specifications, the Contractor must submit shop drawings for the Engineer's approval showing the bench completely assembled including shop drawings of its component parts.

Method of Measurement: Each complete park bench installation including concrete foundations, anchor bolts and associated fasteners shall be measured per Each.

Basis of Payment. The work under this item will be paid for at the contract unit price per Each, for PARK BENCHES, which price will include labor, excavation, concrete foundations, anchor bolts and bolt installation, equipment, materials and incidental work necessary to complete the installation as specified.

TRASH RECEPTACLES

Description: This work shall consist of furnishing and installing new Trash Receptacles at the locations shown on the plans, as specified herein and as directed by the Engineer. The Contractor is responsible for furnishing and installing new Trash Receptacles according to the details in the plans, and for any damage incurred to Trash Receptacles during installation.

General: Each receptacle will be placed at the location indicated in the plans. The locations will be field marked and verified for approval by the Engineer. Anchor bolts must be drilled and grouted into the concrete base for pavers, concrete wearing surface or concrete sidewalk.

Size: The trash receptacles shall be of a nominal 32 gallon size, circular in design, 32 inches in diameter and 36 inches in height. With the following nominal dimension:

3/8" x 1" (10mm x 25mm) vertical solid steel bar; 1/4" x 2-1/2" (6mm x 64mm) horizontal solid steel bands; 3/8" x 3" (10mm x 76mm) steel support bars; 5/8" (16mm) solid steel top ring; leveling feet with a 3/8" (10mm) diameter threaded steel shaft.

Materials. Materials shall be steel or cast iron in construction as specified in the plans. All fasteners shall be stainless steel. Material shall include anchor bolts, nuts and concrete inserts in accordance with Article 1006.31 (a) of the Standard Specifications.

Plastic Inner Liners: Molded with structural ribs and integral handholds. 32-gallon (136 liter) capacity high density plastic liner [weight not to exceed 6 lbs. (2.72kg)].

Color and Coating: Black.

All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are then fully cured to coating manufacturer's specifications. The thickness of the resulting finish averages 8-10 mils (200-250 microns).

Hot-dip galvanize before powder coating. Hot-dip galvanizing shall be performed by an experienced qualified firm. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The hot dip process shall follow ASTM D7803: Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating.

Concrete for trash receptacle foundations shall be Class SI in accordance with Section 1020 of the Standard Specifications.

Submittals:

Trash Receptacles: Shop drawings or catalog cut.

Fasteners: Catalog cut.

Certifications: Submit manufacturer's certification that the tubing and coatings meet the project specifications.

Method of Measurement: This work shall be measured by Unit, Each, for Each for TRASH RECEPTACLE, including the excavation and construction of concrete foundations, receptacle, cover, plastic inner liner, and all required fasteners and hardware, complete, installed.

Basis of Payment: This work will be measured and paid for at the contract unit price Each for TRASH RECEPTACLES, which price shall include all labor, equipment, and material necessary to complete the work as specified, including all mounting hardware.

BOLLARDS

Description: This work shall consist of furnishing and installing new surface mounted and removable Bollards according to the details in the plans, at the locations shown on the plans and as directed by the Engineer. The Contractor shall be responsible for any damage incurred to Bollards during installation.

The bollards shall be 6-inch nominal diameter, 2-foot, 9-inches in height.

One bollard shall be fitted to be removed for maintenance access. This bollard shall include an anchor casting into concrete with removable mounting hardware allowing the post to be locked into place in normal conditions but removed for vehicle access. The appearance of the removable bollard shall be equal to the other fixed bollards.

Material: . Materials shall be steel or cast iron in construction as specified in the plans. All fasteners shall be stainless steel. Material shall include anchor bolts, nuts and concrete inserts in accordance with Article 1006.31 (a) of the Standard Specifications.

Color and Coating: Black

All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are then fully cured to coating manufacturer's specifications. The thickness of the resulting finish averages 8-10 mils (200-250 microns).

Hot-dip galvanize before powder coating. Hot-dip galvanizing shall be performed by an experienced qualified firm. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The hot dip process shall follow ASTM D7803: Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating.

Concrete for bollard foundations shall be Class SI in accordance with Section 1020 of the Standard Specifications.

Submittals:. Submit manufacturer's technical data for the manufactured product, including certification that each product complies with the specified requirements. In accordance with the Standard Specifications, the Contractor must submit shop drawings for the Engineer's approval showing the bollard completely assembled including shop drawings of its component parts.

The final product will be rejected if the coating cracks, ripples in the curved areas or is otherwise damaged due to the fabrication and/or shipping.

Construction Requirements: Bollards must be located according to the plans. Mounting of the Bollard must be surface mounted. Locations of bollards to be verified in the field. Furnishing and installing anchor bolts and leveling washers along with anchoring device allowing for the removal of one bollard are included with the Bollard installation. Siting of bollards to be coordinated with the Engineer.

Basis of Payment: This work will be measured and paid for at the contract unit price Each for BOLLARDS, which price shall include all labor, equipment, and material necessary to complete the work as specified, including all mounting hardware.

FOLD DOWN BOLLARDS

Description: This work shall consist of furnishing and installing Fold Down Bollards at the locations shown on the plan and as directed by the Engineer.

The Fold Down Bollards will be located at either end of the US 150 Eastbound Bridge sidewalk/trail. Siting of bollards to be coordinated with the Engineer.

The Bollards shall be a minimum of 40-inches in height and capable of being lowered or folded to a height of no more the 4-inches. They shall be capable of being locked in both up and down positions using either internal locking mechanisms or via separate pad lock. Separate pad locks will be furnished by others.

The Bollard shall be made of steel and painted in National School Bus Yellow. All hardware shall be either galvanized or stainless steel. Reflectorized tape shall be applied on both sides of the bollard, facing traffic on each side.

Shop drawings and catalog cuts are required.

Method of Measurement: This work will be measured per each location.

Basis of Payment: This work will be paid for at the contract unit price, Each, for FOLD DOWN BOLLARDS.

WAYFINDING SIGN, SPECIAL

Description: This work shall consist of furnishing and installing a metal fabricated framework that outlines a stylized wayfinding compass rose to be inset into the concrete bridge deck at the center arch belvidere (overlook) location.

The stylized compass rose shall be a single metal frame, designed such that the surface of the circle, cross pieces and arrow are flush with the concrete deck. The frame work shall be as shown on the plans or as approved by the Engineer.

Material: The compass rose frame and surfaces shall be of aluminum construction. The areas of the rose to be in the surface of the deck shall have a Number 36 grit orbital finish.

Construction: The compass rose frame shall be placed in the deck formwork such that it will be flush with the deck surface on completion. The concrete finish in all areas of the compass rose shall be equal to that of the adjacent concrete deck. The aluminum frame work shall not touch the reinforcing steel in the deck nor shall it be wired or connected to the reinforcing steel in any way. Plastic supports or chairs shall be used for temporary support during the concrete placement.

The surface of the compass rose shall be protected during the concrete placement. Fresh concrete shall not be allowed to sit or touch any of the aluminum surface. Following the placement, the aluminum surface shall be cleaned.

Method of Measurement: This work shall not be measured for payment but will be paid as a lump sum for furnishing and installing the wayfinding compass rose complete. The concrete bridge deck (including the bridge deck finishing) and bridge reinforcing will be measured and paid for separately.

Basis of Payment: This work will be paid for per lump sum as WAYFINDING SIGN, SPECIAL.

INTERPRETIVE SIGNAGE COMPLETE

Description: This work shall consist of furnishing and installing interpretive signage as detailed herein, at the locations shown on the plans and as directed by the Engineer. The interpretive signage shall consist of frame, foundation, sign panel and associated mounting hardware as shown on the plans and as specified herein. Six (6) separate interpretive panels are required, each of similar size but with slight revisions to text and graphics, depending on location.

Construction Requirements:

Concrete Foundations. Shall be constructed in accordance with the applicable portions of Articles of Section 503 of the Standard Specifications. Concrete shall be Class SI. Anchor bolts per Article 1006.09 of the Standard Specifications and galvanized per AASHTO M232.

Interpretive Sign Panels. Panels shall be High Pressure Laminate (HPL) panels of the size indicated on the plans. HPL graphic sign material is composed of several layers of phenolic resin impregnated kraft filler paper, surfaced by a layer of melamine graphic image substrate, imaged with UV resistant, pigment based process color inks, and translucent UV overlay, and a UV resistant melamine clear overlay, plus an optical coating that will resist no less than 99% of all sunlight and UV rays, as well as provide a graffiti resistant coating. The table below shows the panel number, name, layout and size requirements.

Exterior Interpretive signage panel:

Interpretive Signage Type #1: THE ORIGINAL MCCLUGAGE BRIDGE (Peoria and Tazewell Counties) – 2 total signs
Interpretive Signage Type #2: UPPER FREE BRIDGE (Tazewell location)
Interpretive Signage Type #3: UPPER FREE BRIDGE (Peoria location)
Interpretive Signage Type #4: IRON WORKERS MEMORIAL (Tazewell location)
Interpretive Signage Type #5: IRON WORKERS MEMORIAL (Peoria location)

All panels shall be professionally screen printed producing clean, consistent prints of materials and ink compatible with the proposed process for the specified use.

The Contractor shall provide one set of color paper proofs at half size and one lab proof sample to the Engineer for approval prior to the production of final panels. Proofs shall accurately represent the image to be fabricated in color, clarity and consistency. Rejected proofs shall be corrected as required and resubmitted as specified above.

All edges of printed art are to be sharp and passage of ink when dry to be continuously even and opaque, with no bleeding whatsoever. Contractor is responsible to accurately apply the colored inks in perfect registration and with absolute duplication in accordance to industry standards. Contractor is responsible to touch up and clean up any and all minor imperfections at no additional cost.

Colors and backgrounds will be printed, not sprayed or applied otherwise. All panels are to be consistent in color, opacity and quality.

Ink colors shall match the specified colors, be opaque, clean, able to withstand the laminate process and able to provide ten (10) years of color integrity in continuous outdoor exposure to ultraviolet radiation.

The laminate process requires that the printed paper shall be laminated and processed using exterior grade laminates and exterior solid phenolic core panels approved equivalent.

The panels shall be no less than 1/16" thick, opaque and with matte, non-glare finish. Panels shall be cured and trimmed, smooth on all edges, and cut within a tolerance of 1/32" to size required for final installation. Margins and bleed to be established with the sign manufacturer so that all text and graphics are clearly visible on the completed and framed sign.

The panels must be resistant to scratching, ink, paint, steam, acids and aromatics. All ink or paint markings shall be readily removable with soap and water or solvents without harm.

Sign Frame and Base. The fabrication of these units shall be as detailed on the plans and described herein. Use only specified fastening devices.

Frames shall be designed and built to hold 24" x 36" HPL exhibit panels. The frames shall be 2-legged base for free standing signs as shown on plans.

Material: Materials shall be steel in construction. All fasteners shall be stainless steel. Material shall include anchor bolts, nuts and concrete inserts in accordance with Article 1006.31 (a) of the Standard Specifications.

Color and Coating: Black

All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are then fully cured to coating manufacturer’s specifications. The thickness of the resulting finish averages 8-10 mils (200-250 microns).

Hot-dip galvanize before powder coating. Hot-dip galvanizing shall be performed by an experienced qualified firm. Hot-dip galvanizing includes an aggressive pre-treatment and immersion in a tank of charged liquid zinc at or around 860°F (460°C). The hot dip process shall follow ASTM D7803: Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating.

Submittals: Submit manufacturer's technical data for the manufactured product, including certification that each product complies with the specified requirements. In accordance with the Standard Specifications, the Contractor must submit shop drawings for the Engineer's approval showing the bollard completely assembled including shop drawings of its component parts.

Provide concealed fasteners. Fixtures to hold the frame in place must be tamperproof and durable to outside elements.

The panels shall be installed in the frames so as to allow removal in the future. The completed assemblies shall be crated in materials and containers to ensure they will not be damaged under normal shipping conditions.

Crating and shipping costs will be paid by the Contractor.

Prior to installation, HPL sign units shall be protected by storing in a secure area not exposed to dust, extreme changes in temperature or humidity.

Submittals

The Contractor shall submit the following material regarding the interpretive signs and frames:

Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for signage. Submit manufacturer's and processor's technical data and installation instructions.

Shop Drawings: Containing plans, elevations, sections and details for all work in this section, and indicating location of signs, finishes and method of attachment.

Graphics for Signage: Submit desired graphics to be applied to each component specified.

Samples:

For each finish specified, two complete sets of color chips representing manufacturer's full range of available colors, patterns and finishes.

For finish product specified, one full-size sign representing actual product, color, patterns, and finishes. Include method of raised symbols and copy.

Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by the Engineer.

2. Do not proceed with remaining work until workmanship, color, and sheen are approved by the Engineer.

3. Refinish mock-up area as required to produce acceptable work.

Manufacturer Qualifications. Manufacturer shall have five years' experience manufacturing and fabricating products of similar type and scope as those specified in this section.

Delivery Storage and Handling. Store products in manufacturer's unopened packaging until ready for installation.

Materials shall be delivered to the location in unopened, labeled factory containers. Upon delivery, materials shall be inspected for damage. Deficient materials shall not be used.

Preparation. Verify mounting heights and locations for signage will comply with specified requirements, including accessibility requirements.

Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. Clean mounting locations of dirt, dust, grease or similar conditions that would prevent proper installation.

Installation. Signs will be installed in the locations as shown in drawings and as keyed to the sign numbering system. Install completed sign units square, plumb and accurately level in a workmanlike manner and in accordance with the Drawings and Specifications.

Provide footing for sign bases per Drawings and Specifications.

Clean completed sign unit surface with a soft cloth and soap and water, based on supplier recommendations. Abrasive cleaners shall not be used.

Finished signs will be inspected for blemishes, chips, scratches or other damage. Any sign not meeting requirements of this specification shall be rejected and promptly replaced at the Contractor's expense.

Protection and Adjustment. Protection: Protect all work from misuse or damage after installation has been completed. Work that is scratched, etched, or damaged may not be accepted by the Landscape Architect and Owner's Representative, and shall be replaced with acceptable work, or, as approved, repaired, at no additional cost to the Owner.

Touch-up. In field, after installation and as approved by Landscape Architect, touch-up damaged products before Substantial Completion. If touch-up is not satisfactory as determined by Owner's Representative, the item shall be removed and replaced at no expense to the Owner.

Warranty. Provide a written warranty issued in the name of the Illinois Department of Transportation and signed by the supplier stating that the sign panels have a guaranteed life of ten (10) years against fading, delaminating, discoloration, staining or cracking from the date of substantial performance.

Method of Measurement: This work shall be measured per each sign, frame and foundation complete and installed.

Basis of Payment: This work shall be paid for at the contract unit price, per Each for INTERPRETIVE SIGNAGE COMPLETE, for Each separate and complete sign installation including sign panels, sign frame, concrete foundations, and fittings complete and installed.

Sign Panel Type 1

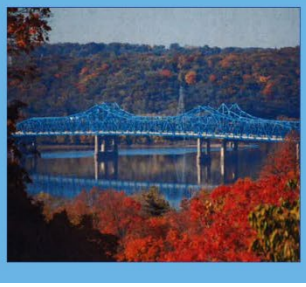
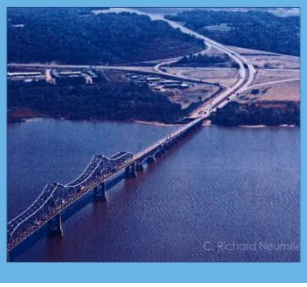
The Original McClugage Bridge
1948 - 2023




Design work for a new bridge to span the Illinois River at the foot of Harvard Street in Peoria began in 1938. The new bridge would be constructed south of the aging Upper Free Bridge and would replace that structure. Work began on the Harvard Street bridge on August 7, 1940 and continued until July 30, 1942 when construction was suspended to support the war effort. The piers and abutments remained as visible testament of the work started in the river and on the banks until construction was resumed on September 27, 1946. Construction was completed and traffic opened on the newly named McClugage Bridge, which was dedicated on December 15, 1948 to honor David H. McClugage, the late mayor of Peoria (1937-1941). The cost for construction of the new bridge was approximately $2,500,000.

The McClugage Bridge was constructed as a steel cantilevered through truss bridge that carried both eastbound and westbound traffic on two lanes over its 4,745-foot bridge length and 29-foot deck width over the Illinois River. The deck was suspended 66 feet over the normal pool elevation of the river with the longest free span between the piers of 536 feet over the river navigational channel. At its opening it was projected to carry between 5000 and 6000 vehicles per day and was welcomed for providing traffic congestion relief for the Franklin Street Bridge, which was the nearest bridge located three and one-half river miles downstream between the cities of Peoria and East Peoria.

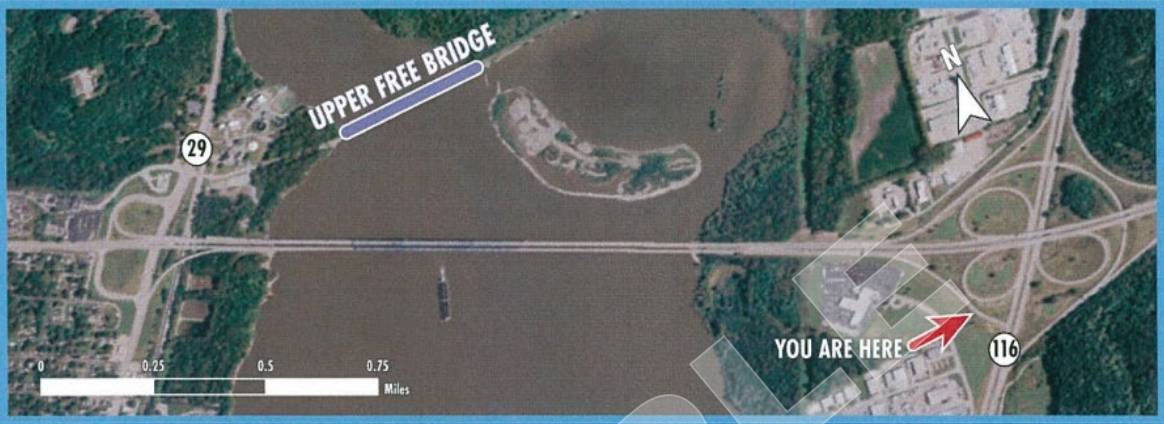
The McClugage Bridge provided for two lane two-way traffic from 1948 until 1982 when, at that time, a larger bridge was built just north of it to accommodate westbound traffic. The original McClugage Bridge was converted to eastbound only traffic and served that purpose for the remainder of its service life. The estimated total traffic for the combined structures was over 40,000 vehicles per day at the time of its deconstruction in 2023.


Sign Panel Type 2

UPPER FREE BRIDGE

1889 - 1947



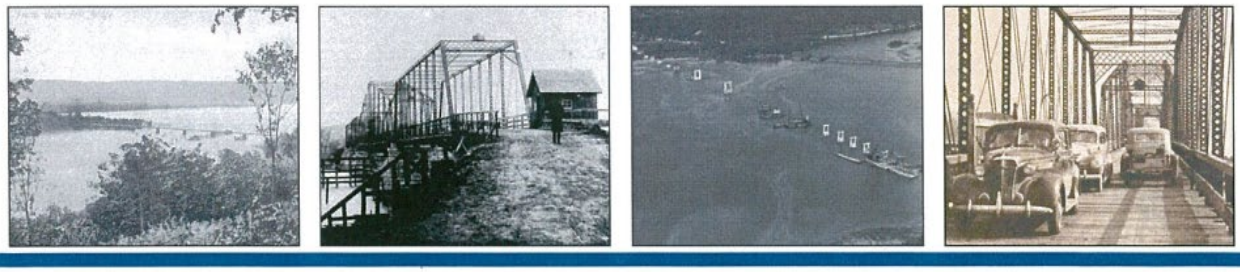
The Upper Free Bridge was located at the south terminus of what is referred to as "the Narrows" of the Illinois River, which is located just north of the current McClugage Bridge structures at the foot of Lorentz Street in Peoria.

[On August 31, 1887 the citizens of Peoria Township voted to construct a bridge at that location. Land was purchased and construction on the new "Upper Free Bridge" began during late 1887 and into 1888 at a cost of approximately $50,000. The bridge was formally dedicated in the fall of 1889. The bridge was constructed as a 1,323 foot long wooden floored structure that had a 450 foot long swing span near the center. The swing span was operated by a man powered turnstile that swung the span parallel to the channel to allow commercial boat passage along the river. The width of the wood planking deck was 18 feet and the height of the deck above the normal pool water elevation was a mere 16 feet.

Before construction of the Upper Free Bridge, people would cross the river by a toll ferry at that location. The operation of the ferry across the Narrows began in 1833. A cost of six and a quarter cents for foot passengers, 25 cents for a man and horse, and 37 cents for wagons was charged to ferry across the River. It is believed that Abraham Lincoln crossed the river on the ferry in 1858 when he came to Metamora to make a speech while campaigning for U.S. Senator].

The Upper Free Bridge was so named because passage over the river on the bridge was free of charge. [The bridge continued in operation until February 27, 1943, when it was struck by the towboat, "Sylvia T" and damaged. It was repaired, but before its reopening on May 17, 1944 the "Sylvia T" struck the bridge again and collapsed a section of it, thereby putting it out of operation for good. The bridge was finally demolished in 1947 by the War Department]. The west pier is all that remains of the bridge and can be seen in the water at the west bank.

[...] Information for this account has been provided from newspaper articles from the Peoria Transcript, Peoria Journal Star and the article, "And Do You Remember that Ol' Upper Free Bridge" by Marg Steenrod courtesy of the Peoria Historical District, in addition, the Metamora Association for Historic Preservation and the book, "Peoria!" written by Jerry Klein.



Sign Panel Type 3

UPPER FREE BRIDGE

1889 - 1947

The Upper Free Bridge was located at the south terminus of what is referred to as "the Narrows" of the Illinois River, which is located just north of the current McClugage Bridge structures at the foot of Lorentz Street in Peoria.

[On August 31, 1887 the citizens of Peoria Township voted to construct a bridge at that location. Land was purchased and construction on the new "Upper Free Bridge" began during late 1887 and into 1888 at a cost of approximately $50,000. The bridge was formally dedicated in the fall of 1889. The bridge was constructed as a 1,323 foot long wooden floored structure that had a 450 foot long swing span near the center. The swing span was operated by a man powered turnstile that swung the span parallel to the channel to allow commercial boat passage along the river. The width of the wood planking deck was 18 feet and the height of the deck above the normal pool water elevation was a mere 16 feet.

Before construction of the Upper Free Bridge, people would cross the river by a toll ferry at that location. The operation of the ferry across the Narrows began in 1833. A cost of six and a quarter cents for foot passengers, 25 cents for a man and horse, and 37 cents for wagons was charged to ferry across the River. It is believed that Abraham Lincoln crossed the river on the ferry in 1858 when he came to Metamora to make a speech while campaigning for U.S. Senator].

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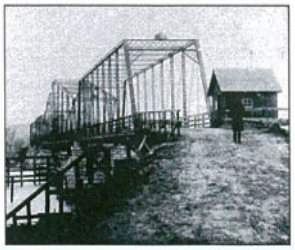
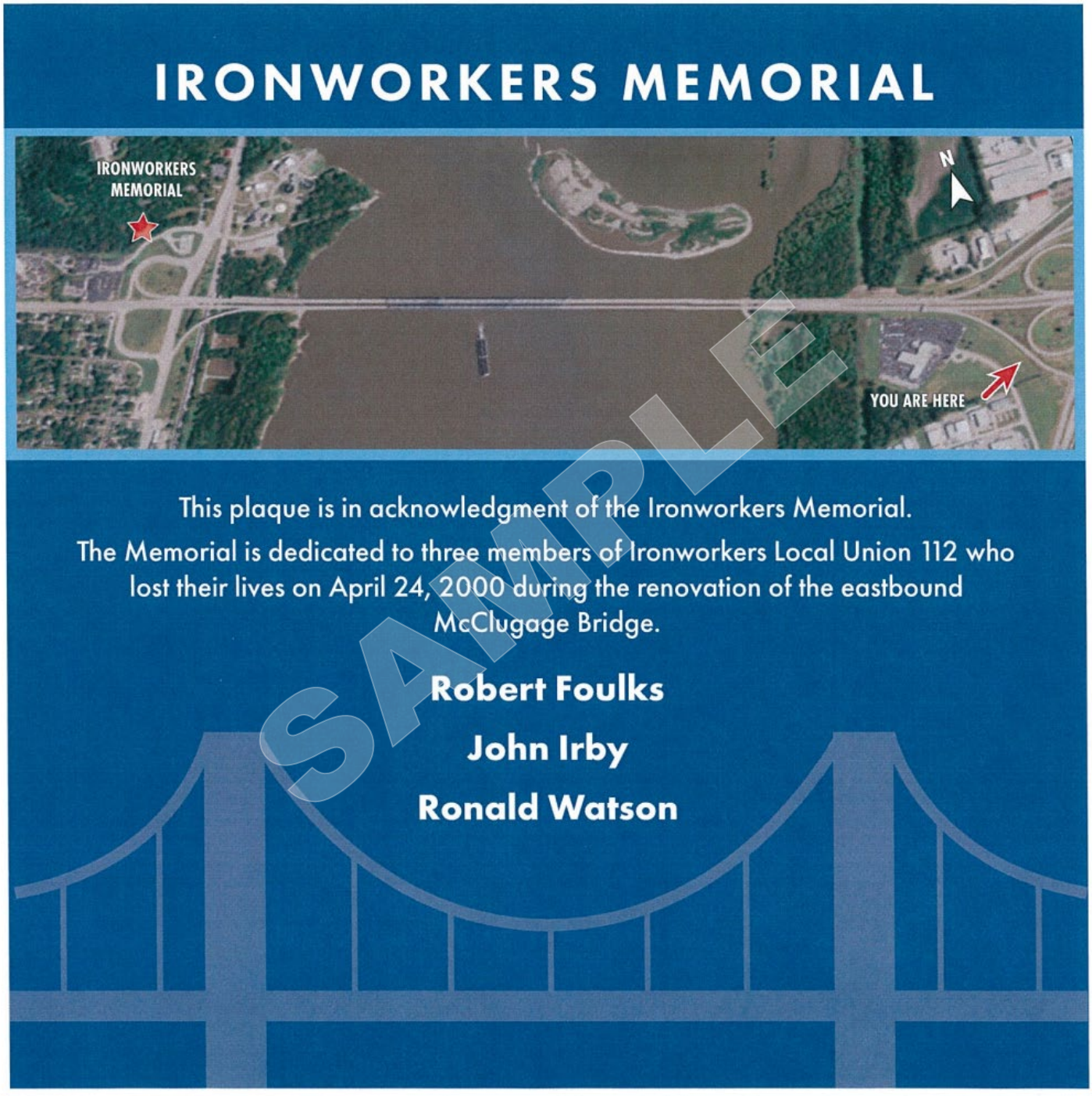
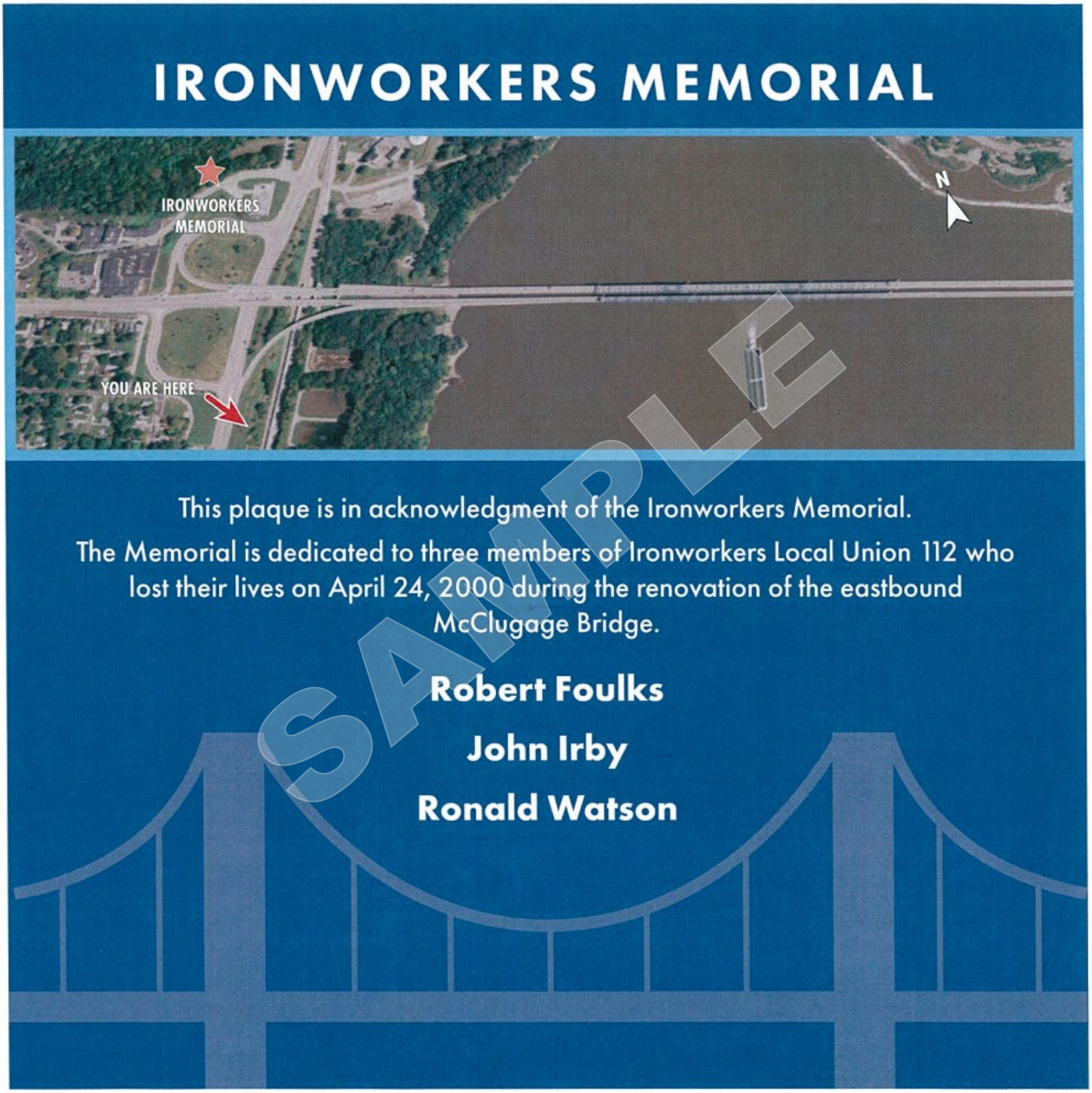


Sign Panel Type 4



Sign Panel Type 5



FURNISH AND ERECT STRUCTURAL STEEL, SPECIAL

Description: This work shall consist of removal of four selected sections of the existing Eastbound US 150 Truss bridge for preservation, rehabilitation, modification and relocation for display in adjacent areas accessible to the public. This work shall be performed as per the applicable sections of Articles 505 and 506 of the Standard Specifications, applicable Guide Bridge Special Provisions, as shown on the plans, as directed by the Engineer and as described herein.

Construction: The Contractor and Engineer will survey the existing structure to determine appropriate steel sections for removal and preservation in the safest and most economical manner. Dimensions shown on the plans are nominal and may be modified in the field based on existing conditions.

Painting: The preserved steel sections shall be repainted in accordance with GBSP 25, Cleaning and Painting Existing Steel Structures. The steel sections shall be cleaned in accordance with SSPC-SP3, Power Tool Cleaning with potential for lead paint removal. If lead paint is found, refer to GBSP 26, Containment and Disposal of Lead Paint Cleaning Residues. The preserved steel sections shall be inspected for rough and protruding edges and other safety items. The steel pieces shall be inspected in accordance with the Public Playground Safety Handbook, latest edition from the Consumer Product Safety Commission. The rough or protruding edges shall be removed and made safe by grinding or other means. The steel pieces shall be repainted per GBSP 25 to Munsell Number 10B 3/6 (blue). The Basis of Payment noted in GBSP 25 and 26 shall not apply and no separate payment will be made. The cost of all cleaning and painting shall be included as a part of this item.

Installation: The steel members shall be installed on concrete or anchor bolt foundations as detailed on the plans and secured using various galvanized anchor bolts, washers, and nuts as detailed on the plans. Anchor bolts shall be installed per Article 521.06 or Article 509.06 as noted on the plans. All Anchor Bolts and nuts shall be hot dipped galvanized per Article 509.06. Steel members shall have holes drilled in the existing steel to match the anchor bolt pattern on the plans.

The cost of concrete foundations, anchor bolts and installation shall be included as part of this item.

Method of Measurement: This work will not be measured for payment but shall be shall paid per lump sum.

Basis of Payment: This work shall be paid for at the contract unit price per Lump Sum for FURNISH AND ERECT STRUCTURAL STEEL, SPECIAL which shall include the survey, removal, rehabilitation, cleaning, painting, relocation and reinstallation of existing bridge truss members to locations shown on the plans and the excavation and construction of concrete foundations and installation of anchor bolts at the locations shown on the plans and as directed by the Engineer.

CONCRETE PAVER PAVEMENT

Description: This work shall consist of furnishing and installing permeable interlocking concrete paver pavement in accordance with the applicable portions of the Standard Specifications, the details in the plans, as directed by the Engineer, and as specified herein.

Qualifications: Contractor and crew must have at least five years' experience in installing concrete pavers on projects of similar size. The Contractor shall submit descriptions and references for five successful concrete paver installation projects completed within the past five years. The submittals shall include project names, client names, and locations.

Materials:

Item	Article
Concrete Pavers (Note 1)	1042

Note 1. Concrete paver dimension, color, and pattern of pavers shall be as noted below and on plans. All pavers shall be suitable for use as permeable pavement.

Concrete Pavers shall be:

1. Pattern 1:
    a. Finish: Brushed,
    b. Edge: Chamfer,
    c. Sizes: 5" x 10" x 3.125" nominal.
    d. Pattern: Herringbone as shown on plans,
    e. Color: Federal Standard 20100 or similar.
2. Pattern 2:
    a. Finish: Brushed,
    b. Edge: Chamfer,
    c. Size: 5" x 10" x 3.125" nominal.
    d. Pattern: Herringbone as shown on plans,
    e. Color: Federal Standard 10049 or similar

3. Pattern 3
   a. Finish: Standard
   b. Edge: Chamfer
   c. Size: 8" x 8" (hexagonal) x 2.75" nominal.
   d. Pattern: Hexagonal as shown on plans,
   e. Color: Federal Standard 36173 or similar

Pigment in concrete pavers shall conform to ASTM C 979. ACI Report No. 212.3R provides guidance on the use of pigments.

Paver Setting Bed Material: Bedding material shall be in accordance with the specification for Bedding Material, Special.

Paver Joint Material: Paver Joint Material shall be in accordance with all applicable portions of section 1004.05 except that the gradation shall be CA-20 and the material shall be washed with less than 2% passing the No. 200 Sieve. For joints narrower than ¼" aggregate meeting ASTM No. 89 or No. 9 gradations may be used upon approval of the Engineer. Submit minimum 1 pound bag of each proposed Paver Joint Material color for approval.

Source Limitations: Obtain each type of concrete paver, joint material, and setting bed material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

Samples: Contractor must submit to the Engineer a minimum of 3 representative full-size samples of each concrete paver type, thickness, color and finish for approval. Submittal shall indicate the full range of concrete pavers in the specified color. Accepted samples become the standard for acceptance for the product produced. Manufacturer's catalog product data, installation instructions and material safety data sheets must also be submitted for approval.

Mock Up: Prior to the installation, a 1 sq. yd full-scale mock-up using actual job specified edge restraint, materials, brick dimensions, colors, methods, and workmanship shall be provided by the Contractor. The actual vibrating equipment and vibrating rate to be used on the job shall be used on the mockup. The accepted mockup will be the standard by which the remaining work will be evaluated for technical and aesthetic merit.

If approved by the Engineer, the mock up area may remain or be reused as part of the installed work at the end of the project provided that it remains undisturbed, remains in good condition, and meets all of the conditions of the specifications.

Delivery: Concrete Pavers shall be delivered in manufacturer's original, unopened, undamaged container packaging with identification tags intact on each paver bundle.

Storage and protection: Materials shall be stored in a protected area such that they are kept free from damage, mud, dirt, and other foreign materials.

Equipment: Equipment shall conform to the following Articles of Division 1100 – Equipment of the Standard Specifications.

(a) Masonry Saw (Note 1)

(b) Vibrator/Compactor (Note 2)

Note 1. The masonry saw shall be a wet or dry saw capable of clean and accurate cuts.

Note 2. The vibratory/compactor shall be either a place compactor with a high frequency, low amplitude plate or a rubber-roller mechanical vibrator.

Construction Requirements:

General:

A. Pre-Installation Meeting: Conduct a pre-installation meeting prior to beginning any excavation or other work in the permeable concrete paver pavement area to verify all products, application procedures, site conditions, and warranty terms are approved and ready for installation. Meeting attendees shall include the Engineer, Owner, Contractor, any subcontractors performing working associated with the permeable concrete paver pavement system, and the concrete paver manufacturer.

B. Excavation, installation of pipe underdrains, filter fabric (where required) infiltration aggregate, aggregate base coarse, bedding material, and concrete curb (required for edge restraint) shall be complete and approved by the Engineer prior to beginning concrete paver pavement installation.

C. All concrete pavers shall be installed per the respective manufacturer’s recommendations.

D. No concrete paver setting work shall be performed when the underlayment has free moisture, ice, or snow, or when the underlayment is frozen.

E. Bedding material shall not be installed when the ambient temperature is below 40°F, at 40°F and falling, or at any time when the setting bed stiffens before concrete pavers are installed.

Paver Cutting:

A. Cut concrete pavers shall be placed in areas shown on the details in the plans. "L" shaped concrete pavers shall be avoided where possible.

B. Concrete pavers shall be cut radially when joints between concrete pavers on curves exceed 1/8" inch.

C. Radial cut concrete pavers shall be created by trimming both sides of concrete paver.

D. Cut concrete pavers shall be no smaller than one third of a whole concrete paver.

Paver Installation:

A. Place concrete pavers by hand in straight courses with hand tight joints and uniform top surface. Good alignment shall be kept and patterns shall be as shown on plans and details. Whole concrete pavers shall be laid first, starting from an exact edge or from the centerline of the pavement, followed by cut concrete pavers.

B. Protect the alignment and elevations of the newly laid concrete pavers with plywood sheeting at all times. Advance the plywood as work progresses and maintain plywood protection over all areas subject to movement of materials, workers, and equipment.

C. Concrete pavers shall be cut only when necessary and used in courses as indicated on plans and details.

D. Joints in the underlayment, if any, shall not reflect up through the setting bed and concrete paver system.

E. Compact to set pavement into bedding course with one pass of the vibrator/compactor. Vibration/compaction shall stop within 6' ft. of any unrestrained edge.

F. When all concrete pavers are installed, apply joint material to paving and sweep into all joints until joints are completely filled. Sweep clean the entire surface and remove all excess material. Do not allow traffic on concrete pavers prior to joints being filled.

G. Compact and seat the concrete pavers into the bedding material using the vibrator/compactor. Make at least two passes in the perpendicular directions with the vibrator/compactor.

H. Additional joint material shall be applied to the opening and joints to fill them completely and remove any excess material by sweeping.

I. Protect newly laid concrete pavers, slabs and curbs with plywood panels on which workers stand. Advance protective panels as work progresses but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of installed concrete pavers, slabs or curbs. All concrete pavers within 6' ft. of the lying face shall be left fully compacted and filled with joint material at the completion of each workday.

J. Repeat the joint-filling process 30 days later or as directed by the Engineer.

K. Replace cracked or chipped concrete pavers at no additional cost to the Department.

L. The final surface tolerance of compacted concrete pavers shall not deviate more than ±3/8" in. under a 10' ft. straight edge.

M. Lippage shall be no greater than 1/8" in. difference in high between adjacent concrete pavers.

N. The surface elevation of concrete pavers shall be 1/8" in. above adjacent drainage inlets and adjacent concrete pavements.

Testing: Surface infiltration rate shall be verified using test method ASTM C1781 at four locations to be determined by the Engineer. Testing shall be included in the cost of this work, and no additional compensation will be provided.

Protection of the work: The permeable concrete paver pavement system shall be kept clean and free of clogging debris, sediment, and soils from the Contractor's operations and all upstream and adjacent debris and sediment. Pavement contaminated by debris, sediment, or soil shall be cleaned to the satisfaction of the Engineer. If the pavement or underlying aggregate materials cannot be unclogged, it shall be removed and replaced at to the satisfaction of the Engineer. No additional compensation will be provided for protecting, cleaning, or replacing the permeable concrete paver pavement system.

Six months after the completion of the work the Contractor shall provide the following as required: filling paver joints with joint material, replacing broken or cracked concrete pavers, and releveling settled concrete pavers to initial elevation. This work shall be included in the unit cost of the original work and no additional compensation will be provide for this work.

Method of Measurement: This work will be measured for payment in place per Square Yard.

Basis of Payment: Payment for this work shall be at the contract unit price per Square Yard for CONCRETE PAVER PAVEMENT which will include all labor, material, and equipment necessary to complete this item of work, including jointing, testing, and protection of the work.

Edge restraints constructed of concrete curb will be measured and paid for according to Article 606.15 of the Standard Specifications.

PRECAST CONCRETE PARKING BLOCK

This work shall consist of furnishing and installing precast concrete parking block wheel stops in designated parking areas at locations shown on the plans, as specified herein and as directed by the Engineer.

The parking blocks shall be a minimum of 6'-feet long, 5"-inches tall and 6"-inches deep. All top edges shall have a minimum of 1"-inch and ½"-inch chamfer edging. The bottom of the wheel stop shall have two drainage openings, a minimum of 12"-inches long, each. Two ¾"-inch diameter holes shall be cast through the wheel stop to allow placement of reinforcing bar to anchor the wheel stop to the pavement.

The parking blocks shall be made of Portland Cement Concrete having a minimum compressive strength of 3, 000 psi and shall be reinforced with two #4 reinforcement bars running along the length. The surface of the parking blocks shall be smooth, free from pits, holes, cracks, excess concrete and blemishes.

The parking blocks shall be installed at the locations shown on the plans and as directed by the Engineer. The installation shall include drilling a ¾"-inch diameter hole through the pavement structure and installing a minimum 2-foot long piece of reinforcing bar to secure the parking block from movement.

Method of Measurement: This work shall be measure per Each location installed, complete.

Basis of Pavement: This work shall be paid for at the contract unit price, per Each, for PRECAST CONCRETE PARKING BLOCK, at the locations shown on the plans, as specified herein and as directed by the Engineer.

LANDSCAPING GRAVEL

Description: This work shall consist of furnishing and installing decorative landscaping gravel for in the areas shown on the plans, as specified here and as directed by the Engineer.

Material: The landscaping gravel material shall meet applicable requirements of Section 1004 of the Standard Specifications. The stone shall range in size from 3"-inch length to 6"-inches in length and be of a general uniform color. It shall be natural gravel/rock, with all rounded surfaces, as generally classified as river run.

The contractor shall provide a minimum of 5 pounds or stone material as a sample for approval prior to ordering material.

Construction: The material shall be placed at the locations shown on the plan as decorative stone, as per applicable portions of Section 311. Filter fabric shall be placed prior to installation. Average depth shall be 6-inches.

Method of Measurement: This work will be measured for payment in Square Yards. Filter fabric shall be measured and paid for separately.

Basis of Payment: This work shall be paid for at the contract unit price, per Square Yards for LANDSCAPING GRAVEL.

GFCI 20 AMP DUPLEX RECEPTACLE

Description: This work shall consist of furnishing and installing a 20 amp ground fault circuit interrupting receptacle with cover box inside the bridge tie girder and arch structures as shown on the plans. The work shall include all attachment hardware, conduit and wiring from adjacent junction box to the receptacle. The Contractor shall provide all labor, material, and equipment necessary to complete the work.

Materials: The receptacle shall be a 20 amp, 120 volt duplex heavy duty, industrial grade. It shall be furnished in a 4" square weatherproof box with cover.

Basis of Payment: This work will be paid for at the contract unit price per Each for GFCI 20 AMP DUPLEX RECEPTACLE.

CIRCUIT BREAKER IN STREET LIGHT CONTROLLER

Description: This work shall consist of furnishing a two-pole, rated 30 A circuit breaker that is mounted on an aluminum plate and is installed in an existing lighting controller at the location shown on the Plans or as designated by the Engineer. All circuit breakers shall have a molded case. This work shall be in accordance with the requirements set forth under Section 805 and 1086 and Article 1068.01(e)(3) in particular of the Standard Specifications.

Basis of Payment: This work will be paid for at the contract unit price of Each for CIRCUIT BREAKER IN STREET LIGHT CONTROLLER, which shall be payment in full for all labor, equipment, and materials required to provide the circuit breaker installation described above, complete.

CONDUIT ATTACHED TO STRUCTURE

Description: This work shall consist of furnishing and installing stainless steel conduit, fittings and accessories attached to structures.

Materials: Materials shall be according to Article 811.02 of the Standard Specifications, except as noted below:

Stainless steel conduit, couplings, and elbows shall be Type 304 or Type 316 stainless steel, and shall be manufactured according to UL Standard 6A and ANSI Standard C80.1. Conduit fittings shall be the threaded type, shall be Type 304 or Type 316 stainless steel, and shall be manufactured according to UL Standard 514B.

All conduit supports, straps, clamps, and other attachments shall be Type 304 or Type 316 stainless steel. Attachment hardware shall be stainless steel according to Art 1006.29(d).

Installation. The conduit shall be installed according to Article 811.03 of the Standard Specifications.

Basis of Payment: This work will be paid for at the contract unit price per Foot for CONDUIT ATTACHED TO STRUCTURE, 1" DIA. STAINLESS STEEL price shall be payment in full for all labor, materials, and equipment required to install the stainless-steel conduit as described above, complete.

REMOVAL OF LIGHTING UNIT, SALVAGE

Description: This work shall consist of the removal and salvage of existing lighting units in accordance with Section 842 of the Standard Specifications and the following additions or exceptions.

General: Where indicated in Peoria County, pole, arm, pole wiring, luminaires, and associated hardware and appurtenances shall remain the property of the City of Peoria and shall be delivered by the Contractor to 3505 North Dries Lane, Peoria, Illinois.

Where indicated on bridge structure or in Tazewell County, pole, arm, pole wiring, luminaires, and associated hardware and appurtenances shall remain the property of the Department and shall be delivered by the Contractor to the IDOT maintenance facility located at 6500 West US Route 150, Edwards, Illinois.

Basis of Payment: This work will be paid for at the contract unit price Each for REMOVAL OF LIGHTING UNIT, SALVAGE.

LUMINAIRE LED, SPECIAL

Description: This work consists of furnishing all materials, equipment, and labor necessary to install Light-Emitting Diode (LED) maintenance luminaires as shown on the plans, in accordance with the applicable requirements of Section 821 of the Standard Specifications for Road and Bridge Construction, and as specified herein.

General: The luminaire fixture and LED lamp shall be assembled in the continental U.S.A. and shall be assembled by and manufactured by the same Manufacturer. The luminaire shall be in compliance with ANSI C136.37. LED light source(s) and driver(s) shall comply with the material requirements of the Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU.

Manufacturer Experience. The luminaire shall be designed to be incorporated into a lighting system with an expected 30-year lifetime.

Housing: The electrical enclosure of the luminaire fixture shall consist of a ceiling-mountable junction box and a lamp holder assembly with a watertight tempered glass or polycarbonate globe surrounded by a protective guard. The lamp holder and globe shall fit a standard A19 or A21 type lamp. The junction box shall contain undrilled entries of minimum of 3/4" NPT four way. Wiring within the junction box shall be rated at 600 V, 221°F (105°C) or higher.

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

Attachment. The luminaire shall be of ceiling mounting type.

Receptacle. The luminaire shall include a medium base, high temperature PBT.

Vibration Characteristics. All luminaires shall pass ANSI C136.31 requirements. Luminaires mounted on a bridge and high mast luminaires shall be rated for "3G" peak acceleration. Vibration testing shall be run using the same luminaire in all three axes.

Labels and Decals. All luminaires shall have external labels in compliance with the latest version of ANSI C136.15 and internal labels in compliance with the latest version of ANSI C136.22.

The luminaire shall be listed for wet locations by a Nationally Recognized Testing Laboratory (NRTL) as defined by OSHA and shall be in compliance with UL 8750 and UL 1598. It shall be identified as such by the holographic UL tag/sticker on the inside of the luminaire.

Hardware. All external fasteners shall be stainless steel. All hardware shall have corrosion resistance.

Optical Assembly: The optical assembly shall consist of a standard A19 or A21 type lamp. It shall utilize high brightness, long life, minimum 70 color rendering index (CRI), 4,000 K color temperature (+/-300 K) LEDs binned according to ANSI C78.377.

Lumen depreciation at 50,000 hours of operation shall not exceed 15% of initial lumen output at the specified LED drive current and an ambient temperature of 77°F (25°C).

Photometric Performance: The LED luminaire wattage shall not exceed 15 watts and shall deliver a minimum of 800 lumens.

Testing. Luminaires shall be tested according to IES LM-79. The laboratory performing this test shall hold accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) under NIST. Submitted reports shall have a backlight, uplight, and glare (BUG) rating according to IESNA TM-15 including a luminaire classification system graph with both the recorded lumen value and percent lumens by zone.

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

Thermal testing shall be provided according to UL 1598. The luminaire shall start and operate in the ambient temperature range specified. The maximum rated case temperature of the driver, LEDs, and other internal components shall not be exceeded when the luminaire is operated in the ambient temperature range specified.

Lumen Maintenance Projection. The LEDs shall have long term lumen maintenance documented according to IESNA TM-21, or when available for the luminaires according to IESNA TM-28. The submitted calculations shall incorporate an in-situ temperature measurement test (ISTMT) and LM- 80 data with TM-21 inputs and reports according to the TM-21 calculator, or when available ISTMT and LM-84 data with TM-28 inputs and reports according to the TM-28 calculator. Ambient temperature shall be 77°F (25°C).

Driver: The driver for the luminaire shall be integral to the unit.

Circuit Protection. Shall tolerate indefinitely open and short circuit output conditions without damage.

Ingress Protection. IP65 rating.

Input Voltage. Shall be suitable for operation 120 volts as required by the system operating voltage.

Operating Temperature. Operating ambient temperature range of -40°F to 104°F (-40°C to 40°C).

Driver Life. Life time of 25,000 hours at 77°F (25°C) ambient.

Power Factor. Shall maintain a power factor of 0.9 or higher and total harmonic distortion of less than 20% at 50% load across the full supply voltage range.

Driver efficiency. Minimum efficiency of 90% at maximum load and a minimum efficiency of 85% for the driver operating at 50% power with driver efficiency defined as output power divided by input power.

Electrical Interference. Shall meet the Electromagnetic Compatibility (EMC) requirements for Class A digital devices included in the FCC Rules and Regulations, Title 47, Part 15.

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

Dimming. 0-10 V dimming capability.

Warranty: The entire luminaire and all of its component parts shall be covered by a 10-year warranty.

Submittal Requirements: The Contractor shall submit, for approval, an electronic version of the TM-21 calculator spreadsheet with inputs and reports associated with the project luminaires. The Contractor shall also provide an electronic version of each of the following Manufacturer's product data for each type of luminaire.

1) Descriptive literature and catalogue cuts for luminaire, LED package, driver, and surge protection device, as applicable.

2) LED drive current, total luminaire input wattage and total luminaire current at the system operating voltage or voltage range and ambient temperature of 77°F (25°C).

3) Luminaire efficacy expressed in lumens per watt (lpw) per luminaire.

4) Initial delivered lumens at the specified color temperature, drive current and ambient temperature.

5) TM-15 BUG rating report.

6) Documentation of Manufacturers experience and certification that luminaires were assembled in the U.S.A.

7) Supporting documentation of compliance with ANSI standards as well as listing requirements.

8) Supporting documentation of laboratory accreditations and certifications for specified testing.

9) Thermal testing documents.

10) IES LM-79, LM-80 (or LM-84) and TM-21 (or TM-28) reports.

11) Vibration characteristics test reports and certification.

12) IP test reports.

13) Manufacturer written warranty.

14) Luminaire installation, maintenance, and washing instructions.

Construction: Examine all luminaires delivered to the jobsite prior to installation to ensure all specification requirements and Shop Drawing comments have been incorporated by the Manufacturer. Deficient luminaires shall not be installed, and the Engineer shall be notified immediately.

Any dirt or film on LEDs and/or the optical assembly shall be thoroughly removed using cleaning methods approved by the manufacturer.

Basis of Payment: This work will be paid for at the contract unit price per Each for LUMINAIRE, LED, SPECIAL which shall be payment in full for all labor, equipment and material necessary to perform the work specified herein.

REMOVAL OF LIGHTING LUMINAIRE, SALVAGE

Description: This work shall consist of the removal of existing luminaires in accordance with Section 842 of the Standard Specifications.

General: Where indicated in Peoria County, the luminaire and all associated hardware and appurtenances shall remain the property of the City of Peoria and shall be delivered by the Contractor to 3505 North Dries Lane, Peoria, Illinois, and unloaded and stacked there, as designated by the Engineer. Luminaires shall be removed and boxed in new containers, approved by the Engineer.

Where indicated on bridge structure or in Tazewell County, the luminaire and all associated hardware and appurtenances shall remain the property of the Department and shall be delivered by the Contractor to 6500 West US Route 150, Edwards, Illinois, and unloaded and stacked there, as designated by the Engineer. Luminaires shall be removed and boxed in new containers, approved by the Engineer.

Basis of Payment: This work will be paid for at the contract unit price Each for REMOVAL OF LIGHTING LUMINAIRE, SALVAGE.

UNDERPASS LUMINAIRE, LED, OF THE WATTAGE SPECIFIED

Description: This work consists of furnishing all materials, equipment, and labor necessary to install Light-Emitting Diode (LED) underpass luminaires as shown on the plans, in accordance with the applicable requirements of Section 821 of the Standard Specifications for Road and Bridge Construction, and as specified herein.

General: The luminaire shall be assembled in the continental U.S.A. and shall be assembled by and manufactured by the same Manufacturer. Quick connect/disconnect plugs shall be supplied between the discrete electrical components within the luminaire such as the driver, surge protection device, and optical assembly for easy removal. The quick connect/disconnect plugs shall be operable without the use of tools and while wearing insulated gloves. The luminaire shall be in compliance with ANSI C136.37. LED light source(s) and driver(s) shall comply with the material requirements of the Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU.

Manufacturer Experience. The luminaire shall be designed to be incorporated into a lighting system with an expected 30-year lifetime. The luminaire Manufacturer shall have a minimum of 15 years' experience manufacturing roadway luminaires.

Housing: The housing shall be designed to ensure maximum heat dissipation and to prevent the accumulation of water, ice, dirt and debris. A passive cooling method with no moving or rotating parts shall be employed for heat management. Wiring within the electrical enclosure shall be rated at 600 V, 221°F (105°C) or higher.

Finish. Painted or finished luminaire surfaces exposed to the environment, shall exceed a rating of six according to ASTM D1654 after 1,000 hours of ASTM B117 testing. The coating shall exhibitno greater than 30% reduction of gloss according to ASTM D523, after 500 hours of ASTM G154 Cycle 6 QUV® accelerated weathering testing.

Attachment. The luminaire shall be suitable for mounting at a position suspended directly above the roadway edge of pavement or attached to a wall or pier.

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

Vibration Characteristics. All luminaires shall pass ANSI C136.31 requirements. Roadway luminaires mounted on a bridge and high mast luminaires shall be rated for "3G" peak acceleration. Vibration testing shall be run using the same luminaire in all three axes.

Labels and Decals. All luminaires shall have external labels in compliance with the latest version of ANSI C136.15 and internal labels in compliance with the latest version of ANSI C136.22.

The luminaire shall be listed for wet locations by a Nationally Recognized Testing Laboratory (NRTL) as defined by OSHA and shall be in compliance with UL 8750 and UL 1598. It shall be identified as such by the holographic UL tag/sticker on the inside of the luminaire.

Hardware. All external fasteners shall be stainless steel. All hardware shall have corrosion resistance.

Optical Assembly: The LED optical assembly, consisting of LED packages, shall have a minimum Ingress Protection rating of IP66 according to ANSI C136.25-2013. Circuiting shall be designed to minimize the impact of individual LED failures on the operation of the other LEDs.

The optical assembly shall utilize high brightness, long life, minimum 70 color rendering index (CRI), 4,000 K color temperature (+/-300 K) LEDs binned according to ANSI C78.377. Provisions for house-side shielding shall be provided when specified.

Lumen depreciation at 50,000 hours of operation shall not exceed 15% of initial lumen output at the specified LED drive current and an ambient temperature of 77°F (25°C).

Photometric Performance:

The classification of LED luminaires shall be as follows:

VLW – Wattages ≤ 100, minimum delivered lumens 5,000,

LW – Wattages 101 - 200, minimum delivered lumens 10,000,

MW – Wattages 201 - 300, minimum delivered lumens 20,000,

HW – Wattages 301 - 400, minimum delivered lumens 30,000,

VHW – Wattages ≥ 401, minimum delivered lumens 40,000.

VLW= very low watt, LW = low watt, MW = medium watt, HW = high watt, and VHW = very high watt luminaire. Luminaires with lumens below the stated minimums will not be accepted.

Testing. Luminaires shall be tested according to IES LM-79. The laboratory performing this test shall hold accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) under NIST. Submitted reports shall have a backlight, uplight, and glare (BUG) rating according to IESNA TM-15 including a luminaire classification system graph with both the recorded lumen value and percent lumens by zone.

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

Thermal testing shall be provided according to UL 1598. The luminaire shall start and operate in the ambient temperature range specified. The maximum rated case temperature of the driver, LEDs, and other internal components shall not be exceeded when the luminaire is operated in the ambient temperature range specified.

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

Calculations. Complete point-by-point luminance and veiling luminance calculations as well as listings of all indicated averages and ratios as applicable shall be provided according to IES RP-8 recommendations. Lighting calculations shall be performed using AGi32 software with calculations performed to two decimal places (i.e. x.xx cd/m^2). Calculation results shall demonstrate that the submitted luminaire meets the lighting metrics specified in the project Luminaire Performance Tables (see exhibit B). Scotopic or mesopic factors will not be allowed.

Lumen Maintenance Projection. The LEDs shall have long term lumen maintenance documented according to IESNA TM-21, or when available for the luminaires according to IESNA TM-28. The submitted calculations shall incorporate an in-situ temperature measurement test (ISTMT) and LM- 80 data with TM-21 inputs and reports according to the TM-21 calculator, or when available ISTMT and LM-84 data with TM-28 inputs and reports according to the TM-28 calculator. Ambient temperature shall be 77°F (25°C).

Driver: The driver for the luminaire shall be integral to the unit.

Circuit Protection. Shall tolerate indefinitely open and short circuit output conditions without damage.

Ingress Protection. IP65 rating.

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

Operating Temperature. Operating ambient temperature range of -40°F to 104°F (-40°C to 40°C).

Driver Life. Life time of 100,000 hours at 77 °F (25 °C) ambient.

Power Factor. Shall maintain a power factor of 0.9 or higher and total harmonic distortion of less than 20 % at 50% load across the full supply voltage range.

Driver efficiency. Minimum efficiency of 90% at maximum load and a minimum efficiency of 85% for the driver operating at 50% power with driver efficiency defined as output power divided by input power.

Electrical Interference. Shall meet the Electromagnetic Compatibility (EMC) requirements for Class A digital devices included in the FCC Rules and Regulations, Title 47, Part 15.

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

Dimming. 0-10 V dimming capability.

Surge Protection Device: SPD shall be labeled as Type 4 in accordance to UL 1449 and be an integral part of the luminaire. It shall provide a minimum system protection level of 10 kV, 10 kA. To protect for a 10 kV, 10 kA surge the required clamping voltage of the external Metal Oxide Varistor (MOV) or another SPD shall be lower than 1 kV at 8 kA {(10 kV-2 kV)/1 ohm=8 kA}.

The SPD shall comply with the following standards:

1) IEEE C62.41.1, IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits,

2) IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low- Voltage (1000 V and Less) AC Power Circuits,

3) IEEE C62.45, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits, and

4) ANSI C136.2, American National Standard for Roadway and Area Lighting Equipment – Luminaire Voltage Classification.

The SPD and performance parameters shall be posted at www.UL.com under Category Code: VZCA2.

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

1) Negligible light output from more than 10 percent of the LED packages

2) Condensed moisture inside the optical assembly

3) driver that continues to operate at a reduced output below 15% of the rated nominal output

The warranty period shall begin on the date of final acceptance of the lighting work as documented in the Resident Engineer’s project notes.

Submittal Requirements: The Contractor shall submit, for approval, an electronic version of all associated luminaire IES files, AGi32 files and the TM-21 calculator spreadsheet with inputs and reports associated with the project luminaires. The Contractor shall also provide an electronic version of each of the following Manufacturer's product data for each type of luminaire.

1) Descriptive literature and catalogue cuts for luminaire, LED package, driver, and surge protection device.

2) LED drive current, total luminaire input wattage and total luminaire current at the system operating voltage or voltage range and ambient temperature of 77°F (25°C).

3) Luminaire efficacy expressed in lumens per watt (lpw) per luminaire.

4) Initial delivered lumens at the specified color temperature, drive current and ambient temperature.

5) Computer photometric calculation reports.

6) TM-15 BUG rating report.

7) Documentation of Manufacturers experience and certification that luminaires were assembled in the U.S.A.

8) Supporting documentation of compliance with ANSI standards as well as listing requirements.

9) Supporting documentation of laboratory accreditations and certifications for specified testing.

10) Thermal testing documents.

11) IES LM-79, LM-80 (or LM-84) and TM-21 (or TM-28) reports.

12) Salt spray (fog) test reports and certification.

13) Vibration characteristics test reports and certification.

14) IP test reports.

15) Manufacturer written warranty.

16) Luminaire installation, maintenance, and washing instructions.

Construction: Examine all luminaires delivered to the jobsite prior to installation to ensure all specification requirements and Shop Drawing comments have been incorporated by the Manufacturer. Deficient luminaires shall not be installed and the Engineer shall be notified immediately.

Any dirt or film on LEDs and/or the optical assembly shall be thoroughly removed using cleaning methods approved by the manufacturer.

Basis of Payment: This work will be paid for at the contract unit price per Each for Luminaire, LED, Underpass, of the wattage specified which shall be payment in full for all labor, equipment and material necessary to perform the work specified herein.

CONDUIT, FLEXIBLE, NON-METALLIC, WEATHERPROOF, 1.0" DIAMETER

Description: This work shall consist of furnishing and installing conduit in accordance with Article 811 of the Standard Specifications. Materials shall meet the follow requirements:

1. Liquidtight flexible nonmetallic conduit shall have a smooth inner surface with integral reinforcement within the conduit wall and be designated as a Type LFNC-B (for FNMCB).

2. Liquidtight flexible nonmetallic conduit shall be listed to UL standard UL1660.

3. Liquidtight flexible nonmetallic conduit shall be flame resistant and when used with listed fittings, is approved for the installation of electrical conductors.

4. Liquidtight flexible nonmetallic conduit shall be installed in accordance with Article 351, Part B of the National Electrical Code (NEC) and other applicable sections of the NEC and/or local electrical codes.

5. Liquidtight Flexible Nonmetallic Conduit shall be marked 'OUTDOOR' for outdoor applications exposed to sunlight and weathering conditions.

6. Liquidtight Fittings shall be listed for the use with Liquidtight Flexible Nonmetallic Conduit and shall be marked LFNC-B (FNMC-B). Liquidtight Fittings uses for direct burial applications shall be listed for 'Wet Locations'.

Basis of Payment: This work shall be paid for at the contract unit price per Foot for CONDUIT, FLEXIBLE NON-METALLIC, WEATHERPROOF, 1.0" DIAMETER, which price shall include all labor, material and equipment necessary to install the conduit in a manner described herein.

LIGHT POLE, ALUMINUM, 18 FT. M.H., TENON MOUNT (SPECIAL)

Description: This work shall consist of furnishing and installing a pedestrian lighting pole in accordance with Section 830 of the Standard Specifications.

General: The light pole shall be constructed of aluminum material with a mounting height of 18 ft, and a tenon mount.

Basis of Payment: This work shall be paid for at the contract unit price Each for LIGHT POLE, ALUMINUM, 18 FT. M.H., TENON MOUNT (SPECIAL).

LIGHT POLE, SPECIAL

Description: This work shall consist of furnishing and installing a light pole in accordance with Section 830 of the Standard Specifications.

General: The light pole shall be constructed of galvanized steel with a mounting height of 45 ft., and a davit arm with a length as shown on the plans.

Basis of Payment: This work shall be paid for at the contract unit price Each for LIGHT POLE, SPECIAL

REMOVAL OF UNDERPASS LIGHTING UNIT, NO SALVAGE

Description: This work shall consist of the removal of existing underpass lighting units in accordance with Section 842 of the Standard Specifications and the following additions or exceptions.

General: Where indicated, luminaire and associated hardware and appurtenances shall become the property of the Contractor and shall be disposed of according to Article 202.03.

Basis of Payment: This work will be paid for at the contract unit price Each for REMOVAL OF LIGHTING UNIT, NO SALVAGE.

LED MODULE AND HPS LAMP RECYCLING

The Contractor shall recycle all LED modules and high-pressure sodium lamps through a certified recycling company. The Contractor shall submit detailed information pertaining to LED module recycling to the Department for review along with the electrical material submittals. The Contractor shall submit proof of recycling to the Department.

Basis of Payment: This work will not be paid for separately but shall be included in the contract unit price for the traffic signal removal items.

TRAFFIC SIGNAL CONSTRUCTION STAGING

The Contractor will be allowed to place the intersection into all-red flash mode to facilitate the installation of the proposed traffic signal controller, mast arms, signal heads, electrical cable, and other components.

The Contractor shall furnish and install a minimum of two stop signs per approach when the intersection is operating in all-red flash mode. The traffic signals may be placed into all-red flash mode between the hours of 8:30 A.M. and 3:00 P.M. only.

The Contractor shall restore the traffic signal to normal operation at all other times, unless specifically directed otherwise by the Engineer.

The Contractor will be allowed to place the intersection into flash for a maximum of five (5) days.

All costs (labor, materials, and equipment) associated with these requirements shall be included in the contract bid price. There will be no additional compensation for items requirement to implement staging, included but not limited to, temporary cable splices, temporary traffic posts, and premium time hours.

TRAFFIC SIGNAL POST, GALVANIZED STEEL

Description: This work shall be in accordance with Sections 878 and 1077 of the Standard Specifications except as modified herein.

The traffic signal post shall be attached to the foundation with four 3/4" x 18" galvanized anchor bolts. The post base shall be secured to the foundation using galvanized nuts and galvanized steel flat washers that have a minimum thickness of 1/4" and are trapezoidal in shape. The washers shall be sized so as to completely capture the mounting flanges of the traffic signal base. Round washers will not be acceptable.

Basis of Payment: This work will be paid for at the contract unit price Each for TRAFFIC SIGNAL POST, GALVANIZED STEEL, of the size indicated on the plans which price shall be payment in full for all labor, material, and equipment required to provide and install the traffic signal post and base described above.

ELECTRIC CABLE IN CONDUIT, EQUIPMENT GROUNDING CONDUCTOR, NO. 6 1C

This work shall be in accordance with the applicable Articles of Sections 801, 806, 873, 1076, and 1088 of the Standard Specifications with the following modifications:

This work shall consist of furnishing and installing a grounding wire to bond all traffic signal handholes (lids and rings), mast arm assemblies, posts, light poles, cabinets and exposed metallic conduits.

The Contractor shall attach the proposed ground wire to the proposed traffic structures to ground and safety bond them in accordance with NEC requirements. All labor, materials, and equipment required to bond the proposed structures (wire, clamps, hardware, etc.) shall be included in the bid price for this pay item.

The Contractor shall also be responsible for locating all handholes and uncovering them as required to facilitate the work.

The proposed ground wire shall be an insulated #6 XLP copper conductor with green insulation.

Basis of Payment: This work will be paid for at the contract unit price per Foot for ELECTRIC CABLE IN CONDUIT, EQUIPMENT GROUNDING CONDUCTOR, NO. 6 1C which price shall be payment in full for all labor, materials, and equipment required to provide the grounding cable described above.

TRAFFIC SIGNAL LED MODULE SPECIFICATIONS

The material requirement shall be in accordance with Sections 880 and 1078 of the Standard Specifications except as modified herein.

The LED assemblies for the red, yellow, and green solid and arrow indications shall meet or exceed the following minimum specifications:

SOLID INDICATION LED MODULE SPECIFICATIONS

Compliance:	Fully compliant with ITE VTCSH LED Circular Signal Supplement specifications dated and adopted June 27, 2005.
Compliance Verification:	Intertek ETL verified compliance – Product must be listed on the "Directory of LED Modules Certified Products" list located on the ETL website at http://www.intertek.com/lighting/performance-testing/traffic-signals/
Diameter:	12" (300mm)
Lens:	UV stabilized scratch resistant polycarbonate, tinted red or yellow, clear for green, uniform non-pixelated illumination, Incandescent Appearance
LEDS:	Hi-Flux
Operating Temperature Range:	-40°C to +74°C (-40°F to +165°F)
Operating Voltage Range:	80 to 135 V (60Hz AC)
Power Factor (PF):	> 90%
Total Harmonic Distortion (THD):	< 20%
Minimum Voltage Turn-Off:	35V
Turn-On/Turn-Off Time:	<75 ms
Nominal Power:	10.0 W (Red), 18.0W (Yellow), 12.5 W (Green)
Nominal Wavelength:	625-626 nm (Red), 589-590 nm (Yellow), 500-502 nm (Green)
Minimum Maintained Intensity:	365 Cd (Red), 910 Cd (Yellow), 475 Cd (Green)
Standard Conformance:	FCC compliant for electrical noise, MIL-STD-810F for moisture resistance, MIL-STD-883 for mechanical vibration, NEMA TS2 Transient Voltage Protection
Warranty:	Five-year replacement (materials, workmanship, and intensity)

ARROW INDICATION LED MODULE SPECIFICATIONS (RED, YELLOW, GREEN)

Compliance:	Fully compliant with ITE VTCSH LED Vehicle Arrow Supplement specifications adopted July 1, 2007.
Compliance Verification:	Intertek ETL verified compliance – Product must be listed on the "Directory of LED Modules Certified Products" list located on the ETL website at http://www.intertek.com/lighting/performance-testing/traffic-signals/
Diameter:	12" (300mm)
Lens:	Clear Frosted, UV stabilized scratch resistant polycarbonate, tinted red or yellow, clear for green, uniform non-pixelated illumination, incandescent appearance, omni-directional
LEDS:	Hi-flux LEDs
Operating Temperature Range:	-40°C to +74°C (-40°F to +165°F)
Operating Voltage Range:	80 to 135 V (60Hz AC)
Power Factor (PF):	> 90%
Total Harmonic Distortion (THD):	< 20%
Minimum Voltage Turn-Off:	35V
Turn-On/Turn-Off Time:	<75 ms
Nominal Power:	5.0-7.0 W (Red), 6.0-12.5W (Yellow), 5.0-7.0 W (Green)
Nominal Wavelength:	625-628 nm (Red), 590 nm (Yellow), 500nm (Green)
Minimum Maintained Intensity:	56.8-58.4 Cd (Red), 141.6-146.0 Cd (Yellow), 73.9-76.0 Cd (Green)
Standard Conformance:	FCC compliant for electrical noise, MIL-STD-810F for moisture resistance, MIL-STD-883 for mechanical vibration, NEMA TS2 Transient Voltage Protection
Warranty:	Five-year replacement (materials, workmanship, and intensity)

ARROW INDICATION LED MODULE SPECIFICATIONS (YELLOW/GREEN DUAL MODE)

Diameter:	12" (300mm)
LEDS:	Interconnected to minimize the effect of single LED failures
Lens:	Clear UV stabilized scratch resistant polycarbonate, uniform non-pixelated illumination, incandescent appearance
Operating Temperature Range:	-40°C to +74°C (-40°F to +165°F)
Operating Voltage Range:	80 to 135 V (60Hz AC)
Power Factor (PF):	> 90%
Total Harmonic Distortion (THD):	< 20%
Minimum Voltage Turn-Off:	35V
Turn-On/Turn-Off Time:	<75 ms
Nominal Power:	8.0-10.0 W (Yellow), 8.0-10.0 W (Green)
Nominal Wavelength:	590-592 nm (Yellow), 505-508 nm (Green)
Minimum Maintained Intensity:	141.6-146.0 Cd (Yellow), 73.9-76.0 Cd (Green)
Standard Conformance:	FCC compliant for electrical noise, MIL-STD-810F for moisture resistance, MIL-STD-883 for mechanical vibration, NEMA TS2 Transient Voltage Protection
Warranty:	Five-year replacement (materials, workmanship, and intensity)

16" PEDESTRIAN LED MODULE SPECIFICATIONS (MAN/HAND WITH COUNTDOWN TIMER)

Compliance:	Fully compliant with ITE PTCSI Part-2 LED Pedestrian Traffic Signal Modules specification adopted August 4, 2010.
Compliance Verification:	Intertek ETL verified compliance – Product must be listed on the "Directory of LED Modules Certified Products" list located on the ETL website at http://www.intertek.com/lighting/performance-testing/traffic-signals/
Size:	16" x 18"
Configuration:	Man/Hand Overlay with Countdown Timer
Lens:	UV stabilized scratch resistant polycarbonate, uniform non-pixelated illumination, incandescent appearance
Operating Temperature Range:	-40°C to +74°C (-40°F to +165°F)
Operating Voltage Range:	80 to 135 V (60Hz AC)
Power Factor (PF):	> 90%
Total Harmonic Distortion (THD):	< 20%
Minimum Voltage Turn-Off:	35V
Turn-On/Turn-Off Time:	<75 ms
Nominal Power:	6.0-9.0 W (Man), 7.0-9.0W (Hand), 5.0-8.0 W (Timer)
Minimum Maintained Intensity:	1,400 Cd (Hand), 1,400 Cd (Timer), 2,200 Cd (Man)
Standard Conformance:	FCC compliant for electrical noise, MIL-STD-810F for moisture resistance, MIL-STD-883 for mechanical vibration, NEMA TS2 Transient Voltage Protection
Warranty:	Five-year replacement (materials, workmanship, and intensity)

SIGNAL HEAD, LED

Description: This work shall be in accordance with Sections 880 and 1078 of the Standard Specifications except as modified herein.

The traffic signal heads shall consist of 12" polycarbonate sections and shall be equipped with LED assemblies for all red bulb, yellow bulb, green bulb, red arrow, yellow arrow, and green arrow indications.

The Contractor shall remove the existing traffic signal heads complete with backplates and bracketing and dispose of them off the right-of-way. Prior to disposal, the Contractor shall remove all LED modules and recycle them at a certified electronics recycling facility.

The traffic signal heads shall have a black finish with black doors and tunnel visors.

The LED signal faces shall be equipped with spade connectors and connected to the traffic signal head terminal block.

The LED modules shall conform to the specifications listed under the section TRAFFIC SIGNAL LED MODULE SPECIFICATIONS.

All costs associated with furnishing and installing new signal head bracketing shall be included in the cost of this pay item. The Contractor shall minimize the total number of holes drilled in a mast arm to no more than three.

Basis of Payment: This work will be paid for at the contract unit prices Each for SIGNAL HEAD, LED of the type specified and will be payment in full for all labor, equipment, and materials required to remove the existing signal heads and bracketing and furnish and install traffic signal heads equipped with LED indications and new bracketing as described above, complete.

TRAFFIC SIGNAL BACKPLATE, RETROREFLECTIVE

This work shall be in accordance with Sections 882 and 1078 of the Standard Specifications except as modified herein.

The traffic signal backplates shall be of the same material as the traffic signal heads as specified on the plans.

A three (3) inch wide strip of reflective sheeting shall be applied to the outside perimeter of the face of the backplates. The reflective tape shall be fluorescent yellow in color and shall consist of type AZ sheeting.

Basis of Payment: This work will be paid for at the contract unit price Each for TRAFFIC SIGNAL BACKPLATE, RETROREFLECTIVE and shall be payment in full for all labor, materials, and equipment required to furnish and install a traffic signal backplate with reflective tape as described above, complete.

SIGN PANEL – TYPE 1

This work shall be in accordance with Sections 720 and 1090, 1091, and 1092 of the Standard Specifications except as modified herein.

The Contractor shall furnish "Left Turn Yield on Flashing Arrow" signs as shown on the plan sheet detail and install them on the mast arms (to the right of the flashing yellow arrow signal head) at the locations indicated on the plan sheets.

The Contractor shall supply all materials required to install the sign (stainless steel banding, brackets, hardware, etc.) as a part of this pay item.

Basis of Payment: This work shall be paid for at the contract unit price per Square Foot for SIGN PANEL – TYPE 1 which price shall be payment in full for all labor, equipment, and materials required to supply and install the sign panel described above, complete.

HANDHOLE, PORTLAND CEMENT CONCRETE

This work shall consist of furnishing the materials and constructing a handhole in accordance with the applicable Articles of Section 814 and 1088 of the Standard Specifications with the following modifications:

The lift ring for the cover shall consist of a solid closed ring of stainless steel at least 3/8" inch in diameter. The lift ring shall be attached to the cover by a loop of stainless steel at least 3/8" inch in diameter. The lift ring and loop shall be recessed in the cover.

The Contractor shall install heavy-duty, fully-galvanized hooks, with a minimum diameter of ½" in the proposed handhole. The Contractor shall submit this material to the Engineer prior to construction of the handholes.

The lid shall be marked with the legend "Traffic Signals".

Pre-cast handholes are not allowed.

All unsuitable materials shall be disposed of by the Contractor outside the job limits.

Basis of Payment: This work will be paid for at the contract unit price Each for HANDHOLE, PORTLAND CEMENT CONCRETE which price shall be payment in full for all labor, materials, and equipment required to provide the handhole described above as well as any necessary excavating, backfilling, disposal of unsuitable materials, and furnishing all materials within the limits of the handhole.

MODIFY EXISTING CONCRETE FOUNDATION

This work shall be in accordance with the applicable Articles of Sections 878, 1006, and 1020 of the Standard Specifications with the following modifications:

This item shall consist of modifying an existing mast arm foundation to accommodate a traffic signal post.

The Contractor shall perform the following (all locations):

- The Contractor shall remove the existing mast arm anchor bolts by cutting them off flush with the top of the foundation and disposing of them off the job site.

- The Contractor shall furnish and install four new anchor bolts. The anchor bolts shall be drilled into the foundation at a minimum depth of 12" inches and secured with epoxy. The Contractor shall submit catalog cuts for the proposed anchor bolts and epoxy to the Department for approval prior to commencing work.

- The Contractor shall perform all other work including, but not limited excavating, drilling, backfilling, form work, etc. to that is required to install the proposed traffic signal post onto the existing foundation.

Basis of Payment: This work will be paid for at the contract unit price per Each for MODIFY EXISTING CONCRETE FOUNDATION which price shall be payment in full for all labor, materials, and equipment required to modify the existing mast arm foundation to accommodate the installation of the proposed traffic signal post.

LUMINAIRE, LED, HORIZONTAL MOUNT, OF THE WATTAGE SPECIFIED

Description: This work consists of removing and disposing of an existing luminaire and furnishing all materials, equipment, and labor necessary to install Light-Emitting Diode (LED) luminaires as shown on the plans, in accordance with the applicable requirements of Section 821 of the Standard Specifications for Road and Bridge Construction, and as specified herein.

General: The luminaire shall be assembled in the continental U.S.A. and shall be assembled by and manufactured by the same Manufacturer. Quick connect/disconnect plugs shall be supplied between the discrete electrical components within the luminaire such as the driver, surge protection device, and optical assembly for easy removal. The quick connect/disconnect plugs shall be operable without the use of tools and while wearing insulated gloves. The luminaire shall be in compliance with ANSI C136.37. LED light source(s) and driver(s) shall meet the material requirements of the Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU.

Manufacturer Experience. The luminaire shall be designed to be incorporated into a lighting system with an expected 30-year lifetime. The luminaire Manufacturer shall have a minimum of 30 years' experience manufacturing High Intensity Discharge (HID) roadway luminaires and shall have a minimum of 5 years' experience manufacturing LED roadway luminaires. The Manufacturer shall have a minimum of 5,000 total LED roadway luminaires installed on a minimum of 30 separate installations, all within the continental U.S.A.

Housing: The housing shall be designed to ensure maximum heat dissipation and to prevent the accumulation of water, ice, dirt and debris. A passive cooling method with no moving or rotating parts shall be employed for heat management. The effective projected area of the luminaire shall not exceed 1.4 sq. ft. The total weight of the luminaire(s) and accessories shall not exceed 75 pounds. Wiring within the electrical enclosure shall be rated at 600 V, 221°F (105°C) or higher.

Finish. Painted or finished luminaire surfaces exposed to the environment, shall exceed a rating of six according to ASTM D1654 after 1,000 hours of ASTM B117 testing. The coating shall exhibit no greater than 30% reduction of gloss according to ASTM D523, after 500 hours of ASTM G154 Cycle 6 QUV® accelerated weathering testing.

Attachment. The luminaire shall slip-fit on a mounting arm with a 2" in. (5 cm) diameter tenon [2.375 in. (6 cm) outer diameter] and shall have a barrier to limit the amount of insertion. The luminaire shall be provided with a leveling surface and shall be capable of being tilted ±5 degrees from the axis of attachment in not more than 2.5 degree increments and rotated to any degree with respect to the supporting arm.

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

Vibration Characteristics. All luminaires shall pass ANSI C136.31 requirements. Roadway luminaires mounted on a bridge and high mast luminaires shall be rated for "3G" peak acceleration. Vibration testing shall be run using the same luminaire in all three axes.

Labels and Decals. All luminaires shall have external labels in compliance with the latest version of ANSI C136.15 and internal labels in compliance with the latest version of ANSI C136.22.

The luminaire shall be listed for wet locations by a Nationally Recognized Testing Laboratory (NRTL) as defined by OSHA and shall be in compliance with UL 8750 and UL 1598. It shall be identified as such by the holographic UL tag/sticker on the inside of the luminaire.

Hardware. All external fasteners shall be stainless steel. All hardware shall have corrosion resistance.

Optical Assembly: The LED optical assembly, consisting of LED packages, shall have a minimum Ingress Protection rating of IP66 according to ANSI/IEC 60529. Circuiting shall be designed to minimize the impact of individual LED failures on the operation of the other LEDs.

The optical assembly shall utilize high brightness, long life, minimum 70 color rendering index (CRI), 4,000 K color temperature (±300 K) LEDs binned according to ANSI C78.377. Lenses shall be UV-stabilized acrylic or glass. Provisions for house-side shielding shall be provided when specified.

Lumen depreciation at 50,000 hours of operation shall not exceed 15% of initial lumen output at the specified LED drive current and an ambient temperature of 77°F (25°C).

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

Photometric Performance: The classification of LED luminaires shall be as follows:

VLW – Wattages ≤ 100, minimum delivered lumens 5,000,
LW – Wattages 101 - 200, minimum delivered lumens 10,000,
MW – Wattages 201 - 300, minimum delivered lumens 20,000,
HW – Wattages 301 - 400, minimum delivered lumens 30,000,
VHW – Wattages ≥ 401, minimum delivered lumens 40,000.

VLW= very low watt, LW = low watt, MW = medium watt, HW = high watt, and VHW = very high watt luminaire. Luminaires with lumens below the stated minimums will not be accepted.

Testing. Luminaires shall be tested according to IES LM-79. The laboratory performing this test shall hold accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) under NIST. Submitted reports shall have a backlight, uplight, and glare (BUG) rating according to IESNA TM-15 including a luminaire classification system graph with both the recorded lumen value and percent lumens by zone.

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

Thermal testing shall be provided according to UL 1598. The luminaire shall start and operate in the ambient temperature range specified. The maximum rated case temperature of the driver, LEDs, and other internal components shall not be exceeded when the luminaire is operated in the ambient temperature range specified.

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

Calculations. Complete point-by-point luminance and veiling luminance calculations as well as listings of all indicated averages and ratios as applicable shall be provided according to IES RP-8 recommendations. Lighting calculations shall be performed using AGi32 software with calculations performed to two decimal places (i.e. x.xx cd/m^2). Calculation results shall demonstrate that the submitted luminaire meets the lighting metrics specified in the project Luminaire Performance Tables (see exhibit B). Scotopic or mesopic factors will not be allowed.

Lumen Maintenance Projection. The LEDs shall have long term lumen maintenance documented according to IESNA TM-21, or when available for the luminaires according to IESNA TM-28. The submitted calculations shall incorporate an in-situ temperature measurement test (ISTMT) and LM-80 data with TM-21 inputs and reports according to the TM-21 calculator, or when available ISTMT and LM-84 data with TM-28 inputs and reports according to the TM-28 calculator. Ambient temperature shall be 77°F (25°C).

Driver: The driver for the luminaire shall be integral to the unit. It shall be mounted in the rear of the luminaire on the inside of a removable door or on a removable mounting pad. The removable door or pad shall be secure when fastened in place and all individual components shall be secured upon the removable element. Each component shall be readily removable from the removable door or pad for replacement.

Circuit Protection. Shall tolerate indefinitely open and short circuit output conditions without damage.

Ingress Protection. IP66 rating.

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

Operating Temperature. Operating ambient temperature range of -40°F to 104°F (-40°C to 40°C).

Driver Life. Life time of 100,000 hours at 77°F (25°C) ambient.

Safety/UL. Listed under UL 1310 or UL 1012.

Power Factor. Shall maintain a power factor of 0.9 or higher and total harmonic distortion of less than 20 % at 50% load across the full supply voltage range.

Driver efficiency. Minimum efficiency of 90% at maximum load and a minimum efficiency of 85% for the driver operating at 50% power with driver efficiency defined as output power divided by input power.

Electrical Interference. Shall meet the Electromagnetic Compatibility (EMC) requirements for Class A digital devices included in the FCC Rules and Regulations, Title 47, Part 15.

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

Dimming. 0-10 V dimming capability.

Leakage current. Compliance with safety standards according to IEC 61347-1 and UL 1012.

Surge Protection Device: SPD shall be labeled as Type 4 in accordance to UL 1449 and be an integral part of the luminaire. It shall provide a minimum system protection level of 10 kV, 10 kA. To protect for a 10 kV, 10 kA surge the required clamping voltage of the external Metal Oxide Varistor (MOV) or other SPD shall be lower than 1 kV at 8 kA {(10 kV-2 kV)/1 ohm=8 kA}.

The SPD shall comply with the following standards:

1) IEEE C62.41.1, IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits,

2) IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits,

3) IEEE C62.45, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits, and

4) ANSI C136.2, American National Standard for Roadway and Area Lighting Equipment – Luminaire Voltage Classification.

The SPD and performance parameters shall be posted at www.UL.com under Category Code: VZCA2.

Warranty: The entire luminaire and all of its component parts shall be covered by a Ten-Year Warranty. Failure is when one or more of the following occur

1) Negligible light output from more than 10 percent of the LED packages

2) Condensed moisture inside the optical assembly

3) driver that continues to operate at a reduced output below 15% of the rated nominal output

The warranty period shall begin on the date of final acceptance of the lighting work as documented in the Resident Engineer's project notes.

Submittal Requirements: The Contractor shall submit, for approval, an electronic version of all associated luminaire IES files, AGi32 files and the TM-21 calculator spreadsheet with inputs and reports associated with the project luminaires. The Contractor shall also provide an electronic version of each of the following Manufacturer's product data for each type of luminaire.

1) Descriptive literature and catalogue cuts for luminaire, LED package, driver, and surge protection device.

2) LED drive current, total luminaire input wattage and total luminaire current at the system operating voltage or voltage range and ambient temperature of 77°F (25°C).

3) Luminaire efficacy expressed in lumens per watt (lpw) per luminaire.

4) Initial delivered lumens at the specified color temperature, drive current and ambient temperature.

5) Computer photometric calculation reports.

6) TM-15 BUG rating report.

7) Documentation of Manufacturers experience and certification that luminaires were assembled in the U.S.A.

8) Supporting documentation of compliance with ANSI standards as well as listing requirements.

9) Supporting documentation of laboratory accreditations and certifications for specified testing.

10) Thermal testing documents.

11) IES LM-79, LM-80 (or LM-84) and TM-21 (or TM-28) reports.

12) Salt spray (fog) test reports and certification.

13) Vibration characteristics test reports and certification.

14) IP test reports.

15) Manufacturer written warranty.

16) Luminaire installation, maintenance, and washing instructions.

Luminaire Testing: When a contract has 30 or more luminaires of the same type, wattage and distribution, that luminaire shall be tested. The quantity of luminaires requiring testing shall be one luminaire for the first 30 plus one additional luminaire for each additional 50 luminaires of that type, wattage, and distribution. Testing is not required for temporary lighting luminaires. The Contractor shall coordinate the luminaire testing, propose a properly accredited laboratory and an independent witness, submit their qualifications for approval prior to any testing, and pay all associated costs including travel expenses for the independent witness. Delays caused by the luminaire testing process shall not be grounds for additional compensation or extension of time.

The independent witness shall be present when tests are performed by the luminaire manufacturer. A laboratory independent of the luminaire manufacturer, distributor, and Contractor may self-certify the test results, in which case the independent witness need not be present during the testing.

After all qualifications have been approved, the independent witness shall select from the project luminaires at the manufacturer's facility the luminaires for testing. In all cases, the selection of luminaires shall be a random selection from the entire completed lot of luminaires required for the contract. Selections from partial lots will not be allowed. The independent witness shall mark each sample luminaire's shipping carton with the IDOT contract number and a unique sample identifier.

At the time of random selection, the independent witness shall inspect the luminaire(s) for compliance with all physical, mechanical, and labeling requirements for luminaires according to Sections 821 and 1067 and as stated herein. If deficiencies are found during the physical inspection, the Contractor shall have all luminaires of that type, wattage, and distribution inspected for the identified deficiencies and shall correct the problem(s) where found. Random luminaire selection and physical inspection must then be repeated. When the physical inspection is successfully completed, the independent witness shall mark the project number and sample identifier on the interior housing and ballast of the luminaires and have them shipped to the laboratory.

The testing performed by the laboratory shall include photometric, colorimetric, and electrical testing. Colorimetric values shall be determined from total spectral radiant flux measurements using a spectroradiometer. Photometric testing shall be according to IES recommendations and as a minimum, shall yield an isofootcandle chart, with max candela point and half candela trace indicated, an isocandela diagram, maximum plane and maximum cone plots of candela, a candlepower table (house and street side), a coefficient of utilization chart, a luminous flux distribution table, BUG rating report, and complete calculations based on specified requirements and test results. All testing shall cover the full spherical light output at a maximum of 5-degree intervals on both the vertical planes and the cones. Tests that "mirror" results from one hemisphere or quadrant to another are not acceptable.

The results for each photometric and colorimetric test performed shall be presented in a standard LM-79 report that includes the IDOT contract number, sample identifier, and the outputs listed above. The calculated results for each sample luminaire shall meet or exceed the contract specified levels in the luminaire performance table(s). The laboratory shall mark its test identification number on the interior of each sample luminaire.

Electrical testing shall be in accordance with LM-79.

The summary test report shall consist of a narrative documenting the test process, highlight any deficiencies and corrective actions, and clearly state which luminaires have met or exceeded all test requirements and may be released for delivery to the jobsite. Photographs shall also be used as applicable to document luminaire deficiencies and shall be included in the test report. The summary test report shall include the Luminaire Physical Inspection Checklist (see exhibit A), photometric and electrical test reports, and point-by-point photometric calculations performed in AGi32 sorted by luminaire type, wattage, and distribution. All test reports shall be certified by the independent test laboratory's authorized representative or the independent witness, as applicable, by a dated signature on the first page of each report. The summary test reports shall be delivered to the Engineer and the Contractor as an electronic submittal. Hard copy reports shall be delivered to the Engineer for record retention.

Should any of the tested luminaires fail to satisfy the specifications and perform according to approved submittal information, all luminaires of that type, wattage, and distribution shall be deemed unacceptable and shall be replaced by alternate equipment meeting the specifications. The submittal and testing process shall then be repeated in its entirety. The Contractor may request in writing that unacceptable luminaires be corrected in lieu of replacement. The request shall identify the corrections to be made and upon approval of the request, the Contractor shall apply the corrections to the entire lot of unacceptable luminaires. Once the corrections are completed, the testing process shall be repeated, including selection of a new set of sample luminaires. The number of luminaires to be tested shall be the same quantity as originally tested.

The process of retesting corrected, or replacement luminaires shall be repeated until luminaires for each type, wattage, and distribution are approved for the project. Corrections and re-testing shall not be grounds for additional compensation or extension of time. No luminaires shall be shipped from the manufacturer to the jobsite until all luminaire testing is completed and approved in writing.

Submittal information shall include a statement of intent to provide the testing as well as a request for approval of the chosen independent witness laboratory. All summary test reports, written reports, and the qualifications of the independent witness and laboratory shall be submitted for approval to the Bureau of Design and Environment in Springfield.

Construction: Examine all luminaires delivered to the jobsite prior to installation to ensure all specification requirements and Shop Drawing comments have been incorporated by the Manufacturer. Deficient luminaires shall not be installed and the Engineer shall be notified immediately.

Luminaires shall be adjusted with the use of a level placed along the fixture housing or other means approved by the manufacturer to make sure they are installed with their optics set to deliver optimum designed light levels on the roadway. Any dirt or film on LEDs and/or the optical assembly shall be thoroughly removed using cleaning methods approved by the manufacturer.

Basis of Payment: This work will be paid for at the contract unit price per Each for Luminaire, LED, Horizontal Mount, of the wattage specified which shall be payment in full for all labor, equipment and material necessary to perform the work specified herein.

SERVICE INSTALLATION, TYPE B

This work shall be in accordance with Section 805 and 1086 of the Standard Specifications except as modified herein.

The service installation shall include furnishing and installing a 25' treated wood pole for an overhead service drop, disconnect switch, and all associated appurtenances including a meter base if required by the utility company. The service disconnects shall be mounted on the wood post.

Galvanized steel conduit shall be used for the service riser. The use of PVC conduit will not be allowed.

A rain tight hub assembly (Myers type) shall be used when conduit enters the switch from the top of the disconnect.

The service disconnect switch shall be a stainless steel, weatherproof NEMA 4X enclosure that meets the following specifications:

60-Ampere (250 V) Minimum Fused Disconnect Switch: Unless indicated otherwise on the plan sheets, the fused disconnect switch shall be single-throw, three-wire (two poles, two fuses, and solid neutral). The switch shall provide for locking the blades in either the "On" or "Off" position with one or two padlocks and for locking the cover in the closed position. The disconnect switch and fuse rating shall be rated at the voltage and amperage required to comply with utility company and equipment requirements. All fuses shall be provided with the disconnect installation.

The service disconnect shall be installed at a maximum height of 42".

The Department will furnish all padlocks.

Basis of Payment: This work shall be paid for at the contract unit price Each for SERVICE INSTALLATION, TYPE B which price shall be payment in full for all labor, equipment, and materials required to provide and install the electrical service installation described above, complete.

FULL ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL

This work shall be in accordance with Sections 857, 1073, and 1074 of the Standard Specifications except as modified herein.

The Contractor shall remove the existing traffic signal cabinet and deliver it to the city of Peoria maintenance facility located at 3505 North Dries Lane, Peoria, Illinois.

The Contractor shall remove existing DIN rail mounted communications equipment, traffic signal interconnect equipment, emergency vehicle preemption equipment, and fiber optic enclosures from the existing traffic signal controller cabinet and install the equipment in the proposed controller cabinet.

The Contractor shall relocate the existing battery backup system cabinet and components from the existing traffic signal controller cabinet to the proposed controller cabinet.

The cabinet and controller shall be compatible with the existing Econolite closed loop system.

The traffic signal cabinet shall have a NEMA TS-2 back panel. The cabinet shall include a malfunction management unit to allow enhanced fault monitoring capabilities. The malfunction management unit shall support flashing yellow arrow operation and be a Reno A&E model MMU-1600G equipped with a graphical display and Ethernet port.

The controller shall be an Econolite Cobalt NEMA TS-2 Type 2, NTCIP compliant controller equipped with Ethernet ports, USB ports, and data key.

The malfunction management unit shall be equipped with the latest software and firmware revisions. The cabinet shall be equipped with a plexi-glass shield that covers the power panel which houses the mercury bus relay, line filter, circuit breakers, and other electrical components.

The cabinet shall be equipped with a plexi-glass shield that covers the thermostat and a LED lighting assembly that turns on when the door is opened. The LED lighting assembly shall be mounted in a location that will not interfere with cabinet maintenance.

The traffic signal cabinet shall be equipped with a sixteen-load switch back panel to accommodate future expansion.

The cabinet shall be furnished with a compact heater strip to be used for moisture reduction during cold weather. The heater shall be thermostatically controlled, operate at 120 volts, have a minimum wattage of 150 watts, a maximum wattage of 250 watts, have a shield to protect service personnel and equipment from damaging heat, be separately fused, and be mounted where it does not interfere with a person working in the cabinet.

The traffic signal cabinets shall be equipped with two non GFCI duplex NEMA 5-15R receptacles to be used to provide power to auxiliary equipment.

The cabinet shall be equipped with a twenty-four-fiber wall-mountable interconnect center and two six-fiber bulkheads.

The cabinet shall be equipped with toggle switch guards for all switches located on the door to prevent accidental switching. The cabinet shall include a high quality deluxe pleated filter.

The cabinet shall be equipped with an external pedestrian pushbutton isolation panel with functionality to provide for latching pedestrian pushbutton indication lights.

The cabinet shall be equipped with additional surge protection for the controller, malfunction management unit, and detector amplifiers, and/or video detection system. The surge protector shall be a Transtector model ACP100BWN3 and shall be included in addition to an EDCO SHA-1250 IRS protector. The EDCO SHA-1250 IRS surge protector is to be provided in accordance with Section 1085.47 A(4a) and shall be wired to provide surge protection for the controller, malfunction management unit, and detector amplifiers. The Transtector surge suppressor may be wired to the equipment protected power terminals of the EDCO SHA-1250 IRS unit provided that the controller, MMU, and detection system are protected.

The Contractor shall set up each cabinet in his or her shop for inspection by the Engineer. All phases that are utilized shall be hooked up to a light board to provide observation for each signal indication. The Engineer shall be notified when the setup is complete so that all pertinent timings may be entered into the each traffic signal controller. The facility shall be subject to a seven-day burn-in period before installation will be allowed.

After installing the cabinet in the field, prior to resuming normal signal operation, the Contractor shall test the cabinet by connecting a jumper to the cabinet field terminals to ensure that all conflicting signals will place the cabinet into conflict flash and to verify that the cabinet, controller, and malfunction management unit are operating correctly. The Contractor shall make arrangements with the local police agency to provide traffic control during the conflict test.

Basis of Payment: This work will be paid for at the contract unit price Each for FULL ACTUATED CONTROLLER AND TYPE IV CABINET SPECIAL and shall be payment in full for all labor, materials, and equipment required to remove the existing traffic signal cabinet and furnish, install, and test the traffic signal cabinet described above, complete.

INDUCTIVE LOOP DETECTOR

This work shall be in accordance with Sections 885 and 1079 of the Standard Specifications except as modified herein.

The detector amplifier shall be equipped with an LCD display that is capable of displaying the loop frequency and inductance and shall conform to the following specifications:

- Custom LCD displays complete status and function settings of the detector.
- All functions are programmable from the front panel LCD "Menu" - no removing of detector to change function settings.
- LCD displays loop frequency, loop inductance, & -L/L% values.
- LCD displays the accumulated number of loop failure incidents since the detector was last reset - helps diagnose intermittent systems.
- LCD bar graph displays loop inductance change to verify ideal sensitivity level setting.
- Selectable "Continuous-CALL" and "Channel-Off" to aid system troubleshooting.
- 8 loop frequencies and 9 levels of sensitivity.
- 2 Selectable modes of operation: Presence or Pulse.
- 255 second CALL Delay and 25.5 second Extension timers.
- 999 second Max. Presence Timer. NEMA TS 2 Status Output.
- EOG (end of green) reset synchronization for Max. Presence timer.
- Super bright LEDS indicate vehicle detection or loop failure.
- Environmentally sealed push button switches to insure trouble-free service.
- Phase Green (Delay Override) input.

The detector amplifier shall be equipped with relay or solid state outputs to ensure that the detectors fail in a constant call mode.

The RENO A&E Model C-1200 Series and EDI Oracle Series are currently approved for use within the District.

Basis of Payment: This work shall be paid for at the contract unit price Each for INDUCTIVE LOOP DETECTOR which price shall be payment in full for all labor, equipment, and materials required to supply and install the inductive loop detector described above, complete.

FIBER OPTIC CABLE IN CONDUIT, 24 FIBERS, SINGLE MODE

This work shall be in accordance with Section 871 and 1076 of the Standard Specifications except as modified herein.

The fiber optic cable shall have 24 single mode fibers.

The Contractor shall terminate 12 fibers from each cable end (one buffer tube) inside each traffic signal cabinet with ST connectors. The terminated fibers shall be laterally spliced into the fiber optic cable located inside the traffic signal handholes.

The Contractor shall furnish and install waterproof splice enclosures, fiber optic termination enclosures, fiber optic pigtails, and all other items required for fiber optic cable termination and splicing.

All fiber strands contained within the unused buffer tube shall remain intact and continuous for future use.

All unused buffer tubes shall be placed outside of the splice enclosure with enough fiber coiled up to facilitate termination in the future without disturbing the terminated fibers.

The contract shall terminate twelve fibers from each cable end with ST connectors. All terminated fibers shall be clearly labeled. All single mode fiber terminations shall be fusion spliced utilizing pre-formed connectors and pigtails.

The Contractor shall coil three feet of all unused buffer tubes to allow access for termination in the future without disturbing the terminated fibers and enclosure when applicable.

The Contractor shall provide and install a 12 Ga., stranded (EPR-TYPE RHW or THHN), insulated tracer cable in all PVC conduits that contain only fiber optic cable (only one locating tracer cable per conduit). This work shall be done at the same time the fiber optic cable is pulled. There will be no additional compensation for this work.

The amount of slack cable listed in Article 873.03 shall be revised as follows:

Location	Length of Slack Cable (Ft.)
Double Handhole	30.0
Handhole	10.0
Controller Cabinet	10.0

The fiber optic cable shall be clearly marked in each handhole and cabinet with a brightly colored (orange or yellow) weather resistant marker securely attached to the cable.

Basis of Payment: This work will be paid for at the contract unit price per Foot for FIBER OPTIC CABLE IN CONDUIT, 24 FIBERS, SINGLE MODE and shall be payment in full for all labor, equipment, and materials required to furnish, install, and test the fiber optic cable described above, complete.

PEDESTRIAN SIGNAL HEAD, LED, 1-FACE, BRACKET MOUNTED WITH COUNTDOWN TIMER, PEDESTRIAN SIGNAL HEAD, LED, 2-FACE, BRACKET MOUNTED WITH COUNTDOWN TIMER

This work shall be in accordance with Section 881 and 1078 of the Standard Specifications except as modified herein.

The pedestrian signal head shall consist of a single 16" polycarbonate section and shall be equipped with an overlaid LED indication with countdown timer (Walking Person/Upraised Hand).

The traffic signal head shall have a black finish with black doors and tunnel visors.

The LED signal faces shall be equipped with spade connectors and connected to the traffic signal head terminal block.

The LED signal face shall have international symbols (Upraised Hand - Color: Portland Orange, Walking Person - Color: Lunar White). Only filled indications will be allowed.

The LED modules shall conform to the specifications listed under the section TRAFFIC SIGNAL LED MODULE SPECIFICATIONS.

Combination hand/person pedestrian signal modules shall incorporate separate power supplies for the hand and the person displays.

All costs associated with furnishing and installing new pedestrian signal head bracketing shall be included in the cost of this pay item. The Contractor shall minimize the total number of holes drilled in a mast arm to no more than three.

Basis of Payment: This work will be paid for at the contract unit prices Each for PEDESTRIAN SIGNAL HEAD, LED, 1-FACE, BRACKET MOUNTED WITH COUNTDOWN TIMER or PEDESTRIAN SIGNAL HEAD, LED, 2-FACE, BRACKET MOUNTED WITH COUNTDOWN TIMER and will be payment in full for all labor, equipment, and materials required to provide and install the pedestrian traffic signal heads equipped with LED indications described above, complete.

PEDESTRIAN PUSHBUTTON

This work shall be in accordance with Sections 888 and 1074 of the Standard Specifications except as modified herein.

The Contractor shall install the proposed pedestrian pushbuttons and signs on the proposed traffic signal mast arms and posts. The proposed pedestrian pushbuttons and signs shall be installed so that the arrow on the sign corresponds to the associated street crossing and crosswalk.

All pedestrian pushbuttons shall have a round case and be equipped with a 2" diameter mushroom head for easy access.

The following models are approved for use within District 4:

- Polara, BullDog with latching LED Indicator with audible buzzer, Round, Yellow Housing, Model (BDLL2-B)

- Campbell 4EVR, with latching LED Indicator with audible buzzer, Round, Yellow Housing

The pedestrian pushbutton installation shall include all crossing signs and hardware required to mount the pedestrian pushbutton. All hardware shall be of stainless steel construction. All bolts shall be 1/4" Hex Head and no self-tapping/drilling screws will be allowed.

A modular pedestrian station shall be furnished and installed with each pedestrian pushbutton. The pedestrian station shall be constructed from aluminum, have a yellow finish, and be sized to accommodate a 9" x 12" pedestrian pushbutton sign (Campbell MPS 912 RND Y, Polara PBF9X12-Y or equivalent).

The following pedestrian pushbutton signs currently meet Department Specifications: Pelco, Models SF-1013-08, SF-1014-08 or approved equivalent.

Basis of Payment: This work shall be paid for at the contract unit price Each for PEDESTRIAN PUSHBUTTON and shall be payment in full for all labor, equipment, and materials required to furnish and install the proposed pedestrian pushbuttons and signs described above, complete.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT

This work shall be in accordance with Section 895 of the Standard Specifications except as modified herein.

The Contractor shall remove the following items:

Removal Items	**IL 29 (Adams St.) & US 150 (War Memorial Dr.) Ramps A&B**	**IL 116 & Centennial Dr.**
Steel Combination Mast Arm Assembly and Pole with Luminaires		1
Steel Mast Arm Assembly and Pole	1	1
Controller Cabinet	1	
Traffic Signal Post and Base	1	3
Signal Head with Backplate, 1 Face, Mast Arm Mounted		2
Signal Head with Backplate, 1 Face, 3 Section, Mast Arm Mounted	4	2
Signal Head with Backplate, 1 Face, 3 Section, Bracket Mounted	2	4
Signal Head, 1 Face, 4 Section, Bracket Mounted	1	
Signal Head with Backplate, 1 Face, 5 Section, Bracket Mounted	1	1
Electric Service Installation	1	
Electric Cable	ALL (Except for Existing Cable to be Re-used in Proposed Traffic Signals)	ALL (Except for Existing Cable to be Re-used in Proposed Traffic Signals

The above list should represent an accurate listing of removal items, however, it is the Contractor's responsibility to verify all quantities prior to bidding. There will be no additional compensation.

The Contractor shall deliver the controller cabinet and contents, mast arm, traffic signal post, traffic signal heads to the city of Peoria maintenance facility located at 3505 North Dries Lane, Peoria, Illinois. The Contractor shall notify Irv LeBlanc, City of Peoria Lead Electrician, at telephone number (309) 303-7440 a minimum of forty eight hours prior to delivery.

The Contractor shall dispose of all remaining items off the right-of-way and reflect the salvage value of the material in the contract bid price.

Basis of Payment: The above work will be paid for at the contract unit price Each for REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT and shall be payment in full for removing and transporting the equipment described above, complete. No additional compensation will be allowed.

CONCRETE FOUNDATION

This work shall consist installing a Concrete Foundations in accordance with Section 878 of the Standard Specifications for Road and Bridge Construction and State Standard 878001-10 with no exceptions.

The proposed location of the Concrete Foundations may be moved in the field to avoid conflicts, or to place pedestrian push buttons at the proper locations at the approval of the Engineer. If the foundation is moved to an area not within the removal limits shown on the plans, removal of the existing sidewalk or earth disturbance shall be completed in accordance with Section 895 of the Standard Specifications for Road and Bridge Construction and any applicable notes or Special Provisions provided in these construction documents.

Method of Measurement: This work will be measured for payment in Feet according to Article 878.04.

Basis of Payment: This work will be paid for at the contract unit price per Foot for Concrete Foundation of the type specified, which price shall be payment in full for all labor, material, and equipment necessary to perform the work described above.

RECTANGULAR RAPID FLASHING BEACON ASSEMBLY (COMPLETE)

Description: This work shall consist of furnishing and installing the Rectangular Rapid Flashing Beacon (RRFB) Assembly complete with RRFB; power supply; traffic signal post; foundation; pedestrian push button; warning signs and plaques; controller and cabinet; and wireless communication equipment as shown on the plans and/or as specified by the Engineer. All equipment and hardware required to mount the RRFB and associated equipment to the assembly shall be included in the unit cost of this item.

Materials: All components shall be manufactured and assembled as a complete system and consist of the following:

Rectangular Rapid Flashing Beacon: Each RRFB assembly shall satisfy the FHWA *Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons* (IA-11), dated July 16, 2008, and all subsequent FHWA Official Interpretation Letters and the 2009 edition of the Manual of Uniform Traffic Control Devices (MUTCD), including the unit size, mounting location, flash rate, and operational parameters unless modified herein by this special provision. The RRFB assembly shall be programmable to allow the County Traffic Engineer to set the duration of the flashing beacon display based on the crossing time requirements established in the MUTCD. The Contractor shall furnish and install two direction RRFB units with far side indicator light mounted to the sign structure as indicated on the plans. The RRFB shall be rated for Class I light intensity output according to the Society of Automotive Engineers (SAE) Standard J595 with a 15-year life expectancy. The minimum size of the LED beacon shall be 7 inches x 3 inches. The RRFB shall be able to see at least 1,000 feet in advance of the crossing during the day. During the night time hours, the RRFB shall be equipped with an automatic dimming feature. The RRFB shall have an operating temperature meeting NEMA specifications.

Power Supply: The installation shall be of an external power supply.

External Power Supply: The external power supply shall meet the following sections of the "Standard Specifications" except as modified herein:

Section 805, Electrical Service Installation-Traffic Signals Section 806, Grounding Section 810, Underground Raceways Section 870, Multi-Conductor Power Cable Section 873, Electric Cable.

The external power supply shall be obtained from the ITS cabinet located near the crossing location. The work as part of this item shall including the furnishing and installing of a 15 amp circuit breaker in the ITS Cabinet to service the power feed for the RRFB controller.

Controller: The RRFB controller shall meet the requirements of Section 858 of the "Standard Specifications" and the LCDOT Traffic Signal Special Provisions except where modified herein:

1. Power Options: The controller unit shall be available in both solar-powered and AC powered options.

2. Controller to Controller Communication: At each location all installed RRFB assemblies shall communicate wirelessly using an unlicensed radio band so as to simultaneously commence operation of their alternating rapid flashing indications and cease operation simultaneously. The communication equipment shall comply with FCC requirements and the vendor representative shall field test the equipment prior to placing the units in operation to demonstrate the RRFBs ability to achieve proper operation under the requirements of FHWA Memorandum IA-11and all subsequent interpretation letters. Up to 10 optional RF channels shall be available to allow multiple RRFB Systems to operate within close proximity of each other.

3. Timing: The controller shall provide the full programmed timing upon all push button activations.

Traffic Signal Post: The traffic signal post shall meet the requirements of Section 875 of the “Standard Specifications” for traffic signal post or traffic signal post, special, as shown on the plans.

Foundation: The traffic signal post foundation may be either concrete or metal.

a. Concrete Foundation: If used the concrete foundation shall meet the requirements of Section 878 of the “Standard Specifications” and the LCDOT Traffic Signal Special Provisions.

b. Light Pole Foundation Metal: If used the metal foundation shall meet the requirements of Section 836 of the “Standard Specifications”.

Pedestrian Push Button: The pedestrian push button shall meet the requirements of Section 888 of the “Standard Specifications”.

Signs: Each RRFB assembly shall include two crossing signs (W11-1, W11-2, W11-15 or S1-1) 36" inch x 36" inch dimension, two diagonal downward pointing arrow (W16-7P) plaques 24" inch x 12" inch dimension, mounted back-to-back and a R10-25 9" inch x 12" inch dimension, mounted as part of or above the pedestrian push button. The W-series sign panels shall be manufactured with fluorescent yellow green type ZZ sheeting meeting the requirements of Section 1091of the "Standard Specifications". The R-series signs shall be manufactured with type AP sheeting meeting the requirements of Section 1091 of the "Standard Specifications" and shall be vandal resistant. All signs shall meet the latest requirements of the MUTCD. The signs shall have brackets and sign channels.

Warranty: All materials shall be warranted for three years from date of acceptance or turn on by the IDOT.

Installation: The RRFB Assembly (Complete) shall be installed strictly according to the manufacturer’s recommendations, the applicable portions of the "Standard Specifications" as modified herein, as shown on the Plans, and/or as directed by the Engineer.

The final elevation and location of the beacons shall be approved by the Engineer prior to the Contractor beginning work.

Method of Measurement: This work shall be measured as one complete crossing installation, including all material, wiring, posts, beacons, installation and testing.

Basis of Payment: This work will be paid at the contract unit price for Each RECTANGULAR RAPID FLASHING BEACON ASSEMBLY (COMPLETE), which price shall include all labor, equipment, materials and documentation required to furnish and install the RRFB assembly complete with power supply; traffic signal post; foundation; pedestrian push button; warning signs and plaques; controller and cabinet; wireless communication equipment; and mounting hardware.

ITS SYSTEM IMPLEMENTATION, EQUIPMENT INTEGRATION AND SUPPORT

The Contractor shall install the CCTV cameras at the locations indicated on the plans.

The CCTV camera along with all related 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 thirty days. In the event that there are operational problems during the burn-in period, the burn-in period shall reset back to day one.

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

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

The Contractor shall install the DMS at the locations indicated on the plans.

The DMS along with all related components shall be subject to a 60-day burn-in period. During the "burn-in" period, all components shall perform continuously, without any interruption of operation, for a period of sixty days. In the event that there are operational problems during the burn-in period, the burn-in period shall reset back to day one.

This work will not be paid for separately but shall be included in the contract bid price.

CONTRACT GUARANTEE

The Contractor shall guarantee all electrical equipment, apparatus, materials, and workmanship provided under the contract for a period of six (6) months after the date of final inspection according to Article 801.14.

All instruction sheets required to be furnished by the manufacturer for materials and supplies and for operations shall be delivered to the Engineer prior to the acceptance of the project, with the following warranties and guarantees:

1. The manufacturer's standard written warranty for each piece of electrical equipment or apparatus furnished under the contract.

2. The Contractor's written guarantee that, for a period of six (6) months after the date of final inspection of the project, all necessary repairs to or replacement of said warranted equipment, or apparatus shall be made by the Contractor at no cost to the Department.

3. The Contractor's written guarantee for satisfactory operation of all electrical systems furnished and constructed under the contract for a period of six (6) months after final inspection of the project.

POT-HOLING FOR LOCATION OF EXISTING UNDERGROUND UTILITIES

Potholing to locate existing underground utilities shall be included in the contract bid price for the conduit pay items.

Removal and replacement of existing sidewalk, pavement, and islands only for utility locating purposes will not be paid for separately but shall be included in the contract bid price for the conduit pay items.

CONSTRUCTION PERMITS

The Contractor shall be responsible for obtaining all required permits from counties, municipalities, and other entities prior to beginning work. The Contractor shall pay all costs associated with obtaining the permits.

Basis of Payment. This work will not be paid for separately but shall be included in the contract bid price.

AS-BUILT DOCUMENTATION

The Contractor shall locate all proposed conduit, communication vaults, and camera poles every 100 feet using a GIS locating device that is accurate to the nearest Foot.

The Contractor shall provide a GIS based map of the conduit route and a complete listing of all of map coordinates in an electronic format (Google Earth KML or KMZ shape file).

Basis of Payment. This work will not be paid for separately but shall be included in the contract bid price.

FIBER OPTIC CABLE 96 FIBERS, SINGLE MODE

This work shall be in accordance with Sections 801, 864, 871, and 1076 of the Standard Specifications except as modified herein.

Each cable shall be clearly labeled in each cabinet utilizing a durable computer generated label. The label shall contain information in regards to the location where the cable is going to or coming from, buffer tube, and fiber color. The Contractor shall provide numerical foot marking data at each handhole, vault, and cabinet to the Department.

The fibers shall be spliced and terminated as shown on the fiber termination diagram on the plan sheets. All terminated fibers shall be clearly labeled.

Fibers not being used shall be labeled "spare", and fibers not attached to a distribution enclosure shall be capped and sealed.

All ancillary components, required to complete the fiber optic cable plant, including but not limited to, moisture and water sealants, cable caps, fan-out kits, weather-proof splice kits, boots, cable trays, splice enclosures, termination panels, etc., shall be supplied under this pay item and will not be paid for separately. These items shall be submitted to the Department for approval.

The fiber optic cable shall be clearly marked in each handhole, communication vault, and cabinet with a brightly colored (orange or yellow) weather resistant label securely attached to the cable. The Contractor shall provide and install a 12 Ga., stranded (EPR-TYPE RHW or THHN), insulated tracer cable in all conduits that contain fiber optic cable and do not contain an existing tracer wire. This work shall be done at the same time the fiber optic cable is pulled. There will be no additional compensation for this work.

Materials. The single-mode, fiber optic cable shall incorporate a loose, buffer-tube design. The cable shall conform to the requirements of RUS 7 CFR1755.900 (PE-90) for a single sheathed, non-armored cable, and shall be new, unused and of current design and manufacture. The number of fibers in each cable shall be as specified on the plans.

Construction Requirements:

Experience Requirements:

Personnel involved in the installation, splicing and testing of the fiber optic cables shall meet the following requirements:

A minimum of three (3) years' experience in the installation of fiber optic cables, including splicing, terminating and testing single mode fibers.

Install two systems where fiber optic cables are outdoors in conduit and where the systems have been in continuous satisfactory operation for at least two years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the installed fiber optic systems.

One fiber optic cable system (which may be one of the two in the preceding paragraph), which the Contractor can arrange for demonstration to the Department representatives and the Engineer.

Installers shall be familiar with the cable manufacturer’s recommended procedures for installing the cable. This shall include knowledge of splicing procedures for and equipment being used on this project and knowledge of all hardware such as breakout (furcation) kits and splice closures. The Contractor shall submit documented procedures to the Engineer for approval and to be used by Construction inspectors.

Personnel involved in testing shall have been trained by the manufacturer of the fiber optic cable test equipment to be used, in fiber optic cable testing procedures. Proof of this training shall be submitted to the Engineer for approval. In addition, the Contractor shall submit documentation of the testing procedures for approval by the Engineer.

Installation in Conduit.

During cable pulling operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and pulling operations. Entry guide chutes shall be used to guide the cable into the handhole conduit ports. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation-bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the cable manufacturers specifically approve the array.

The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. Fuse links and breaks can be used to ensure that the cable tensile strength is not exceeded. The pulling system shall have an audible alarm that sounds whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the Engineer upon request.

The cable shall be pulled into the conduit as a single component, absorbing the pulling force in all tension elements. The central strength member and Aramid yarn shall be attached directly to the pulling eye during cable pulling. "Basket grip" or "Chinese-finger type" attachments, which only attach to the cable's outer jacket, shall not be permitted. A breakaway swivel, rated at 95% of the cable manufacturer's approved maximum tensile loading, shall be used on all pulls. When simultaneously pulling fiber optic cable with other cables, separate grooved rollers shall be used for each cable.

Splicing Requirements:

Splices shall be made at locations shown on the Plans. Any other splices shall be permitted only with the approval of the Engineer. The Contractor shall submit a splicing plan to the Department for approval.

Operation and Maintenance Documentation:

After the fiber optic cable plant has been installed, two (2) complete sets of Operation and Maintenance Documentation shall be provided. The documentation shall, as a minimum, include the following:

- Complete and accurate as-built diagrams showing the entire fiber optic cable plant including locations of all splices.
- Final copies of all approved test procedures.
- Complete performance data of the cable plant showing the losses at each terminal connector.
- Complete parts list including names of vendors.
- Electronic Testing Files (OTDR traces, power meter data, etc.)

Testing Requirements:

Testing shall be in accordance with Article 801.13 except where modified by this special provision.

The Contractor shall submit detailed test procedures for approval by the Engineer. All continuous fiber runs shall be tested bi-directionally at both 1310 nm and 1550 nm with a power meter and optical source and OTDR. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

The Contractor shall provide the date, time and location of any tests required by this specification to the Engineer at least 5 days before performing the test. Upon completion of the cable installation, splicing, and termination, the Contractor shall test all fibers in each link for continuity and attenuation. The test procedure shall be as follows:

A Certified Technician utilizing an Optical Source/Power Meter and OTDR shall conduct the testing. The Technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.

At the completion of the test, the Contractor shall provide two copies of documentation of the test results to the Engineer. The test documentation shall be bound and shall include the following:

Cable & Fiber Identification:

Cable ID
Cable Location - beginning and end point
Fiber ID, including tube and fiber color
Operator Name
Date & Time
Setup Parameters
Wavelength
Pulse width (OTDR)
Refractory index (OTDR)
Range (OTDR)
Scale (OTDR)
Setup Option chosen to pass OTDR “dead zone”

Test Results:

Optical Source/Power Meter

Total Attenuation
Attenuation (dB/km)

These results shall be provided in tabular form. The following shall be the criteria for the acceptance of the cable:

The test results shall show that the dB/km loss does not exceed +3% of the factory test or 1% of the cable's published production loss. However, no event shall exceed 0.10 dB. If any event is detected above 0.10 dB, the Contractor shall replace or repair the proposed fiber and/or fusion splice and connector including that event point.

The total dB loss of the cable, less events, shall not exceed the manufacturer's production specifications as follows: 0.5 dB/km at both 1310 and 1550 nm.

If the total loss exceeds these specifications, the Contractor shall replace or repair that cable run at the Contractor's expense, both labor and materials. Elevated attenuation due to exceeding the pulling tension during installation shall require the replacement of the cable run at the Contractor's expense, including labor and materials.

The Contractor shall label the destination of each trunk cable onto the cable in each handhole and termination panel.

Slack Storage of Fiber Optic Cables.

A part of this pay item, slack fiber shall be supplied as necessary to allow splicing the fiber optic cables in a controlled environment, such as a splicing van or tent. After splicing has been completed, the slack fiber shall be stored underground in handholes and in the traffic controller cabinets.

The amount of slack cable listed in Article 873.03 shall be revised as follows:

Location	Length of Slack Cable (Ft.)
Communications Vault	30.0
Double Handhole	30.0
Handhole	10.0
CCTV or Signal Cabinet	10.0
Junction Box	10.0
Equipment Cabinet	3.0

Basis of Payment: This work will be paid for at the contract unit price per foot for FIBER OPTIC CABLE 96 FIBERS and shall be payment in full for all labor, equipment, and materials required to provide, install, terminate, splice, and test the fiber optic cable described above, complete.

FUSION SPLICING OF FIBER OPTIC CABLES

Description. The Contractor will splice optical fibers from different cable sheaths and protect them with a splice closure at the locations shown on the Plans. Fiber splicing consists of in-line fusion splices for all fibers described in the cable plan at the particular location.

Two types of splices are identified. A mainline splice includes selected fibers from each cable run as shown in the plan sheets. In a lateral splice, the buffer tubes in the mainline cable are dressed out and those fibers identified on the plans are accessed in and spliced to lateral cables.

Materials.

Splice Closures:

Splice closures shall be designed for use under the most severe conditions such as moisture, vibration, impact, cable stress and flex temperature extremes as demonstrated by successfully passing the factory test procedures and minimum specifications listed below:

Physical Requirements:

The closures shall provide ingress for up to four cables in a butt configuration.

The closure shall prevent the intrusion of water without the use of encapsulates.

The closure shall be capable of accommodating splice organizer trays that accept mechanical, or fusion splices. The splice closure shall have provisions for storing fiber splices in an orderly manner, mountings for splice organizer assemblies, and space for excess or un-spliced fiber. Splice organizers shall be re-enterable. The splice case shall be UL rated.

Closure re-entry and subsequent reassembly shall not require specialized tools or equipment. Further, these operations shall not require the use of additional parts.

The splice closure shall have provisions for controlling the bend radius of individual fibers to a minimum of 1.5 in (38 mm).

Factory Testing of Splice Closures:

Compression Test: The closure shall not deform more than 10% in its largest cross-sectional dimension when subjected to a uniformly distributed load of 1335 N at a temperature of 0°F and 100°F (-18ºC and 38ºC). The test shall be performed after stabilizing at the required temperature for a minimum of two hours. It shall consist of placing an assembled closure between two flat parallel surfaces, with the longest closure dimension parallel to the surfaces. The weight shall be placed on the upper surface for a minimum of 15 minutes. The measurement shall then be taken with weight in place.

Impact Test: The assembled closure shall be capable of withstanding an impact of 28 N-M at temperatures of 0°F and 100°F (-18ºC and 38ºC). The test shall be performed after stabilizing the closure at the required temperature for a minimum of 2 hours. The test fixture shall consist of 20 lb (9 kg) cylindrical steel impacting head with a 2 in (5 cm) spherical radius at the point where it contacts the closure. It shall be dropped from a height of 12 in (30 cm). The closure shall not exhibit any cracks or fractures to the housing that would preclude it from passing the water immersion test. There shall be no permanent deformation to the original diameter or characteristic vertical dimension by more than 5%.

Cable Gripping and Sealing Testing: The cable gripping and sealing hardware shall not cause an increase in fiber attenuation in excess of 0.05 dB/fiber @ 1550 nm when attached to the cables and the closure assembly. The test shall consist of measurements from six fibers, one from each buffer tube or channel, or randomly selected in the case of a single fiber bundle. The measurements shall be taken from the test fibers before and after assembly to determine the effects of the cable gripping and sealing hardware on the optical transmission of the fibers.

Vibration Test: The splice organizers shall securely hold the fiber splices and store the excess fiber. The fiber splice organizers and splice retaining hardware shall be tested per EIA Standard FOTP-II, Test Condition I. The individual fibers shall not show an increase in attenuation in excess of 0.1 dB/fiber.

Water Immersion Test: The closure shall be capable of preventing a 10 ft. (3 m) water head from intruding into the splice compartment for a period of seven (7) days. Testing of the splice closure is to be accomplished by the placing of the closure into a pressure vessel and filling the vessel with tap water to cover the closure. Apply continuous pressure to the vessel to maintain a hydrostatic head equivalent to 10 ft. (3 m) on the closure and cable. This process shall be continued for 30 days. Remove the closure and open to check for the presence of water. Any intrusion of water in the compartment containing the splices constitutes a failure.

Certification: It is the responsibility of the Contractor to insure that either the manufacturer, or an independent testing laboratory has performed all of the above tests, and the appropriate.

Construction Requirements.

The closure shall be installed according to the manufacturer's recommended guidelines. For all splices, the cables shall be fusion spliced.

The Contractor shall prepare the cables and fibers in accordance with the closure and cable manufacturers' installation practices. A copy of these practices shall be provided to the Engineer 21 days prior to splicing operations.

Using a fusion splicer, the Contractor shall optimize the alignment of the fibers and fuse them together. The Contractor shall recoat the fused fibers and install mechanical protection over them.

Upon completing all splicing operations for a cable span, the Contractor shall measure the mean bi-directional loss at each splice using an Optical Time Domain Reflectometer. This loss shall not exceed 0.1 dB.

The Contractor shall measure the end-to-end attenuation of each fiber optic link, from connector to connector, using an optical power meter and source. This loss shall be measured from both directions and shall not exceed 0.5 dB per installed kilometer of single mode cable. Measurements shall be made at both 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 handhole or traffic signal cabinet. No cables or enclosures will be permitted to lie on the floor of the splice facility. Cables that are spliced inside a building will be secured to the equipment racks or walls as appropriate and indicated on the Plans.

Basis of Payment. This work will not be paid for separately, but shall be included in the bid price for the fiber optic cable pay items.

TERMINATION OF FIBER OPTIC CABLES WITH FUSION SPLICED ST CONNECTORS

Description. The Contractor shall terminate a single mode fiber by fusion splicing a factory-formed ST connector (from a pre-formed fiber optic pigtail) onto a field fiber at the locations shown on the Plans.

Materials. The Contractor shall be responsible for ensuring that the pre-formed pigtail fiber is compatible with the field fiber that it will be fusion splice to.

The splice shall be protected with a protection sleeve/enclosure that will secure both cables and prevent cable movement.

The fiber optic patch cords shall meet or exceed the following specifications:

- High-quality 125um fiber optics
- 900um tight buffer construction
- Aramid yarn individually protected
- Duplex construction
- Stress relief boots color coded (Tx/Rx)
- ST connectors with high-grade zirconia ferrule
- Insertion Loss < 0.2 dB @ 1310 / 1550 nm
- Return Loss < -58 dB @ 1310 / 1550 nm
- Compliant with ANSI/TIA/EIA 568-B.3
- TIA/EIA-604, FOCIS-2

The Contractor shall submit a shop drawing of all proposed components to the Engineer for approval prior to commencing construction.

Construction Requirements.

The Contractor shall prepare the cables and fibers in accordance with the cable manufacturers' installation practices. A copy of these practices shall be provided to the Engineer twenty-one (21) days prior to splicing operations.

Using a fusion splicer, the Contractor shall optimize the alignment of the fibers and fuse them together. The Contractor shall recoat the fused fibers and install mechanical protection over them.

Upon completing all splicing operations for a cable span, the Contractor shall measure the mean bi-directional loss at each connector using an Optical Time Domain Reflectometer. This loss shall not exceed the loss of the fusion splice (0.1 dB) plus the loss of the connector (typically 0.75 dB).

As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice and/or connector not satisfying the required objectives.

Basis of Payment: This work will not be paid for separately but shall be included in the bid price for the fiber optic cable pay items.

GROUNDING OF ITS STRUCTURES

This work shall be in accordance with the applicable articles of Sections 807, 817 and 1066 of the Standard Specifications with the following modifications:

This work shall consist of furnishing and installing a grounding wire to connect all proposed ITS cabinets and camera poles in accordance with NEC requirements.

The proposed ground wire shall be an insulated #6 XLP green copper conductor. This wire shall be bonded to all items and their associated ground rods utilizing mechanical lugs and bolts. This wire may be made continuous by splicing in the adjacent handholes with compression lugs. Split bolts will not be allowed.

The grounding wire shall be bonded to the grounded conductor at the service disconnect per the NEC.

All clamps, hardware, and other materials required shall be included.

Basis of Payment: This work will be paid for at the contract unit price per Foot for ELECTRIC CABLE IN CONDUIT, 600V (XLP-TYPE USE) 1/C NO. 6 which price shall be payment in full for all labor, materials, and equipment required to furnish and install the grounding wire described above.

CLOSED-CIRCUIT TELEVISION DOME CAMERA, HD

Description. This work shall consist of furnishing and installing an integrated Closed-Circuit Television (CCTV) Dome Camera Assembly, camera brackets, and all other items required for installation and operation. This assembly shall contain all components identified in the Materials Section and shall be configured as indicated on the plan sheets.

Materials.

The CCTV camera shall be an Axis Model Q6055-E Dome Camera Assembly for integration into the existing District 4 ITS system.

The Contractor shall provide all materials required to install the proposed camera on the proposed sign structure camera mast as shown on the plan sheets.

The Contractor shall submit catalog cut sheets to the Department for all items (mounting brackets, hardware, etc.) that will be utilized for review prior to commencing work.

The Department will program the cameras.

The camera shall meet or exceed the following specifications:

CAMERA

VIDEO:	60 Hz (NTSC), 50 Hz (PAL)
IMAGE SENSOR:	1/2.8” progressive scan CMOS
LENS:	4.44–142.6 mm, F1.6–4.41 Horizontal angle of view: 62.8°–2.23° Vertical angle of view: 36.8°–1.3° Autofocus, auto-iris
DAY AND NIGHT:	Automatically removable infrared-cut filter
MINIMUM ILLUMINATION:	Color: 0.3 lux at 30 IRE F1.6 B/W: 0.03 lux at 30 IRE F1.6 Color: 0.5 lux at 50 IRE F1.6 B/W: 0.04 lux at 50 IRE F1.6
SHUTTER TIME: NTSC:	1/33000 s to 1/3 s with 50 Hz 1/33000 s to 1/4 s with 60 Hz

PAN/TILT/ZOOM:	Pan: 360° endless, 0.05° - 450°/s Tilt: 220°, 0.05°-450°/s 32x optical zoom and 12x digital zoom, total 384x zoom E-flip, 256 preset positions, Tour recording, Guard tour, Control queue, On-screen directional indicator, Set new pan 0°, Adjustable zoom speed
VIDEO	
VIDEO COMPRESSION:	H.264 (MPEG-4 Part 10/AVC), Motion JPEG
RESOLUTIONS:	HDTV 1080p 1920x1080 to 320x180 HDTV 720p 1280x720 to 320x180
FRAME RATE (H.264):	Up to 60/50 fps (60/50 Hz) in HDTV 720p Up to 30/25 fps (60/50 Hz) in HDTV 1080p
VIDEO STREAMING:	Multiple, individually configurable streams in H.264 and Motion JPEG, Axis' Zipstream technology, Controllable frame rate and bandwidth, VBR/MBR H.264
IMAGE SETTING:	Manual shutter time, compression, color, brightness, sharpness, white balance, exposure control, exposure zones, fine tuning of behavior at low light, rotation: 0°, 180°, text and image overlay, 32 individual 3D privacy masks, image freeze on PTZ, automatic defog, backlight compensation Wide Dynamic Range (WDR): Up to 120 dB depending on scene, highlight compensation
NETWORK	
SECURITY:	Password protection, IP address filtering, HTTPSa encryption, IEEE 802.1Xa network access control, Digest authentication, User access log, Centralized Certificate Management
PROTOCOLS:	IPv4/v6, HTTP, HTTPSa, SSL/TLSa, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnPTM, SNMP v1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, SFTP, TCP, UDP, IGMP, RTCP, ICMP,DHCP, ARP, SOCKS, SSH, NTCIP
SYSTEM INTEGRATION	
APPLICATION PROG	Open API for software integration, including VAPIX®
INTERFACE:	and AXIS Camera Application Platform; specifications at www.axis.com, AXIS Video Hosting System (AVHS) with One-Click Connection, ONVIF Profile S, specification at www.onvif.org

ANALYTICS:	Video motion detection, Autotracking, Active Gatekeeper Basic Analytics (not to be compared with third-party analytics): Object removed, Enter/Exit detector, Fence detector, Object Counter, Highlight compensation, Support for AXIS Camera Application Platform enabling installation of third-party applications, see www.axis.com/acap
EVENT TRIGGERS:	Detectors: Live stream accessed, Video motion detection, Shock Detection, Object removed, Enter/Exit detector, Fence detector, Object counter; Hardware: Fan, Network, Temperature, Casing Open; PTZ: Autotracking, Error, Moving, Ready, Preset Reached; Storage: Disruption, Recording; System: System Ready; Time: Recurrence, Use Schedule; Input signal: Manual trigger, Virtual Input
EVENT ACTIONS:	Day/night mode, overlay text, video recording to edge storage, pre- and post-alarm video buffering, send SNMP trap PTZ: PTZ preset, start/stop guard tour File upload via FTP, SFTP, HTTP, HTTPS network share and Email; Notification via email, HTTP, HTTPS and TCP
DATA STREAMING	Event data
BUILT IN INSTALLATION AIDS	Pixel Counter

GENERAL

CASING:	IP66-, NEMA 4X- and IK10-rated Metal casing (aluminum), polycarbonate (PC) clear dome, sunshield (PC/ASA)
SUSTAINABILITY:	PVC Ffree
MEMORY:	512 MB RAM, 128 MB Flash
POWER CAMERA:	Axis High PoE midspan 1–port: 100–240 V AC, max 74 W Camera consumption: typical 16 W, max 60 W
CONNECTORS:	RJ45 10BASE-T/100BASE-TX PoE, RJ45 Push-pull Connector (IP66) included
EDGE STORAGE:	Support for SD/SDHC/SDXC card Support for recording to dedicated network-attached storage (NAS); For SD card and NAS recommendations see www.axis.com
OPERATING	With 30 W midspan: -20 °C to 50 °C (-4 °F to 122 °F)

CONDITIONS:	With 60 W midspan: -50 °C to 50 °C (-58 °F to 122 °F) Maximum temperature (intermittent): 60 °C (140 °F) Arctic Temperature Control: Start-up as low as -40 °C (-40 °F) Humidity 10–100% RH (condensing)
APPROVALS:	EMC: EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, EN 55024, FCC Part 15 Subpart B Class A, ICES-003 Class A, VCCI Class A, RCM AS/NZS CISPR 22 Class A, KCC KN32 Class A, KN35 Safety: IEC/EN/UL 60950-1, IEC/EN/UL 60950-22 Environment: EN 50121-4, IEC 62236-4, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27, IEC 60721-4-3, NEMA 250 Type 4X, IEC 60068-2-30, IEC 60068-2-60, IEC 60068-2-78, IEC/EN 60529 IP66, NEMA TS-2-2003 v02.06, Subsection 2.2.7, 2.2.8, 2.2.9; IEC 62262 IK10, ISO 4892-2 Midspan: EN 60950-1, GS, UL, cUL, CE, FCC, VCCI, CB, KCC, UL-AR
WEIGHT:	3.7 kg (8.2 lb.)
INCLUDED	Axis High PoE 60 W midspan 1-port, RJ45 Push-pull Connector
ACCESSORIES:	(IP66), Sunshield, Installation Guide, Windows decoder 1-user license
VIDEO MANAGEMENT:	AXIS Camera Companion, AXIS Camera Station, Video
SOFTWARE:	management software from Axis' Application Development Partners available on www.axis.com/techsup/software
WARRANTY:	AXIS Three-year warranty and AXIS Extended Warranty option

Environmental Enclosure/Housing

The environmental enclosure shall be designed to physically protect the integrated camera from the outdoor environment and moisture via a sealed enclosure. If the option exists in the standard product line of the manufacturer, the assembly shall be supplied with an integral sun shield. The enclosure shall be fully water and weather resistant with a NEMA 4 rating or better.

The camera dome shall be constructed of distortion free acrylic or equivalent material that must not degrade from environmental conditions. The environmental housing shall include a camera-mounting bracket. In addition, the environmental housing shall include a heater, blower, and power surge protector. An integral fitting compatible with a standard 1½" in. (38.1 mm) NPT pipe, suitable for outdoor pendant mounting shall also be provided.

The enclosure shall be equipped with a heater controlled by a thermostat. The heater shall turn on when the temperature within the enclosure falls below 40°F (4.4°C). The heater shall turn off when the temperature exceeds 60°F (15.6°C). The heater will minimize internal fogging of the dome faceplate when the assembly is operated in cold weather.

In addition, a fan shall be provided as part of the enclosure. The fan will provide airflow to ensure effective heating and to minimize condensation.

The enclosure shall be equipped with a hermetically sealed, weatherproof connector, located near the top for external interface with power, video, and control feeds.

CCTV Dome Camera Mounting Supports

The Contractor shall furnish and install an Axis Pole Mount Bracket T91L61 (Part Number 5801-721) for camera installation on traffic signal mast arms and CCTV camera poles and stainless steel banding as required.

Mounting supports shall be configured as shown on the camera support detail plans and as approved by the Engineer. Mount shall be of aluminum construction with enamel or polyester powder coat finish. Braces, supports, and hardware shall be stainless steel. Wind load rating shall be designed for sustained gusts up to 90 mph (145 km/hr), with a 30% gust factor. Load rating shall be designed to support up to 75 lb. (334 N). For roof or structural post/light pole mounting, mount shall have the ability to swivel inward for servicing. The mounting flange shall use standard 1½" inch (38.1 mm) NPT pipe thread.

Connecting Cables

The Contractor shall furnish and install outdoor rated, shielded CAT 5E cable. The cable shall be terminated using the IP66 rated RJ-45 connector on the camera end and a shielded RJ-45 connector in the cabinet. The Contractor shall test the cable prior after termination.

Cable will be paid for separately under the pay item CAT 5 ETHERNET CABLE.

Construction Requirements.

General

The Contractor shall prepare a shop drawing detailing the complete CCTV Dome Camera Assembly and installation of all components to be supplied for approval of the Engineer. Particular emphasis shall be given to the cabling and the interconnection of all of the components.

The Contractor shall install the CCTV dome camera assembly at the locations indicated in the

Plans. The CCTV Dome Camera Assembly shall be mounted on a pole, wall, or other structure.

Testing

The Contractor shall test each installed CCTV Dome Camera Assembly. The test shall be conducted from the field cabinet using the standard communication protocol and a laptop computer. The Contractor shall verify that the camera can be fully exercised and moved through the entire limits of Pan, Tilt, Zoom, Focus and Iris adjustments, using both the manual control and presets. The Contractor shall maintain a log of all testing and the results. A representative of the Contractor and a representative of the Engineer shall sign the log as witnessing the results. Records of all tests shall be submitted to the Engineer prior to accepting the installation.

Method of Measurement. The closed circuit television dome camera bid item will be measured for payment by the Actual Number of CCTV dome camera assemblies furnished, installed, tested, and accepted.

Basis of Payment. Payment will be made at the contract unit price for Each CLOSED CIRCUIT TELEVISION DOME CAMERA, IP BASED including all equipment, material, testing, documentation, and labor detailed in the contract documents for this bid item.

CAT 5 ETHERNET CABLE

This work shall be in accordance with Sections 873, 1076, and 1088 of the Standard Specifications except as modified herein.

This work shall consist of furnishing and installing an outdoor rated CAT5E cable in conduits, handholes, and poles.

The cable shall be rated for outdoor use and conform to the following specifications:

- Outdoor CMX Rated Jacket (climate/oil resistant jacket)
- UV Resistant Outer Jacket Material (PVC-UV, UV Stabilized)
- Outer Jacket Ripcord
- Designed For Outdoor Above- Ground or Conduit Duct applications
- Cat5E rated to 350MHz (great for 10/100 or even 1000mbps Gigabit Ethernet)
- Meets TIA/EIA 568b.2 Standard
- Shielded Twist Pair
- 4 Pairs, 8 Conductors
- 24AWG, Solid Core Copper
- UL 444 ANSI TIA/EIA-568.2 ISO/IEC 11801
- RoHS Compliant
- Water Blocking Gel

Basis of Payment: This work will be paid for at the contract unit price per Foot for CAT 5 ETHERNET CABLE, which shall be payment in full for all labor, equipment, and materials required to provide and install the cable described above, complete.

COMMUNICATIONS VAULT

This work shall be in accordance with Sections 814 and 1088 of the Standard Specifications except as modified herein.

This work shall consist of furnishing and installing a communications vault constructed of polymer concrete.

The following items are approved for use in District 4: Hubbel, Quazite, Part Numbers: PG2436HA00 (Cover) and PG2436BA30 (Box).

The communications vault and lid shall conform to the following specifications:

Cover:

Material: Polymer Concrete
Nominal Dimensions: 24” W x 36 L”
Gasketed, Heavy Duty Lid with 2 Bolts
Design/Test Load: 15,000/22,500 lbs.
ANSI Tier: 15
Gasketed

Box:

Material: Polymer Concrete
Nominal Dimensions: 24" W x 36" L x 30" D
Open Bottom
Design/Test Load: 22,500/33,750 lbs.
ANSI Tier: 22

The location of the handhole shall be excavated so that the top of the handhole is set flush with the sidewalk or paved surface. When installed in earth shoulder away from the pavement edge, the top surface of the handhole shall be 1" in. (25 mm) above the finished grade. The excavation shall be deep enough to accommodate the depth of the box and french drain.

The french drain shall be constructed underneath the proposed handhole according to Article 601.06 and in accordance with Highway Standard 814006.

The conduits shall enter the vault at between 24" and 30" and the Contractor shall install six inches of CA 5 or CA 7 in the bottom of the vault.

The Contractor shall submit testing reports to verify that the communications vaults and lids meet the requirements of ANSI Tier 15 and ANSI Tier 22 loading.

The locating cable shall be continuous and accessible on the outside of each communication vault. The Contractor shall utilize appropriate corrosion resistant hardware (stainless steel) and connections to the locating wire. The Contractor shall submit material and installation methods to the Department for review.

Basis of Payment: This work will be paid for at the contract unit price of Each for COMMUNICATIONS VAULT, which shall be payment in full for all labor, equipment, and materials required to provide and install the equipment described above, complete.

FIBER OPTIC ETHERNET DROP AND REPEAT SWITCH

The Contractor shall furnish a fiber optic drop and repeat switch (material only) complete with the accessories specified below and deliver it to the Department.

The fiber optic drop and repeat switch shall meet or exceed the following minimum specifications:

Approved Models: Antaira (Aaxeon) Technologies Model LNX-0702C-SFP-T (7-Port (5-port 10/100T + 2 10/100/1000T SFP ports Industrial Ethernet Switch, Wide Operating Temperature) or approved equal.

Features:	• 5-Port 10/100TX + 2-Port 10/100/1000T/Mini-GBIC Combo • Store-and-Forward Switching Architecture • 10Gbps Back-Plane (Switching Fabric) • 1 Mbits Memory Buffer • 8K MAC Address Table • Wide-Range Redundant Power Design • Power Polarity Reserve Protect • Provides EFT Protection 3000 VDC for Power Line • Supports 6000 VDC Ethernet ESD Protection • IP30 Rugged Aluminum Case Design • Five-Year Warranty
Standard:	• IEEE 802.3 10BaseT Ethernet • IEEE 802.3u 100BaseTX Fast Ethernet • IEEE 802.z Gigabit Fiber • IEEE 802.3x Flow Control and Back-Pressure
Protocol:	• CSMA/CD
Switch Architecture:	• Back-Plane (Switching Fabric): 10Gbps
Transfer Rate:	• 14,880pps for Ethernet Port • 148,800pps for Fast Ethernet Port • 1,488,000pps for Gigabit Fiber Ethernet Port
MAC Address:	• 8K MAC Address Table

Memory Buffer:	• 7,926 pps (default)
LED:	• Unit: Power 1, Power 2, Fault • 10/100 TX: Link/Activity, Full Duplex/Collision • Gigabit Copper: Link/Activity, Speed • SFP: Link/Activity
Connector:	• 10/100T: 5 x RJ-45 • 100/1000T: 2 x 100/1000 SFP Sockets
Network Cable:	• 10BaseT: 2-pair UTP/STP Cat. 3, 4, 5 cable EIA/TIA-568 100-ohm (100m) • 100BaseTX: 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m)
Power Supply:	• DC 12 ~ 48V, Redundant Power with Polarity Reverse Protect Function and Removable Terminal Block
Power Consumption:	• 6 Watts
Reverse Polarity Protection:	• Present
Overload Current Protection:	• Present
Mechanical:	• Casing: IP30 Metal Case • Dimension (W x H x D): 30 x 99 x 142 mm • Installation: DIN-Rail/Wall Mountable
Weight:	• Unit Weight: 1.3 lbs. • Shipping Weight: 1.7 lbs.
Operation Temperature:	• Wide Operating Temperature: -40° C to 75° C (-40°F to 176°F)
Operation Humidity:	• 5% to 95% (Non-condensing)
Storage Temperature:	• -40°C to 85°C
EMI:	• FCC Class A • CE EN6100-4-2/EN6100-4-3/EN6100-4-4/EN6100-4-5/EN6100-4-6 • /EN6100-4-8/EN6100-4-11/EN6100-4-12/EN6100-6-2/EN6100-6-4

Stability Testing:	• Shock: IEC60068-2-27 • Free Fall: IEC60068-2-32 • Vibration: IEC60068-2-6
Warranty:	• Five-Year Warranty

The following items shall also be included with each switch:

- SFP Fiber Optic Module – Qty. 2 (Aaxeon SFP-S20-T, 1.25Gbps Ethernet SFP Transceiver, Single Mode 20KM / LC / 1310nm, -40ºC~85ºC)
- Fiber Optic Patch Cables – Qty. 2 (single mode fiber, 1 meter length, duplex, LC/ST connectors)

Basis of Payment: This work will be paid for at the contract unit price per Each for FIBER OPTIC ETHERNET DROP AND REPEAT SWITCH which price shall be payment in full for all labor, materials, and equipment required to provide the fiber optic Ethernet drop and repeat switch and associated equipment and deliver it to the Department.

CLOSED CIRCUIT TELEVISION CABINET

Description. This work consists of furnishing and installing a pole mounted equipment cabinet and peripheral equipment at locations indicated in the Plans. These cabinets will be utilized to house critical electrical, optical, and communications equipment as defined in other contract pay items.

Materials. Materials shall be in accordance to the following specifications.

General. The equipment cabinet shall conform to the details shown on the plan sheet. Equipment cabinets shall be mounted and anchored on the poles and structures at locations indicated in the Plans. In addition, all mounting hardware and brackets required to install the equipment cabinet on the pole shall be stainless steel and provided by the Contractor. The mounting heights and pole diameters shall be as specified by the Engineer.

The cabinet shall be a NEMA 3R Single Door Enclosure, constructed from .125" thick aluminum, with nominal outside dimensions of 24" (H) x 14" (W) x 10" (D). The cabinet shall have a natural finish.

The cabinet shall be furnished with a slam lock, neoprene door gasket, vent slots, continuous stainless steel door hinge, and all stainless steel hardware. The cabinet shall also have a Corbin #2 dead bolt lock or skeleton key. The key shall be removable in the lock position only. Two keys shall be supplied for each lock, and all equipment cabinet locks shall be keyed the same.

All cables shall be labeled utilizing marking tags.

The cabinet shall be equipped with a main power panel as shown on the cabinet plan detail sheet. The power panel shall include one 15A main breaker, power terminal blocks, and one six outlet power strip with integral surge protection. The power panel shall include a plexi-glass safety shield that covers the power panel.

Power Strip

The cabinet power strip shall have a minimum of six outlets and integral surge suppression that meets or exceeds the following minimum specifications:

- Let Through Voltage: <85 Volts
- Operating Voltage: 120VAC, 50/60H
- UL Suppressed Voltage Rating: 330V
- Energy Rating: 320J
- Peak Current NM/CM: 13k Amps NM, 13k Amps CM
- EMI/RFI Noise Filtration: >25-60dB

The power strip shall be wired directly to the protected power terminals on the cabinet surge arrestor.

Construction Requirements.

The Contractor shall prepare and submit shop drawings that detail all of the components to be supplied, along with associated mounting hardware for the pole mounted equipment cabinet. The shop drawings must be approved by the Engineer prior installation of the completed cabinet in the field.

The Engineer reserves the right to inspect and/or factory test any completed cabinet assemblies prior to shipment of the material to the project site. Any deviances from these specifications that are identified during such testing shall be corrected prior to delivery of the assembly to the project site.

The Contractor shall install the cabinet to an existing or proposed light pole at the locations show on the plan sheets.

The AC power service to be run to the equipment cabinet shall be terminated. In addition, the cabinet shall be connected to an adequate ground following the Standard Specifications.

The Contractor shall terminate any inbound and outbound fiber optic, CAT5E cables, or wireless antenna leads in the equipment cabinet as shown in the Plans. The Contractor shall terminate any twisted pair communication cable on the termination panel in the equipment cabinet as shown in the Plans. Lugs shall be installed at the end of each conductor suitable for connection to the barrier terminal blocks.

Method of Measurement. This item shall be measured for payment by Each pole mounted equipment cabinet in-place.

Basis of Payment. This work shall be paid for at the contract unit price Each for CLOSED CIRCUIT TELEVISION CABINET, and shall include all equipment, material and labor required to furnish the cabinet and install it as described above, complete.

CIRCUIT BREAKER, 1-POLE, 20 AMP, 120V IN EXISTING CABINET

This work shall consist of furnishing a single pole, rated 20 A circuit breaker that is mounted on an aluminum plate and is installed in a small panel board in an existing cabinet or on the wall of a building at the locations shown on the Plans or as designated by the Engineer. All circuit breakers shall have a molded case. This work shall be in accordance with the requirements set forth under Section 805 and 1086 and Article 1068.01(e)(3) in particular of the Standard Specifications.

Wall mounted breakers shall include an enclosure to house the breaker.

Basis of Payment: This work will be paid for at the contract unit price of Each for CIRCUIT BREAKER, 1-POLE, 20 AMP, 120V IN EXISTING CABINET, which shall be payment in full for all labor, equipment, and materials required to provide the circuit breaker installation described above, complete.

LIGHT POLE, GALVANIZED STEEL, 45 FT. M.H., TENON MOUNT

This work shall be in accordance with Section 830 and 1069 of the Standard Specifications except as modified herein.

The Contractor shall pick up two metal light pole foundations from the IDOT Warehouse located at 6511 West US Route 150, Edwards, Illinois and deliver them to the job sites Interstate 74 at US Route 150 (East Main) and US Route 34 and IL Route 41/IL Route 164 in Galesburg for installation.

The Contractor shall install the metal foundations in accordance with Articles 836, 1003, and 1070 of the Standard Specifications.

The proposed light poles will be utilized for installing CCTV cameras. The Contractor shall cover the tenon mount with a weatherproof cap to prevent water intrusion.

Identification labels will not be required.

Basis of Payment: This work will be paid for at the contract unit price Each for LIGHT POLE, GALVANIZED STEEL, 45 FT. M.H., TENON MOUNT and shall be payment in full for all labor, materials, and equipment required to deliver the IDOT furnished metal foundations to the job sites and install the light pole and foundations as described above, complete.

CAMERA POLE, 45 FT.

The camera pole shall be galvanized steel and designed in accordance with the plan sheet detail. The camera pole shall be designed in accordance with AASHTO 2015 standards.

Basis of Payment: This item shall be paid at the contract unit price Each for CAMERA POLE, 45 FT. which price shall include all equipment, labor, and materials required to furnish and install the camera pole described above and as shown in the plan detail.

CLOSED CIRCUIT TELEVISION DOME CAMERA (MATERIAL ONLY)

The Contractor shall furnish one complete CCTV camera assembly with housing, mounting bracket kit, and accessories (power supplies, etc.) and deliver it to the Department.

The camera shall conform to the specifications listed under the pay item for CLOSED CIRCUIT TELEVISION DOME CAMERA.

Basis of Payment: This work will be paid for at the contract unit price per Each for CLOSED CIRCUIT TELEVISION DOME CAMERA (MATERIAL ONLY) which price shall be payment in full for all labor, materials, and equipment required to provide the equipment specified above and deliver it to the Department.

CLOSED CIRCUIT TELEVISION DOME CAMERA, IP BASED (MATERIAL ONLY)

The Contractor shall furnish one complete CCTV camera assembly with housing, mounting bracket kit, and accessories (power supplies, etc.) and deliver it to the Department.

The camera shall conform to the specifications listed under the pay item for CLOSED CIRCUIT TELEVISION DOME CAMERA, HD.

Basis of Payment: This work will be paid for at the contract unit price per Each for CLOSED CIRCUIT TELEVISION DOME CAMERA, IP BASED (MATERIAL ONLY) which price shall be payment in full for all labor, materials, and equipment required to provide the equipment specified above and deliver it to the Department.

TRAFFIC COUNTER

This work shall consist of furnishing and installing a microwave traffic counter on a proposed galvanized steel pole at the locations shown on the plan sheets.

The traffic counter shall be either a Wavetronix Smartsensor or an Image Sensing Solutions RTMS G4 equipped with Ethernet port for integration into the IDOT District 4 ITS and Advanced Traffic Management Software.

The Contractor shall perform the following:

- Furnish and install the power supply and lightning arrestor in the proposed Type 334 equipment cabinet.

- Furnish and install the traffic counter on the proposed camera pole in accordance with the manufacturer's recommendations.

- Adjust the rotation, elevation, and azimuth of sensor as directed by the Engineer (IDOT will be on-site during sensor installation to program sensor and verify sensor operation).

- Furnish and install power and data cables.

- Furnish and install all items required for installation and operation including, but not limited to, communication cables, brackets, banding, hardware, etc.

The Department will program the traffic counters and integrate them into the IDOT District 4 ITS and Advanced Traffic Management Software and will be responsible for all labor and materials required for integration.

Description. This work shall consist of furnishing and installing a complete and operational microwave detector with all necessary hardware and software components. The microwave detector shall be a true presence detector that senses vehicles in several lanes and collects location-specific traffic flow data including lane volumes, occupancy, and speed. The detector shall be mounted in a side-fire configuration, at the side of and well above the traveled way.

The microwave detector includes the following components: a detector assembly, power to the unit, and appurtenant mounting hardware, conduits, and cables. These items shall be installed as shown on the Plans and in accordance with the applicable requirements identified in these Special Provisions.

Materials.

General.

All required components including tools, equipment, cables, materials, supplies, and manufactured articles required to successfully install the components of the microwave detector as shown on the Plans and as specified herein.

All equipment and component parts furnished shall be new, be of the latest design and manufacture, and be in an operable condition at the time of delivery and installation. All parts shall be of high quality workmanship, and no part or attachment shall be substituted or applied contrary to the manufacturer's recommendations and standard practices.

The design shall be such as to prevent reversed assembly or improper installation of connectors, fasteners, etc. Each item of equipment shall be designed to protect personnel from exposure to high voltage during equipment operation, adjustments, and maintenance.

Microwave Detector Assembly.

Microwave detector assembly includes a microwave detector, mounting brackets or plates, cabling, wiring harnesses, and manufacturer specific setup software connected through a communications cable to a terminal block and a power supply placed in the proposed Type 334 cabinet, to provide a fully functioning vehicle detector installation. All mounting hardware, conduit bushings, conduit straps, cables, wires, connectors, weather heads, etc. necessary to complete the microwave detector special as shown on the Plans and specified herein shall be supplied and installed as recommended by the manufacturer and as approved by the Engineer.

The Contractor shall provide each microwave detector consisting of primarily a detector, mounting bracket, sufficient power and communication cables to go from the detector assembly to a local equipment cabinet that provides power and communications services, and a power supply and terminal block inside the equipment cabinet.

Microwave Detector.

The microwave vehicle detector shall meet or exceed the following requirements:

- Above-pavement installation. The subsystem shall not be embedded in or beneath the traveled way.
- Easy to install, adjust and remove.
- Fully programmable to support a variety of applications.
- Designed for roadside installation in a "side-fire" configuration, with each detector capable of detecting vehicles in several lanes of traffic.
- Resistant to degradation by weather or normal changes in other environmental conditions.
- Outputs processed data including speed, volume, occupancy and detector errors for up to 8 detection zones from each field device. This information shall be available via a serial communications port in the cabinet.
- Transmitter power, if required, shall not exceed 10 milliwatts.
- The microwave detector’s vehicle detection range shall be from $\leq$ 5 ft (1.5 m) to $\geq$ 197 ft (60 m) with an elevation beam width of 45 degrees and an azimuth beam width of 15 degrees.
- The maximum number of detection zones defined shall be no fewer than eight (8). The range limits of each zone shall be user defined in steps of 7 ft.
- The detector shall identify vehicle presence within each detection zone with a 95% accuracy or greater, independent of the vehicle’s direction of travel through the detection zone.

- Measurement error percentage shall be less than or equal to values in the following table:

Measurement	% Error	Range
Per lane Occupancy (Side-fire)	<5%	0-100 %
Per lane Volume (Side-fire)	<5%	0-255
Per lane Average Speed (Side-fire)	<10%	0-100mph

- The maximum permissible error shall be 10% in the case of side-fire speed measurement.

- The designed Mean Time Between Failures (MTBF) of the microwave detector, operating continuously in this application, shall be 10 years or longer.

- The detector shall be enclosed in a rugged watertight NEMA Type 3R enclosure or 4X polycarbonate box.

- The overall dimensions of the detector unit, including fittings, shall not exceed 8 in (21 cm) X 10 in (27 cm) X 6 in (16 cm).

- The total weight of the detector shall not exceed 15 lbs.

- The detector unit shall be operable from either 12 - 24 VAC/DC @ 6W, or from 95 - 135 VAC @ 60 Hz.

- Power supply shall be obtained from the power distribution assembly within the equipment cabinet.

Communication Cable Requirements.

Provide a weatherproof, UV-resistant cable of six or more twisted pairs of insulated, stranded AWG #20 or #22 wires with a common shield rated at 300 volts with a temperature rating of > 222 degrees F (105 degrees C) between each detector and the equipment and terminal block in the equipment cabinet for data communications and power. Each conducting pair shall be separately shielded, and all shields shall have a common drain connection. The Contractor shall submit a catalog cut sheet to the Department for approval.

The traffic counter shall be equipped with a RJ-45 Ethernet port for communications with central polling software.

Environmental Requirements.

Equipment shall be enclosed in a rugged weatherproof box and sealed to protect the equipment inside from wind, dust and airborne particles, and exposure to moisture.

Equipment within the box shall meet all its specified requirements during and after being subjected to any combination of the following:

- Ambient temperature range of -35°F to +165°F (-31°C to 74°C)
- Relative humidity from 5 to 95 percent, non-condensing
- Sustained wind speed of ≤ 90 mph (1454 kph), with a 30% gust factor

The design shall be inherently temperature compensated to prevent abnormal operation. Circuit design shall include such compensation as is necessary to overcome adverse effects in the specified environmental range.

No item, component, or subassembly shall emit a noise level exceeding the peak level of 55 dBA when measured at a distance 3.3 foot (1 meter) away from its surface.

If the microwave detector emits radio frequency (RF), each detector shall transmit on a frequency band of 10.525 GHz +/- 25 MHz or another approved spectral band. The detector shall comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules or the appropriate Spectrum Management Authority.

The microwave detector shall be resistant to vibration in accordance with IEC 68-2-30 (test Fc), NEMA TS-1 (Section 2.1.12), or approved equivalent.

The microwave detector shall be resistant to shock in accordance with IEC 68-2-27 (test Ea.), NEMA TS-1 (Section 2.1.13), or approved equivalent.

Power Supply

Provide a power supply in the local equipment cabinet that shall provide appropriate electrical power to the microwave detector. No modular DC power supplies with integral AC plugs shall be used. The device shall protect the microwave detector against damage from power line transients and surges. The device shall include surge protection in accordance with IEC 1000-4-5/EN 61000-4-5.

System Interface

The microwave detector system interface shall consist of a single MS connector, which provides:

- Power to the microwave detector unit.
- A minimum 12-connector terminal block in the cabinet that terminates the communications cable from the microwave detector.
- Output contact closure wire pairs for each of the required detection zones rated at 200 V AC/DC 100 mA.
- A serial communications port for programming, testing or modem interface to the microwave detector at 9.6 Kbps or faster.

Mounting Bracket:

- A mounting bracket for each detector shall be provided.
- Provide painted steel, stainless steel or all aluminum construction brackets capable of supporting a load of 22 lb. (10 kg) for approval by the Engineer.
- Incorporate a ball joint or other approved mechanism that can be tilted in both axes and locked into place to provide the optimum area of coverage.
- Bands fastening the detector-mounting bracket to the support pole shall be made of minimum ¾" in. (19 mm) wide, 0.025 in (0.635 mm) thick stainless steel.
- Bolts that are to fasten the detector-mounting bracket to a concrete wall/bridge shall be stainless steel expansion bolts of sufficient length and diameter to support 100 lb. (45 kg).

Software.

The microwave detector shall include manufacturer specific software that provides capabilities satisfying the functional detector requirements listed above. In addition, the software shall:

- Allow a maintenance person to set up to eight (8) detection lanes of varying width.
- Allow parameters to be set manually and/or automatically when calibrating speeds in individual lanes.

Construction Requirements.

Microwave Detector Assembly.

The microwave detector shall be mounted in a side-fire configuration on poles or sign structures at the specified locations, using the manufactured supplied mounting brackets as shown in the Plans and specified herein. The Contractor shall install the microwave detector unit on a pole at the height specified above the road surface as shown in the Plans so that the masking of vehicles is minimized and that all detection zones are contained within the specified elevation angle as suggested by the manufacturer and approved by the Engineer.

Where the Plans show one microwave detector unit at one site, it shall be configured to obtain traffic data from all the lanes Northbound or Southbound or all the lanes Eastbound or Westbound.

Prepare the power and communications cable according to the detector manufacturer's instructions and as approved by the Engineer. Inside the equipment cabinet, terminate cable pairs used for detector power on the communications interface terminal block, and make the appropriate connections to a power supply or power distribution assembly.

Power and Communications System Interface

Install all necessary electrical and interface cables in the equipment cabinet, as shown in the Plans and in accordance with the details as indicated. The MS connector pins must be crimped to the cable conductors and assembled and tested prior to the installation and pulling of cable on site. The Department will test the cable and microwave detector prior to installation.

On the back of the microwave detector unit, terminate the power and communication cable to provide power and serial communications. Inside the cabinet, terminate cable pairs used for power on interface panel terminal blocks, and make the necessary connections to the power supply and/or the power distribution assembly.

Miscellaneous

The microwave detector special includes installation of the following components: a detector assembly, power to the unit, and appurtenant mounting hardware, conduits, and power and communications cables. All the earthwork preparation and grading necessary for the installation of the side-fire microwave detector station shall be included in the bid price of this item, including repairing disturbed portions of the construction area.

Install cable tags for all controller and internal wiring harnesses, jumper cables, and microwave detector cables. Include the cable function, origin, destination, equipment location, and other information to facilitate testing, operation, and maintenance as required and approved by the Engineer.

Comply with the requirements of associations, societies, codes, and regulations as applicable. Provide certifications as required by law.

Warranty

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

Method of Measurement: The microwave detector special will be measured for payment by the Actual Number of sites furnished, installed, tested, and accepted including all necessary hardware and software components.

Basis of Payment: This work will be paid for at the contract unit price of Each for TRAFFIC COUNTER, which shall be payment in full for all labor, equipment, and materials required to provide and install the traffic counter described above, complete.

CONCRETE FOUNDATION (SPECIAL)

Description. Concrete foundations shall be constructed to support ITS equipment cabinets (Type 1 foundations) at locations as indicated on the Plans. This work shall include installing any necessary hardware (entering conduits, bolts, anchor rods, grounding, etc.) as shown on the Plans. This work shall also include any topsoil, fertilizing, seeding, and mulching of the distributed areas in accordance with Sections 211, 250, and 251 of the Standard Specifications.

Materials. Type 1 concrete foundations shall be according to materials defined in Article 836.02 of Section 836 of the Standard Specifications. All anchor bolts shall be in accordance with Section 1006.09 of the Standard Specifications except that all anchor bolts shall be hot dipped galvanized the full length of the anchor bolt including the hooks. Anchor bolts shall provide bolt spacing as shown in the Plans and as required by the cabinet manufacturer.

The Type 1 concrete foundations shall also be fabricated in accordance with Section 1070 of the Standard Specifications. These concrete foundations shall be fabricated from material new and unused in any previous application. The manufacturer shall provide a Certificate of Compliance that the materials are new and meet the specified requirements in accordance with the Standard Specifications and as shown on the Plans.

Construction Requirements. The Engineer will determine the final placement of the Type 1 concrete foundations. Type 1 concrete foundation dimensions shall be in accordance with those dimensions shown in the Plans on the detail sheet. The foundation shall be located as required in order to avoid existing and relocated utilities. The top of the foundation shall be finished level. Shimming of the appurtenance to be attached will not be permitted.

Prior to pouring the foundation, the Contractor shall check the Plans for the specific number, size, and direction of conduit entrances required at the given location. All conduit in the foundation shall be installed rigidly in place before concrete is deposited in the form. Bushings shall be provided at the ends of the conduit. Anchor rods and ground rod shall be set in place before the concrete is deposited by means of a template constructed to space the anchor rods according to the pattern of the bolt holes in the base of the appurtenance to be attached. The appurtenance shall not be erected on the foundation until the bases have cured for at least (7) days. The Concrete shall cure according to Article 1020.13 of the Standard Specifications.

Method of Measurement: Concrete foundations shall be measured for payment in Feet of the concrete foundation in-place installed in accordance with the total length of concrete foundation required for Type 1 foundations as indicated on the Plans and as directed by the Engineer. Extra foundation depth, beyond the directive of the Engineer, will not be measured for payment.

Basis of Payment: Payment will be paid for at the contract unit price per Feet of CONCRETE FOUNDATION (SPECIAL), of the diameter and length indicated. The price shall include payment in full for furnishing, installing, and testing all materials (entering conduits, bolts, anchor rods, grounding, etc.) within the limits of the foundation and any topsoil, fertilizing, seeding, and mulching of the distributed areas as well as all associated labor is to be included in this price.

CABINET, MODEL 334

Description. Work under this item shall consist of furnishing and installing a Model 334 cabinet for field equipment including fiber optic communications, inductive loop detector stations, changeable message signs, and CCTV dome camera, as shown on the Plans and as hereinafter provided.

Materials

General. Cabinet, Model 334 shall be an aluminum durable, weatherproof enclosure, with nominal outside dimensions of 66 in (1.7 m) high X 24 in (600 mm) wide X 30 in (762 mm) deep. Cabinet, Model 334 shall consist of the following components: double door each equipped with a lock for front and rear cabinet entry, housing, mounting cage, service panel, thermostatically controlled fan, and all necessary mounting hardware and wiring, and other equipment, as shown on the Plans and specified in these special provisions.

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

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

The cabinet shall have single front and rear doors, each equipped with a lock. The enclosure door frames shall be double flanged out on all 4 sides and shall have strikers to hold tension on and form a firm seal between the door gasketing and the frame. The front and rear doors shall be provided with catches to hold the door open at both 90 and 180 ±10°. Gasketing shall be provided on all door openings and shall be dust-tight. For horizontal support and bolt attachment, cage bottom support mounting angles shall be provided on either side, level with the bottom edge of the door.

The latching handles on the doors shall have provisions for padlocking in the closed position. When the door is closed and latched, the door shall be locked. The locks and handles shall be on the right side of the front door and the left side of the rear door. The lock and lock support shall be rigidly mounted to the door. The locks shall be Corbin #2 and two keys shall be supplied to the Department with each lock. The keys shall be removable in the locked position only.

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

The intake (including filter with shell) and exhaust areas shall pass a minimum of 60 cubic feet of air per minute for housing #1 and 26 cubic feet of air per minute for housing #2. The thermostatically controlled fan with ball or roller bearings shall be mounted within the housing and vented. The fan shall provide a capacity of at least 150 cubic feet of free air delivery per minute of ventilation. The fan shall be thermostatically controlled and activated when the temperature inside the cabinet exceeds 75°F (24°C) and shut off when the temperature is less than 64°F (18°C). In addition, the fan shall be manually adjustable for automatic turn on and off. The fan circuit shall be protected at 125% 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 (482 mm) EIA self-standing rack assemblies. The EIA rack portion of the cage shall consist of 2 pairs of continuous, adjustable equipment mounting angles that comply with Standard EIA RS-310-B. The cage shall be centered within the cabinet and bolted to the cabinet at 4 points.

Each cabinet shall be equipped with 2 shelves and one slide out keyboard tray. Shelves shall be the full width of the rack and 12" in. (300 mm) deep. The shelves shall be designed to support a minimum of 50 pounds.

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

Each cabinet shall be equipped with one fluorescent lighting fixture mounted to the inside top front portion of the cabinet. The fixture shall have an F-15-T-8 cool white lamp; operated from a normal power factor, UL listed cold weather ballast. A door-activated switch shall be installed to turn the cabinet light on when the front door is opened. The door switch shall be on a separate circuit by itself and used only to turn on the cabinet light.

Each cabinet shall be supplied with a heavy-duty plastic envelope to store plans, wiring diagrams, schematics, etc. This envelope shall have metal grommets so that it hangs from the door hooks. The envelope shall have minimum dimensions of 10 in (250 mm) x 15 in (381 mm).

Foundations shall conform to those shown on the plan sheets. The foundation is paid for separately.

Construction Requirements

The Contractor shall deliver the Cabinet Model 334 mounted on a plyboard-shipping pallet that is bolted to the cabinet base. The cabinet shall be enclosed in a slipcover cardboard packaging shell. The housing doors shall be blocked to prevent movement during transportation to the site.

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

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

Tests.

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

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

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

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

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

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

VIDEO DETECTION SYSTEM

The following video detection systems are approved for use within District Four:

Gridsmart (1 Camera System for 4 Approaches equipped with Performance Plus Module).

The Contractor may elect to submit an alternate product for consideration provided that it is a one camera system that meets the minimum requirements contained in this specification.

The video vehicle detection system shall include all necessary electric cable, electrical junction boxes, electrical and communications surge suppression, hardware, software, programming, and any camera brackets that are required for installation and configuration. These items should be taken into consideration and shall be included in the bid price for the video detection system.

All CAT 5 Ethernet cable shall meet the requirements contained in the special provisions (outdoor rated, gel-filled, shielded, etc.).

All vehicle video detection systems shall be equipped with the latest software or firmware revisions.

The video vehicle system shall be configured and installed to NEMA TS2 Standards (use of the SDLC port and BIU). Installation conforming to NEMA TS1 standards will not be allowed.

The minimum requirements for a video vehicle detection system are listed below:

1.0 General

This Specification sets forth the minimum requirements for a system that monitors vehicles on a roadway via processing of video images and provides detector outputs to a traffic controller or similar device.

1.1 System Hardware

The system shall consist of four video cameras and an automatic control unit (ACU). The ACU shall process all detected calls and shall be equipped with the latest firmware revisions.

1.2 System Software

The system shall be able to detect either approaching or receding vehicles in multiple traffic lanes. A minimum of 24 detection zones shall be user-definable per camera. The user shall be able to modify and delete previously defined detection zones. The software shall provide remote access operation and shall be the latest revision.

2.0 Functional Capabilities

2.1 Real-Time Detection

2.2 The ACU shall be capable of simultaneously processing information from up to four (4) digital video sources. The video shall be digitized and analyzed at a rate of 30 times per second.

2.3 The system shall be able to detect the presence of vehicles in a minimum of 96 detection zones within the combined field of view of the image sensors.

3.0 Vehicle Detection

3.1 Detection Zone Placement

The video detection system shall provide flexible detection zone placement anywhere and at any orientation within the combined field of view of the image sensors. In addition, detection zones shall have the capability of implementing logical functions including AND and OR.

3.2 Optimal Detection

The video detection system shall reliably detect vehicle presence when the image sensor is mounted 10m (30 ft.) or higher above the roadway, when the image sensor is adjacent to the desired coverage area, and when the length of the detection area or field of view (FOV) is not greater than ten (10) times the mounting height of the image sensor. The image sensor shall not be required to be mounted directly over the roadway. A single image sensor, placed at the proper mounting height with the proper lens, shall be able to monitor six (6) to eight (8) traffic lanes simultaneously.

3.3 Detection Performance

Overall performance of the video detection system shall be comparable to inductive loops. Using standard image sensor optics and in the absence of occlusion, the system shall be able to detect vehicle presence with 98% accuracy under normal conditions, (days & night) and 96% accuracy under adverse conditions (fog, rain, snow). The ACU shall output a constant call for each enabled detector output channel if a loss of video signal occurs in any camera.

The ACU shall be capable of processing a minimum of twenty detector zones placed anywhere in the field of view of the camera.

4.0 ACU Hardware

4.1 ACU Mounting

The ACU shall be shelf or rack mountable. Nominal outside dimensions excluding connectors shall not exceed 180mm (7.25") x 475mm (19") x 260mm (10.5") (H x W x D).

4.2 ACU Environmental

The ACU shall be designed to operate reliably in the adverse environment found in the typical roadside traffic cabinet. It shall meet the environmental requirements set forth by the NEMA (National Electrical Manufacturers Association) TS1 and TS2 standards as well as the environmental requirements for Type 170 and Type 179 controllers. The minimum operating temperature range shall be from -35°C to +74°C at 0% to 95% relative humidity, non-condensing.

5.0 ACU Electrical

5.1 The ACU shall be modular in design and provide processing capability equivalent to the Intel Pentium microprocessor. The bus connections used to interconnect the modules of the ACU shall be gold-plated DIN connectors.

5.2 The ACU shall be powered by 89 - 135 VAC, 60 Hz, single phase, and draw 0.25 amps, or by 190 - 270 VAC, 50 Hz, single phase and draw 0.12 amps. If a rack mountable ACU is supplied, it shall be capable of operating from 10 to 28 VDC. The power supply shall automatically adapt to the input power level. Surge ratings shall be as set forth in the NEMA TS1 and TS2 specifications.

5.3 Serial communications to a remote computer equipped with remote monitoring software shall be through a RJ-45 Ethernet port.

5.4 The ACU shall be equipped with a NEMA TS2 RS-485 SDLC interface for communicating input and output information. Front panel LEDs shall provide status information when communications are open.

5.5 The ACU and/or camera hookup panel shall be equipped with four RJ-45 connector based/terminal block connections for cameras so that signals from four image sensors can be processed in real-time.

5.6 The ACU shall be equipped with USB ports, WiFi, and Ethernet ports to provide communications to a computer running the configuration and remote access software.

5.7 The ACU and/or camera hookup panels used for a rack mountable ACU shall be equipped with a video output port.

5.8 The ACU shall be equipped with viewable front panel detection LED indications.

6.0 Camera

6.1 The video detection system shall use high resolution, color, cameras as the video source for real-time vehicle detection. As a minimum, each image sensor shall provide the following capabilities:

a. MPEG-4 and H.264 video compression and transport

b. Support video streaming that is viewable through a standard web browser with an adjustable frame rates of 5/15/30 fps

c. Images shall be produced with a CCD sensing element with horizontal resolution of at least 720 lines and vertical resolution of at least 480 lines.

d. Useable video and resolvable features in the video image shall be produced when those features have luminance levels as low as 0.1 lux at night.

e. Useable video and resolvable features in the video image shall be produced when those features have luminance levels as high as 10,000 lux during the day.

f. Automatic gain, automatic iris, and absolute black reference controls shall be furnished.

g. An optical filter and appropriate electronic circuitry shall be included in the image sensor to suppress "blooming" effects at night.

6.2 The image sensor shall be equipped with an integrated zoom lens with zoom and focus capabilities that can be changed using either configuration computer software or hand-held controller. The machine vision processor (MVP) may be enclosed within the camera.

6.3 The image sensor and lens assembly shall be housed in an environmental enclosure that provides the following capabilities:

a. The enclosure shall be waterproof and dust-tight to NEMA-4 specifications. The camera shall be IP-67 rated.

b. The enclosure shall allow the image sensor to operate satisfactorily over an ambient temperature range from -34°C to +74°C while exposed to precipitation as well as direct sunlight.

c. The enclosure shall allow the image sensor horizon to be rotated in the field during installation.

d. A heater shall be at the front of the enclosure to prevent the formation of ice and condensation in cold weather, as well as to assure proper operation of the lens' iris mechanism. The heater shall not interfere with the operation of the image sensor electronics, and it shall not cause interference with the video signal.

f. The enclosure shall be light-colored and shall include a sun shield to minimize solar heating. The front edge of the sunshield shall protrude beyond the front edge of the environmental enclosure and shall include provision to divert water flow to the sides of the sunshield. The amount of overhang of the sun shield shall be adjustable to prevent direct sunlight from entering the lens or hitting the faceplate.

g. The total weight of the image sensor in the environmental enclosure with sunshield shall be less than 2.7 kg (6 pounds).

h. When operating in the environmental enclosure with power and video signal cables connected, the image sensor shall meet FCC class B requirements for electromagnetic interference emissions.

6.3 The video output of the image sensor shall be isolated from earth ground. All video connections from the image sensor to the video interface panel shall also be isolated from earth ground.

6.4 The video output, communication, and power to the image sensor shall include transient protection to prevent damage to the sensor due to transient voltages occurring on the cable leading from the image sensor to other field locations.

6.5 A stainless-steel junction box shall be available as an option with each image sensor for installation on the structure used for image sensor mounting. The junction box shall contain a terminal block for terminating power to the image sensor and connection points for cables from the image sensor and from the ACU.

7.0 Software

7.1 The system shall include the remote access software that is used to setup.

and configure the video detection system. The software shall be of the latest revision.

7.2 All necessary cable, adapters, and other equipment shall be included with the system.

8.0 Installation and Training

8.1 The supplier of the video detection system shall supervise the installation and testing of the video and video vehicle detection equipment. A factory certified representative from the supplier shall be on-site during installation.

9.0 Warranty, Maintenance, and Support

9.1 The video detection system shall be warranted by its supplier for a minimum of three (3) years from date of turn-on. This warranty shall cover all material defects and shall also provide all parts and labor as well as unlimited technical support.

9.2 Ongoing software support by the supplier shall include updates of the ACU and supervisor software. These updates shall be provided free of charge during the warranty period.

9.3 The supplier shall maintain a program for technical support and software updates following expiration of the warranty period. This program shall be made available to the contracting agency in the form of a separate agreement for continuing support.

Basis of Payment: This work will not be paid for separately but shall be included in the contract unit price Each for VIDEO DETECTION SYSTEM which price shall be payment in full for all labor, equipment, and materials required to furnish, install, and test the video vehicle detection system described above, complete.

REMOVE EXISTING ITS EQUIPMENT

This work shall be in accordance with Section 895 of the Standard Specifications except as modified herein.

The Contractor shall remove the following items:

Removal Items	**US 150 (War Memorial Dr.) & IL 29 (Adams St.) Peoria County**
Galvanized Steel Camera Pole	1
ITS Equipment Cabinet	1
Electric Service for ITS Equipment Cabinet	1
Electric Cable (Not Required for Proposed Installation)	All

The above list should represent an accurate listing of removal items, however, it is the Contractor's responsibility to verify all quantities prior to bidding. There will be no additional compensation.

The Contractor shall notify the Department prior to removing the facilities to allow for the removal of ITS and communications equipment from the equipment cabinets.

The Contractor shall deliver the camera pole to the IDOT Peoria West facility located at 6505 W. US Route 150, Edwards. The Contractor shall notify Mr. Greg Dixon at (309) 258-7481 forty eight hours in advance of delivery.

The Contractor shall dispose of all other items off of the right-of-way and reflect the salvage value of this equipment in the unit bid price for this pay item.

Basis of Payment: The above work will be paid for at the contract unit price Each for REMOVE EXISTING ITS EQUIPMENT and shall be payment in full for removing and transporting the equipment described above, complete. No additional compensation will be allowed.

REPLACEMENT OF SENSORS FOR ROADWAY WEATHER INFORMATION SYSTEM

This work shall be in accordance with Sections 805, 806, 810, 811, 813, 815, 817, 873, 1066, and 1076 of the Standard Specifications except as modified herein.

This pay item shall consist of installing new in-pavement sensors in the bridge deck of the proposed structure for use with the existing RWIS system located along US 24 @ McClugage Bridge in (Tazewell County).

All equipment furnished and installed under this contract shall be compatible with the existing statewide RWIS (Roadway Weather Information System).

All equipment shall be furnished and installed by Surface Systems Inc. (SSI), a division of Quixote Transportation Technologies (QTT-Vaisala) to ensure compatibility with and integration into the statewide system.

The existing statewide RWIS system has been installed by Vaisala. The contact person is Sandra Thomas, Vaisala Inc., 194 South Taylor Avenue, Louisville, CO 80027, USA, (303) 262-4022 (sandra.thomas@vaisala.com)

The Contractor shall complete the following work items:

- Disconnect power and affected sensors from the RWIS control cabinet to prevent damage to the existing facility.

- Install one new passive pavement sensor (FP2000 or equivalent) in the bridge deck for each vehicular driving lane of the proposed eastbound structure. (Qty. 3).

- Install one new sub surface temperature sensor in the outside lane on the approach for proposed structure.

- Install one new sub surface temperature sensor in the inside lane on the approach for proposed structure.

- Furnish and install all conduits, electric cables, junction boxes, and all other items required to install the sensors and integrate them into the existing RWIS control cabinet and restore functionality to the RWIS site.

- Coordinate all work with Vaisala to determine sensor locations for optimum performance.

- Integrate all items into the existing RWIS site, commission, perform system testing.

- Modify existing RWIS as required to provide ITS device control functionality. The existing RWIS shall be modified to include software and logic to control a roadside ITS device with a maximum of up to three conditional parameters configurable for device control. The RWIS site shall contain the specific sensor required to detect the desired weather or roadway condition. Upon the RPU detecting a defined weather condition or roadway grip condition, the system will be able to provide a dry contact relay closure to any roadside device such as LED sign, beacon, for on and off control functionality.

Sensor installation shall consist of furnishing the sensor and installing the sensor in the bridge deck or sub surface.

The Contractor shall provide all labor, equipment, and materials required to install the sensors and connect them to the existing RWIS control cabinet.

The Contractor shall submit catalog cut sheets to the Department for review and approval prior to ordering any materials.

All conduit, including brackets, hardware, and other items attached to structure shall be stainless steel. All work shall conform to NEC requirements.

Basis of Payment: This work will be paid for at the contract unit price per Lump Sum for REPLACEMENT OF SENSORS FOR ROADWAY WEATHER INFORMATION SYSTEM, which shall include all labor, equipment, and material required to complete the work described above complete.

REMOVE AND REPLACE ITS EQUIPMENT

This work consists of removing an existing post mounted dynamic message sign and furnishing a new dynamic message sign and installing it on the existing steel sign supports at the locations shown on the plan sheets.

The Contractor shall remove the existing dynamic message sign (installed on three structural steel beams), sign controller cabinet, electrical and communications junction boxes, and all other items not required for the proposed sign installation.

The Contractor shall deliver the existing communications equipment to the Department. The Contractor shall dispose of all remaining items off the right-of-way and reflect the salvage value of these items in the bid price for this pay item.

The Contractor shall furnish and install a new dynamic message sign, sign controller cabinet, all new structural steel hardware, stainless steel conduits, non-metallic conduits, brackets, and all other items required for sign installation.

The proposed dynamic message sign shall be a Daktronics Vanguard VF-2420-36x110-46-A with amber display and equipped with two amber flashing LED beacons, Vanguard 336S Equipment Cabinet, and Vanguard VFC-3000 controller or approved equal that meets or exceeds the following minimum requirements.

DMS Features and Benefits:

- Maximizes legibility with an aluminum and polycarbonate masked face
- Provides a safe working environment with lock-open side-swinging doors
- Simplifies maintenance with lightweight, easily-accessed components
- Provides diagnostics including real-time pixel and power supply statuses
- Stays cool and dry with a positive-pressure, forced-air ventilation system
- Meets industry standards: NTCI P v2, NEMA TS 4, AASHTO, UL and NEC
- Suits any site with a controller mounted in the DMS or in a road-side cabinet

DMS Specifications:

Display Technology:	High-intensity LED
Cabinet Access:	Front access
Cabinet Enclosure:	NEMA 3R
Face Panel:	Aluminum mask over polycarbonate face panel
Weight:	1220 lbs. (554 kg)
Dimensions:	6'7" x 17'5" x 1'4" (2.01 m x 5.30 m x 0.38 m)
Operating Temp. Range:	-30˚ F to +165˚ F (-34˚C to +74˚C)
Humidity Range:	0 to 99%, non-condensing
Ventilation:	Pressurized, forced-air ventilation system
Controller Location:	Sign cabinet or equipment cabinet
Display Type:	Full-matrix (variable text and graphics)
Active Area:	5'3" x 16'1" (1.60 m x 4.89 m)
Top/Bottom Border Width:	8" (203 mm)
Left/Right Border Width:	8" (203 mm)
Pixel Matrix:	36 rows x 110 columns
Pixel Pitch:	46mm (1.75")
Viewing Distance:	600' (183 m) using 12" characters
Sign Intensity:	Amber 9,200 candelas/m2 minimum
LED Color:	Amber (590nm ± 5nm)
Power Requirements:	120/240 VAC, single-phase power (3-wires plus ground)
Redundant Power Supplies:	Yes, provide uninterrupted operation
Communications Protocol:	NTCIP 1203
Communications Options:	Cellular, fiber optic, direct Ethernet and radio Ethernet
Structural Design Standard:	AASHTO
NEMA Standards:	NEMA TS 4 Section 2 Environmental Requirements
Viewing Angle (HxV):	30° x 30°
Amber Amps Per Leg:	15
Amber Typical Power:	664 W
Character Height:	18”: 2 Lines, 12 Characters; 12”: 3 Lines, 18 Characters
LED Beacons:	Two, 12” Diameter, Yellow LED

DMS Controller Cabinet Specifications:

Cabinet Construction:	Aluminum 5052-H34 with continuously welded external seams
Access:	Three-point latch with stainless steel handle, two sides
Weight:	275 lbs. (125 kg) empty
Cabinet Dimensions:	3'10" H x 2'0" W x 2'6" D (1.17m x 0.61m x 0.76m)
Cabinet Lock:	Corbin #2
Door Opening Dimensions:	2'10" H x 1'10" W (0.86m x 0.56m)
Access Doors:	Sealed with 0.5" x 2" closed-cell neoprene gasket
Ventilation:	Positive-pressure, forced-air ventilation
Controller:	Vanguard® VFC-3000
Environmental Rating:	NEMA 3R
Lighting:	LED light in top of cabinet
Power Requirements:	120/240 VAC, single-phase power (3-wire plus ground)
Equipment Rack:	EIA 19" rack
Standard Equipment:	Support shelf, Slide-out drawer, RU 12-position outlet strip, 12-position panel board

The Department will utilize its existing NTCIP compliant ATMS software and its existing Daktronics Vanguard Professional software to communicate with and manage the proposed dynamic message sign.

General Specifications.

The DMS housing shall provide front service access for all LED display modules, electronics, environmental control equipment, air filters, wiring, and other internal DMS components.

The DMS shall contain a full display matrix measuring a minimum of 36 rows high by 110 pixel columns wide. The matrix shall display messages that are continuous, uniform, and unbroken in appearance to motorists and travelers.

Each display pixel shall be composed of multiple monochrome amber LEDs. Other pixel technologies, such as fiber optic, flip disk, combination flip disk-fiber optic, combination flip disk-LED, liquid crystal, LED Lenses, and incandescent lamp, will not be accepted.

The pixel matrix shall be capable of displaying alphanumeric 12” (310mm) high characters in accordance with the definition defined by NEMA TS 4 Hardware Standards for Dynamic Message Signs Standards.

The DMS shall be able to display messages composed of any combination of alphanumeric text, punctuation symbols, and graphic images across multiple frames.

Legibility

- DMS messages shall be legible within a distance range of 100 ft. (30.5 m) to 600 ft. (183 m) from the DMS display face under the following conditions:
- When the DMS is mounted so its bottom side is positioned between five feet (1,524 mm) and 20 feet (6,096 mm) above a level roadway surface.
- Whenever the DMS is displaying alphanumeric text that is 12-inches (310 mm) high.
- 24 hours per day and in most normally encountered weather condition.
- During dawn and dusk hours when sunlight is shining directly on the display face or when the sun is directly behind (silhouetting) the DMS.
- When viewed by motorists and travelers that have 20-20 corrected vision • When the motorist eye level is 3 feet (914 mm) to 12 feet (3,658 mm) above the roadway surface.

Dimensions

DMS housing dimensions shall not exceed 6' 7"/2.01 ft/m high by 17' 5"/5.3 ft/m wide. The front-to-back housing depth shall not exceed 1' 2"/0.36 ft/m at its widest point, including the rear ventilation hoods.

DMS weight shall not exceed 1220/553 pounds/kg

Power Requirements

Maximum AC power shall not exceed 15 Amps per leg, when the following circuits are operational and fully loaded:

- LED display pixel matrix, with 100% of the pixels operating at their maximum possible drive current
- DMS environmental control system
- Utility outlet circuit
- DMS sign controller

Typical DMS AC operating power shall not exceed 664 watts with the following circuit loadings:

- LED display pixel matrix, with 15% of the pixels operating at their maximum possible drive current
- DMS sign controller

DMS shall operate from a 120/240 VAC, 60Hz, single-phase power source, including neutral and earth ground (3 wire plus ground).

Sign Construction

The DMS housing shall be constructed to have a neat, professional appearance. The housing shall protect internal components from rain, ice, dust, and corrosion in accordance with NEMA enclosure Type 3R standards, as described in NEMA Standards Publication 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

The DMS housing bottom side shall contain small weep holes for draining any water that may accumulate due to condensation. Weep holes and ventilation/exhaust hoods shall be screened to prevent the entrance of insects and small animals.

DMS and sign controller components shall operate in a minimum temperature range of –30ºF to +165ºF (-34ºC to +74ºC) and a relative humidity range of 0 to 99%, non-condensing. DMS and sign controller components shall not be damaged by storage at or temporary operational exposure to a temperature range of –40ºF to +185ºF (-40ºC to +85ºC).

DMS Construction and Operation 17 External DMS component hardware (nuts, bolts, screws, standoffs, rivets, fasteners, etc.) shall be fabricated from hot dipped or mechanically galvanized steel, stainless steel, aluminum, nylon, or other durable corrosion-resistant materials suitable for the roadway signage application.

DMS and sign controller components shall be 100% solid-state, except for the environmental control fans and thermostats. All high voltage electrical components (exceeding 24 VDC) used in the DMS and the sign controller shall be UL (Underwriter’s Laboratory) listed and meet all local NEC codes applicable to DMS applications.

The presence of ambient radio signals and magnetic or electromagnetic interference, including those from power lines, transformers, and motors, shall not impair the performance of the DMS system. The DMS system shall not radiate electromagnetic signals that adversely affect any other electronic device, including those located in vehicles passing underneath or otherwise near the DMS and its sign controller.

DMS Sign Housing

The major structural frame members in the DMS housing shall consist of aluminum extrusions made from 6061-T6 aluminum alloy. Minor structural frame members shall consist of 0.125 inch (3.17 mm) thick formed sheet stock made from 5052-H32 aluminum alloy. The rear of the DMS housing exterior shall be covered with 0.125-inch (3.17 mm) 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 housing right, left, front, and rear walls shall be vertical. The top and bottom sides shall be horizontal.

DMS structural assembly hardware (nuts, bolts, washers, and direct tension indicators) shall be galvanized A325 high-strength steel and shall be appropriately sized for the application.

Chemical Bonding

An alternate method of attaching the aluminum sheet to the cabinet extrusion shall be the use of a two-part chemically bonding structural adhesive. The adhesive shall be applied in a continuous bead on all cabinet extrusion surfaces that contact the aluminum sheet. The adhesive shall provide the necessary structural bond between the aluminum sheet and the cabinet extrusion as required by the contract specifications and other pertinent standards and codes. The adhesive shall ensure a watertight seal is obtained around the entire perimeter of the cabinet and where any aluminum sheets are spliced.

To ensure that appropriate procedures are followed to bond the aluminum sheet and cabinet extrusion, the structural adhesive manufacturer shall certify the DMS manufacturer. The DMS manufacturer is responsible for performing all necessary testing of the adhesive to meet all requirements of the contract specifications.

Mounting Brackets

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:

- Extruded from aluminum alloy number 6061-T6
- Attached to the DMS structural frame members, not just the exterior sheet metal
- Installed at the DMS manufacturer's factory
- Attached to the DMS using mechanically galvanized A325 high-strength steel bolts
- Attached to the DMS using direct tension indicators to verify that mounting hardware is tightened with the proper amount of force
- Installed such that all bracket-to-DMS attachment points are sealed and water-tight
- 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

Lifting Hardware

For moving and installation purposes, multiple galvanized steel 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. Lifting hardware, as well as the housing frame, shall be designed such that the DMS can be shipped and handled without damage or excessive stress being applied to the housing prior to or during DMS installation on its support structure.

The lifting eyebolts shall be easily removed by one individual without opening or entering the display and without any risk of compromising water-tightness. Special tools shall not be required. Removal of the eyebolts shall not create holes and no replacement bolts or other hardware shall be necessary to seal the cabinet.

Front Face Construction

The DMS front face shall be constructed with multiple vertically hinged rigid door panels, each of which contains a full-height section of the LED display matrix. The door panels shall be fabricated using aluminum sheeting on the exterior and polycarbonate sheeting on the interior of the panel.

The DMS housing shall provide safe and convenient access to all modular assemblies, components, wiring, and subsystems located within the DMS housing. All of those internal components shall be removable and replaceable by a single technician.

Doors

One (1) access door shall be provided for each 25-pixel wide section of the sign housing. These doors shall be vertically hinged and shall contain a section of the sign's front face. The doors shall swing out from the face to provide access to the cabinet interior. Each door shall extend the full height of the display matrix.

To prevent open doors from blowing in wind, they shall each have a retaining latch mechanism to hold the door open at a 90-degree angle.

Each door shall form the face panel for a section of the sign. The LED modules shall be mounted to the door and be removable from the door when in the open position. Other sign components, such as power supplies, wiring, etc. shall be located inside the sign cabinet and be accessible through the door opening. Each door shall cover an opening that is a minimum of 23-inches (584 mm) wide and the same height as the display pixel matrix.

Each door shall contain a minimum of two (2) captive-type latches to lock them in the closed position. These latches shall be captive to prevent them from falling off. They shall pull the door tight and compress a gasket located around the perimeter of each door. They shall also be capable of providing leverage to easily release the gasket seal when opening the doors. The gasket shall prevent water from entering the cabinet around the doors.

Face Panels

Front face panels shall provide a high-contrast background for the DMS display matrix. The aluminum mask of each door 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.

Each door 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. The use of a plastic lens system will not meet the requirements and will be cause for rejection.

Polycarbonate sheets shall have the following characteristics:

- Tensile Strength, Ultimate: 10,000 PSI
- Tensile Strength, Yield: 9,300 PSI
- Tensile Strain at Break: 125%
- Tensile Modulus: 330,000 PSI
- Flexural Modulus: 330,000 PSI
- Impact Strength, Izod (1/8", notched): 17 ft-lbs/inch of notch
- Rockwell Hardness: M75, R118
- Heat Deflection Temperature Under Load: 264 PSI at 270F and 66 PSI at 288F
- Coefficient of Thermal Expansion: 3.9X10-5 in/in/F
- Specific Heat: 0.30 BTU/lb/F
- Initial Light Transmittance: 85% minimum
- Change in Light Transmittance, 3 years exposure in a Southern latitude: 3%
- Change in Yellowness Index, 3 years exposure in a Southern latitude: less than 5%

LED display modules shall mount to the inside of the DMS front face door 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. The surrounding borders shall be a minimum of 2/3 of the character height on the display according to NEMA TS4's standard font set (7) pixels high by (5) pixels wide font).

In the presence of wind, the DMS front face shall not distort in a manner that adversely affects LED message legibility.

Exterior Finish

DMS front face panels and front face border pieces shall be coated with semi-gloss black polyvinylidene fluoride (PDVF) 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 DMS mounting brackets, shall be natural mill finish aluminum.

LED Display Modules

The DMS shall contain LED display modules that include an LED pixel array, and LED driver circuitry. 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:

- Each LED display module shall consist of one circuit board.

- All LED modules shall be manufactured and designed to IPC standards.

- 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. The use of light enhancing lenses to achieve defined viewing cone shall be cause for rejection.

- LED display module power and signal connections shall be a quick-disconnect locking connector type. Removal of a display module from the DMS shall not require a soldering operation.

- 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.

- Individual addressing of each LED display module shall be configured via the communication wiring harness and connector. No on-board addressing jumpers or switches shall be allowed.

- 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.

- It shall not be possible to mount an LED display module upside-down or in an otherwise incorrect position within the DMS display matrix.

- All LED display modules shall be identical and interchangeable throughout the DMS.

LED Pixels

- 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:

- Each LED module shall contain a minimum of 45 LED pixels configured in a two dimensional array. The pixel array shall be a minimum of nine (9) pixels high by five (5) pixels wide.

- The distance from the center of one pixel to the center of all adjacent pixels, both horizontally and vertically, shall be 1.75"-inches (44 mm).

- All pixels shall contain an equal quantity of discrete LEDs and LED strings. If a pixel contains four (4) or more discrete LEDs, then each pixel shall contain a minimum of two (2) independent and parallel strings of LEDs.

- The failure of an LED string or pixel shall not cause the failure of any other LED string or pixel in the DMS.

- Each pixel shall contain the quantity of discrete amber LEDs needed to output a minimum luminous intensity of 9,200 candelas per square meter when measured using a photometric meter through the front face panel assembly. Failure to conform to the requirements will be cause for rejection.

- The circular base of the discrete LEDs shall be soldered so that they are flush and parallel to the surface of the printed circuit board. The longitudinal axis of the LEDs shall be perpendicular to the circuit board.

Discrete LEDs

DMS pixels shall be constructed with discrete LEDs manufactured by a reputable manufacturer such as Avago Technologies (formerly Agilent Technologies), Nichia Corporation, OSRAM, CREE or EOI. Discrete LEDs shall conform to the following specifications:

- 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. Using optical enhancing lenses with 15 degree LED's will not conform to 30 degree half-power viewing cone specifications and will be cause for rejection.

- Amber LEDs shall utilize AlInGaP semiconductor technology and shall emit amber light that has a peak wavelength of 590 ± 5 nm.
- The LED packages shall be fabricated from UV light resistant epoxy
- 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. 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.

- LED package style shall be through-hole flush-mount. Through-hole LEDs with standoffs or surface-mount LEDs will not be accepted.

- 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.

- 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.

Pixel Drive Circuitry

Each LED display module shall contain electronic driver circuitry that shall individually control all pixels on that module. The driver circuitry shall conform to the following specifications:

- Each LED driver circuitry shall be microprocessor-controlled and shall communicate with the sign controller on a wire or fiber optic communication network using an addressable network protocol. The microprocessor shall process commands from the sign controller to display data, perform diagnostic tests, and report pixel and diagnostic status.

- Constant current LED driver ICs shall be used to prevent LED forward current from exceeding the LED manufacturer's recommended forward current whenever a forward voltage is applied. To maximize LED service life, LED drive currents will not be allowed that exceed the manufacturer's recommendations for the 100,000- hour lifetime requirement.

- The LED pixels shall be directly driven using pulse width modulation (PWM) of the drive current to control the display intensity. This LED driver circuitry shall vary the current pulse width to achieve the proper display intensity levels for all ambient light conditions. The drive current pulse shall be modulated at a frequency high enough to provide flicker-free operation and a minimum of 200 brightness levels.

- Each LED driver circuit shall be powered by 24 VDC from external regulated DC power supplies.

- The voltage of each power input shall be measured to the nearest tenth of a volt and reported to the sign controller upon request. Each driver circuit shall also contain a status LED for the power supplies that indicates if the power source is present or not.

- The LED driver circuitry shall be able to detect that individual LED strings or pixels are stuck off and shall report the pixel status to the sign controller upon request.

- The LED driver circuit 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.

Regulated DC Power Supplies

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.

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 +140ºF (60ºC) or less.

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.

The power supplies shall be sufficient to maintain the appropriate LED display intensity throughout the entire operating input voltage range.

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 via a CAN (controller area network) communication network to the sign controller upon request.

The power supplies used to power the LED pixel modules must be identical and interchangeable throughout the DMS.

The power supplies used to power the LED pixel modules shall have an application of acrylic conformal coating, to protect from the environmental elements, and must be UL listed.

The regulated DC power supplies shall conform to the following specifications:

- Nominal output voltage of 24 VDC +/- 10%

- Nominal maximum output power rating of 1,000 watts

- Operating input voltage range shall be a minimum of 90 to 264 VAC

- Operating temperature range shall be a minimum of –30ºF to +165ºF (-34ºC to +74ºC)

- Maximum output power rating shall be maintained over a minimum temperature range of –30ºF to +140ºF (-34ºC to +60ºC)

- Power supply efficiency shall be a minimum of 80%

- Power factor rating shall be a minimum of 0.95

- Power supply input circuit shall be fused

- 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

- Power supplies shall be UL listed

- Printed circuit boards shall be protected by an acrylic conformal coating

Control Systems

The DMS shall include a DMS controller that is installed inside the proposed controller cabinet as specified in the Requirements for DMS Controllers section herein.

Environmental Monitoring Systems

The DMS shall include sensors that monitor and report ambient (external) light level and temperature, as well as the internal temperature and humidity.

- Ambient Light Measurement: Sensors that measure the outdoor ambient light level and the outdoor ambient temperature at the DMS site shall be mounted in-line with the DMS housing walls. This ambient light and temperature measurement system shall consist of three (3) electronic light sensors. Two of the light sensors shall be placed such that they measure the ambient light levels striking the front and rear of the DMS. The third light sensor shall be mounted to the floor of the DMS housing and shall face the ground. The DMS sign controller shall continuously monitor the light sensors and adjust the LED display matrix intensity to a level that creates a legible message on the DMS face.

- Ambient Temperature Measurement: A minimum of one (1) ambient temperature sensor shall be mounted to the bottom of the DMS housing. The sensor shall be placed such that it is never in direct contact with sunlight. The external temperature sensor reading shall be continuously monitored by the DMS sign controller and shall be reported to the DMS control software upon request.

- Internal Temperature Measurement: The DMS shall contain a minimum of one (1) temperature sensor. The sensor(s) shall measure the temperature of the air in the cabinet over a minimum range of -40°F to +176ºF (-40°C to +80°C). The internal temperature sensor output shall be continuously monitored by the DMS sign controller and shall be reported to the DMS control software upon request.

- Internal Humidity Measurement: The DMS shall contain one (1) sensor that measures the relative humidity of the air inside the DMS cabinet. The sensor shall monitor the humidity from 0 to 100%. The humidity sensor output shall be continuously monitored by the DMS sign controller and shall be reported to the DMS control software upon request.

Interior DMS Environmental Control

The DMS shall contain systems for cabinet ventilation and safe over-temperature shutdown.

- Housing Ventilation System: The DMS shall contain an electronically controlled ventilation system and a failsafe thermostat designed to keep the internal DMS air temperature lower than +140°F (+60°C), when the outdoor ambient temperature is +115°F (+46°C) or less. The ventilation system shall consist of two or more air intake ports. Intake ports shall be located near the bottom of the DMS rear wall. Each intake port shall be covered with a filter that removes airborne particles measuring 500 microns in diameter and larger. One or more ball bearing-type fans shall be mounted at each intake port. These fans shall positively pressure the DMS cabinet. Fans and air filters shall be removable and replaceable from inside the DMS housing. Each ventilation fan shall contain a sensor to monitor its rotational speed, measured in revolutions per minute. The fan speed shall be reported via a CAN (controller area network) communication network to the sign controller upon request. The ventilation system shall move air across the rear of the LED modules in a manner such that heat is dissipated from the LED's. The airflow shall move from the bottom of the cabinet towards the top to work with natural convection to move heat away from the modules. Each exhaust port shall be located near the top of the rear DMS wall. One exhaust port shall be provided for each air intake port. All exhaust port openings shall be screened to prevent the entrance of insects and small animal. An aluminum hood attached to the rear wall of the DMS shall cover each air intake and exhaust port. All intakes and exhaust hoods shall be thoroughly sealed to prevent water from entering the DMS.

- Over Temperature Safety Shutdown: A temperature sensor shall be installed on each LED display module and shall report the temperature of each individual display module to the sign controller. The sign controller shall automatically shut down the LED modules to prevent damaging the LEDs if the measured onboard temperature exceeds a maximum threshold temperature. The threshold temperature shall be configurable and shall have a default factory setting of 190°F (+88°C). The factory default setting shall be overridden if the selected message priority is set above 200 or is selected as an emergency message.

Sign Controller Signal Interface

In situations where the sign controller is located in a ground-mounted or pole-mounted traffic cabinet, the communication signals from the external sign controller to the DMS shall use fiber optic cable with the following specifications:

- 62.5/125 µm diameter
- ST-style connectors
- Rated for indoor/outdoor use
- UL-rated
- PVC outer jacket
- Tight buffer inner jacket
- Operating temperature range: –40ºF to +185ºF (-40ºC to +85ºC)

A minimum of six (6) fibers shall be provided with one (1) for controller to sign commands, one (1) for sign to controller responses, and four (4) spares.

For systems with controllers mounted inside the DMS cabinet, the controller to sign interface shall use shielded Category 5 copper cable.

Wiring and Power Distribution: Power and Signal Entrances: Two threaded conduit hubs shall be located on the rear or side wall of the DMS housing. One hub shall be for incoming AC power and the other shall be for incoming DMS signal cabling or a communications line.

Panel Board: The DMS shall contain a power panel board and circuit breakers that meet the following minimum requirements:

- Service entrance-rated
- Minimum of 8 circuit breaker mounting positions
- Short circuit ratings of 10,000 amps and 10,000 amps for the main and branch circuits, respectively
- UL listed panel board and circuit breakers

Internal Wiring: Wiring for LED display module control, environmental control circuits, and other internal DMS components shall be installed in the DMS housing in a neat and professional manner. Wiring shall not impede the removal of display modules, power supplies, environmental control equipment, and other sign components. Wires shall not make contact with or bend around sharp metal edges. All wiring shall conform to the National Electrical Code.

Earth Grounding: The DMS manufacturer shall provide one earth ground lug that is electrically bonded to the DMS housing. The lug shall be installed near the power entrance location on the DMS housing's rear wall. The DMS installation contractor shall provide the balance of materials and services needed to properly earth ground the DMS. All earth grounding shall conform to the National Electrical Code.

Convenience Outlets: The DMS housing shall contain a utility outlet circuit consisting of a minimum of one (1) 15- A NEMA 15-R, 120 VAC duplex outlet, with ground-fault circuit interrupters. This outlet shall be located near the panel board.

Transient Protection: The DMS and sign controller signal and power inputs shall be protected from electrical spikes and transients as follows:

Sign AC Power: The AC power feed for all equipment in the sign cabinet shall be protected at the panel board by a parallel-connection surge suppresser rated for a minimum surge of 50 kA. This device shall conform to the following requirements:

- Withstand a peak 100,000-ampere surge current, 50kA L-N, 50kA L-G
- Designed, manufactured, & tested consistent with: ANSI/IEEE C62.41.1-2002, C62.42.2-2002C62.45-2002, NEMA LS-1, NEC 285, and IEC 61643, CE
- Less than 1 nanosecond response time
- Temperature range of -15ºF to +140°F (-25ºC to +60ºC)
- Approximate dimensions of 3-inches (76 mm) wide by 8-inches (203 mm) long by 3- inches (76 mm) high
- High Energy Parallel Deign for Category C3 & C-High Application
- UL listed to: UL 1449 Third Edition 200kA & 100kA SCCR

Requirements for DMS Controllers: This section describes the minimum specifications for the dynamic message sign (DMS) controllers to be provided with this contract. Each DMS shall include a sign controller and associated equipment. The contractor shall provide all the materials, software, and services necessary to install DMS controllers and associated equipment that fully comply with the functional requirements specified herein, including incidental items that may have been inadvertently omitted.

General Requirements: Each DMS shall be controlled and monitored by its own sign controller. The sign controller shall be a stand-alone microprocessor-based system, which does not require continuous communication with DMS control software in order to perform most DMS control functions.

The sign controller shall be a stand-alone, fully-contained unit that has been specifically manufactured for use with the dynamic message sign. The sign controller shall be installed inside the controller cabinet for easy access by maintenance personnel on the ground.

Sign controllers that utilize a 2070 controller platform and consist of various media convertors, electronic boards, power supplies, etc. shall not be allowed.

The sign controller shall meet the following operational requirements:

- Communicate using embedded NTCIP protocol.
- Contain memory for storing changeable and permanent messages, schedules, and other necessary files for controller operation.
- Include a front panel user interface with graphical LCD and keypad for direct operation and diagnostics as described herein.
- Contain a minimum of three (3) NTCIP-compliant RS232 communication ports.
- Contain a minimum of one (1) NTCIP-compliant Ethernet port with RJ45 connector.
- Contain a minimum of one (1) NTCIP-compliant RS422 communication port with RJ45 connector.
- Have the ability to play volatile messages.
- Contain DMS-specific control firmware (embedded software) that shall monitor all external and internal sensors and communication inputs and control the display modules as directed by external control software and the front panel interface NTCIP shall be natively supported in the DMS controller. External protocol converter or translator devices shall not be allowed.

Controller Location: The sign controller and associated communication equipment shall be installed in one of the following locations inside a pole-mounted control equipment cabinet attached to the DMS support structure.

Environmental: The sign controller shall meet the following environmental requirements defined in NEMA Standards Publication TS 4, Hardware Standards for Dynamic Message Signs (DMS), with NTCIP Requirements.

Mechanical and Electrical : The sign controller shall meet the following electrical and mechanical requirements:

- Mount in a standard EIA 19-inch (480 mm) equipment rack with a maximum 4U space requirement
- Weigh no more than 10 pounds, including its enclosure
- Consume no more than 30 watts of power
- Powered by an internal regulated DC power supply capable of operating on 120VAC or 240VAC at both 50Hz and 60Hz
- All printed circuit boards shall be sealed with a protective layer of conformal coating

Operational RequirementsL:

Front Panel User Interface: The sign controller's front panel shall include a menu driven architecture, 16 button keypad, and a 64x240 graphical LCD screen. These devices shall be used to perform the following functions with the sign controller and DMS:

Monitor the current status of the sign controller, including the status of all sensors and a monochromatic what-you-see-is-what-you-get (WYSIWYG) representation of the message visible on the display face including the use of graphical messages.

- Perform all diagnostics testing of various system components, including pixels, power systems, sensors, and more
- Activate, create, preview, and delete messages stored in memory
- Blank the sign
- Start and stop the schedule
- Configure display parameters, including display size and color technology
- Configure date and time
- Configure communications port settings and NTCIP options
- Configurable level of password protection per user
- Select automatic or manual brightness mode of operation

The front panel interface shall also include:

- Power switch to turn the controller on and off
- LED power "on" indicator
- "Local/remote" switch that places the controller in local mode such that it can be controlled from the front panel interface, instead of via the primary NTCIP communication channel
- LED to indicate state of the "local/remote" mode switch
- Reset switch to quickly restart the controller
- LED "Active" indicator that blinks when the controller is operating correctly
- LED to indicate when any of the NTCIP communication channels are active

Memory: The sign controller shall have non-volatile electronically changeable memory. This memory shall be formed by flash or battery-backed static RAM integrated circuits that retain the data in memory for a minimum of 30 days following a power loss. This changeable memory shall be used to store messages and schedules. The controller memory shall be capable of storing a minimum of 500 changeable messages.

Internal Clock: The DMS sign controller shall contain a computer-readable clock that has a battery backup circuit. The battery shall keep the clock operating properly for at least three (3) years without external power, and the clock shall automatically adjust for daylight savings time and leap year using hardware, software, or a combination of both. The clock shall be set electronically by the sign controller microprocessor and shall be accurate to within one (1) minute per month.

Communications: All remote communication ports shall be NTCIP-compatible as defined in the "Requirements for NTCIP Compatibility" section of these specifications.

Communication Modes: The DMS sign controller shall be able to receive instructions from and provide information to a computer containing DMS control software using the following communication modes:

- Remotely via direct or dial-up communications with a remotely located computer. The system communications backbone, as well as all field modems or signal converters, shall provide the DMS sign controller with an RS232 signal.

- Locally via direct connection with a laptop computer that is connected directly to the sign controller using an RS232 null modem connection.

Serial Communication Ports: The DMS sign controller shall contain a minimum of three (3) NTCIP-compatible RS232 communication ports. These ports shall support multiple communication interfaces, including, but not limited to, direct null-modem (for local laptop control), dial-up and leased-line modems, radio systems, cellular modems, and fiber optic modems. The RS232 ports shall all have standard DB9M connectors.

The baud rate, connection type, and NTCIP communication protocol shall be configurable. Each port must support all typical serial baud rates ranging from 1200 to 115,200 baud. All three ports shall be capable of supporting either of the following sub network profiles: NTCIP 2101 (PMPP) or NTCIP 2103 (PPP). They shall also be capable of supporting either NTCIP 2201 (Null) or NTCIP 2202 (Internet) transport profiles. Only one each of the transport and sub network profiles shall be active at any time on each port.

Communications on the Ethernet port shall be NTCIP-compatible using the NTCIP 2202 Internet transport profile and the NTCIP 2104 Ethernet sub network profile. This shall permit the controller to be operated on any typical Ethernet network using the TCP/IP and UDP/IP protocols.

Controller Addressing: The DMS sign controller shall use whatever addressing scheme is appropriate for the NTCIP network types used for communications. The controller addressing shall be configurable through the front panel user interface.

NTCIP 2101 (PMPP) networks shall be configured with an address in the range 1 to 255 with a default address of 1. NTCIP 2104 (Ethernet) networks shall use a static IP address. Both the IP address and subnet shall be configurable. NTCIP 2103 (PPP) networks shall not require network addressing.

Transient Protection: The RS422 and Ethernet communication ports in the DMS sign controller shall be protected with surge protection between each signal line and ground. This surge protection shall be integrated internally within the controller.

A series/parallel two-stage suppression device shall protect the modem communication port from over-voltage and over-current conditions. This surge protection shall be integrated internally within the controller.

DMS Control Outputs: The DMS sign controller shall transmit and receive data packets to and from the DMS via dedicated fiber optic cables. Copper cables may be used if the controller is located within the sign housing. This network will communicate with all sensors, drivers, and other devices utilizing a CAN (controller area network) bus network running throughout the DMS. Data transferred shall include pixel states, sensor values, and I/O readings from various devices, such as door sensors and power supply monitors. Pixel data shall include the states to be displayed on the sign face as well as diagnostic data retrieved from the LED drivers.

Messaging: The DMS controller shall have the ability to display messages on the DMS display face as required herein.

Message Presentation on the DMS Display Matrix: The sign controller shall control the LED drivers in a manner that causes the desired message to display on the DMS sign. At a minimum, the sign controller shall support the following features as described in the DMS specification:

- Display of alpha numeric characters, including letters, numbers, and punctuation
- Selection of particular character fonts style
- Horizontal alignment of text on the display, including left, center, and right justification
- Vertical alignment of text on the display, including top, middle, and bottom justification
- Adjusting the spacing horizontally between characters or vertically between lines of text
- Alternating between pages of a multiple-page message
- Display of graphic bitmaps of various sizes ranging to very small to the size of the entire DMS matrix

Message Effects: The DMS shall be able to display messages using the following types of effects:

- Static Message – The selected message is displayed continuously on the sign face until the sign controller blanks the sign or causes the display of another message.

- Flashing Message – All or part of a message is displayed and blanked alternately at rates between 0.1 seconds and 9.9 seconds. The flash rate is user programmable in increments of 0.1 seconds.

- Scrolling Message – The message moves across the display face from one side to the other. The direction of travel is user selectable as either left-to-right or right-to-left.

- Multiple-Page Message – A message contains up to six different pages of information, with each page filling the entire pixel matrix. Each page's display time is user programmable from 0.1 seconds to 25.5 seconds, and adjustable in increments of 0.1 seconds.

Message Activation: Messages shall be activated on a DMS in three ways:

- Manual – An operator using the front panel LCD/keypad interface or NTCIP compatible control software manually instructs a particular message to be activated.

- Schedule – The internal time-based scheduler in the DMS may be configured to activate messages at programmable times and dates. Prior to activation, these messages and their activation times and dates shall be configured using the control software.

- Events – Certain events, like a power loss, may trigger the activation of preconfigured messages when they occur. These events must be configured using the control software.

A displayed message shall remain on the sign until one of the following occurs:

- The message's duration timeout expires • The controller receives a command to change the message.

- The controller receives a command to blank the sign • The schedule stored in the controller's memory indicates that it is time to activate a different message.

- A special event, such as a loss of communication, occurs that is linked to message activation It shall be possible to confer a "priority" status onto any message, and a command to display a priority message shall cause any non-priority message to be overridden.

Schedule Activation: The DMS sign controller shall support the activation of messages based on a time/date-based schedule. The format and operation of the message scheduler shall be per the NTCIP 1201 and NTCIP 1203 standards.

Display of Alphanumeric Text: The DMS sign controller shall support the storage and use of a minimum of twelve (12) font sets with which messages can be formatted and displayed. Each font shall support up to 255 characters. All text font files shall include the following characters:

- The letters "A" through "Z", in both upper and lower case
- Decimal digits "0" through "9" • A blank space
- Eight (8) directional arrows
- Punctuation marks, such as: . , ! ? – ' ' " " : ; • Special characters, such as: # & * + / ( ) [ ] < > @

Display of Graphic Images: The DMS control software shall support the inclusion of graphics in messages. If the NTCIP 1203 v2 standard has not reached a "recommended" or "approved" state by the time of contract award, the vendor shall support graphics using manufacturer-specific objects and MULTI tags.

If a manufacturer-specific means of supporting graphics is used, the vendor shall commit to provide NTCIP 1203 v2 firmware updates at no cost to the customer. These updates will include all current requirements of these specifications and also standard graphics support. The vendor shall install the updates no later than six months after the NTCIP 1203 v2 standard reaches the "approved" state.

DMS Intensity Control: The DMS controller shall provide means to change the brightness of the display matrix manually or automatically. The manual control will allow the user to select one of at least 100 intensity levels, which will be communicated to the LED drivers in the DMS. The brightness shall remain at that level until the user changes the level or sets the controller to automatic mode.

The automatic intensity control mode will monitor the ambient light sensors of the DMS and will use a mathematical algorithm to automatically select one of the 100 or more intensity levels. The intensity level will then be transmitted to the LED drivers in the DMS. The algorithm used to calculate the intensity level shall be determined by the manufacturer and tested under real-world lighting conditions.

The intensity control mode, manual or automatic, shall be settable via NTCIP using the control software or via the front panel interface. The manual brightness level shall be settable via the software or front panel. The mode and brightness level shall be monitored from both the software or front panel interfaces.

System Status Monitoring and Diagnostic Testing: The DMS controller shall be capable of monitoring the status of many of the DMS components and subsystems in real-time and/or manual modes, depending on the component or system. The following sections detail the status and diagnostic information that shall be provided by the controller. All of this status and diagnostic data shall be available via the front panel LCD screen and shall be transmitted via NTCIP to control software upon request.

- Message Display Status: The DMS controller shall be capable of monitoring and displaying the currently active message (if any) including graphical messages on the controller's front panel LCD display. This display shall be in a WYSIWYG format.

- LED Pixel Testing: Upon command from either the front panel control interface or via NTCIP from remote control software, the sign controller shall direct all of the LED modules to perform diagnostic tests of all their pixels and shall not disrupt the message being displayed on the DMS to assure motorist safety. The controller shall then collect and report the results of the pixel testing. The controller shall also be capable of automatically detecting in real-time the status of each of the display's pixels and reporting their on/off status. This monitoring shall take place without interfering with the display of data on the DMS face.

- Power Supply Operation: The sign controller shall monitor and report the functional status of regulated DC power supplies located in the DMS by monitoring diagnostic outputs located on the supplies. The controller shall monitor the output voltage of each power supply and the status of each output fuse. The power supply voltages shall be measured to the nearest tenth of a volt and the fuse status shall be indicated as pass or fail.

- Door States: If the DMS or control equipment cabinet is equipped with access doors and sensors to monitor their open status, the controller shall monitor the status of those doors.

- Fan Operation: If the DMS is equipped with fan diagnostic systems, the controller shall monitor and report the status of the fans.

- Environmental Conditions: The DMS controller shall monitor the readings of all light, temperature, and humidity sensors installed in the DMS housing.

Error Notification: The DMS sign controller shall be capable of automatically informing a maintenance operator (via the local LCD panel) and a central control system (via NTCIP communication) of the occurrence of important events and subsystem failures.

All major component and subsystem errors shall be indicated on the controller's LCD front panel. The controller shall be capable of sending event notifications to the central control system via SNMP "traps" as allowed by NTCIP. When one of these events occurs, the sign controller shall create a data packet for transmission to the central controller that shall contain details about the event. The transmission of traps shall be governed by the NTCIP standards. The controller shall be configurable to enable or disable the transmission of traps for each event or error type. This configuration will include the automatic initiation of these traps, including establishing telephone modem connections if appropriate, when the NTCIP network permits transmission initiation by the sign controller.

The following sections list errors and events that the controller shall report as defined above.

Over Temperature Shutdown: A temperature sensor shall be installed on each LED display module and shall report the temperature of each individual display module to the sign controller. The sign controller shall automatically shut down the LED modules to prevent damaging the LEDs if the measured onboard temperature exceeds a maximum threshold temperature. The threshold temperature shall be configurable and shall have a default factory setting of 190°F (+88°C).

If the temperature approaches the threshold the controller shall reduce the brightness of the sign face. If the temperature continues to increase and exceeds that threshold, the controller shall trigger a warning notification event and blank the face of the sign. The sign face will remain blank until the temperature begins to drop. As the temperature drops, the controller will gradually increase the brightness of the display face, eventually returning to full brightness.

The sign controller shall employ an algorithm to control the above brightness reductions and increases utilizing hysteresis to ensure that the display face does not visibly flicker as the temperature changes.

The event notifications sent for over temperature situations will include visual indication on the controller's front panel LCD, as well as a trap notification sent to the central control system.

Controller Restart: When the DMS controller detects that it has been restarted due to a manual reset or error condition, it shall send a trap notification to the central system. It shall also automatically activate the NTCIP reset message if it is configured to do so.

Power Loss: When the DMS controller detects that it has lost power, it shall automatically indicate that on the front panel LCD. It shall also send a trap notification to the central system and activate the NTCIP power loss message if configured to do so.

Power System Failure: The DMS controller shall automatically monitor the major power systems in the sign and detect when one of them has failed. These failures will be reported on the front panel LCD and transmitted to the central system in the form of a trap.

Door Opened: When the sign controller detects that one of the sign cabinet or control cabinet doors has been opened, it will transmit a trap to the central system indicating which door has opened.

Communication Loss: The DMS controller shall monitor the frequency of communication packets from the central system. If the controller detects that communication has not occurred between the controller and central system for longer than a configurable timeout, then the controller will automatically activate a communication loss message as defined by NTCIP. This communication loss message shall be configurable and may be disabled as allowed by NTCIP.

Requirements for Control Equipment Cabinets: This section describes the requirements of the metal cabinet(s) used to house the sign controller and associated equipment separately from the sign cabinet.

Pole-Mounted Controller Cabinet: The pole-mounted control equipment cabinet shall be a 336S-type cabinet. It shall be provided with two (2) mounting brackets suitable for use with pole-mount straps. The cabinet shall enclose the sign controller, panel board, 120 VAC electrical outlets, and remote communication devices, such as a modem.

General Specifications: The pole-mounted controller cabinet shall be 46" (1,168 mm) ±1" (25.4 mm) high by 24" (610 mm) ±0.5" (12.7 mm) wide by 20.25" (514 mm) ±0.5" (12.7 mm) deep. The front to-back cabinet dimensions shall not exceed 26” (660 mm) at its widest point, including the door handles, louvers and roof overhang. The controller cabinet weight shall not exceed 200 pounds (45.5 kg) when the cabinet is empty.

Cabinet Construction: The controller cabinet shall be constructed to have a neat, professional appearance. The cabinet 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 250, Enclosures for Electrical Equipment (1000 Volts Maximum). Internal component hardware (nuts, bolts, screws, standoffs, rivets, fasteners, etc.) shall be fabricated from hot dipped galvanized steel, stainless steel, aluminum, nylon or other durable corrosion-resistant materials suitable for roadway signage applications. The DMS controller cabinet shall be constructed using 0.125-inch thick aluminum alloy 5052- H32. The exterior of the controller cabinet shall be natural mill-finish aluminum.

Serviceability: The controller cabinet shall provide safe and convenient access to all modular assemblies, components, wiring and other materials located within the cabinet. All internal components shall be removable and replaceable by a single technician. Two (2) vertically hinged doors shall be mounted on the cabinet for interior access. One door shall be located on the front face and one door shall be located on the rear face of the cabinet. Each of the door openings shall not be less than 36" (914 mm) high by 21" (533 mm) wide. Each opening shall be sealed with a 0.5" x 2" closed cell foam gasket. Each door shall be attached to the cabinet by a full-length stainless steel hinge and mounting hardware. Both doors shall open outward. In the closed position, each door shall latch to a double-flanged door opening with a three-point draw-roller mechanism. The door handle shall be stainless steel. Each door shall have a doorstop to hold the door in the open position. The doors shall each be equipped with a Corbin #2 lock. A LED lamp shall be located at the top of the controller cabinet to illuminate the cabinet interior. A switch mounted near the front and rear doors shall automatically turn on the light when the door is opened.

Equipment Rack: The cabinet shall contain a full-height standard EIA 19-inch rack. The rack shall be secured within the cabinet by mounts at the top and bottom. The rack shall contain a minimum of one (1) pullout drawer. The drawer shall be suitable for storing manuals and small tools, such as screwdrivers. The drawer shall be able to latch in the out position to function as a laptop/utility shelf.

Electrical Systems: The cabinet shall contain a power panel board and circuit breakers that meet the following minimum requirements:

- Service entrance-rated
- Minimum of 12 circuit breaker mounting positions
- Short circuit ratings of 22,000 amps and 10,000 amps for the main and branch circuits, respectively
- UL listed

The panel board shall be mounted in the equipment rack. The cabinet shall contain a utility outlet circuit consisting of a minimum of two (2) 15-A NEMA 15-R, 120 VAC duplex outlets, with a minimum of one (1) ground-fault circuit interrupters. The outlets shall be mounted inside the cabinet and located near the panel board. The cabinet shall include one (1) earth ground lug that is electrically bonded to the cabinet. The lug shall be installed near the power entrance. The installation contractor shall provide the balance of materials and services needed to properly connect to earth ground. All earth grounding shall conform to the National Electrical Code.

Environmental Systems: One (1) thermostatically controlled 100 cfm exhaust fan shall be mounted near the top of the control cabinet. Filtered air intake ports shall be located on the bottom third of each access door. The fan and air filters shall be removable and replaceable from inside the cabinet.

DMS Manufacturer Qualifications:

The dynamic message sign manufacturer for this contract shall:

- Have been in the business of manufacturing large outdoor permanently mounted LED DMS, which are used to manage vehicular roadway traffic, for minimum period of ten (10) years prior to the contract bid date. An "LED" DMS contains display pixels constructed solely of high-intensity discrete LEDs.

- Have in operation a minimum of one thousand (1000) large outdoor permanently mounted LED DMS in North America as defined above. Each of these DMS shall have successfully operated for a minimum period of one (1) year prior to the contract bid date.
-
- Have in operation as of the contract bid date a minimum of ten (10) independently owned and operated LED DMS systems. Each of the ten (10) systems shall contain a minimum of ten (10) permanently mounted DMS that use the National Transportation Communications ITS Protocol (NTCIP) as their primary communication protocol. Each of the DMS signs shall be communicating over dialup telephone, cellular telephone, spread spectrum radio, or fiber optic networks.

- The DMS manufacturer must have an in-house Quality Management System (QMS) in place certified by an approved registrar to the latest standard of ISO 9001.

- Utilize a documented certified welding procedure in accordance with the latest version of AWS D1.2.

Material, Manufacturing, and Design Standards:

DMS provided for this contract must comply with the following standards. If no revision date is specified, the most recent revision of the standard applies:

- General DMS Requirements – The DMS must be designed in accordance with NEMA Standards Publication TS 4, Hardware Standards for Dynamic Message Signs (DMS), with NTCIP Requirements.

- Aluminum Welding – The DMS housing must be designed, fabricated, welded, and inspected in accordance with the latest revisions of ANSI/AWS D1.2 Structural Welding Code-Aluminum.

- Electrical Components – High-voltage components and circuits (120 VAC and greater) must be designed, wired, and color-coded per the National Electric Code.

- Environmental Resistance – The DMS housing must be designed to comply with type 3R enclosure criteria as described in the latest revision of NEMA Standards Publication 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

- Product Electrical Safety – The DMS and all associated equipment and enclosures must be listed by the Underwriters Laboratories (UL) and will bear the UL mark on the outside of the DMS enclosure. Control equipment and enclosures shall be listed as conformant to UL 1433 Standard for Control Centers for Changing Message Type Electric Signs. Failure to meet conformance will be cause of rejection.

- Radio Frequency Emissions – All equipment must be designed in accordance with Federal Communications Commission (FCC) Part 15, Subpart B as a "Class A" digital device.

- Structural Integrity – The DMS housing must be designed and constructed to comply with all applicable sections of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, as well as the fatigue resistance requirements of NCHRP Report 412, Fatigue-Resistant Design of Cantilevered Signal, Sign, and Light Supports.

- Communication Protocols – The sign controller hardware/firmware and DMS control software must conform to the applicable National Transportation Communication for ITS Protocol (NTCIP) standards.

Customer Service Department: The DMS manufacturer must have a customer service department that provides technical support and services for the manufacturer's DMS systems.

The manufacturer's customer service department must have technical support help desk that may be contacted via telephone, e-mail and fax. The help desk must be staffed from 8:00 A.M. to 5:00 P.M. Central Time (CT) at a minimum. The manufacturer must also offer bench level repair services for failed components and stocking of most parts for replacement.

The manufacturer must include a description of its available customer support services in the pre-build technical submittal.

Manufacturing Automation Systems: The DMS manufacturer must utilize automated equipment in the manufacturing process. Automated systems shall be used for the following processes at a minimum: component insertion, soldering, circuit board washing, and conformal coating application.

Product Testing: The DMS manufacturer must provide documentation indicating that the DMS product has been tested to the following standards. It must be acceptable for 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.

Failure to conform to these testing requirements will be grounds for rejection. Rejected equipment may be offered for test or retest provided all non-compliant items have been corrected and tested or retested by the DMS manufacturer. Any corrections deemed necessary by the Engineer must be made by the DMS manufacturer, at no additional cost to the Department.

Product Testing. Product test reports shall be submitted for the following testing:

- NEMA Standards Publication TS 4, 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 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.

The supplier must provide a record of each test performed including the results of each test. The report must include a record of the product test report and the test lab's representative that witnessed the tests, including the signature of the lab's representative. The test reports must be provided to the Engineer for review as part of the technical submittal.

Self Certification: The DMS manufacturer must provide self-certification, including a statement of conformance and copies of test reports, indicating that the following tests have been performed and passed.

Product test reports must be submitted for testing of the following National Transportation Communication for ITS Protocol (NTCIP) standards:

- NTCIP 1201: NTCIP Global Object Definitions (including Amendment 1).
- NTCIP 1203: Object Definitions for Dynamic Message Signs (including Amendment 1).
- NTCIP 2101: Point to Multi-Point Protocol Using RS-232 Subnetwork Profile.
- NTCIP 2103: Point-to-Point Protocol Over RS-232 Subnetwork Profile.

The NTCIP testing must have been 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) must include testing of sub-network communications functionality, all mandatory objects in all mandatory conformance groups, and a subset of the remaining objects.

DMS Housing Structural Certification. A Professional Engineer registered in the United States must analyze the DMS structural design and shall certify that the DMS:

- Will withstand the temporary effects of being lifted by the lifting eyebolts provided Manufacturer Contract Requirements 11.

- Will comply with the applicable requirements of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

- Complies with the fatigue resistance requirements of NCHRP Report 412, Fatigue Resistant Design of Cantilevered Signal, Sign, and Light Supports.

The Professional Engineer must analyze the complete DMS structural design. This includes the housing, mounting brackets, and lifting eyebolts, as well as the bracket-to-housing mounting hardware (nuts, bolts, washers, direct tension indicators, etc.) provided by the DMS manufacturer. Analysis must include, but shall not be limited to:

- The quantity and type of lifting eyebolts to be provided.
- The quantity and type of mounting brackets to be provided.
- The quantity and type of hardware (nuts, bolts, washers) used to attach the mounting brackets to the DMS.
- Verification that no dissimilar metals problem will exist and/or affect the structural integrity of the DMS-to-bracket attachment points.
- A recommendation of the number of attachment points, as well as the attachment locations, that the installing contractor should use when mounting the DMS to its support structure.

The DMS manufacturer must include a signed and sealed copy of this P.E. certification, including all supporting calculations, within thirty days of submittal approval. Failure to provide P.E. calculations will be cause for rejection.

Pre-Build Technical Submittal. The DMS manufacturer must provide a complete pre-build technical submittal within 60 days of contract award and shall not proceed with DMS manufacture until the Engineer has approved the submittal. The DMS manufacturer shall provide three (3) copies of the submittal both in electronic format on CD and in paper format in three-ring binders. The submittal must include:

- All DMS manufacturer qualification information, as specified herein.
- DMS shop drawing, including an illustration of the recommended installation method.
- DMS structural calculations and certification by a registered professional engineer from the state which the DMS is specified will be available within thirty days of submittal approval.
- DMS site riser diagram.
- AC site power requirements, including the number of legs, current draw per leg, and typical site power consumption.
- Major DMS schematics in block diagram form, including AC power distribution inside and outside the DMS, DC power distribution within the DMS, and control signal distribution inside and outside the DMS.

- Drawings of major DMS components, including LED display modules, driver boards, control/logic components, environmental control assemblies, DMS sign controller, control equipment cabinet assembly, and control cabinet mounting footprint.

- Catalog cut sheets for major DMS components, including front face paint material, polycarbonate face material, LEDs, regulated DC power supplies, circuit board conformal coating material, hookup wire, signal cable, surge suppression devices, panel board, circuit breakers, utility outlets, sign controller, ventilation/cooling fans, heaters, ventilation filter, thermostats, and any other major system components.

- Test reports and certification for all items identified in the "Product Testing" specifications herein. Documentation that proves the DMS manufacturer complies with these specifications must be provided with the DMS manufacturer's pre-build technical submittal. This submittal shall also include five (5) references from states that have had NTCIP compliant DMS from the manufacturer installed for a minimum of five (5) years and project information for all the manufacturer's DMS customers of the last five (5) years, including:

- Equipment owner/operator agency name.

- Contact person name, telephone number, fax number, and email address.

- DMS system name and location of operations control center (project name/number, roadway name/number, state, county, and country).

- DMS commissioning date (first date of successful on-site operation).

- DMS quantity.

- DMS display pixel technology (LED, fiber optic, flip disk, etc.).

- DMS display matrix size (pixel rows by pixel columns) and type (full matrix, line matrix, or discrete character).

- DMS housing access type (walk-in, front, rear, or other specific access type).

- Communications protocol used (NTCIP or proprietary; if proprietary, provide a name or description) • Type of communications backbone used (telephone, fiber optic, direct, etc.).

- NTCIP compliance test reports prepared by independent testing companies, including contact information.

The pre-build submittal shall also include the following background information about the DMS manufacturer:

- Full corporate name.
- Corporate address.
- Contact person name, telephone number, fax number, and email address.
- Names and qualifications of the primary project team members, including the following: sales person, project manager, product manager, application engineer, and manufacturing manager.
- Number of years in business under the current corporate name.
- Copy of the DMS manufacturer's in-house quality management system.
- Copy of the DMS manufacturer's certified welding procedure.
- Copy of welding certifications for all personnel who will perform welding of the DMS housing.
- General corporate literature • DMS product literature. Failure to provide complete and accurate submittal information, as specified herein, will be cause for rejecting the DMS manufacturer.

Glossary.

The following abbreviations and definitions shall govern this specification:

- AASHTO – American Association of State Highway and Transportation Officials.
- AlInGaP – Aluminum Indium Gallium Phosphide. Refers to the chemical composition of an amber LED dye.
- ANSI – American National Standards Institute.
- AWS – American Welding Society.
- Bin – Group of LEDs categorized and sorted by intensity or color. Each "bin" has upper and lower intensity or color specifications and contains only LEDs that are measured to be within that range. LED manufacturers sort LEDs into bins to ensure consistent intensity and color properties.

- Control Computer – A desktop or laptop computer used in conjunction with DMS control software to communicate with DMS sign controllers. The control computer can instruct a DMS sign controller to program and control the DMS, monitor DMS status, and run DMS diagnostic tests. A control computer can be used for remote control of one of more DMS, as well as for local control of a single DMS.

- DMS – Dynamic message sign. An industry term that applies to various types of changeable sign technology. Also known as Changeable Message Signs (CMS) and Variable Message Signs (VMS).

- Font – The style and shape of alphanumeric characters that are displayed on the DMS matrix to create messages viewed by motorists and travelers.

- FSORS – An NTCIP term meaning "Full, Standardized Object Range Support." See the NTCIP standards for additional information.

- GUI – Graphical user interface.

- IPC – Association Connecting Electronics Industries.

- ISO – International Organization for Standardization.

- ITE – Institute of Transportation Engineers.

- ITS – Intelligent Transportation System.

- LED – Light Emitting Diode.

- Message – Information displayed on the DMS for the purpose of visually communicating with motorists. A DMS message can consist of one or more pages of data that are displayed consecutively.

- MIB – NTCIP management information base.

- Module – Assembly consisting of a two-dimensional LED pixel array, pixel drive circuitry, and mounting hardware. Modules are installed in the display adjacent to each other to form the display matrix.

- NEMA – National Electrical Manufacturers Association.

- NCHRP – National Cooperative Highway Research Program.

- NTCIP – National Transportation Communications for ITS Protocol.

- Object – This is a NTCIP term referring to an element of data in an NTCIP compatible device that can be manipulated to control or monitor the device.

- Page – This is a NTCIP term referring to the data that is displayed on the DMS display matrix at a given moment in time. Also referred to as a "frame."

- Pixel – Picture element. The smallest changeable (programmable) portion of a DMS display matrix.

- PMPP – Point to multi-point protocol.

- PPP – Point to point protocol.

- PWM – Pulse width modulation.

- Schedule – A set of data that determines the time and date when a DMS sign controller will cause a stored message to be displayed on the DMS.

- Sign Controller – A stand-alone computer that is located at a DMS site, which controls a single DMS. A sign controller received commands and sends information to a control computer.

- Stroke – Refers to the vertical and horizontal width of the lines and curves of a display font. "Single stroke" denotes character segments that are one pixel wide. "Double stroke" denotes character segments that are two pixels wide.

- WYSIWYG – What You See Is What You Get. More specifically, what you see on the DMS control computer monitor is a scaled representation of how a message will appear when it is being displayed on the DMS. Similarly, after a pixel diagnostic test routine has been run, what you see on the control computer monitor is a scaled representation of the functional status of each pixel in the DMS display matrix.

Construction Requirements. All conduit attached to structure shall be stainless steel. The sign shall be installed in accordance with the manufacturer's recommendations and best industry practices.

All work shall be done to the satisfaction of the Engineer.

DMS Commissioning and Testing. The Contractor shall arrange for a manufacturer's representative to be on-site during sign turn-on. The representative shall perform sign testing in accordance with the manufacturer's sign commissioning and sign testing procedures in the presence of the Department. The Contractor shall submit copies of all pertinent testing and commissioning documentation to the Department.

Operational Burn-In Period. The DMS and all associated equipment furnished and installed under this contract shall be subject to a 60-day burn-in period.

During the "burn-in" period, all components shall perform continuously, without any interruption of operation, for a period of sixty days. In the event that there are operational problems during the burn-in period, the burn-in period shall reset back to day one.

Basis of Payment: This work will be paid for at the contract unit price Each for REMOVE AND REPLACE ITS EQUIPMENT and shall be payment in full for all labor, materials, and equipment required to remove the existing dynamic message sign, dispose of it off-site, furnish and install the proposed dynamic message sign and required components, and perform sign testing and commissioning as described above, complete.

SUPPORT EQUIPMENT AND MAINTENANCE

The Contractor shall furnish the following equipment (MATERIAL ONLY) and deliver it to the Department:

There are no support requirements associated with this pay item.

- Dynamic Message Sign Controller - Qty. 1
- Dynamic Message Sign LED Modules with Driver Cards (7x5, 4 LEDS per pixel, 30 Degree) – Qty. 6
- Dynamic Message Sign External Power Supplies – Qty. 2
- Dynamic Message Sign Surge Arrestors – Qty

Basis of Payment: This work will be paid for at the contract unit price per Lump Sum for SUPPORT EQUIPMENT AND MAINTENANCE which price shall be payment in full for all labor, materials, and equipment required to provide the equipment specified above and deliver it to the Department.

TRANSFORMER, GENERAL PURPOSE

This work shall be in accordance with the requirements set forth under Section 805, 827 and 1086 and Article 1068 of the Standard Specifications.

This work shall consist of furnishing a general purpose encapsulated transformer and installing it on the side of a proposed lighting controller to provide power to an ITS cabinet.

The transformer shall be a 3.0 kVA, Type EP and shall convert 240x480 Volts to 120/240 Volts.

The Contractor shall also furnish a 15A, 480V two-pole breaker for the line side of the transformer and install it in the existing lighting cabinet in accordance with NEC requirements.

All circuit breakers shall have a molded case.

This work shall be in accordance with the requirements set forth under Section 805, 827 and 1086 and Article 1068 of the Standard Specifications.

Basis of Payment: This work will be paid for at the contract unit price of Each for TRANSFORMER, GENERAL PURPOSE, which shall be payment in full for all labor, equipment, and materials required to furnish and install the transformer and circuit breaker as described above, complete.

DATA SERVER

This pay item shall consist of furnishing data servers, hardware, and related items to the Department (material only) and deliver all items to the IDOT District Four headquarters in Peoria.

The Contractor shall furnish the following items:

Application Server – Configuration 1 – Qty. 2.0
Uninterruptable Power Supply – Qty. 2.0
All items shall conform to the specifications listed below:

Specifications for APPLICATION SERVER – CONFIGURATION 1

The computer shall be a Dell PowerEdge R730 server, or approved equal that meets or exceeds the following minimum specifications:

Server Features for Application Server – Configuration 1

The server shall have the following features:

Form factor:	2U rack
Dimensions:	H: 8.73 cm (3.44 in.), W: 44.40 cm (17.49 in.), D: 68.40 cm (26.92 in.)
Processor sockets:	2
Cache:	2.5MB per core; core options: 4, 6, 8, 10, 12, 14, 16, 18, 22
Chipset:	Intel C610 series chipset
I/O slots:	Up to 7 x PCIe 3.0 plus dedicated PERC slot
Drive bays:	Up to 16 x 2.5" HDD: SAS, SATA, nearline SAS SSD: SAS, SATA
Embedded NIC:	4 x 1GbE, 2 x 10+2GbE, 4 x 10GbE NDC
Graphics Controller:	Integrated, Matrox G200eR2, 16 MB, VGA Interface
Power supplies:	Platinum efficiency 495W, 750W, 1100W AC power supply

Systems management:	IPMI 2.0 compliant, Dell OpenManage Essentials, Dell OpenManage Mobile, Dell OpenManage Power Center, Dell OpenManage Integrations, Dell OpenManage Integration Suite for Microsoft® System Center, Dell OpenManage Integration for VMware® vCenter™ Dell OpenManage Connections, HP Operations Manager, IBM Tivoli® Netcool® and CA Network and Systems Management, Dell OpenManage Plug-in for Oracle® Database Manager
Rack support:	ReadyRails™ II sliding rails for tool-less mounting in 4-post racks with square or unthreaded round holes or tooled mounting in 4-post threaded hole racks

Server Configuration for Application Server – Configuration 1

The server shall be configured with the following options:

Base:	PowerEdge R730 Server
Trusted Platform Module (TPM):	Trusted Platform Module 2.0 FIPs, Common Criteria
Chassis:	Chassis with up to 8, 2.5" Hard Drives
Processor:	Intel® Xeon® E5-2695 v4 2.1GHz,45M Cache,9.60GT/s QPI,Turbo,HT,18C/36T (120W) Max Mem 2400MHz
Additional Processor:	Intel® Xeon® E5-2695 v4 2.1GHz,45M Cache,9.60GT/s QPI,Turbo,HT,18C/36T (120W) Max Mem 2400MHz
Processor Thermal Configuration:	2 CPU Standard
Hard Drive:	1.2TB 10K RPM SAS 12Gbps 2.5in Hot-plug Hard Drive – Qty. 7 - Configured as RAID5
OS Partitions:	None
Removable Storage:	None
Memory DIMM Type and Speed:	2400MT/s RDIMMs
Memory Configuration Type:	Performance Optimized
Memory:	192 GB Total (32GB RDIMM, 2400MT/s, Dual Rank, x4 Data Width – Qty. 6)

RAID Controller:	PERC H730P RAID Controller, 2GB NV Cache
Operating System:	Windows Server® 2016, Standard Edition,16CORE,Factory Inst, No MED,NO CAL
OS Media Kits:	Windows Server® 2016, Standard Edition,16CORE, Media Kit
Licenses:	Windows Server® 2016,Standard, Add License, 16CORE, Factory Inst, NO MEDIA/KEY
OS Partitions:	None
Embedded Systems Management:	iDRAC8 Enterprise, integrated Dell Remote Access Controller, Enterprise
PCIe Riser:	Risers with up to 1 FH, x8 PCIe Slots + 2 FH, x16 PCIe Slots
Network Daughter Card:	Intel Ethernet I350 QP 1Gb Network Daughter Card
Additional Network Cards:	QLogic 57810 DP 10Gb DA/SFP+ Converged Network Adapter
Additional Software Offerings:	None
Internal SD Module:	Internal SD Module with 1x 32GB SD Card
Internal Optical Drive:	DVD+/-RW, SATA, Internal
Cooling:	None
Power Supply:	Dual, Hot-plug, Redundant Power Supply (1+1), 1100W
Power Cords:	NEMA 5-15P to C13 Wall Plug, 125 Volt, 15 AMP, 10 Feet (3m), Power Cord, North America (Qty. 2)
Bezel:	No Bezel
Power Management BIOS Settings:	Performance BIOS Setting
Rack Rails:	Sliding Rails Without Cable Management Arm
System Documentation:	Electronic System Documentation and OpenManage DVD Kit

Virtualization Software:	None
Enabled Virtualization:	None
Database Software:	None
Warranty:	Three-Year ProSupport and Next Business Day On-site Service

Specifications for UNINTERRUPTABLE POWER SUPPLY

The uninterruptible power supply shall be a rack mounted APC Smart-UPS X 1500VA Rack LCD 120V equipped with network card (SMX1500RM2UNC) or approved equal that meets or exceeds the following specifications:

OUTPUT

Output Power Capacity:	• 1200 Watts / 1500 VA
Nominal Output Voltage:	• 120V
Efficiency at Full Load:	• 97.7%
Output Voltage Distortion:	• Less than 5% at full load
Output Frequency (sync to mains):	• 47 - 63 Hz for 60 Hz nominal
Waveform Type:	• Sine wave
Output Connections:	• (8) NEMA 5-15R

INPUT

Nominal Input Voltage:	• 120V
Input Frequency:	• 50/60 Hz +/- 3 Hz (auto sensing)
Input Connections:	• NEMA 5-15P
Cord Length	• 8 feet
Input voltage range for main operations:	• 82 - 143V
Input voltage adjustable range for mains operation:	• 75 - 154V

Maximum input current:	• 12A
Input breaker capacity:	• 20.0A

BATTERIES AND RUNTIME

Battery Type:	• Maintenance-free sealed Lead-Acid battery with suspended electrolyte (leak-proof)
Typical recharge time:	• 3 hour(s)
Typical Backup Time at Half Load:	• 17.2 minutes (600 Watts)
Typical Backup Time at Full Load:	• 5.8 minutes (1,200 Watts)
DC overcurrent protection	• 60A

COMMUNICATIONS & MANAGEMENT

Interface Port(s):	• SmartSlot, USB
Pre-Installed SmartSlot™ Cards:	• AP9631 (RJ-45 10/100 Base-T, HTTP,HTTPS,IPv4,IPv6,NTP,SMTP,SNMP v1,SNMP v3,SSH V1,SSH V2,SSL,TCP/IP,Telnet)
Control panel:	• Multi-function LCD status and control console
Audible Alarm:	• Alarm when on battery: distinctive low battery alarm: overload continuous tone alarm

SURGE PROTECTION AND FILTERING

Surge energy rating:	• 600 Joules
Filtering:	• Full time multi-pole noise filtering : 5% IEEE surge let-through : zero clamping response time : meets UL 1449

PHYSICAL

Maximum Height:	• 3.50 inches (89 mm)
Maximum Width:	• 19.30 inches (432 mm)
Maximum depth:	• 18.00 inches (457 mm)
Rack Height:	• 2U
Net Weight:	• 54.60 lbs. (28.64 kg)
Mounting	• Equipped with Sliding Rails

ENVIRONMENTAL

Operating Environment:	• 32°F - 104°F (0°C - 40°C)
Operating Relative Humidity:	• 0 - 95%
Audible noise at 1 meter from surface of unit:	• 40 dBA
Online Thermal Dissipation:	• 133.00 BTU/hr

CONFORMANCE

Regulatory Approvals:	• cUL Listed,UL 1778

WARRANTY

Manufacturer's Warranty	• Three-years (materials and workmanship), 2 years on batteries

Basis of Payment: This work will be paid for at the contract unit price per Lump Sum for DATA SERVER which price shall be payment in full for all labor, materials, and equipment required to furnish the servers, hardware, and accessories described above and deliver it to the Department.

CLOSED CIRCUIT TELEVISION DOME CAMERA

Description. This work shall consist of furnishing and installing an integrated Closed-Circuit Television (CCTV) Dome Camera Assembly, camera brackets, and all other items required for installation and operation. This assembly shall contain all components identified in the Materials Section and shall be configured as indicated on the plan sheets.

Materials.

The CCTV camera shall be an Axis Model Q6000-E Mk II PTZ Network Camera equipped with one Axis T94A01C Attachment Kit, and Four M12 6mm Lenses for integration into the existing District 4 ITS system.

The Contractor shall provide all materials required to install the proposed camera on the proposed sign structure camera mast as shown on the plan sheets.

The Contractor shall submit catalog cut sheets to the Department for all items (mounting brackets, hardware, etc.) that will be utilized for review prior to commencing work.

The Department will program the cameras.

The camera shall meet or exceed the following specifications:
CAMERA

SUPPORTED PRODUCTS:	AXIS Q60-E PTZ Network Cameras
IMAGE SENSOR:	2 MP Progressive scan RGB CMOS 4 x 1/2.8"
LENS:	Fixed focus, Fixed iris, F2.0, Focal length: 1.37 mm Horizontal field of view default mode (4:3) 113° Horizontal field of view (16:9) 152° Vertical field of view (4:3 and 16:9) 85°
DAY AND NIGHT:	Automatically removable infrared-cut filter
LIGHT SENSITIVITY:	Color: 0.3 lux, F2.0
SHUTTER TIME: NTSC:	1/45500 s to 4 s
CAMERA ANGLE ADJUSTEMENT:	Pan: 4° x 90° Tilt: –10° to –75°
PAN/TILT/ZOOM:	Remote Gatekeeper, One-click PTZ control

VIDEO

VIDEO COMPRESSION:	H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High profiles Motion JPEG

RESOLUTIONS:	Standard lenses: 4 x 1280x720 (HDTV 720p) to 320x180 Default: 960x720 Quad view: 1920x1440 (4:3) to 320x180 Optional lenses: 4 x 1920x1080 (HDTV 1080p) to 480x270 Default: 960x720
FRAME RATE (H.264):	Up to 25/30 fps (50/60 Hz) @720p Up to 12.5/15 fps (50/60 Hz) @1080pa
VIDEO STREAMING:	Multiple, individually configurable streams in H.264 and Motion JPEG, Axis' Zipstream technology, Controllable frame rate and bandwidth, VBR/MBR H.264
IMAGE SETTING:	Resolution, compression, color level, brightness, sharpness, contrast, white balance, exposure value, exposure control, automatic backlight compensation, exposure zones, shutter & gain fine tuning of behavior at normal and low light, privacy masks (maximum 4 per channel)

NETWORK

SECURITY:	Password protection, IP address filtering, HTTPSa encryption, IEEE 802.1Xa network access control, Digest authentication, User access log, Centralized Certificate Management
PROTOCOLS:	IPv4/v6, HTTP, HTTPSa, SSL/TLSa, QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnPTM, SNMP v1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, SFTP, TCP, UDP, IGMP, RTCP, ICMP,DHCP, ARP, SOCKS, SSH, NTCIP

SYSTEM INTEGRATION

APPLICATION PROG INTERFACE:	Open API for software integration, including VAPIX® and AXIS Camera Application Platform; specifications at www.axis.com, AXIS Video Hosting System (AVHS) with One-Click Connection, ONVIF Profile S, specification at www.onvif.org
ANALYTICS:	Video motion detection, Autotracking, Active Gatekeeper Basic Analytics (not to be compared with third-party analytics): Object removed, Enter/Exit detector, Fence detector, Object Counter, Highlight compensation, Support for AXIS Camera Application Platform enabling installation of third-party applications, see www.axis.com/acap

EVENT TRIGGERS:	Detectors: Live stream accessed, Video motion detection, Shock Detection, Object removed, Enter/Exit detector, Fence detector, Object counter; Hardware: Fan, Network, Temperature, Casing Open; PTZ: Autotracking, Error, Moving, Ready, Preset Reached; Storage: Disruption, Recording; System: System Ready; Time: Recurrence, Use Schedule; Input signal: Manual trigger, Virtual input
EVENT ACTIONS:	Day/night mode, overlay text, video recording to edge storage, pre- and post-alarm video buffering, send SNMP trap PTZ: PTZ preset, start/stop guard tour File upload via FTP, SFTP, HTTP, HTTPS network share and Email; Notification via email, HTTP, HTTPS and TCP
DATA STREAMING	Event data
BUILT IN INSTALLATION AIDS	Pixel Counter

GENERAL

CASING:	IP66- and NEMA 4X-rated, die-casted aluminum, polycarbonate Dome
SUSTAINABILITY:	PVC Ffree
MEMORY:	1 GB RAM, 256 MB Flash
POWER CAMERA:	AXIS Q6000–E Mk II with Solo kit: Power consumption: typical 8 W, max 18 W Axis Midspan 30 W 1-port: 100-240 V AC, max. 30 W AXIS Q6000–E Mk II with AXIS Q60–E/Q61–E PTZ Network Cameras: Axis High PoE midspan 1–port 100–240 V AC, max 60 W recommended (included in AXIS Q60-E/Q61–E PTZ Network Cameras).
CONNECTORS:	RJ45 10BASE-T/100BASE-TX/1000BASE-T PoE RJ45 10BASE-T/100BASE-TX Q60-E/Q61–E port RJ45 10BASE-T/100BASE-TX Service port
EDGE STORAGE:	Support for SD/SDHC/SDXC card Support for recording to dedicated network-attached storage (NAS); For SD card and NAS recommendations see www.axis.com

OPERATING CONDITIONS:	With 30 W midspan: -20°C to 50°C (-4°F to 122°F) With 60 W midspan: -50°C to 50°C (-58°F to 122°F) -30°C to 50°C (-22°F to 122°F) Maximum temperature (intermittent): 60°C (140°F) Humidity 10-100% RH (condensing)
APPROVALS:	EMC: EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, EN 55024, FCC Part 15 Subpart B Class A, ICES-003 Class A, VCCI Class A, RCM AS/NZS CISPR 22 Class A, KCC KN32 Class A, KN35 Safety: IEC/EN/UL 60950-1, IEC/EN/UL 60950-22 Environment: EN 50121-4, IEC 62236-4, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27, IEC 60721-4-3, NEMA 250 Type 4X, IEC 60068-2-30, IEC 60068-2-60, IEC 60068-2-78, IEC/EN 60529 IP66, NEMA TS-2-2003 v02.06, Subsection 2.2.7, 2.2.8, 2.2.9; IEC 62262 IK10, ISO 4892-2 Midspan: EN 60950-1, GS, UL, cUL, CE, FCC, VCCI, CB, KCC, UL-AR
WEIGHT:	3.55 kg (7.8 lb) 7.2 kg (16 lb) including an AXIS Q60-E PTZ Network Camera 6.6 kg (14.55 lb) including an AXIS Q61–E PTZ Network Camera 4.2 kg (9.26 lb) including AXIS Q6000–E Solo kit
INCLUDED ACCESSORIES:	Ethernet adaptor, Bayonet screws, Installation Guide, Windows decoder 1-user license
VIDEO MANAGEMENT SOFTWARE:	AXIS Camera Companion, AXIS Camera Station, Video management software from Axis' Application Development Partners available on www.axis.com/techsup/software
WARRANTY:	AXIS Three-year warranty and AXIS Extended Warranty option

Environmental Enclosure/Housing. The environmental enclosure shall be designed to physically protect the integrated camera from the outdoor environment and moisture via a sealed enclosure. If the option exists in the standard product line of the manufacturer, the assembly shall be supplied with an integral sun shield. The enclosure shall be fully water and weather resistant with a NEMA 4 rating or better.

The camera dome shall be constructed of distortion free acrylic or equivalent material that must not degrade from environmental conditions. The environmental housing shall include a camera-mounting bracket. In addition, the environmental housing shall include a heater, blower, and power surge protector. An integral fitting compatible with a standard 1½" in. (38.1 mm) NPT pipe, suitable for outdoor pendant mounting shall also be provided.

The enclosure shall be equipped with a heater controlled by a thermostat. The heater shall turn on when the temperature within the enclosure falls below 40°F (4.4°C). The heater shall turn off when the temperature exceeds 60°F (15.6°C). The heater will minimize internal fogging of the dome faceplate when the assembly is operated in cold weather.

In addition, a fan shall be provided as part of the enclosure. The fan will provide airflow to ensure effective heating and to minimize condensation.

The enclosure shall be equipped with a hermetically sealed, weatherproof connector, located near the top for external interface with power, video, and control feeds.

CCTV Dome Camera Mounting Supports

The Contractor shall furnish and install an Axis Pole Mount Bracket T91L61 (Part Number 5801-721) for camera installation on traffic signal mast arms and CCTV camera poles and stainless-steel banding as required.

Mounting supports shall be configured as shown on the camera support detail plans and as approved by the Engineer. Mount shall be of aluminum construction with enamel or polyester powder coat finish. Braces, supports, and hardware shall be stainless steel. Wind load rating shall be designed for sustained gusts up to 90 mph (145 km/hr), with a 30% gust factor. Load rating shall be designed to support up to 75 lb. (334 N). For roof or structural post/light pole mounting, mount shall have the ability to swivel inward for servicing. The mounting flange shall use standard 1½" inch (38.1 mm) NPT pipe thread.

Connecting Cables. The Contractor shall furnish and install outdoor rated, shielded CAT 5E cable. The cable shall be terminated using the IP66 rated RJ-45 connector on the camera end and a shielded RJ-45 connector in the cabinet. The Contractor shall test the cable prior after termination.

Cable will be paid for separately under the pay item CAT 5 ETHERNET CABLE

Construction Requirements.

General. The Contractor shall prepare a shop drawing detailing the complete CCTV Dome Camera Assembly and installation of all components to be supplied for approval of the Engineer. Particular emphasis shall be given to the cabling and the interconnection of all of the components.

The Contractor shall install the CCTV dome camera assembly at the locations indicated in the Plans. The CCTV Dome Camera Assembly shall be mounted on a pole, wall, or other structure.

Testing. The Contractor shall test each installed CCTV Dome Camera Assembly. The test shall be conducted from the field cabinet using the standard communication protocol and a laptop computer. The Contractor shall verify that the camera can be fully exercised and moved through the entire limits of Pan, Tilt, Zoom, Focus and Iris adjustments, using both the manual control and presets. The Contractor shall maintain a log of all testing and the results. A representative of the Contractor and a representative of the Engineer shall sign the log as witnessing the results. Records of all tests shall be submitted to the Engineer prior to accepting the installation.

Method of Measurement. The closed circuit television dome camera bid item will be measured for payment by the actual number of CCTV dome camera assemblies furnished, installed, tested, and accepted.

Basis of Payment. Payment will be made at the contract unit price for Each CLOSED CIRCUIT TELEVISION DOME CAMERA including all equipment, material, testing, documentation, and labor detailed in the contract documents for this bid item.

RAILROAD PROTECTIVE LIABILITY INSURANCE (BDE)

Effective: December 1, 1986
Revised: January 1, 2006

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

NAMED INSURED & ADDRESS	NUMBER & SPEED OF PASSENGER TRAINS	NUMBER & SPEED OF FREIGHT TRAINS
Tazewell & Peoria Railroad Inc. 1500 N. Grand Ave. East P. O. Box 139 Springfield, IL 62705	0	3/day @ 10 mph

DOT/AAR No.: 604 022V
RR Division: Midwest
RR Mile Post: 4.96
RR Sub-Division: Peoria Uptown

For Freight/Passenger Information Contact: Toby Tobias Phone: (217) 793-7957
For Insurance Information Contact: Crystal Galbreath Phone: (904) 596-7782

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

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

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

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

MATERIAL TRANSFER DEVICE (BDE)
Effective: June 15, 1999 Revised: August 1, 2014

Description. This work shall consist of placing HMA and Polymerized HMA binder and surface course mixtures according to Section 406 of the Standard Specifications, except that these materials shall be placed using a material transfer device (MTD).

Materials and Equipment. The MTD shall have a minimum surge capacity of 15 tons (13.5 metric tons), shall be self-propelled and capable of moving independent of the paver, and shall be equipped with the following:

(a) Front-Dump Hopper and Conveyor. The conveyor shall provide a positive restraint along the sides of the conveyor to prevent material spillage. MTDs having paver style hoppers shall have a horizontal bar restraint placed across the foldable wings which prevents the wings from being folded.

(b) Paver Hopper Insert. The paver hopper insert shall have a minimum capacity of 14 tons (12.7 metric tons).

(c) Mixer/Agitator Mechanism. This re-mixing mechanism shall consist of a segmented, anti-segregation, re-mixing auger or two full-length longitudinal paddle mixers designed for the purpose of re-mixing the hot-mix asphalt (HMA). The longitudinal paddle mixers shall be located in the paver hopper insert.

CONSTRUCTION REQUIREMENTS

General. The MTD shall be used for the placement of all HMA and Polymerized HMA binder and surface course mixtures placed with a paver. The MTD speed shall be adjusted to the speed of the paver to maintain a continuous, non-stop paving operation.

Use of a MTD with a roadway contact pressure exceeding 25 psi (172 kPa) will be limited to partially completed segments of full-depth HMA pavement where the thickness of binder in place is 10 in. (250 mm) or greater.

Structures. The MTD may be allowed to travel over structures under the following conditions:

(a) Approval will be given by the Engineer.

(b) The vehicle shall be emptied of HMA material prior to crossing the structure and shall travel at crawl speed across the structure.

(c) The tires of the vehicle shall travel on or in close proximity and parallel to the beam and/or girder lines of the structure.

Method of Measurement. This work will be measured for payment in Tons (Metric Tons) for all HMA and Polymerized HMA binder and surface course materials placed with a material transfer device.

Basis of Payment. This work will be paid for at the contract unit price per Ton (Metric Ton) for MATERIAL TRANSFER DEVICE.

The various HMA mixtures placed with the MTD will be paid for as specified in their respective specifications. The Contractor may choose to use the MTD for other applications on this project; however, no additional compensation will be allowed.

HIGH LOAD MULTI-ROTATIONAL BEARINGS
Effective: October 13, 1988 Revised: April 1, 2016

Description. This work shall consist of furnishing and installing High Load Multi-Rotational type bearing assemblies at the locations shown on the plans.

High Load Multi-Rotational (HLMR) bearings shall be one of the following at the Contractors option unless otherwise noted on the plans:

a) Pot Bearings. These bearings shall be manufactured so that the rotational capability is provided by an assembly having a rubber disc of proper thickness, confined in a manner so it behaves like a fluid. The disc shall be installed, with a snug fit, into a steel cylinder and confined by a tight fitting piston. The outside diameter of the piston shall be no more than 0.03 in. (750 microns) less than the inside diameter of the cylinder at the interface level of the piston and rubber disc. The sides of the piston shall be beveled. PTFE sheets, or silicone grease shall be utilized to facilitate rotation of the rubber disc. Suitable brass sealing rings shall be provided to prevent any extrusion between piston and cylinder.

b) Shear Inhibited Disc Type Bearing. The Structural Element shall be restricted from shear by the pin and ring design and need not be completely confined as with the Pot Bearing design. The disc shall be a molded monolithic Polyether Urethane compound.

These bearings shall be further subdivided into one or more of the following types:

1) Fixed. These allow rotation in any direction but are fixed against translation.

2) Guided Expansion. These allow rotation in any direction but translation only in limited directions.

3) Non-Guided Expansion. These allow rotation and translation in any direction.

The HLMR bearings shall be of the type specified and designed for the loads shown on the plans. The design of the top and bottom bearing plates are based on detail assumptions which are not applicable to all suppliers and may require modifications depending on the supplier chosen by the Contractor. The overall depth dimension for the HLMR bearings shall be as specified on the plans. The horizontal dimensions shall be limited to the available bearing seat area. Any modifications required to accommodate the bearings chosen shall be submitted to the Engineer for approval prior to ordering materials. Modifications required shall be made at no additional cost to the State. Inverted pot bearing configurations will not be permitted.

The Contractor shall comply with all manufacturer’s material, fabrication and installation requirements specified.

All bearings shall be supplied by prequalified manufacturers. The Department will maintain a list of prequalified manufacturers.

Submittals. Shop drawings shall be submitted to the Engineer for approval according to Article 105.04 of the Standard Specifications. In addition the Contractor shall furnish certified copies of the bearing manufacturer's test reports on the physical properties of the component materials for the bearings to be furnished and a certification by the bearing manufacturer stating the bearing assemblies furnished conform to all the requirements shown on the plans and as herein specified. Submittals with insufficient test data and supporting certifications will be rejected.

Materials. The materials for the HLMR bearing assemblies shall be according to the following:

(a) Elastomeric Materials. The rubber disc for Pot bearings shall be according to Article 1083.02(a) of the Standard Specifications.

(b) Polytetrafluoroethylene (PTFE) Material. The PTFE material shall be according to Article 1083.02(b) of the Standard Specifications.

(c) Stainless Steel Sheets: The stainless steel sheets shall be of the thickness specified and shall be according to Article 1083.02(c).

(d) Structural Steel. All structural steel used in the bearing assemblies shall be according to AASHTO M 270, Grade 50 (M 270M Grade 345), unless otherwise specified.

(e) Threaded studs. The threaded stud, when required, shall conform to the requirements of Article 1083.02(d)(4) of the Standard Specifications.

(f) Polyether Urethane for Disc bearings shall be according to all of the following requirements:

PHYSICAL PROPERTY	ASTM TEST METHOD	REQUIREMENTS	
Hardness, Type D durometer	D 2240	45 Min	65 Max
Tensile Stress, psi (kPa) At 100% elongation, min	D 412	1500 psi (10,350 kPa)	2300 psi (15,900 kPa)
Tensile Stress, psi (kPa) At 200% elongation, min	D 412	2800 psi (19,300 kPa)	4000 psi (27,600 kPa)
Tensile Strength, psi (kPa), min	D 412	4000 psi (27,600 kPa)	6000 psi (41,400 kPa)
Ultimate Elongation, %, min	D 412	350	220
Compression Set 22 hr. at 158 °F (70 °C), Method B %, max	D 395	40	40

The physical properties for a durometer hardness between the minimum and maximum values shown above shall be determined by straight line interpolation.

Design. The fabricator shall design the HLMR bearings according to the appropriate AASHTO Design Specifications noted on the bridge plans.

Fabrication. The bearings shall be complete factory-produced assemblies. They shall provide for rotation in all directions and for sliding, when specified, in directions as indicated on the plans. All bearings shall be furnished as a complete unit from one manufacturing source. All material used in the manufacture shall be new and unused with no reclaimed material incorporated into the finished assembly.

The translation capability for both guided and non-guided expansion bearings shall be provided by means of a polished stainless steel sliding plate that bears on a PTFE sheet bonded and recessed to the top surface of the piston or disc. The sliding element of expansion bearings shall be restrained against movement in the fixed direction by exterior guide bars capable of resisting the horizontal forces or 20 percent of the vertical design load on the bearing applied in any direction, whichever is greater. The sliding surfaces of the guide bar shall be of PTFE sheet and stainless steel. Guiding off of the fixed base, or any extension of the base, will not be permitted.

Structural steel bearing plates shall be fabricated according to Article 505.04(l) of the Standard Specifications. Prior to shipment the exposed edges and other exposed portions of the structural steel bearing plates shall be cleaned and given a corrosion protection coating as specified on the plans and according to the applicable Special Provisions and Articles 506.03 and 506.04 of the Standard Specifications. During cleaning and coating the stainless steel, PTFE sheet and neoprene shall be protected from abrasion and coating material.

PTFE sheets shall be bonded to steel under factory controlled conditions using heat and pressure for the time required to set the epoxy adhesive used. The PTFE sheet shall be free from bubbles and the sliding surface shall be burnished to an absolutely smooth surface.

The steel piston and the steel cylinder for pot bearings shall each be machined from a solid piece of steel. The steel base cylinder shall be either integrally machined, recessed into with a snug fit, or continuously welded to its bottom steel bearing plate.

Packaging. Each HLMR bearing assembly shall be fully assembled at the manufacturing plant and delivered to the construction site as complete units. The assemblies shall be packaged, crated or wrapped so the assemblies will not be damaged during handling, transporting and shipping. The bearings shall be held together with removable restraints so sliding surfaces are not damaged.

Centerlines shall be marked on both top and base plates for alignment in the field. The bearings shall be shipped in moisture-proof and dust-proof covers.

Performance Testing. The following performance tests are required. All tests shall be performed by the manufacturer prior to shipment. Where lot testing is permitted, a lot size shall be the number of bearings per type on the project but not to exceed 25 bearings per type.

Dimension Check. Each bearing shall be checked dimensionally to verify all bearing components are within tolerances. Failure to satisfy any dimensional tolerance shall be grounds for rejecting the bearing component or the entire bearing assembly.

Clearance Test. This test shall be performed on one bearing per lot. The bearing selected for this test shall be the one with the least amount of clearance based on the dimension check. The bearing assembly shall be loaded to its service limit state rated capacity at its full design rotation but not less than 0.02 radians to verify the required clearances exist. This test shall be performed twice for each bearing with the rotation oriented longitudinally with the bridge once in each direction. Any visual signs of rubbing or binding shall be grounds for rejection of the lot.

Proof Load Test. This test shall be performed on one bearing per lot. The bearing assembly shall be load tested to 150 percent of the service limit state rated capacity at a rotation of 0.02 radians. The load shall be maintained for 5 minutes, removed then reapplied for 5 minutes. If the load drops below the required value during either application, the test shall be restarted from the beginning. This test shall be performed twice for each bearing with the rotation oriented longitudinally with the bridge once in each direction.

The bearing shall be visually examined both during the test and upon disassembly after the test. Any resultant visual defects include, but are not limited to:

1. Extruded or deformed elastomer, polyether urethane, or PTFE.
2. Insufficient clearances such as evidence of metal to metal contact between the pot wall and the top plate.
3. Damaged components such as cracked steel, damaged seal rings, or damaged limiting rings.
4. Bond failure.

If any of the above items are found it shall be grounds for rejection of the lot.

Sliding Friction Test. For expansion bearings, this test shall be performed on one bearing per lot. The sliding surfaces shall be thoroughly cleaned with a degreasing solvent. No lubrication other than that specified for the bearing shall be used. The bearing shall be loaded to its service limit state rated capacity for 1 hour prior to and throughout the duration of the sliding test. At least 12 cycles of plus and minus sliding with an amplitude equaling the smaller of the design displacement and 1 inch (25 mm) shall then be applied. The average sliding speed shall be between 0.1 inch and 1.0 inches (2.5 mm and 25 mm) per minute. The sliding friction coefficient shall be computed for each direction of each cycle and its mean and standard deviation shall be computed for the sixth through twelfth cycles.

The friction coefficient for the first movement and the mean plus two standard deviations for the sixth through twelfth cycles shall not exceed the design value used. In addition, the mean value for the sixth through twelfth cycles shall not exceed 2/3 of the design value used. Failure of either of these shall result in rejection of the lot.

The bearing shall also be visually examined both during and after the testing, any resultant defects, such as bond failure, physical destruction, or cold flow of the PTFE shall also be cause for rejection of the lot.

The Contractor shall furnish to the Department a notarized certification from the bearing manufacturer stating the HLMR bearings have been performance tested as specified. The Contractor shall also furnish to the Engineer of Tests at the Bureau of Materials and Physical Research (126 East Ash Springfield, IL 62704) a purchase order prior to fabrication. The purchase order shall contain, as a minimum, the quantity and size of each type of bearing furnished. The Department reserves the right to perform any of the specified tests on one or more of the furnished bearings. If the tested bearing shows failure it shall be replaced and the remaining bearings shall be similarly tested for acceptance at the Contractor's expense.

When directed by the Engineer, the manufacturer shall furnish an additional bearing assembly and/or random samples of component materials used in the bearings, for testing by the Department, according to Article 1083.04 of the Standard Specifications.

Installation. The HLMR bearings shall be erected according to Article 521.05 of the Standard Specifications.

Exposed edges and other exposed portions of the structural steel plates shall be field painted as specified for Structural Steel.

Basis of Payment. This work will be paid for at the contract unit price each for HIGH LOAD MULTI-ROTATIONAL BEARINGS, FIXED; HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION; or HIGH LOAD MULTI-ROTATIONAL BEARINGS, NON-GUIDED EXPANSION of the load rating specified.

When the fabrication and erection of HLMR bearings is accomplished under separate contracts, the applicable requirements of Article 505.09 shall apply.

Fabricated HLMR bearings and other materials complying with the requirements of this item, furnished and accepted, will be paid for at the contract unit price each for FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, FIXED, FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION or FURNISHING HIGH LOAD MULTI-ROTATIONAL BEARINGS, NON-GUIDED EXPANSION of the load rating specified.

Storage and care of fabricated HLMR bearings and other materials complying with the requirements of this item by the Fabrication Contractor beyond the specified storage period, will be paid for at the contract unit price per calendar day for STORAGE OF HIGH LOAD MULTI-ROTATIONAL BEARINGS if a pay item is provided for in the contract, or will be paid for according to Article 109.04 if a pay item is not provided in the contract.

HLMR bearings and other materials fabricated under this item erected according to the requirements of the specifications, and accepted, will be paid for at the contract unit price each for ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, FIXED, ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, GUIDED EXPANSION or ERECTING HIGH LOAD MULTI-ROTATIONAL BEARINGS, NON-GUIDED EXPANSION of the load rating specified.

MODULAR EXPANSION JOINT
Effective: May 19, 1994 Revised: December 29, 2014

Description. This work shall consist of furnishing and installing a modular expansion joint(s) as shown on the plans, and according to applicable portions of Section 520 of the Standard Specifications.

General. The expansion joint device shall be capable of handling the specified longitudinal movement. In addition, when specified, the joint shall also be capable of handling the differential non-parallel longitudinal movement. The expansion joint device shall effectively seal the joint opening in the deck surface and barrier curbs against the entrance of water and foreign materials. There shall be no appreciable change in the deck surface plane with the expansion and contraction movements of the bridge.

The device shall consist of a shop-fabricated modular assembly of transverse neoprene seals, edge and separation beams, bearing on support bars spanning the joint opening. The assembly shall maintain equal distances between intermediate support rails, at any cross section, for the entire length of the joint. The assembly shall be stable under all conditions of expansion and contraction, using a system of longitudinal control springs and upper and lower support beam bearings and springs.

At sidewalks, concrete median barriers and concrete parapet joints, a sliding steel plate shall be fabricated and installed according to the plans. Painting or galvanizing of sliding steel plates shall be as specified on the plans.

Suppliers: The Department maintains a pre-qualified list of proprietary structural systems allowed for modular expansion joints. This list can be found on the Departments web site under Prequalified Structural Systems. The Contractor's options are limited to those systems pre-qualified by the Department. These systems have been reviewed for structural feasibility and adequacy only. Presence on this list shall in no case relieve the Contractor of the site specific design or QC/QA requirements stated herein.

The manufacturer shall provide evidence of current certification by AISC according to Article 106.08(d) of the Standard Specifications.

Submittals: Shop drawings and a copy of the calculations and support documents shall be submitted to the Engineer for approval according to Article 105.04 of the Standard Specifications. Submittals will be required for each modular expansion joint device specified. In addition the Contractor shall provide the Department with a certification of compliance by the manufacturer listing all materials in the system. The certification shall attest that the system conforms to the design and material requirements and be supported by a copy of the successful results of the fatigue tests performed on the system as herein specified. Submittals with insufficient test data and supporting certifications will be rejected.

The shop drawings shall include tables showing the total anticipated movements for each joint and the required setting width of the joint assemblies at various temperatures.

Design Requirements: The maximum vertical, transverse and horizontal rotations and displacements shall be defined and included in the design.

The expansion joint device(s) shall be designed, detailed and successfully tested, according to Section 14 of the AASHTO LRFD Bridge Design Specifications.

Top, bottom and sides of support bars shall be restrained to prevent uplift, transmit bearing loads, and maintain the lateral position of the bars.

The total movement of each individual sealing element shall not exceed 3 in. (75 mm).

Materials:

(a) Metals. Structural Steel. All structural steel shall be according to AASHTO M 270, Grade 50 (M 270M Grade 345), unless otherwise specified.

Stainless steel sheets for the sliding surfaces of the support bars shall conform to the requirements of ASTM A240 (A240M) type 302 or 304.

The use of aluminum components in the modular joint will not be allowed.

(b) Preformed Elastomeric Seals. The elastomeric sealing element shall be according to ASTM D5973.

Lubricant/Adhesive for installing the preformed elastomeric elements in place shall be a one-part, moisture-curing, polyurethane and hydrocarbon solvent mixture as recommended by the manufacturer and containing not less than 65 percent solids.

(c) Support Bar Bearings. Support bar bearings shall be fabricated from elastomeric pads with polytetrafluorethylene (PTFE) surfacing or from polyurethane compound with PTFE sliding surfaces. The elastomeric and PTFE materials shall meet the requirements of Section 1083 of the Standard Specifications.

(d) Control Springs. Suitable elastomeric type springs which work longitudinally shall be used to maintain the equidistant spacing between transverse edge and separation beams when measured at any given cross section through the joint.

(e) Support Bars. Support bars shall incorporate stainless steel sliding surfaces to permit joint movement.

Construction Requirements

General. Installation of expansion devices shall be according to the plans and shop drawings.

The fabricator of the modular joint assembly shall be AISC certified according to Article 106.08 for Bridge and Highway Metal Component Manufacturers. In lieu of AISC certification, the Contractor may have all welding on main members (support bars and separation beams) observed and inspected by independent (third party) personnel at the Contractor's expense. Welding shall then be observed by a Certified Welding Inspector (CWI) in addition to the manufacturer's own welding inspection. Third party Non Destructive Examination (NDE) shall be performed by inspector(s), certified as level II in applicable methods, and all complete penetration beam-to-bar welds and butt joints in beams shall be UT inspected and 10 percent of fillets and partial pen welds shall be MT inspected.

The manufacturer of the expansion device shall provide a qualified technical service representative to supervise installation. Modular expansion joint devices shall be factory prefabricated assemblies, preset by the manufacturer prior to shipment with provisions for field adjustment for the ambient temperature at the time of installation.

Unless otherwise shown on the plans, the neoprene seals shall be continuous without any field splices. Installation of the joint seals shall be performed by a trained representative of the Manufacturer.

All steel surfaces of the prefabricated assembly shall be shop painted with the primer specified for structural steel, except areas in direct contact with the seals, galvanized items and stainless steel surfaces.

The metal surfaces in direct contact with the neoprene seals shall be blast cleaned to permit a high strength bond of the lubricant/adhesive between the neoprene seal and mating metal surfaces.

The Contractor shall anticipate and make all necessary adjustments to existing or plan-specified reinforcement bars, subject to the approval of the Engineer, in order to prevent interferences with placement of the selected joint in the structure. Any adjustments to reinforcement bars interfering with the joint installation shall be the responsibility of the Contractor and preapproved by the Engineer prior to installation of the joint. Cutting of reinforcement shall be minimized, and any bars that are cut shall be replaced in-kind at no additional cost.

The prefabricated joint assembly shall be properly positioned and attached to the structure according to the manufacturer's approved shop drawings. The attachment shall be sufficiently rigid to prevent non-thermal rotation, distortion, or misalignment of the joint system relative to the deck prior to casting the concrete. The joints shall be adjusted to the proper opening based on the ambient temperature at the time of installation and then all restraints preventing thermal movement shall be immediately released and/or removed. The joint assembly units shall be straight, parallel and in proper vertical alignment or reworked until proper adjustment is obtained prior to casting of the concrete around the joint.

After the joint system is installed, the joint area shall be flooded with water and inspected, from below for leakage. If leakage is observed, the joint system shall be repaired, at the expense of the Contractor, as recommended by the manufacturer and approved by the Engineer.

Method of Measurement. This work will be measured for payment in place, in feet (meters), along the centerline of the joint from face to face of the parapets or curbs. All sliding plate assemblies at the sidewalks, parapets and median barriers will not be measured for payment. The size will be defined as the specified longitudinal movement rounded up to the nearest 3 inch (75 mm) increment.

Basis of Payment: When only a longitudinal movement is specified, this work will be paid for at the contract unit price per foot (meter) for the MODULAR EXPANSION JOINT, of the size specified. When a differential non parallel movement is also specified, this work will be paid for at the contract unit price per foot (meter) for the MODULAR EXPANSION JOINT-SWIVEL, of the size specified.

All materials, equipment and labor required to fabricate, paint and install the sliding plate assemblies at the sidewalks, parapets and median barriers will not be paid for separately but shall be included in the price for the expansion joint specified.

When the fabrication and erection of modular expansion joint is accomplished under separate contracts, the applicable requirements of Article 505.09 shall apply, except the furnishing pay items shall include storage and protection of fabricated materials up to 75 days after the completion dates.

Fabricated modular expansion joints and other materials complying with the requirements of this item, furnished and accepted, will be paid for at the contract unit price per foot (meter) for FURNISHING MODULAR EXPANSION JOINT or FURNISHING MODULAR EXPANSION JOINT – SWIVEL of the size specified.

Storage and care of fabricated joints and other materials complying with the requirements of this item by the Fabrication Contractor beyond the specified storage period, will be paid for at the contract unit price per calendar day for STORAGE OF MODULAR EXPANSION JOINTS if a pay item is provided for in the contract, or will be paid for according to Article 109.04 if a pay item is not provided in the contract.

Modular expansion joints and other materials erected according to the requirements of the specifications, and accepted, will be paid for at the contract unit price per foot (meter) for ERECTING MODULAR EXPANSION JOINT or ERECTING MODULAR EXPANSION JOINT - SWIVEL of the size specified.

CLEANING AND PAINTING EXISTING STEEL STRUCTURES
Effective: October 2, 2001 Revised: April 22, 2016

Description. This work shall consist of the preparation of all designated metal surfaces by the method(s) specified on the plans. This work also includes the painting of those designated surfaces with the paint system(s) specified on the plans. The Contractor shall furnish all materials, equipment, labor, and other essentials necessary to accomplish this work and all other work described herein and as directed by the Engineer.

Materials. All 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 products that have met preliminary requirements. Each batch of material, except for the penetrating sealer, shall be tested and assigned a MISTIC approval number before use. The specified colors shall be produced in the coating manufacturer's facility. Tinting of the coating after it leaves the manufacturer's facility is not allowed.

The paint materials shall meet the following requirements of the Standard Specification and as noted below:

Item	Article
(a) Waterborne Acrylic	1008.04
(b) Aluminum Epoxy Mastic	1008.03
(c) Organic Zinc Rich Primer	1008.05
(d) Epoxy/ Aliphatic Urethane	1008.05
(e) Penetrating Sealer (Note 1)	
(f) Moisture Cured Zinc Rich Urethane Primer (Note 2)	
(g) Moisture Cured Aromatic/Aliphatic Urethane (Note 2)	
(h) Moisture Cured Penetrating Sealer (Note 3)	

Note 1: 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 2: These material requirements shall be according to the Special Provision for the Moisture Cured Urethane Paint System.

Note 3: The Moisture Cured Penetrating Sealer manufacturer's certification will be required.

Submittals. The Contractor shall submit for Engineer review and acceptance, the following plans and information for completing the work. The submittals shall be provided within 30 days of execution of the contract unless given written permission by the Engineer to submit them at a later date. Work cannot proceed until the submittals are accepted by the Engineer. Details for each of the plans are presented within the body of this specification.

a) Contractor/Personnel Qualifications. Evidence of Contractor qualifications and the names and qualifications/experience/training of the personnel managing and implementing the Quality Control program and conducting the quality control tests, and certifications for the CAS (Coating Application Specialists) on SSPC-QP1 and QP2 projects.

b) Quality Control (QC) Program. The QC Program shall identify the following; the instrumentation that will be used, a schedule of required measurements and observations, procedures for correcting unacceptable work, and procedures for improving surface preparation and painting quality as a result of quality control findings. The program shall incorporate at a minimum, the IDOT Quality Control Daily Report form, or a Contractor form (paper or electronic) that provides equivalent information.

c) Inspection Access Plan. The inspection access plan for use by Contractor QC personnel for ongoing inspections and by the Engineer during Quality Assurance (QA) observations.

d) Surface Preparation/Painting Plan. The surface preparation/painting plan shall include the methods of surface preparation and type of equipment to be utilized for washing, hand/power tool cleaning, removal of rust, mill scale, paint or foreign matter, abrasive blast or water jetting, and remediation of chloride. If detergents, additives, or inhibitors are incorporated into the water, the Contractor shall include the names of the materials and Safety Data Sheets (SDS). The Contractor shall identify the solvents proposed for solvent cleaning together with SDS.

   If cleaning and painting over existing galvanized surfaces are specified, the plan shall address surface preparation, painting, and touch up/repair of the galvanized surfaces.

   The plan shall also include the methods of coating application and equipment to be utilized.

   If the Contractor proposes to heat or dehumidify the containment, the methods and equipment proposed for use shall be included in the Plan for the Engineer’s consideration.

e) Paint Manufacturer Certifications and Letters. When a sealer is used, the Contractor shall provide the manufacturer’s certification of compliance with IDOT testing requirements listed under “Materials” above. A certification regarding the compatibility of the sealer with the specified paint system shall also be included.

   When rust inhibitors are used, the Contractor shall provide a letter from the coating manufacturer indicating that the inhibitor is compatible with, and will not adversely affect the performance of the coating system.

If the use of a chemical soluble salt remover is proposed by the Contractor, provide a letter from the coating manufacturer indicating that the material will not adversely effect the performance of the coating system.

The paint manufacturer's most recent application and thinning instructions, SDS and product data sheets shall be provided, with specific attention drawn to storage temperatures, and the temperatures of the material, surface and ambient air at the time of application.

A letter or written instructions from the coating manufacturer shall be provided indicating the length of time that each coat must be protected from cold or inclement weather (e.g., exposure to rain) during its drying period, the maximum recoat time for each coat, and the steps necessary to prepare each coat for overcoating if the maximum recoat time is exceeded.

f) Abrasives. Abrasives to be used for abrasive blast cleaning, including SDS. For expendable abrasives, the Contractor shall provide certification from the abrasive supplier that the abrasive meets the requirements of SSPC-AB1. For steel grit abrasives, the certification shall indicate that the abrasive meets the requirements of SSPC-AB3.

g) Protective Coverings. Plan for containing or controlling paint debris (droplets, spills, overspray, etc.). Any tarpaulins or protective coverings proposed for use shall be fire retardant. For submittal requirements involving the containment used to remove lead paint, the Contractor shall refer to Special Provision for Containment and Disposal of Lead Paint Cleaning Residues.

h) Progress Schedule. Progress schedule shall be submitted per Article 108.02 and shall identify all major work items (e.g., installation of rigging/containment, surface preparation, and coating application).

When the Engineer accepts the submittals, the Contractor will receive written notification. The Contractor shall not begin any paint removal work until the Engineer has accepted the submittals. The Contractor shall not construe Engineer acceptance of the submittals to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Acceptance of the programs 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.

Contractor Qualifications. Unless indicated otherwise on the contract plans, for non lead abatement projects, the painting Contractor shall possess current SSPC–QP1 certification. Unless indicated otherwise on the plans, for lead abatement projects the Contractor shall also possess current SSPC-QP2 certification. The Contractor shall maintain certified status throughout the duration of the painting work under the contract. The Department reserves the right to accept Contractors documented to be currently enrolled in the SSPC-QP7, Painting Contractor Introductory Program, Category 2, in lieu of the QP certifications noted above.

Quality Control (QC) Inspections. The Contractor shall perform first line, in process QC inspections. The Contractor shall implement the submitted and accepted QC Program to insure that the work accomplished complies with these specifications. The designated Quality Control inspector shall be onsite full time during any operations that affect the quality of the coating system (e.g., surface preparation and chloride remediation, coating mixing and application, and evaluations between coats and upon project completion). The Contractor shall use the IDOT Quality Control Daily Report form to record the results of quality control tests. Alternative forms (paper or electronic) will be allowed provided they furnish equivalent documentation as the IDOT form, and they are accepted as part of the QC Program submittal. The completed reports shall be turned into the Engineer before work resumes the following day. The Engineer or designated representative will sign the report. The signature is an acknowledgment that the report has been received, but should not be construed as an agreement that any of the information documented therein is accurate.

Contractor QC inspections shall include, but not be limited to the following:

- Suitability of protective coverings and the means employed to control project debris and paint spills, overspray, etc.
- Ambient conditions
- Surface preparation (solvent cleaning, pressure washing including chalk tests, hand/power tool or abrasive blast cleaning, etc.)
- Chloride remediation
- Coating application (specified materials, mixing, thinning, and wet/dry film thickness)
- Recoat times and cleanliness between coats
- Coating continuity and coverage (freedom from runs, sags, overspray, dryspray, pinholes, shadow-through, skips, misses, etc.)

The personnel managing the Contractor's QC Program shall possess a minimum classification of Society of Protective Coatings (SSPC) BCI certified, National Association of Corrosion Engineers (NACE) Coating Inspector Level 2 - Certified, and shall provide evidence of successful inspection of 3 bridge projects of similar or greater complexity and scope that have been completed in the last 2 years. Copies of the certification and experience shall be provided. References for experience shall be provided and shall include the name, address, and telephone number of a contact person employed by the bridge owner.

The personnel performing the QC tests shall be trained in coatings inspection and the use of the testing instruments. Documentation of training shall be provided. The QC personnel shall not perform hands on surface preparation or painting activities. Painters shall perform wet film thickness measurements, with QC personnel conducting random spot checks of the wet film. 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 shall supply all necessary equipment with current calibration certifications to perform the QC inspections. Equipment shall include the following at a minimum:

- Sling psychrometer or digital psychrometer for the measurement of dew point and relative humidity, together with all necessary weather bureau tables or psychrometric charts. In the event of a conflict between readings with the sling psychrometer and the digital psychrometer, the readings with the sling psychrometer shall prevail.
- Surface temperature thermometer
- SSPC Visual Standards VIS 1, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning; SSPC-VIS 3, Visual Standard for Power and Hand-Tool Cleaned Steel; SSPC-VIS 4, Guide and Reference Photographs for Steel Prepared by Water Jetting, and/or SSPC-VIS 5, Guide and Reference Photographs for Steel Prepared by Wet Abrasive Blast Cleaning, as applicable.
- Test equipment for determining abrasive cleanliness (oil content and water-soluble contaminants) according to SSPC abrasive specifications AB1, AB2, and AB3.
- Commercially available putty knife of a minimum thickness of 40 mils (1mm) and a width between 1 and 3 in. (25 and 75 mm). Note that the putty knife is only required for projects in which the existing coating is being feathered and tested with a dull putty knife.
- Testex Press-O-Film Replica Tape and Micrometer compliant with Method C of ASTM D4417, Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel, or digital profile depth micrometer compliant with ASTM D4417, Method B. In the event of a conflict between measurements with the two instruments on abrasive blast cleaned steel, the results with the Testex Tape shall prevail. Note that for measuring the profile of steel power tool cleaned to SSPC-SP15, Commercial Grade Power Tool Cleaning, the digital profile depth micrometer shall be used.
- Bresle Cell Kits or CHLOR*TEST kits for chloride determinations, or equivalent
- Wet Film Thickness Gage
- Blotter paper for compressed air cleanliness checks
- Type 2 Electronic Dry Film Thickness Gage per SSPC - PA2, Procedure for Determining Conformance to Dry Coating Thickness Requirements
- Standards for verifying the accuracy of the dry film thickness gage
- Light meter for measuring light intensity during paint removal, painting, and inspection activities
- All applicable ASTM and SSPC Standards used for the work (reference list attached)

The accuracy of the instruments shall be verified by the Contractor's personnel according to the equipment manufacturer's recommendations and the Contractor’s QC Program. All inspection equipment shall be made available to the Engineer for QA observations on an as needed basis.

Hold Point Notification. Specific inspection items throughout this specification are designated as Hold Points. Unless other arrangements are made at the project site, the Contractor shall provide the Engineer with a minimum 4-hour notification before a Hold Point inspection will be reached. If the 4-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 4-hour notification is required. Permission to proceed beyond a Hold Point without a QA inspection will be granted solely at the discretion of the Engineer, and only 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 provide all necessary daily QC inspections of his/her 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.

Inspection Access and Lighting. The Contractor shall facilitate the Engineer's observations as required, including allowing ample time to view the work. The Contractor shall furnish, erect and move scaffolding or other mechanical equipment to permit close observation of all surfaces to be cleaned and painted. This equipment shall be provided during all phases of the work. Examples of acceptable access structures include:

- Mechanical lifting equipment, such as, scissor trucks, hydraulic booms, etc.
- Platforms suspended from the structure comprised of trusses or other stiff supporting members and including rails and kick boards.
- Simple catenary supports are permitted only if independent life lines for attaching a fall arrest system according to Occupational Safety and Health Administration (OSHA) regulations are provided.

When the surface to be inspected is more than 6 ft. (1.8 m) above the ground or water surface, and fall prevention is not provided (e.g., guardrails are not provided), the Contractor shall provide the Engineer with a safety harness and a lifeline according to OSHA regulations. The lifeline and attachment shall not direct the fall into oncoming traffic. The Contractor shall provide a method of attaching the lifeline to the structure independent of the inspection facility or any support of the platform. When the inspection facility (e.g., platform) is more than 2 1/2 ft. (800 mm) above the ground, the Contractor shall provide an approved means of access onto the platform.

The Contractor shall provide artificial lighting in areas both inside and outside the containment where natural light is inadequate, as determined by the Engineer, to allow proper cleaning, inspection, and painting. Illumination for inspection shall be at least 30 foot candles (325 LUX). Illumination for cleaning and painting, including the working platforms, access and entryways shall be at least 20 foot candles (215 LUX). General work area illumination outside the containment shall be employed at the discretion of the Engineer and shall be at least 5 foot candles. The exterior lighting system shall be designed and operated so as to avoid glare that interferes with traffic, workers, and inspection personnel.

Surface Preparation and Painting Equipment. 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. All power tools shall be equipped with vacuums and High Efficiency Particulate Air (HEPA) filtration. 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 Sections. Prior to surface preparation, the Contractor shall prepare a test section(s) on each structure to be painted in a location(s) which the Engineer considers to be representative of the existing surface condition and steel type for the structure as a whole. More than one test section may be needed to represent the various design configurations of the structure. The purpose of the test section(s) is to demonstrate the use of the tools and degree of cleaning required (cleanliness and profile) for each method of surface preparation that will be used on the project. Each test section shall be approximately 10 sq. ft. (0.93 sq m). The test section(s) shall be prepared using the same equipment, materials and procedures as the production operations. The Contractor shall prepare the test section(s) to the specified level of cleaning according to the appropriate SSPC visual standards, modified as necessary to comply with the requirements of this specification. The written requirements of the specification prevail in the event of a conflict with the SSPC visual standards. Only after the test section(s) have been approved shall the Contractor proceed with surface preparation operations. Additional compensation will not be allowed the Contractor for preparation of the test section(s).

For the production cleaning operations, the specifications and written definitions, the test section(s), and the SSPC visual standards shall be used in that order for determining compliance with the contractual requirements.

Protective Coverings and Damage. All portions of the structure that could be damaged by the surface preparation and painting operations (e.g., utilities), including any sound paint that is allowed to remain according to the contract documents, shall be protected by covering or shielding. Tarpaulins drop cloths, or other approved materials shall be employed. The Contractor shall comply with the provisions of the Illinois Environmental Protection Act. Paint drips, spills, and overspray are not permitted to escape into the air or onto any other surfaces or surrounding property not intended to be painted. Containment shall be used to control paint drips, spills, and overspray, and shall be dropped and all equipment secured when sustained wind speeds of 40 mph (64 kph) or greater occur, unless the containment design necessitates action at lower wind speeds. The contractor shall evaluate project-specific conditions to determine the specific type and extent of containment needed to control the paint emissions and shall submit a plan for containing or controlling paint debris (droplets, spills, overspray, etc.) to the Engineer for acceptance prior to starting the work. Acceptance by the Engineer shall not relieve the Contractor of their ultimate responsibility for controlling paint debris from escaping the work zone.

When the protective coverings need to be attached to the structure, they shall be attached by bolting, clamping, or similar means. Welding or drilling into the structure is prohibited unless approved by the Engineer in writing. When removing coatings containing lead the containment and disposal of the residues shall be as specified in the Special Provision for Containment and Disposal of Lead Paint Cleaning Residues contained elsewhere in this Contract. When removing coatings not containing lead the containment and disposal of the residues shall be as specified in the Special Provision for Containment and Disposal of Non-Lead Paint Cleaning Residues contained elsewhere in this Contract.

The Contractor shall be responsible for any damage caused to persons, vehicles, or property, except as indemnified by the Response Action Contractor Indemnification Act. Whenever the intended purposes of the controls or protective devices used by the Contractor are not being accomplished, work shall be immediately suspended until corrections are made. Damage to vehicles or property shall be repaired by the Contractor at the Contractor's expense. Painted surfaces damaged by any Contractor's operation shall be repaired, removed and/or repainted, as directed by the Engineer, at the Contractor's expense.

Weather Conditions. Surfaces to be painted after cleaning shall remain free of moisture and other contaminants. The Contractor shall control his/her operations to insure that dust, dirt, or moisture do not come in contact with surfaces cleaned or painted that day.

a) The surface temperature shall be at least 5°F (3°C) above the dew point during final surface preparation operations. The manufacturers' published literature shall be followed for specific temperature, dew point, and humidity restrictions during the application of each coat.

b) If the Contractor proposes to control the weather conditions inside containment, proposed methods and equipment for heating and/or dehumidification shall be included in the work plans for the Engineer's consideration. Only indirect fired heating equipment shall be used to prevent the introduction of moisture and carbon monoxide into the containment. The heating unit(s) shall be ventilated to the outside of the containment. Any heating/dehumidification proposals accepted by the Engineer shall be implemented at no additional cost to the department.

c) Cleaning and painting shall be done between April 15 and October 31 unless authorized otherwise by the Engineer in writing.

The Contractor shall monitor temperature, dew point, and relative humidity every 4 hours during surface preparation and coating application in the specific areas where the work is being performed. The frequency of monitoring shall increase if weather conditions are changing. If the weather conditions after application and during drying are forecast to be outside the acceptable limits established by the coating manufacturer, coating application shall not proceed. If the weather conditions are forecast to be borderline relative to the limits established by the manufacturer, monitoring shall continue at a minimum of 4-hour intervals throughout the drying period. The Engineer has the right to reject any work that was performed, or drying that took place, under unfavorable weather conditions. Rejected work shall be removed, recleaned, and repainted at the Contractor's expense.

Compressed Air Cleanliness. Prior to using compressed air for abrasive blast cleaning, blowing down the surfaces, and painting with conventional spray, 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 each 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 compressed air. Effected work shall be repaired at the Contractor's expense.

Low Pressure Water Cleaning and Solvent Cleaning (HOLD POINT). The Contractor shall notify the Engineer 24 hours in advance of beginning surface preparation operations.

a) Water Cleaning of Lead Containing Coatings Prior to Overcoating. Prior to initiating any mechanical cleaning such as hand/power tool cleaning on surfaces that are painted with lead, all surfaces to be prepared and painted, and the tops of pier and abutment caps shall be washed. Washing is not required if the surfaces will be prepared by water jetting.

   Washing shall involve the use of potable water at a minimum of 1000 psi (7 MPa) and less than 5000 psi (34 MPa) according to "Low Pressure Water Cleaning" of SSPC-SP WJ-4. There are no restrictions on the presence of flash rusting of bare steel after cleaning. Paint spray equipment shall not be used to perform the water cleaning. The cleaning shall be performed in such a manner as to remove dust, dirt, chalk, insect and animal nests, bird droppings, loose coating, loose mill scale, loose rust and other corrosion products, and other foreign matter. Water cleaning shall be supplemented with scrubbing as necessary to remove the surface contaminants. . The water, debris, and any loose paint removed by water cleaning shall be collected for proper disposal. The washing shall be completed no more than 2 weeks prior to surface preparation.

   If detergents or other additives are added to the water, the detergents/additives shall be included in the submittals and not used until accepted by the Engineer. When detergents or additives are used, the surface shall be rinsed with potable water before the detergent water dries.

   After washing has been accepted by the Engineer, all traces of asphaltic cement, oil, grease, diesel fuel deposits, and other soluble contaminants which remain on the steel surfaces to be painted shall be removed by solvent cleaning according to SSPC – SP1, supplemented with scraping (e.g., to remove large deposits of asphaltic cement) as required. The solvent(s) used for cleaning shall be compatible with the existing coating system. The Contractor shall identify the proposed solvent(s) in the submittals. If the existing coating is softened, wrinkled, or shows other signs of attack from the solvents, the Contractor shall immediately discontinue their use. The name and composition of replacement solvents, together with MSDS, shall be submitted for Engineer acceptance prior to use.

Under no circumstances shall subsequent hand/power tool cleaning or abrasive blast cleaning be performed in areas containing surface contaminants or in areas where the Engineer has not accepted the washing and solvent cleaning. Surfaces prepared by hand/power tool cleaning or abrasive blast cleaning without approval of the washing and solvent cleaning may be rejected by the Engineer. Rejected surfaces shall be recleaned with both solvent and the specified mechanical means at the Contractor's expense.

After all washing and mechanical cleaning are completed, representative areas of the existing coating shall be tested to verify that the surface is free of chalk and other loose surface debris or foreign matter. The testing shall be performed according to ASTM D4214. Cleaning shall continue until a chalk rating of 6 or better is achieved in every case.

b) Water Cleaning of Non-Lead Coatings Prior to Overcoating. Thoroughly clean the surfaces according to the steps defined above for "Water Cleaning of Lead Containing Coatings Prior to Overcoating." The wash water does not need to be collected, but paint chips, insect and animal nests, bird droppings and other foreign matter shall be collected for proper disposal. If the shop primer is inorganic zinc, the chalk rating does not apply. All other provisions are applicable.

c) Water Cleaning/Debris Removal Prior to Total Coating Removal. When total coating removal is specified, water cleaning of the surface prior to coating removal is not required by this specification and is at the option of the Contractor. If the Contractor chooses to use water cleaning, the above provisions for water cleaning of lead and non-lead coatings apply as applicable, including collection and disposal of the waste.

Whether or not the surfaces are pre-cleaned using water, the tops of the pier caps and abutments shall be cleaned free of dirt, paint chips, insect and animal nests, bird droppings and other foreign matter and the debris collected for proper disposal. Cleaning can be accomplished by wet or dry methods.

Prior to mechanical cleaning, oil, grease, and other soluble contaminants on bare steel or rusted surfaces shall be removed by solvent cleaning according to SSPC-SP1.

d) Water Cleaning Between Coats. When foreign matter has accumulated on a newly applied coat, washing and scrubbing shall be performed prior to the application of subsequent coats. The water does not need to be collected unless it contacts existing lead containing coatings.

Laminar and Stratified Rust. All laminar and stratified rust that has formed on the existing steel surfaces shall be removed. Pack rust formed along the perimeter of mating surfaces of connected plates or shapes of structural steel shall be removed to the extent feasible without mechanically detaching the mating surface. Any pack rust remaining after cleaning the mating surfaces shall be tight and intact when examined using a dull putty knife. The tools used to remove these corrosion products shall be identified in the submittals and accepted by the Engineer. If the surface preparation or removal of rust results in nicks or gouges in the steel, the work shall be suspended, and the damaged areas repaired to the satisfaction of the Engineer, at the Contractor's expense. The Contractor shall also demonstrate that he/she has made the necessary adjustments to prevent a reoccurrence of the damage prior to resuming work. If surface preparation reveals holes or section loss, or creates holes in the steel, the Contractor shall notify the Engineer. Whenever possible, the Department will require that the primer be applied to preserve the area, and allow work to proceed, with repairs and touch up performed at a later date.

Surface Preparation (HOLD POINT). One or more of the following methods of surface preparation shall be used as specified on the plans. When a method of surface preparation is specified, it applies to the entire surface, including areas that may be concealed by the containment connection points. In each case, as part of the surface preparation process, soluble salts shall be remediated as specified under "Soluble Salt Remediation." The Contractor shall also note that the surface of the steel beneath the existing coating system may contain corrosion and/or mill scale. Removal of said corrosion and/or mill scale, when specified, shall be considered included in this work and no extra compensation will be allowed.

When a particular cleaning method is specified for use in distinct zones on the bridge, the cleaning shall extend into the existing surrounding paint until a sound border is achieved. The edge of the existing paint is considered to be sound and intact after cleaning if it cannot be lifted by probing the edge with a dull putty knife. The sound paint shall be feathered for a minimum of 1 1/2 in. (40 mm) to achieve a smooth transition between the prepared steel and the existing coatings. Sanders with vacuum attachments, which have been approved by the Engineer, shall be used as necessary to accomplish the feathering.

a) Limited Access Areas: A best effort with the specified methods of cleaning shall be performed in limited access areas such as the backsides of rivets inside built up box members. The equipment being used for the majority of the cleaning may need to be supplemented with other commercially available equipment, such as angle nozzles, to properly clean the limited access areas. The acceptability of the best effort cleaning in these areas is at the sole discretion of the Engineer.

b) Near-White Metal Blast Cleaning: This surface preparation shall be accomplished according to the requirements of Near-White Metal Blast Cleaning SSPC-SP 10. Unless otherwise specified in the contract, the designated surfaces shall be prepared by dry abrasive blast cleaning, wet abrasive blast cleaning, or water jetting with abrasive injection. A Near-White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining.

Random staining shall be limited to no more than 5 percent of each 9 sq. in. (58 sq. cm) of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. With the exception of crevices as defined below, surface discoloration is considered to be a residue that must be removed, rather than a stain, if it possesses enough mass or thickness that it can be removed as a powder or in chips when scraped with a pocketknife.

A surface profile shall be created on the steel as defined later under “Surface Profile.”

At the discretion of the Engineer, after a best effort cleaning, slight traces of existing coating may be permitted to remain within crevices such as those created between the steel and rivets orbolts/washers/nuts, and between plates.. When traces of coating are permitted to remain, the coating shall be tightly bonded when examined by probing with a dull putty knife. The traces of coating shall be confined to the bottom portion of the crevices only, and shall not extend onto the surrounding steel or plate or onto the outer surface of the rivets or bolts. Pitted steel is excluded from exemption considerations and shall be cleaned according to SSPC-SP10.

If hackles or slivers are visible on the steel surface after cleaning, the Contractor shall remove them by grinding followed by reblast cleaning. At the discretion of the Engineer, the use of power tools to clean the localized areas after grinding, and to establish a surface profile acceptable to the coating manufacturer, can be used in lieu of blast cleaning.

If the surfaces are prepared using wet abrasive methods, attention shall be paid to tightly configured areas to assure that the preparation is thorough. After surface preparation is completed, the surfaces, surrounding steel, and containment materials/scaffolding shall be rinsed to remove abrasive dust and debris. Potable water shall be used for all operations. An inhibitor shall be added to the supply water and/or rinse water to prevent flash rusting. With the submittals, the Contractor shall provide a sample of the proposed inhibitor together with a letter from the coating manufacturer indicating that the inhibitor is suitable for use with their products and that the life of the coating system will not be reduced due to the use of the inhibitor. The surfaces shall be allowed to completely dry before the application of any coating.

c) Commercial Grade Power Tool Cleaning: This surface preparation shall be accomplished according to the requirements of SSPC-SP15. The designated surfaces shall be completely cleaned with power tools. A Commercial Grade Power Tool Cleaned surface, when viewed without magnification, is free of all visible oil, grease, dirt, rust, coating, oxides, mill scale, corrosion products, and other foreign matter, except for staining. In previously pitted areas, slight residues of rust and paint may also be left in the bottoms of pits.

Random staining shall be limited to no more than 33 percent of each 9 sq. in. (58 sq. cm) of surface area. Allowable staining may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Surface discoloration is considered to be a residue that must be removed, rather than a stain, if it possesses enough mass or thickness that it can be removed as a powder or in chips when scraped with a pocketknife.

A surface profile shall be created on the steel as defined later under "Surface Profile."

At the Contractor's option, Near-White Metal Blast Cleaning may be substituted for Power Tool Cleaning – Commercial Grade, as long as containment systems appropriate for abrasive blast cleaning are utilized and there is no additional cost to the Department.

d) Power Tool Cleaning – Modified SP3: This surface preparation shall be accomplished according to the requirements of SSPC-SP3, Power Tool Cleaning except as modified as follows. The designated surfaces shall be cleaned with power tools. A power tool cleaned surface shall be free of all loose rust, loose mill scale, loose and peeling paint, and loose rust that is bleeding through and/or penetrating the coating. All locations of visible corrosion and rust bleed, exposed or lifting mill scale, and lifting or loose paint shall be prepared using the power tools, even if the material is tight.

Upon completion of the cleaning, rust, rust bleed, mill scale and surrounding paint are permitted to remain if they can not be lifted using a dull putty knife.

e) Power Tool Cleaning of Shop Coated Steel. When shop-coated steel requires one or more coats to be applied in the field, the surface of the shop coating shall be cleaned as specified under "Water Cleaning of Non-Lead Coatings Prior to Overcoating." If the damage is to a fully applied shop system, water cleaning is not required unless stipulated in the contract. Damaged areas of shop coating shall be spot cleaned according to Power Tool Cleaning - Modified SSPC-SP3. If the damage extends to the substrate, spot cleaning shall be according to SSPC-SP15. The edges of the coating surrounding all spot repairs shall be feathered.

f) Galvanized Surfaces: If galvanized surfaces are specified to be painted, they shall be prepared 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 roughen) the galvanized steel for painting. If cleaning and etching solutions are selected, the Contractor shall submit the manufacturer's technical product literature and SDS for Engineer's review and written acceptance prior to use.

Abrasives. Unless otherwise specified in the contract, when abrasive blast cleaning is specified, it shall be performed using either expendable abrasives (other than silica sand) or recyclable steel grit abrasives. Expendable abrasives shall be used one time and disposed of. Abrasive suppliers shall certify that the expendable abrasives meet the requirements of SSPC-AB1 and that recyclable steel grit abrasives meet SSPC-AB3. Tests to confirm the cleanliness of new abrasives (oil and water-soluble contamination) shall be performed by the Contractor according to the requirements and frequencies of SSPC-AB1 and SSPC-AB3, as applicable. On a daily basis, the Contractor shall verify that recycled abrasives are free of oil and water-soluble contamination by conducting the tests specified in SSPC-AB2.

All surfaces prepared with abrasives not meeting the SSPC-AB1, AB2, or AB3 requirements, as applicable, shall be solvent cleaned or low pressure water cleaned as directed by the Engineer, and reblast cleaned at the Contractor's expense.

Surface Profile (HOLD POINT). The abrasives used for blast cleaning shall have a gradation such that the abrasive will produce a uniform surface profile of 1.5 to 4.5 mils (38 to 114 microns). If the profile requirements of the coating manufacturer are more restrictive, advise the Engineer and comply with the more restrictive requirements. For recycled abrasives, an appropriate operating mix shall be maintained in order to control the profile within these limits.

The surface profile for SSPC-SP15 power tool cleaned surfaces shall be within the range specified by the coating manufacturer, but not less than 2.0 mils (50 microns).

The surface profile produced by abrasive blast cleaning shall be determined by replica tape or digital profile depth micrometer according to SSPC-PA 17 at the beginning of the work, and each day that surface preparation is performed. Areas having unacceptable profile measurements shall be further tested to determine the limits of the deficient area. When replica tape is used, it shall be attached to the daily report. In the event of a conflict between measurements taken with the replica tape and digital profile depth micrometer, the measurements with the replica tape shall prevail.

The surface profile produced by power tools to SSPC-SP15, shall be measured using the digital profile depth micrometer only. Replica tape shall not be used.

When unacceptable profiles are produced, work shall be suspended. The Contractor shall submit a plan for the necessary adjustments to insure that the correct surface profile is achieved on all surfaces. The Contractor shall not resume work until the new profile is verified by the QA observations, and the Engineer confirms, in writing, that the profile is acceptable.

Soluble Salt Remediation (HOLD POINT). The Contractor shall implement surface preparation procedures and processes that will remove chloride from the surfaces. Surfaces that may be contaminated with chloride include, but are not limited to, expansion joints and all areas that are subject to roadway splash or run off such as fascia beams and stringers.

Methods of chloride removal may include, but are not limited to, steam cleaning or pressure washing with or without the addition of a chemical soluble salt remover as approved by the coating manufacturer, and scrubbing before or after initial paint removal. The Contractor may also elect to clean the steel and allow it to rust overnight followed by recleaning, or by utilizing blends of fine and coarse abrasives during blast cleaning, wet abrasive/water jetting methods of preparation, or combinations of the above. If steam or water cleaning methods of chloride removal are utilized over surfaces where the coating has been completely removed, and the water does not contact any lead containing coatings, the water does not have to be collected. The Contractor shall provide the proposed procedures for chloride remediation in the Surface Preparation/Painting Plan.

Upon completion of the chloride remediation steps, the Contractor shall use cell methods of field chloride extraction and test procedures (e.g., silver dichromate) accepted by the Engineer, to test representative surfaces that were previously rusted (e.g., pitted steel) for the presence of remaining chlorides. Remaining chloride levels shall be no greater than 7µg/sq cm as read directly from the surface without any multiplier applied to the results. The testing must be performed, and the results must be acceptable, prior to painting each day.

A minimum of 5 tests per 1000 sq. ft. (93 sq m) or fraction thereof completed in a given day, shall be conducted at project start up. If results greater than 7 µg/sq cm are detected, the surfaces shall be recleaned and retested at the same frequency. If acceptable results are achieved on three consecutive days in which testing is conducted, the test frequency may be reduced to 1 test per 1000 sq. ft. (93 sq. m) prepared each day provided the chloride remediation process remains unchanged. If unacceptable results are encountered, or the methods of chloride remediation are changed, the Contractor shall resume testing at a frequency of 5 tests per 1000 sq. ft. (93 sq. m).

Following successful chloride testing the chloride test areas shall be cleaned. SSPC-SP15, Commercial Grade Power Tool Cleaning can be used to clean the test locations when the specified degree of cleaning is SSPC-SP10.

Surface Condition Prior to Painting (HOLD POINT). Prepared surfaces, shall meet the requirements of the respective degrees of cleaning immediately prior to painting, and shall be painted before rusting appears on the surface. If rust appears or bare steel remains unpainted for more than 12 hours, the affected area shall be prepared again at the expense of the Contractor.

All loose paint and surface preparation cleaning residue on bridge steel surfaces, scaffolding and platforms, containment materials, and tops of abutments and pier caps shall be removed prior to painting. When lead paint is being disturbed, cleaning shall be accomplished by HEPA vacuuming unless it is conducted within a containment that is designed with a ventilation system capable of collecting the airborne dust and debris created by sweeping and blowing with compressed air.

The quality of surface preparation and cleaning of surface dust and debris must be accepted by the Engineer prior to painting. 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 coating work shall be removed and replaced at the Contractor's expense.

General Paint Requirements. Paint storage, mixing, and application shall be accomplished according to these specifications and as specified in the paint manufacturer's written instructions and product data sheets for the paint system used. In the event of a conflict between these specifications and the coating manufacturers' instructions and data sheets, 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.

Unless noted otherwise, If a new concrete deck or repair to an existing deck is required, painting shall be done after the deck is placed and the forms have been removed.

a) Paint Storage and Mixing. All Paint shall be stored according to the manufacturer's published instructions, including handling, temperatures, and warming as required prior to mixing. All coatings shall be supplied in sealed containers bearing the manufacturers name, product designation, batch number and mixing/thinning instructions. Leaking containers shall not be used.

The Contractor shall only use batches of material that have an IDOT MISTIC approval number. For multi-component materials, the batch number from one component is tested with specific batch numbers from the other component(s). Only the same batch number combinations that were tested and approved shall be mixed together for use.

Mixing shall be according to the manufacturer's instructions. Thinning shall be performed using thinner provided by the manufacturer, and only to the extent allowed by the manufacturer's written instructions. In no case shall thinning be permitted that would cause the coating to exceed the local Volatile Organic Compound (VOC) emission restrictions. For multiple component paints, only complete kits shall be mixed and used. Partial mixing is not allowed.

The ingredients in the containers of paint shall be thoroughly mixed by mechanical power mixers according to the manufacturer's instructions, in the original containers before use or mixing with other containers of paint. The paint shall be mixed in a manner that will break up all lumps, completely disperse pigment and result in a uniform composition. Paint shall be carefully examined after mixing for uniformity and to verify that no unmixed pigment remains on the bottom of the container. Excessive skinning or partial hardening due to improper or prolonged storage will be cause for rejection of the paint, even though it may have been previously inspected and accepted.

Multiple component coatings shall be discarded after the expiration of the pot life. Single component paint shall not remain in spray pots, paint buckets, etc. overnight. It shall be stored in a covered container and remixed before use.

The Engineer reserves the right to sample field paint (individual components and/or the mixed material) and have it analyzed. If the paint does not meet the product requirements due to excessive thinning or because of other field problems, the coating shall be removed from that section of the structure and replaced as directed by the Engineer.

b) Application Methods. Unless prohibited by the coating manufacturer's written instructions, paint may be applied by spray methods, rollers, or brushes. If applied with conventional or airless spray methods, paint shall be applied in a uniform layer with overlapping at the edges of the spray pattern.

The painters shall monitor the wet film thickness of each coat during application. The wet film thickness shall be calculated based on the solids by volume of the material and the amount of thinner added. When the new coating is applied over an existing system, routine QC inspections of the wet film thickness shall be performed in addition to the painter's checks in order to establish that a proper film build is being applied.

When brushes or rollers are used to apply the coating, additional applications may be required to achieve the specified thickness per layer.

c) Field Touch Up of Shop-Coated Steel. After cleaning, rusted and damaged areas of shop-primed inorganic zinc shall be touched up using epoxy mastic. Damaged areas of shop-applied intermediate shall be touched-up using the same intermediate specified for painting the existing structure. Following touch up, the remaining coats (intermediate and finish, or finish only, depending on the number of coats applied in the shop) shall be the same materials specified for painting the existing structure. When inorganic zinc has been used as the shop primer, a mist coat of the intermediate coat shall be applied before the application of the full intermediate coat in order to prevent pinholing and bubbling.

d) Recoating and Film Continuity (HOLD POINT for each coat). Paint shall be considered dry for recoating according to the time/temperature/humidity criteria provided in the manufacturer's instructions and when an additional coat can be applied without the development of film irregularities; such as lifting, wrinkling, or loss of adhesion of the under coat. The coating shall be considered to be too cured for recoating based on the maximum recoat times stipulated by the coating manufacturer. If the maximum recoat times are exceeded, written instructions from the manufacturer for preparing the surface to receive the next coat shall be provided to the Engineer. Surface preparation and application shall not proceed until the recommendations are accepted by the Engineer in writing. If surfaces are contaminated, washing shall be accomplished prior to intermediate and final coats. Wash water does not have to be collected unless the water contacts existing lead containing coatings.

Painting shall be done in a neat and workmanlike manner. Each coat of paint shall be applied as a continuous film of uniform thickness free of defects including, but not limited to, runs, sags, overspray, dryspray, pinholes, voids, skips, misses, and shadow-through. Defects such as runs and sags shall be brushed out immediately during application. Dry spray on the surface of previous coats shall be removed prior to the application of the next coat.

Paint Systems. The paint system(s) from the list below shall be applied as specified.

The paint manufacturer's relative humidity, dew point, and material, surface, and ambient temperature restrictions shall be provided with the submittals and shall be strictly followed. Written recommendations from the paint manufacturer for the length of time each coat must be protected from cold or inclement weather (e.g., exposure to rain), during the drying period shall be included in the submittals. Upon acceptance by the Engineer, these times shall be used to govern the duration that protection must be maintained during drying.

Where stripe coats are indicated, the Contractor shall apply an additional coat to edges, rivets, bolts, crevices, welds, and similar surface irregularities. The stripe coat shall be applied by brush or spray, but if applied by spray, it shall be followed immediately by brushing to thoroughly work the coating into or on the irregular surfaces, and shall extend onto the surrounding steel a minimum of 1 in. (25 mm) in all directions. The purpose of the stripe coat is to assure complete coverage of crevices and to build additional thickness on edges and surface irregularities. If the use of the brush on edges pulls the coating away, brushing of edges can be eliminated, provided the additional coverage is achieved by spray. Measurement of stripe coat thickness is not required, but the Contractor shall visually confirm that the stripe coats are providing the required coverage.

The stripe coat may be applied as part of the application of the full coat unless prohibited by the coating manufacturer. If applied as part of the application process of the full coat, the stripe coat shall be allowed to dry for a minimum of 10 minutes in order to allow Contractor QC personnel to verify that the coat was applied. If a wet-on-wet stripe coat is prohibited by the coating manufacturer or brush or roller application of the full coat pulls the underlying stripe coat, the stripe coat shall dry according to the manufacturers' recommended drying times prior to the application of the full coat. In the case of the prime coat, the full coat can also be applied first to protect the steel, followed by the stripe coat after the full coat has dried.

The thicknesses of each coat as specified below shall be measured according to SSPC-PA2, using Coating Thickness Restriction Level 3 (spot measurements 80% of the minimum and 120% of the maximum, provided the entire area complies with the specified ranges).

a) System 1 – OZ/E/U – for Bare Steel: System 1 shall consist of the application of a full coat of organic (epoxy) zinc-rich primer, a full intermediate coat of epoxy, and a full finish coat of aliphatic urethane. Stripe coats of the prime and finish coats shall be applied. The film thicknesses of the full coats shall be as follows:

   - One full coat of organic zinc-rich primer between 3.5 and 5.0 mils (90 and 125 microns) dry film thickness. The prime coat shall be tinted to a color that contrasts with the steel surface.

   - One full intermediate coat of epoxy between 3.0 and 6.0 mils (75 and 150 microns) dry film thickness. The intermediate coat shall be a contrasting color to both the first coat and finish coat.

   - One full finish coat of aliphatic urethane between 2.5 and 4.0 mils (65 and 100 microns) dry film thickness. Finish coat color shall be according to contract plans.

   The total dry film thickness for this system, exclusive of areas receiving the stripe coats, shall be between 9.0 and 15.0 mils (225 and 375 microns).

b) System 2 – PS/EM/U – for Overcoating an Existing System: System 2 shall consist of the application of a full coat of epoxy penetrating sealer, a spot intermediate coat of aluminum epoxy mastic and a stripe and full finish coat of aliphatic urethane.

   A full coat of epoxy penetrating sealer shall be applied to all surfaces following surface preparation. A spot intermediate coat shall consist of the application of one coat of the aluminum epoxy mastic on all areas where rust is evident and areas where the old paint has been removed, feathered and/or damaged prior to, during or after the cleaning and surface preparation operations. After the spot intermediate, a stripe coat and full finish coat of aliphatic urethane shall be applied. The film thicknesses shall be as follows:

   - One full coat of epoxy penetrating sealer between 1.0 and 2.0 mils (25 and 50 microns) dry film thickness.

   - One spot coat of aluminum epoxy mastic between 5.0 and 7.0 mils (125 and 175 microns) dry film thickness. The color shall contrast with the finish coat.

- One full finish coat of aliphatic urethane between 2.5 and 4.0 mils (65 and 100 microns) dry film thickness. Finish coat color shall be according to contract plans.

The total dry film thickness for this system, exclusive of the stripe coat, shall be between 8.5 and 13.0 mils (215 and 325 microns). The existing coating thickness to remain under the overcoat must be verified in order to obtain accurate total dry film thickness measurements.

c) System 3 – EM/EM/AC – for Bare Steel: System 3 shall consist of the application of two full coats of aluminum epoxy mastic and a full finish coat of waterborne acrylic. Stripe coats for first coat of epoxy mastic and the finish coat shall be applied. The film thicknesses of the full coats shall be as follows:

- One full coat of aluminum epoxy mastic between 5.0 and 7.0 mils (125 and 175 microns) dry film thickness. The first coat of aluminum epoxy mastic shall be tinted a contrasting color with the blast cleaned surface and the second coat.

- One full intermediate coat of aluminum epoxy mastic between 5.0 and 7.0 mils (125 and 175 microns) dry film thickness. The intermediate coat shall be a contrasting color to the first coat and the finish coat.

- A full finish coat of waterborne acrylic between 2.0 and 4.0 mils (50 and 100 microns) dry film thickness. Finish coat color shall be according to contract plans.

The total dry film thickness for this system, exclusive of areas receiving the stripe coats, shall be between 12.0 and 18.0 mils (360 and 450 microns).

d) System 4 – PS/EM/AC – for Overcoating an Existing System: System 4 shall consist of the application of a full coat of epoxy penetrating sealer, a spot intermediate coat of aluminum epoxy mastic and a stripe and full finish coat of waterborne acrylic.

A full coat of epoxy penetrating sealer shall be applied to all surfaces following surface preparation. A spot intermediate coat shall consist of the application of one coat of the aluminum epoxy mastic on all areas where rust is evident and areas where the old paint has been removed, feathered and/or damaged prior to, during or after the cleaning and surface preparation operations. After the spot intermediate, a stripe coat and full finish coat of waterborne acrylic shall be applied. The film thicknesses shall be as follows:

- One full coat of epoxy penetrating sealer between 1.0 and 2.0 mils (25 and 50 microns) dry film thickness.

- One spot coat of aluminum epoxy mastic between 5.0 and 7.0 mils (125 and 175 microns) dry film thickness. The color shall contrast with the finish coat.

- One full finish coat of waterborne acrylic between 2.0 and 4.0 mils (50 and 100 microns) dry film thickness. Finish coat color shall be according to contract plans.

The total dry film thickness for this system, exclusive of the stripe coat, shall be between 8.0 and 13.0 mils (200 and 325 microns). The existing coating thickness to remain under the overcoat must be verified in order to obtain accurate total dry film thickness measurements.

e) System 5 – MCU – for Bare Steel: System 5 shall consist of the application of a full coat of moisture cure urethane (MCU) zinc primer, a full coat of MCU intermediate, and a full coat of MCU finish. Stripe coats of the prime and finish coats shall be applied. The Contractor shall comply with the manufacturer's requirements for drying times between the application of the stripe coats and the full coats. The film thicknesses of the full coats shall be as follows:

- One full coat of MCU zinc primer between 3.0 and 5.0 mils (75 and 125 microns) dry film thickness. The prime coat shall be tinted to a color that contrasts with the steel surface.

- One full MCU intermediate coat between 3.0 and 4.0 mils (75 and 100 microns) dry film thickness. The intermediate coat shall be a contrasting color to both the first coat and finish coat.

- One full MCU finish coat between 2.0 and 4.0 mils (50 and 100 microns) dry film thickness. Finish coat color shall be according to contract plans.

The total dry film thickness for this system, exclusive of areas receiving the stripe coats, shall be between 8.0 and 13.0 mils (200 and 325 microns).

f) System 6 – MCU – for Overcoating an Existing System: System 6 shall consist of the application of a full coat of moisture cure urethane (MCU) penetrating sealer, a spot coat of MCU intermediate, and a stripe and full coat of MCU finish.

A full coat of MCU penetrating sealer shall be applied to all surfaces following surface preparation. A spot intermediate coat shall consist of the application of one coat of MCU intermediate on all areas where rust is evident and areas where the old paint has been removed, feathered and/or damaged prior to, during or after the cleaning and surface preparation operations. After the spot intermediate, a stripe coat and full coat of MCU finish shall be applied. The Contractor shall comply with the manufacturer's requirements for drying time between the application of the stripe coat and the full finish coat. The film thicknesses shall be as follows:

- One full coat of MCU sealer between 1.0 and 2.0 mils (25 and 50 microns) dry film thickness.

- One full MCU intermediate coat between 3.0 and 4.0 mils (75 and 100 microns) dry film thickness. The color shall contrast with the finish coat.

- One full MCU finish coat 2.0 and 4.0 mils (50 and 100 microns) dry film thickness. Finish coat color shall be according to contract plans.

The total dry film thickness for this system, exclusive of areas receiving the stripe coats, shall be between 6.0 and 10.0 mils (150 and 250 microns). The existing coating thickness to remain under the overcoat must be verified in order to obtain accurate total dry film thickness measurements.

Application of Paint System over Galvanizing: If galvanized surfaces are present and specified to be painted, the Contractor shall apply one of the following as designated on the plans:

- A 2-coat system consisting of a full aluminum epoxy mastic coat and a full waterborne acrylic finish coat from System 3. If red rust is visible, rusted areas shall be spot primed with aluminum epoxy mastic prior to the application of the full coat of aluminum epoxy mastic.
- A 2-coat system consisting of a full epoxy coat and a full urethane coat from System 1. If red rust is visible, rusted areas shall be spot primed with organic zinc prior to the application of the full coat of epoxy.

Surface Preparation and Painting of Galvanized Fasteners: The Contractor shall prepare all fasteners (i.e., galvanized nuts, bolts, etc.) by power tool cleaning in accordance with SSPC-SP 2 or SSPC-SP3 to remove loose material. Following hand/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 is acceptable. If any dye is transferred to a cloth after vigorous rubbing, additional cleaning is required.

The fasteners shall be coated with one coat of an aluminum epoxy mastic meeting the requirements of Article1008.03 and the same acrylic or urethane topcoat specified above for use on galvanized members.

Repair of Damage to New Coating System and Areas Concealed by Containment. The Contractor shall repair all damage to the newly installed coating system and areas concealed by the containment/protective covering attachment points, at no cost to the Department. The process for completing the repairs shall be included in the submittals. If the damage extends to the substrate and the original preparation involved abrasive blast cleaning, the damaged areas shall be prepared to SSPC-SP15 Power Tool Cleaning - Commercial Grade. If the original preparation was other than blast cleaning or the damage does not extend to the substrate, the loose, fractured paint shall be cleaned to Power Tool Cleaning – Modified SP3.

The surrounding coating at each repair location shall be feathered for a minimum distance of 1 1/2 in. (40 mm) to achieve a smooth transition between the prepared areas and the existing coating.

If the bare steel is exposed, all coats shall be applied to the prepared area. For damaged galvanizing, the first coat shall be aluminum epoxy mastic. If only the intermediate and finish coats are damaged, the intermediate and finish shall be applied. If only the finish coat is damaged, the finish shall be applied.

Special Instructions.

a) At the completion of the work, the Contractor shall stencil the painting date and the paint code on the bridge. The letters shall be capitals, not less than 2 in. (50 mm) and not more than 3 in. (75 mm) in height.

   The stencil shall contain the following wording "PAINTED BY (insert the name of the Contractor)" and shall show the month and year in which the painting was completed, followed by the appropriate code for the coating material applied, all stenciled on successive lines:

   CODE U (for field applied System 3 or System 4).

   CODE Z (for field applied System 1 or System 2).

   CODE AA (for field applied System 5 or System 6).

   This information shall be stenciled on the cover plate of a truss end post near the top of the railing, or on the outside face of an outside stringer near one end of the bridge, or at some equally visible surface near the end of the bridge, as designated by the Engineer.

b) All surfaces painted inadvertently shall be cleaned immediately.

It is understood and agreed that the cost of all work outlined above, unless otherwise specified, has been included in the bid, and no extra compensation will be allowed.

Basis of Payment. This work shall be paid for at the contract Lump Sum price for CLEANING AND PAINTING STEEL BRIDGE, at the designated location, or for CLEANING AND PAINTING the structure or portions thereof described. Payment will not be authorized until all requirements for surface preparation and painting have been fulfilled as described in this specification, including the preparation and submittal of all QC documentation. Payment will also not be authorized for non-conforming work until the discrepancy is resolved in writing.

Appendix 1 – Reference List

The Contractor shall maintain the following regulations and references on site for the duration of the project:

- Illinois Environmental Protection Act
- ASTM D 4214, Standard Test Method for Evaluating Degree of Chalking of Exterior Paint Films
- ASTM D 4285, Standard Test Method for Indicating Oil or Water in Compressed Air
- ASTM D4417, Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
- SSPC-AB 1, Mineral and Slag Abrasives
- SSPC-AB 2, Cleanliness of Recycled Ferrous Metallic Abrasives
- SSPC-AB 3, Ferrous Metallic Abrasive
- SSPC-PA 2, Procedure for Determining Conformance to Dry Coating Thickness Requirements
- SSPC-PA 17, Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements
- SSPC-QP 1, Standard Procedure for Evaluating Painting Contractors (Field Application to Complex Structures)
- SSPC-QP 2, Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint
- SSPC-SP 1, Solvent Cleaning
- SSPC-SP 2, Hand Tool Cleaning
- SSPC-SP 3, Power Tool Cleaning
- SSPC-SP 10/NACE No. 2, Near White Metal Blast Cleaning
- SSPC-SP WJ-4, Waterjet Cleaning of Metals – Light Cleaning
- SSPC-SP 15, Commercial Grade Power Tool Cleaning
- SSPC-SP 16, Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals
- SSPC-VIS 1, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning
- SSPC-VIS 3, Visual Standard for Power- and Hand-Tool Cleaned Steel
- SSPC-VIS 4, Guide and Reference Photographs for Steel Cleaned by Water Jetting
- SSPC-VIS 5, Guide and Reference Photographs for Steel Prepared by Wet Abrasive Blast Cleaning
- The paint manufacturer's application instructions, MSDS and product data sheets

CONTAINMENT AND DISPOSAL OF LEAD PAINT CLEANING RESIDUES
Effective: October 2, 2001 Revised: April 22, 2016

Description. This work shall consist of the containment, collection, temporary storage, transportation and disposal of waste from lead paint removal projects. Waste requiring containment and control includes, but is not limited to, old paint, spent abrasives, corrosion products, mill scale, dirt, dust, grease, oil, salts, and water used for cleaning the surface of existing lead coatings prior to overcoating.

General. The existing coatings contain lead and may also contain other toxic metals. This specification provides the requirements for containment and for the protection of the public, and the environment from exposure to harmful levels of toxic metals that may be present in the paint being removed or repaired. The Contractor shall take reasonable and appropriate precautions to protect the public from the inhalation or ingestion of dust or debris from the operations, and is responsible for the clean-up of all spills of waste at no additional cost to the Department.

The Contractor shall comply with the requirements of this Specification and all applicable Federal, State, and Local laws, codes, and regulations, including, but not limited to the regulations of the United States Environmental Protection Agency (USEPA), Occupational Safety and Health Administration (OSHA), and Illinois Environmental Protection Agency (IEPA). The Contractor shall comply with all applicable regulations even if the regulation is not specifically referenced herein. If a Federal, State, or Local regulation is more restrictive than the requirements of this Specification, the more restrictive requirements shall prevail.

Submittals. The Contractor shall submit for Engineer review and acceptance, the following drawings and plans for accomplishing the work. The submittals shall be provided within 30 days of execution of the contract unless given written permission by the Engineer to submit them at a later date. Work cannot proceed until the submittals are accepted by the Engineer. Details for each of the plans are presented within the body of this specification. The Contractor shall also maintain on site, copies of the standards and regulations referenced herein (list provided in appendix 1).

a) Containment Plans. The containment plans shall include drawings, equipment specifications, and calculations (wind load, air flow and ventilation when negative pressure is specified. The plans shall include copies of the manufacturer's specifications for the containment materials and equipment that will be used to accomplish containment and ventilation.

   When required by the contract plans, the submittal shall provide calculations that assure the structural integrity of the bridge when it supports the containment and the calculations and drawings shall be signed and sealed by a Structural Engineer licensed in the state of Illinois.

   When working over the railroad or navigable waterways, the Department will notify the respective agencies that work is being planned. Unless otherwise noted in the plans, the Contractor is responsible for follow up contact with the agencies, and shall provide evidence that the railroad, Coast Guard, Corps of Engineers, and other applicable agencies are satisfied with the clearance provided and other safety measures that are proposed.

b) Environmental Monitoring Plan. The Environmental Monitoring Plan shall address the visual inspections and clean up of the soil and water that the Contractor will perform, including final project inspection and cleanup. The plan shall address the daily visible emissions observations that will be performed and the corrective action that will be implemented in the event emissions or releases occur. When high volume ambient air monitoring is required, an Ambient Air Monitoring Plan shall be developed. The plan shall include:

- Proposed monitor locations and power sources in writing. A site sketch shall be included, indicating sensitive receptors, monitor locations, and distances and directions from work area.
- Equipment specification sheet for monitors to be used, and a written commitment to calibrate and maintain the monitors.
- Include a procedure for operation of monitors per 40 CFR 50, Appendix B, including use of field data chain-of-custody form. Include a sample chain of custody form.
- Describe qualifications/training of monitor operator.
- The name, contact information (person's name and number), and certification of the laboratory performing the filter analysis. Laboratory shall be accredited by one of the following: 1) the American Industrial Hygiene Association (AIHA) for lead (metals) analysis, 2) Environmental Lead Laboratory Accreditation Program (ELLAP) for metals analysis, 3) State or federal accreditation program for ambient air analysis or, 4) the EPA National Lead Laboratory Accreditation Program (NLLAP) for lead analysis. The laboratory shall provide evidence of certification, a sample laboratory chain-of-custody form, and sample laboratory report that provides the information required by this specification. The laboratory shall also provide a letter committing to do the analysis per 40 CFR 50, Appendix G. If the analysis will not be performed per 40 CFR Appendix G, a proposed alternate method shall be described, together with the rationale for using it. The alternate method can not be used unless specifically accepted by the Engineer in writing.

c) Waste Management Plan. The Waste Management Plan shall address all aspects of handling, storage, testing, hauling and disposal of all project waste, including waste water. Include the names, addresses, and a contact person for the proposed licensed waste haulers and disposal facilities. Submit the name and qualifications of the laboratory proposed for Toxicity Characteristic Leaching Procedure (TCLP) analysis. If the use of abrasive additives is proposed, provide the name of the additive, the premixed ratio of additive to abrasive being provided by the supplier, and a letter from the supplier of the additive indicating IEPA acceptance of the material. Note that the use of any steel or iron based material, such as but not limited to grit, shot, fines, or filings as an abrasive additive is prohibited. The plan shall address weekly inspections of waste storage, maintaining an inspection log, and preparing a monthly waste accumulation inventory table.

d) Contingency Plan. The Contractor shall prepare a contingency plan for emergencies including fire, accident, failure of power, failure of dust collection system, failure of supplied air system or any other event that may require modification of standard operating procedures during lead removal. The plan shall include specific procedures to ensure safe egress and proper medical attention in the event of an emergency.

When the Engineer accepts the submittals, the Contractor will receive written notification. The Contractor shall not begin any work until the Engineer has accepted the submittals. The Contractor shall not construe Engineer acceptance of the submittals to imply approval of any particular method or sequence for conducting the work, or for addressing health and safety concerns. Acceptance of the plans does not relieve the Contractor from the responsibility to conduct the work according to the requirements of Federal, State, or Local regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

Quality Control (QC) Inspections. The Contractor shall perform first line, in process QC inspections of all environmental control and waste handling aspects of the project to verify compliance with these specification requirements and the accepted drawings and plans. The Contractor shall use the IDOT Environmental Daily Report form to record the results of the inspections. Alternative forms (paper or electronic) will be allowed provided they furnish equivalent documentation as the IDOT form, and they are accepted as part of the QC Program submittal. The completed reports shall be turned into the Engineer before work resumes the following day. Contractor QC inspections shall include, but not be limited to the following:

- Proper installation and continued performance of the containment system(s) in accordance with the approved drawings.
- Visual inspections of emissions into the air and verification that the cause(s) for any unacceptable emissions is corrected.
- Set up, calibration, operation, and maintenance of the regulated area and high volume ambient air monitoring equipment, including proper shipment of cassettes/filters to the laboratory for analysis. Included is verification that the Engineer receives the results within the time frames specified and that appropriate steps are taken to correct work practices or containment in the event of unacceptable results.
- Visual inspections of spills or deposits of contaminated materials into the water or onto the ground, pavement, soil, or slope protection. Included is verification that proper cleanup is undertaken and that the cause(s) of unacceptable releases is corrected.
- Proper implementation of the waste management plan including laboratory analysis and providing the results to the Engineer within the time frames specified herein.
- Proper implementation of the contingency plans for emergencies.

The personnel providing the QC inspections shall poses current SSPC-C3 certification or equal, including the annual training necessary to maintain that certification (SSPC-C5 or equal), and shall provide evidence of successful completion of 2 bridge lead paint removal projects of similar or greater complexity and scope that have been completed in the last 2 years. References shall include the name, address, and telephone number of a contact person employed by the bridge owner. Proof of initial certification and the current annual training shall also be provided.

Quality Assurance (QA) Observations. The Engineer will conduct QA observations of any or all of the QC monitoring inspections that are undertaken. The presence or activity of Engineer observations in no way relieves the Contractor of the responsibility to provide all necessary daily QC inspections of its own and to comply with all requirements of this Specification.

Containment Requirements. The Contractor shall install and maintain containment systems surrounding the work for the purpose of controlling emissions of dust and debris according to the requirements of this specification. Working platforms and containment materials that are used shall be firm and stable and platforms shall be designed to support the workers, inspectors, spent surface preparation media (e.g., abrasives), and equipment during all phases of surface preparation and painting. Platforms, cables, and other supporting structures shall be designed according to OSHA regulations. If the containment needs to be attached to the structure, the containment shall be attached by bolting, clamping, or similar means. Welding or drilling into the structure is prohibited unless approved by the Engineer in writing.

The containment shall be dropped in the event of sustained winds of 40 mph (64 kph) or greater and all materials and equipment secured.

The Contractor shall provide drawings showing the containment system and indicating the method(s) of supporting the working platforms and containment materials to each other and to the bridge. When the use of negative pressure and airflow inside containment is specified, the Contractor shall provide all ventilation calculations and details on the equipment that will be used for achieving the specified airflow and dust collection.

When directed in the contract plans, the Contractor shall submit calculations and drawings, signed and sealed by a Structural Engineer licensed in the state of Illinois, that assure the structural integrity of the bridge under the live and dead loads imposed, including the design wind loading.

When working over railroads, the Contractor shall provide evidence that the proposed clearance and the safety provisions that will be in place (e.g., flagman) are acceptable to the railroad. In the case of work over navigable waters, the Contractor shall provide evidence that the proposed clearance and provisions for installing or moving the containment out of navigation lanes is acceptable to authorities such as the Coast Guard and Army Corps of Engineers. The Contractor shall include plans for assuring that navigation lighting is not obscured, or if it is obscured, that temporary lighting is acceptable to the appropriate authorities (e.g., Coast Guard) and will be utilized.

Engineer review and acceptance of the drawings and calculations shall not relieve the Contractor from the responsibility for the safety of the working platforms and containment, and for providing ample ventilation to control worker and environmental exposures. After the work platforms and containment materials are erected additional measures may be needed to ensure worker safety according to OSHA regulations. The Contractor shall institute such measures at no additional cost to the Department.

Containment for the cleaning operation of this contract is defined as follows:

- The containment system shall maintain the work area free of visible emissions of dust and debris according to all provisions of this Specification, with no debris permitted outside of the regulated area at any time. All debris within the regulated area and within the containment shall be collected at the end of the last shift each day, and properly stored in sealed containers. Cleaning shall be accomplished by HEPA vacuuming unless it is conducted within a containment that is designed with a ventilation system capable of collecting the airborne dust and debris created by sweeping and blowing with compressed air. The ventilation system shall be in operation during the cleaning.

- The containment systems shall comply with the specified SSPC Guide 6 classifications as presented in Table 1 for the method of paint removal utilized.

- TSP-lead in the air at monitoring locations selected by the Contractor shall comply with the requirements specified herein.

The Contractor shall take appropriate action to avoid personnel injury or damage to the structure from the installation and use of the containment system. If the Engineer determines that there is the potential for structural damage caused by the installed containment system, the Contractor shall take appropriate action to correct the situation.

In addition to complying with the specific containment requirements in Table 1 for each method of removal, the Contractor shall provide and maintain coverage over the ground in the areas to be cleaned. This coverage shall be capable of catching and containing surface preparation media, paint chips, and paint dust in the event of an accidental escape from the primary containment. The containment materials shall be cleaned of loose material prior to relocation or dismantling. Acceptable methods of cleaning include blowing down the surfaces with compressed air while the ventilation system is in operation, HEPA vacuuming, and/or wet wiping. If paint chips or dust is observed escaping from the containment materials during moving, all associated operations shall be halted and the materials and components recleaned.

The containment systems shall also meet the following requirements:

a) Dry Abrasive Blast Cleaning - Full Containment with Negative Pressure (SSPC Class 1A)

The enclosure shall be designed, installed, and maintained to sustain maximum anticipated wind forces, including negative pressure. Flapping edges of containment materials are prohibited and the integrity of all containment materials, seams, and seals shall be maintained for the duration of the project. Airflow inside containment shall be designed to provide visibility and reduce worker exposures to toxic metals according to OSHA regulations and as specified in Table 1 and its accompanying text. When the location of the work on the bridge, or over lane closures permit, the blast enclosure shall extend a minimum of 3 ft. (1 m) beyond the limits of surface preparation to allow the workers to blast away from, rather than into the seam between the containment and the structure. The blast enclosure shall have an airlock or resealable door entryway to allow entrance and exit from the enclosure without allowing the escape of blasting residue.

If recyclable metallic abrasives are used, the Contractor shall operate the equipment in a manner that minimizes waste generation. Steps shall also be taken to minimize dust generation during the transfer of all abrasive/paint debris (expendable or recyclable abrasives) for recycling or disposal. Acceptable methods include, but are not limited to vacuuming, screw or belt conveyance systems, or manual conveyance. However manual conveyance is only permitted if the work is performed inside a containment that is equipped with an operating ventilation system capable of controlling the dust that is generated.

Appropriate filtration shall be used on the exhaust air of dust collection and abrasive recycling equipment as required to comply with IEPA regulations. The equipment shall be cleaned/maintained, enclosed, or replaced if visible dust and debris are being emitted and/or the regulated area or high volume monitor lead levels are not in compliance.

Areas beneath containment connection points that were shielded from abrasive blast cleaning shall be prepared by vacuum blast cleaning or vacuum-shrouded power tool cleaning after the containment is removed.

b) Vacuum Blast Cleaning within Containment (SSPC-Class 4A)

Vacuum blasting equipment shall be fully automatic and capable of cleaning and recycling the abrasive. The system shall be designed to deliver cleaned, recycled blasting abrasives and provide a closed system containment during blasting. The removed coating, mill scale, and corrosion shall be separated from the abrasive, and stored for disposal.

The Contractor shall attach containment materials around and under the work area to catch and contain abrasive and waste materials in the event of an accidental escape from the vacuum shroud. This containment is in addition to the ground covers specified earlier.

It is possible that the close proximity of some structural steel members, such as the end diaphragms or end cross-frames underneath transverse deck expansion joints, preclude the use of the vacuum blasting equipment for the removal of the old paint. For surfaces that are inaccessible for the nozzles of the vacuum blasting equipment, the Contractor shall remove the paint by means of full containment inside a complete enclosure as directed by the Engineer.

c) Vacuum-Shrouded Power Tool Cleaning within Containment (SSPC-Class 3P)

The Contractor shall utilize power tools equipped with vacuums and High Efficiency Particulate Air (HEPA) filters. The Contractor shall attach containment walls around the work area, and install containment materials beneath the work area to catch and contain waste materials in the event of an accidental escape from the vacuum shroud. This containment is in addition to the ground covers specified earlier and shall be installed within 10 ft. (3m) of the areas being cleaned.

d) Power Tool Cleaning without Vacuum, within Containment (SSPC-Class 2P)

When the use of power tools without vacuum attachments is authorized by the Engineer, the Contractor shall securely install containment walls and flooring around the work area to capture and collect all debris that is generated. The containment material requirements for this Class 2P are similar to Class 3P used for vacuum-shrouded tools, but the supporting structure will be more substantial in Class 2P to better secure the containment materials from excessive movement that could lead to the loss of waste paint chips and debris. Containment beneath the work shall be within 10 ft. (3m) of the areas being cleaned, and is in addition to the ground covers specified earlier.

e) Water Washing, Water Jetting or Wet Abrasive Blast Cleaning within Containment (SSPC Class 2W-3W)

Water washing of the bridge for the purpose of removing chalk, dirt, grease, oil, bird nests, and other surface debris, and water jetting or wet abrasive blast cleaning for the purpose of removing paint and surface debris shall be conducted within a containment designed, installed, and maintained in order to capture and contain all water and waste materials. The containment shall consist of impermeable floors and lower walls to prevent the water and debris from escaping. Permeable upper walls and ceilings are acceptable provided the paint chips, debris, and water, other than mists, are collected. A fine mist passing through the permeable upper walls is acceptable, provided the environmental controls specified below are met. If paint chips, debris, or water, other than mists, escape the containment system, impermeable walls and ceilings shall be installed.

When water is used for surface cleaning, the collected water shall be filtered to separate the particulate from the water. Recycling of the water is preferred in order to reduce the volume of waste that is generated. The water after filtration shall be collected and disposed of according to the waste handling portions of this specification.

When a slurry is created by injecting water into the abrasive blast stream, the slurry need not be filtered to separate water from the particulate.

Environmental Controls and Monitoring. The Contractor shall prepare and submit to the Engineer for review and acceptance, an Environmental Monitoring Plan. The purpose of the plan is to address the observations and equipment monitoring undertaken by the Contractor to confirm that project dust and debris are not escaping the containment into the surrounding air, soil, and water.

a) Soil and Water. Containment systems shall be maintained to prevent the escape of paint chips, abrasives, and other debris into the water, and onto the ground, soil, slope protection, and pavements. Releases or spills of, paint chips, abrasives, dust and debris that have become deposited on surrounding property, structures, equipment or vehicles, and bodies of water are unacceptable. If there are inadvertent spills or releases, the Contractor shall immediately shut down the emissions-producing operations, clean up the debris, and change work practices, modify the containment, or take other appropriate corrective action as needed to prevent similar releases from occurring in the future.

Water booms, boats with skimmers, or other means as necessary shall be used to capture and remove paint chips or project debris that falls or escapes into the water.

At the end of each workday at a minimum, the work area inside and outside of containment, including ground tarpaulins, shall be inspected to verify that paint debris is not present. If debris is observed, it shall be removed by hand and HEPA-vacuuming. If wet methods of preparation are used, the damp debris can remain overnight provided it is protected from accidental release by securely covering the waste, folding the waste into the ground tarps, or by other acceptable methods. Prior to commencing work the next day, the debris from the folded ground tarps shall be removed.

Upon project completion, the ground and water in and around the project site are considered to have been properly cleaned if paint chips, paint removal media (e.g., spent abrasives), fuel, materials of construction, litter, or other project debris have been removed.

NOTE: All project debris must be removed even if the debris (e.g.,spent abrasive and paint chips) was a pre-existing condition.

b) Visible Emissions. The Contractor shall conduct observations of visible emissions and releases on an ongoing daily basis when dust-producing activities are underway, such as paint removal, clean up, waste handling, and containment dismantling or relocation. Note that visible emissions observations do not apply to the fine mist that may escape through permeable containment materials when wet methods of preparation are used.

Visible emissions in excess of SSPC-TU7, Method A (Timing Method), Level 1 (1% of the workday) are unacceptable. In an 8-hour workday, this equates to emissions of a cumulative duration no greater than 5 minutes.. This criterion applies to scattered, random emissions of short duration. Sustained emissions from a given location (e.g., 1 minute or longer), regardless of the total length of emissions for the workday, are unacceptable and action shall be initiated to halt the emission.

If unacceptable visible emissions or releases are observed, the Contractor shall immediately shut down the emission-producing operations, clean up the debris, and change work practices, modify the containment, or take other appropriate corrective action as needed to prevent similar releases from occurring in the future.

c) Ambient Air Monitoring. The Contractor shall perform ambient air monitoring according to the following:

- Monitor Siting. The Contractor shall collect and analyze air samples to evaluate levels of TSP-lead if there are sensitive receptors within 5 times the height of the structure or within 1000 ft. (305 m) of the structure, whichever is greater. If sensitive receptors are not located within these limits, monitoring is not required. Sensitive receptors are areas of public presence or access including, but not limited to, homes, schools, parks, playgrounds, shopping areas, livestock areas, and businesses. The motoring public is not considered to be a sensitive receptor for the purpose of ambient air monitoring.

The Contractor shall locate the monitors according to Section 7.3 of SSPC-TU-7, in areas of public exposure and in areas that will capture the maximum pollutant emissions resulting from the work. The Contractor shall identify the recommended monitoring sites in the Ambient Air Monitoring Plan, including a sketch identifying the above. The monitors shall not be sited until the Engineer accepts the proposed locations. When possible, monitors shall be placed at least 30 feet (9 m) away from highway traffic.

- Equipment Provided by Contractor. The Contractor shall provide up to 4 monitors per work site and all necessary calibration and support equipment, power to operate them, security (or arrangements to remove and replace the monitors daily), filters, flow chart recorders and overnight envelopes for shipping the filters to the laboratory. The number of monitors required will be indicated in the Plan Notes. Each monitor shall be tagged with the calibration date.

- Duration of Monitoring. Monitoring shall be performed for the duration of dust-producing operations (e.g., paint removal, waste handling, containment clean-up and movement, etc.) or a minimum of 8 hours each day (when work is performed).

  The monitoring schedule shall be as follows:

  1. For dry abrasive blast cleaning monitoring shall be conducted full time during all days of dust-producing operations (e.g., paint removal, waste handling, containment movement, etc.).
  2. For wet abrasive blast cleaning, water jetting, or power tool cleaning, monitoring shall be conducted for the first 5 days of dust producing operations. If the results after 5 days are acceptable, monitoring may be discontinued. If the results are unacceptable, corrective action shall be initiated to correct the cause of the emissions, and monitoring shall continue for an additional 5 days. If the results are still unacceptable, the Engineer may direct that the monitoring continue full time.

     When monitoring is discontinued, if visible emissions are observed and/or the Contractor's containment system changes during the course of the project, then air monitoring will again be required for a minimum of two consecutive days until compliance is shown.

- Background Monitoring. Background samples shall be collected for two days prior to the start of work while no dust producing operations are underway to provide a baseline. The background monitoring shall include one weekday and one weekend day. The background monitoring shall coincide with the anticipated working hours for the paint removal operations, but shall last for a minimum of 8 hours each day.

- Monitor Operation and Laboratory Analysis.

  The Contractor shall calibrate the monitors according to the manufacturer's written instructions upon mobilization to the site and quarterly. Each monitor shall be tagged with the calibration date, and calibration information shall be provided to the Engineer upon request.

All ambient air monitoring shall be performed by the Contractor according to the accepted Ambient Air Monitoring Plan and according to EPA regulations 40 CFR Part 50 Appendix B, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method), and 40 CFR Part 50 Appendix G, Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air.

Filters shall be placed in monitors and monitors operated each day prior to start of dust-producing operations and the filters removed upon completion each day. The Contractor shall advise the Engineer in advance when the filters will be removed and replaced. The monitor operator shall record the following information, at a minimum, on field data and laboratory chain-of-custody forms (or equivalent):

1. Monitor location and serial number
2. Flow rate, supported by flow charts
3. Start, stop times and duration of monitoring
4. Work activities and location of work during the monitoring period
5. Wind direction/speed

For the first 5 days of monitoring, the Contractor shall submit the filters, field data and laboratory chain-of-custody forms together with the flow chart recorders (i.e. monitor flow rate and the duration of monitoring) on a daily basis in an overnight envelope to the laboratory for analysis. The laboratory must provide the Engineer with written results no later than 72 hours after the completion of each day's monitoring. At the discretion of the Engineer, if the initial 5 days of monitoring on full time monitoring projects is acceptable, the filters may be sent to the laboratory every 3 days rather than every day. Written results must be provided to the Engineer no later than 5 days after the completion of monitoring for the latest of the 3 days.

- Ambient Air Monitoring Results. The laboratory shall provide the report directly to the Engineer with a copy to the contractor. The report shall include:

1. Monitor identification and location
2. Work location and activities performed during monitoring period
3. Monitor flow rate, duration, and volume of air sampled
4. Laboratory methods used for filter digestion / analysis
5. Sample results for the actual duration of monitoring
6. Sample results expressed in terms of a 24 hour time weighted average. Assume zero for period not monitored.
7. Comparison of the results with the acceptance criteria indicating whether the emissions are compliant.
8. Field data and chain-of-custody records used to derive results.

Should revised reports or any information regarding the analysis be issued by the laboratory directly to the Contractor at any time, the contractor shall immediately provide a copy to the Engineer and advise the laboratory that the Engineer is to receive all information directly from the laboratory.

- Acceptance Criteria. TSP-lead results at each monitor location shall be less than 1.5 μg/cu m per calendar quarter converted to a daily allowance using the formulas from SSPC- TU7 as follows, except that the maximum 24-hour daily allowance shall be no greater than 6 μg/cu m.

  The formula for determining a 24-hour daily value based on the actual number of paint disturbance days expected to occur during the 90-day quarter is:

  DA = (90 ÷ PD) x 1.5 μg/cu m, where

  DA is the daily allowance, and
  PD is the number of preparation days anticipated in the 90-day period
  If the DA calculation is > 6.0 μg/cu m, use 6.0 μg/cu m.

Regulated Areas. Physically demarcated regulated area(s) shall be established around exposure producing operations at the OSHA Action Level for the toxic metal(s) present in the coating. The Contractor shall provide all required protective clothing and personal protective equipment for personnel entering into a regulated area. Unprotected street clothing is not permitted within the regulated areas.

Hygiene Facilities/Protective Clothing/Blood Tests. The Contractor shall provide clean lavatory and hand washing facilities according to OSHA regulations and confirm that employees wash hands, forearms, and face before breaks. The facilities shall be located at the perimeter of the regulated area in close proximity to the paint removal operation. Shower facilities shall be provided when workers' exposures exceed the Permissible Exposure Limit. Showers shall be located at each bridge site, or if allowed by OSHA regulations, at a central location to service multiple bridges. The shower and wash facilities shall be cleaned at least daily during use.

All wash and shower water shall be filtered and containerized. The Contractor is responsible for filtration, testing, and disposal of the water.

The Contractor shall make available to all IDOT project personnel a base line and post project blood level screening for lead and zinc protoporphyrin (ZPP) (or the most current OSHA requirement) levels as determined by the whole blood lead method, utilizing the Vena-Puncture technique. This screening shall be made available every 2 months for the first 6 months, and every 6 months thereafter.

The Contractor shall provide IDOT project personnel with all required protective clothing and equipment, including disposal or cleaning. Clothing and equipment includes but is not limited to disposable coveralls with hood, booties, disposable surgical gloves, hearing protection, and safety glasses. The protective clothing and equipment shall be provided and maintained on the job site for the exclusive, continuous and simultaneous use by the IDOT personnel. This equipment shall be suitable to allow inspection access to any area in which work is being performed.

All handwash and shower facilities shall be fully available for use by IDOT project personnel.

Site Emergencies.

a) Stop Work. The Contractor shall stop work at any time the conditions are not within specifications and take the appropriate corrective action. The stoppage will continue until conditions have been corrected. Standby time and cost required for corrective action is at the Contractor's expense. The occurrence of the following events shall be reported in writing to IDOT and shall require the Contractor to automatically stop lead paint removal and initiate clean up activities.

- Airborne lead levels at any of the high volume ambient air monitoring locations that exceed the limits in this specification, or airborne lead in excess of the OSHA Action Level at the boundary of the regulated area.
- Break in containment barriers.
- Visible emissions in excess of the specification tolerances.
- Loss of negative air pressure when negative air pressure is specified (e.g., for dry abrasive blast cleaning).
- Serious injury within the containment area.
- Fire or safety emergency
- Respiratory system failure
- Power failure

b) Contingency Plans and Arrangements. The Engineer will refer to the contingency plan for site specific instructions in the case of emergencies.

The Contractor shall prepare a contingency plan for emergencies including fire, accident, failure of power, failure of dust collection system, failure of supplied air system or any other event that may require modification of standard operating procedures during lead removal. The plan shall include specific procedures to ensure safe egress and proper medical attention in the event of an emergency. The Contractor shall post the telephone numbers and locations of emergency services including fire, ambulance, doctor, hospital, police, power company and telephone company on clean side of personnel decontamination area.

A two-way radio, or equal, as approved by the Engineer, capable of summoning emergency assistance shall be available at each bridge during the time the Contractor's personnel are at the bridge site under this contract. The following emergency response equipment described in the contingency plan (generic form attached) shall be available during this time as well: an appropriate portable fire extinguisher, a 55 gal (208 L) drum, a 5 gal (19 L) pail, a long handled shovel, absorbent material (one bag).

A copy of the contingency plan shall be maintained at each bridge during cleaning operations and during the time the Contractor's personnel are at the bridge site under this contract. The Contractor shall designate the emergency coordinator(s) required who shall be responsible for the activities described.

An example of a contingency plan is included at the end of this Special Provision.

Collection, Temporary Storage, Transportation and Disposal of Waste. The Contractor and the Department are considered to be co-generators of the waste.

The Contractor is responsible for all aspects of waste collection, testing and identification, handling, storage, transportation, and disposal according to these specifications and all applicable Federal, State, and Local regulations. The Contractor shall provide for Engineer review and acceptance a Waste Management Plan that addresses all aspects of waste handling, storage, and testing, and provides the names, addresses, and a contact person for the proposed licensed waste haulers and disposal facilities. The Department will not perform any functions relating to the waste other than provide EPA identification numbers, provide the Contractor with the emergency response information, the emergency response telephone number required to be provided on the manifest, and to sign the waste manifest. The Engineer will obtain the identification numbers from the state and federal environmental protection agencies for the bridge(s) to be painted and furnish those to the Contractor.

All surface preparation/paint residues shall be collected daily and deposited in all-weather containers supplied by the Contractor as temporary storage. The storage area shall be secure to prevent unauthorized entry or tampering with the containers. Acceptable measures include storage within a fully enclosed (e.g., fenced in) and locked area, within a temporary building, or implementing other reasonable means to reduce the possibility of vandalism or exposure of the waste to the public or the environment (e.g., securing the lids or covers of waste containers and roll-off boxes). Waste shall not be stored outside of the containers. Waste shall be collected and transferred to bulk containers taking extra precautions as necessary to prevent the suspension of residues in air or contamination of surrounding surfaces. Precautions may include the transfer of the material within a tarpaulin enclosure. Transfer into roll-off boxes shall be planned to minimize the need for workers to enter the roll-off box.

No residues shall remain on surfaces overnight, either inside or outside of containment. Waste materials shall not be removed through floor drains or by throwing them over the side of the bridge. Flammable materials shall not be stored around or under any bridge structures.

The all-weather containers shall meet the requirements for the transportation of hazardous materials and as approved by the Department. Acceptable containers include covered roll-off boxes and 55-gallon drums (17H). The Contractor shall insure that no breaks and no deterioration of these containers occurs and shall maintain a written log of weekly inspections of the condition of the containers. A copy of the log shall be furnished to the Engineer upon request. The containers shall be kept closed and sealed from moisture except during the addition of waste. Each container shall be permanently identified with the date that waste was placed into the container, contract number, hazardous waste name and ID number, and other information required by the IEPA.

The Contractor shall have each waste stream sampled for each project and tested by TCLP and according to EPA and disposal company requirements. The Engineer shall be notified in advance when the samples will be collected. The samples shall be collected and shipped for testing within the first week of the project, with the results due back to the Engineer within 10 days. Testing shall be considered included in the pay item for “Containment and Disposal of Lead Paint Cleaning Residues.” Copies of the test results shall be provided to the Engineer prior to shipping the waste.

Waste water generated from bridge washing, hygiene purposes, and cleaning of equipment shall be filtered on site to remove particulate and disposed of at a Publicly Owned Treatment Works (POTW) according to State regulations. The Contractor shall provide the Engineer with a letter from the POTW indicating that they will accept the waste water. If the POTW allows the filtered water to be placed into the sanitary sewer system, the Contractor shall provide a letter from the POTW indicating that based on the test results of the water, disposal in the sanitary sewer is acceptable to them. Water shall not be disposed of until the above letter(s) are provided to, and accepted by, the Engineer.

If approved abrasive additives are used that render the waste non-hazardous as determined by TCLP testing, the waste shall be classified as a non-hazardous special waste, transported by a licensed waste transporter, and disposed of at an IEPA permitted disposal facility in Illinois.

When paint is removed from the bridge without the use of abrasive additives, the paint, together with the surface preparation media (e.g. abrasive) shall be handled as a hazardous waste, regardless of the TCLP results. The waste shall be transported by a licensed hazardous waste transporter, treated by an IEPA permitted treatment facility to a non-hazardous special waste and disposed of at an IEPA permitted disposal facility in Illinois.

The treatment/disposal facilities shall be approved by the Engineer, and shall hold an IEPA permit for waste disposal and waste stream authorization for this cleaning residue. The IEPA permit and waste stream authorization must be obtained prior to beginning cleaning, except that if necessary, limited paint removal will be permitted in order to obtain samples of the waste for the disposal facilities. The waste shall be shipped to the facility within 90 days of the first accumulation of the waste in the containers. When permitted by the Engineer, waste from multiple bridges in the same contract may be transported by the Contractor to a central waste storage location(s) approved by the Engineer in order to consolidate the material for pick up, and to minimize the storage of waste containers at multiple remote sites after demobilization. Arrangements for the final waste pickup shall be made with the waste hauler by the time blast cleaning operations are completed or as required to meet the 90 day limit stated above.

The Contractor shall submit a waste accumulation inventory table to the Engineer no later than the 5th day of the month. The table shall show the number and size of waste containers filled each day in the preceding month and the amount of waste shipped that month, including the dates of shipments.

The Contractor shall prepare a manifest supplied by the IEPA for off-site treatment and disposal before transporting the hazardous waste off-site. The Contractor shall prepare a land ban notification for the waste to be furnished to the disposal facility. The Contractor shall obtain the handwritten signature of the initial transporter and date of the acceptance of the manifest. The Contractor shall send one copy of the manifest to the IEPA within two working days of transporting the waste off-site. The Contractor shall furnish the generator copy of the manifest and a copy of the land ban notification to the Engineer. The Contractor shall give the transporter the remaining copies of the manifest.

All other project waste shall be removed from the site according to Federal, State and Local regulations, with all waste removed from the site prior to final Contractor demobilization.

The Contractor shall make arrangements to have other hazardous waste, which he/she generates, such as used paint solvent, transported to the Contractor's facility at the end of each day that this waste is generated. These hazardous wastes shall be manifested using the Contractor's own generator number to a treatment or disposal facility from the Contractor's facility. The Contractor shall not combine solvents or other wastes with cleaning residue wastes. All waste streams shall be stored in separate containers.

The Contractor is responsible for the payment of any fines and undertaking any clean up activities mandated by State or federal environmental agencies for improper waste handling, storage, transportation, or disposal.

Contractor personnel shall be trained in the proper handling of hazardous waste, and the necessary notification and clean up requirements in the event of a spill. The Contractor shall maintain a copy of the personnel training records at each bridge site.

Basis of Payment. The soil, water, and air monitoring, containment, collection, temporary storage, transportation, testing and disposal of all project waste, and all other work described herein will be paid for at the contract lump sum price for CONTAINMENT AND DISPOSAL OF LEAD PAINT CLEANING RESIDUES at the designated location. Payment will not be authorized until all requirements have been fulfilled as described in this specification, including the preparation and submittal of all QC documentation, submittal of environmental monitoring and waste test results, and disposal of all waste.

Appendix 1 – Reference List

The Contractor shall maintain the following reference standards and regulations on site for the duration of the project:

- Illinois Environmental Protection Agency – Information Statement on the Removal of Lead-Based Paint from Exterior Surfaces, latest revision
- Illinois Environmental Protection Act
- SSPC Guide 6, Guide for Containing Debris Generated During Paint Removal Operations
- 29 CFR 1926.62, Lead in Construction
- 40 CFR Part 50, Appendix B, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method)
- 40 CFR Part 50, Appendix G, Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air
- SSPC Guide 16, Guide to Specifying and Selecting Dust Collectors
- SSPC TU-7, Conducting Ambient Air, Soil, and Water Sampling Activities During Surface Preparation and Paint Disturbance Activities.

Table 1
Containment Criteria for Removal of Paint Containing Lead and Other Toxic Metals[1]

Removal Method	SSPC Class[2]	Containment Material Flexibility	Containment Material Permeability[3]	Containment Support Structure	Containment Material Joints[4]
Hand Tool Cleaning	3P[6]	Rigid or Flexible	Permeable or Impermeable	Minimal	Partially Sealed
Power Tool Cleaning w/ Vacuum	3P[6]	Rigid or Flexible	Permeable or Impermeable	Minimal	Partially Sealed
Power Tool Cleaning w/o Vacuum	2P	Rigid or Flexible	Permeable or Impermeable	Rigid or Flexible	Fully or Partially Sealed
Water Jetting Wet Ab Blast Water Cleaning[7]	2W-3W	Rigid or Flexible	Permeable and Impermeable[7]	Rigid, Flexible, or Minimal	Fully and Partially Sealed
Abrasive Blast Cleaning	1A	Rigid or Flexible	Impermeable	Rigid or Flexible	Fully Sealed
Vacuum Blast Cleaning	4A[6]	Rigid or Flexible	Permeable	Minimal	Partially Sealed

Table 1 (Continued)
Containment Criteria for Removal of Paint Containing Lead and Other Toxic Metals[1]

Removal Method	SSPC Class[2]	Containment Entryway	Ventilation System Required[5]	Negative Pressure Required	Exhaust Filtration Required
Hand Tool Cleaning	3P[6]	Overlapping or Open Seam	Natural	No	No
Power Tool Cleaning w/ Vacuum	3P[6]	Overlapping or Open Seam	Natural	No	No
Power Tool Cleaning w/o Vacuum	2P	Overlapping or Open Seam	Natural	No	No
Water Jetting Wet Ab Blast Water Cleaning[7]	2W-3W	Overlapping or Open Seam	Natural	No	No
Abrasive Blast Cleaning	1A	Airlock or Resealable	Mechanical	Yes	Yes
Vacuum Blast Cleaning	4A[6]	Open Seam	Natural	No	No

Notes:

[1]This table provides general design criteria only. It does not guarantee that specific controls over emissions will occur because unique site conditions must be considered in the design. Other combinations of materials may provide controls over emissions equivalent to or greater than those combinations shown above.

[2]The SSPC Classification is based on SSPC Guide 6. Note that for work over water, water booms or boats with skimmers must be employed, where feasible, to contain spills or releases. Debris must be removed daily at a minimum.

[3]Permeability addresses both air and water as appropriate. In the case of water removal methods, the containment materials must be resistant to water. Ground covers should always impermeable, and of sufficient strength to withstand the impact and weight of the debris and the equipment used for collection and clean-up. Ground covers must also extend beyond the containment boundary to capture escaping debris.

[4] If debris escapes through the seams, then additional sealing of the seams and joints is required.

[5]When “Natural” is listed, ventilation is not required provided the emissions are controlled as specified in this Special Provision, and provided worker exposures are properly controlled. If unacceptable emissions or worker exposures to lead or other toxic metals occur, incorporate a ventilation system into the containment.

[6]Ground covers and wall tarpaulins may provide suitable controls over emissions without the need to completely enclose the work area.

[7]This method applies to water cleaning to remove surface contaminants, and water jetting (with and without abrasive) and wet abrasive blast cleaning where the goal is to remove paint. Although both permeable and impermeable containment materials are included, ground covers and the lower portions of the containment must be water impermeable with fully sealed joints, and of sufficient strength and integrity to facilitate the collection and holding of the water and debris for proper disposal. If water or debris, other than mist, escape through upper sidewalls or ceiling areas constructed of permeable materials, they shall be replaced with impermeable materials. Permeable materials for the purpose of this specification are defined as materials with openings measuring 25 mils (1 micron) or less in greatest dimension.

A. Containment Components - The basic components that make up containment systems are defined below. The components are combined in Table 1 to establish the minimum containment system requirements for the method(s) of paint removal specified for the Contract.

1. Rigidity of Containment Materials - Rigid containment materials consist of solid panels of plywood, aluminum, rigid metal, plastic, fiberglass, composites, or similar materials. Flexible materials consist of screens, tarps, drapes, plastic sheeting, or similar materials. When directed by the Engineer, do not use flexible materials for horizontal surfaces directly over traffic lanes or vertical surfaces in close proximity to traffic lanes. If the Engineer allows the use of flexible materials, The Contractor shall take special precautions to completely secure the materials to prevent any interference with traffic.

2. Permeability of Containment Materials - The containment materials are identified as air impenetrable if they are impervious to dust or wind such as provided by rigid panels, coated solid tarps, or plastic sheeting. Air penetrable materials are those that are formed or woven to allow air flow. Water impermeable materials are those that are capable of containing and controlling water when wet methods of preparation are used. Water permeable materials allow the water to pass through. Chemical resistant materials are those resistant to chemical and solvent stripping solutions. Use fire retardant materials in all cases.

3. Support Structure - Rigid support structures consist of scaffolding and framing to which the containment materials are affixed to minimize movement of the containment cocoon. Flexible support structures are comprised of cables, chains, or similar systems to which the containment materials are affixed. Use fire retardant materials in all cases.

4. Containment Joints - Fully sealed joints require that mating surfaces between the containment materials and to the structure being prepared are completely sealed. Sealing measures include tape, caulk, Velcro, clamps, or other similar material capable of forming a continuous, impenetrable or impermeable seal. When materials are overlapped, a minimum overlap of 8 in. (200 mm) is required.

5. Entryway - An airlock entryway involves a minimum of one stage that is fully sealed to the containment and which is maintained under negative pressure using the ventilation system of the containment. Resealable door entryways involve the use of flexible or rigid doors capable of being repeatedly opened and resealed. Sealing methods include the use of zippers, Velcro, clamps, or similar fasteners. Overlapping door tarpaulin entryways consist of two or three overlapping door tarpaulins.

6. Mechanical Ventilation - The requirement for mechanical ventilation is to ensure that adequate air movement is achieved to reduce worker exposure to toxic metals to as low as feasible according to OSHA regulations (e.g., 29 CFR 1926.62), and to enhance visibility. Design the system with proper exhaust ports or plenums, adequately sized ductwork, adequately sized discharge fans and air cleaning devices (dust collectors) and properly sized and distributed make-up air points to achieve a uniform air flow inside containment for visibility. The design target for airflow shall be a minimum of 100 ft. (30.5m) per minute cross-draft or 60 ft. (18.3 m) per minute downdraft. Increase these minimum airflow requirements if necessary to address worker lead exposures. Natural ventilation does not require the use of mechanical equipment for moving dust and debris through the work area.

7. Negative Pressure - When specified, achieve a minimum of 0.03 in. (7.5 mm) water column (W.C.) relative to ambient conditions, or confirm through visual assessments for the concave appearance of the containment enclosure.

8. Exhaust Ventilation - When mechanical ventilation systems are used, provide filtration of the exhaust air, to achieve a filtration efficiency of 99.9 percent at 0.02 mils (0.5 microns).

HAZARDOUS WASTE
CONTINGENCY PLAN
FOR
LEAD BASED PAINT REMOVAL PROJECTS

Bridge No.: _____
Location: _____
USEPA Generator No.: _____
IEPA Generator No.: _____

Note:

1. A copy of this plan must be kept at the bridge while the Contractor's employees are at the site.

2. A copy of the plan must be mailed to the police and fire departments and hospital identified herein.

Primary Emergency Coordinator

Name: _____
Address: _____
City: _____
Phone: (Work) _____
(Home) _____

Alternate Emergency Coordinator

Name: _____
Address: _____
City: _____
Phone: (Work) _____
(Home) _____

Emergency Response Agencies

POLICE:

1. State Police (if bridge not in city) Phone:_____

   District No. _____

   Address: _____

2. County Sheriff _____Phone: _____

   County: _____

   Address: _____

3. City Police _____Phone: _____

   District No. _____

   Address: _____

Arrangements made with police: (Describe arrangements or refusal by police to make arrangements):

_____

FIRE:

1. City _____Phone: _____

   Name: _____

   Address:_____

2. Fire District _____Phone: _____

   Name: _____

   Address: _____

3. Other _____Phone: _____

   Name: _____

   Address: _____

Arrangements made with fire departments: (Describe arrangements or refusal by fire departments to make arrangements):

_____

_____

HOSPITAL:

Name: _____ Phone: _____

Address: _____

Arrangements made with hospital: (Describe arrangements or refusal by hospital to make arrangements):

_____

_____

Properties of waste and hazard to health:

Places where employees working:

Location of Bridge:

Types of injuries or illness which could result:

Appropriate response to release of waste to the soil:

Appropriate response to release of waste to surface water:

Emergency Equipment at Bridge

Emergency Equipment List	Location of Equipment	Description of Equipment	Capability of Equipment
1. Two-way radio	Truck		Communication
2. Portable Fire Extinguisher	Truck		Extinguishes Fire
3. Absorbent Material	Truck		Absorbs Paint or Solvent Spills
4. Hand Shovel	Truck		Scooping Material
5. 55 Gallon (208 L) Drum	Truck		Storing Spilled Material
6. 5 Gallon (19 L) Pail	Truck		Storing Spilled Material

Emergency Procedure

1. Notify personnel at the bridge of the emergency and implement emergency procedure.

2. Identify the character, source, amount and extent of released materials.

3. Assess possible hazards to health or environment.

4. Contain the released waste or extinguish fire. Contact the fire department if appropriate.

5. If human health or the environment is threatened, contact appropriate police and fire department. In addition, the Emergency Services and Disaster Agency needs to be called using their 24-hour toll free number (800-782-7860) and the National Response Center using their 24-hour toll free number (800-824-8802).

6. Notify the Engineer that an emergency has occurred.

7. Store spilled material and soil contaminated by spill, if any, in a drum or pail. Mark and label the drum or pail for disposal.

8. Write a full account of the spill or fire incident including date, time, volume, material, and response taken.

9. Replenish stock of absorbent material or other equipment used in response.

PIPE UNDERDRAINS FOR STRUCTURES
Effective: May 17, 2000 Revised: January 22, 2010

Description. This work shall consist of furnishing and installing a pipe underdrain system as shown on the plans, as specified herein, and as directed by the Engineer.

Materials. Materials shall meet the requirements as set forth below:

The perforated pipe underdrain shall be according to Article 601.02 of the Standard Specifications. Outlet pipes or pipes connecting to a separate storm sewer system shall not be perforated.

The drainage aggregate shall be a combination of one or more of the following gradations, FA1, FA2, CA5, CA7, CA8, CA11, or CA13 thru 16, according to Sections 1003 and 1004 of the Standard Specifications.

The fabric surrounding the drainage aggregate shall be Geotechnical Fabric for French Drains according to Article 1080.05 of the Standard Specifications.

Construction Requirements. All work shall be according to the applicable requirements of Section 601 of the Standard Specifications except as modified below.

The pipe underdrains shall consist of a perforated pipe drain situated at the bottom of an area of drainage aggregate wrapped completely in geotechnical fabric and shall be installed to the lines and gradients as shown on the plans.

Method of Measurement. Pipe Underdrains for Structures shall be measured for payment in feet (meters), in place. Measurement shall be along the centerline of the pipe underdrains. All connectors, outlet pipes, elbows, and all other miscellaneous items shall be included in the measurement. Concrete headwalls shall be included in the cost of Pipe Underdrains for Structures, but shall not be included in the measurement for payment.

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for PIPE UNDERDRAINS FOR STRUCTURES of the diameter specified. Furnishing and installation of the drainage aggregate, geotechnical fabric, forming holes in structural elements and any excavation required, will not be paid for separately, but shall be included in the cost of the pipe underdrains for structures.

ERECTION OF CURVED STEEL STRUCTURES
Effective: June 1, 2007

Description: In addition to the requirements of Article 505.08(e), the following shall apply.

The Contractor or sub-Contractor performing the erection of the structural steel is herein referred to as the Erection Contractor.

Erection Plan: The Erection Contractor shall retain the services of an Illinois Licensed Structural Engineer, experienced in the analysis and preparation of curved steel girder erection plans, for the completion of a project-specific erection plan. The structural engineer, herein referred to as the Erection Engineer, shall sign and seal the erection plan, drawings, and calculations for the proposed erection of the structural steel.

The erection plan shall be complete in detail for all phases, stages, and conditions anticipated during erection. The erection plan shall include structural calculations and supporting documentation necessary to completely describe and document the means, methods, temporary support positions, and loads necessary to safely erect the structural steel in conformance with the contract documents and as outlined herein. The erection plans shall address and account for all items pertinent to the steel erection including such items as sequencing, falsework, temporary shoring and/or bracing, girder stability, crane positioning and movement, means of access, pick points, girder shape, permissible deformations and roll, interim/final plumbness, cross frame/diaphragm placement and connections, bolting and anchor bolt installation sequences and procedures, and blocking and anchoring of bearings. The Erection Contractor shall be responsible for the stability of the partially erected steel structure during all phases of the steel erection.

The erection plans and procedures shall be submitted to the Engineer for review and acceptance prior to starting the work. Review, acceptance and/or comments by the Department shall not be construed to guarantee the safety or final acceptability of the work or compliance with all applicable specifications, codes, or contract requirements, and shall neither relieve the Contractor of the responsibility and liability to comply with these requirements, nor create liability for the Department. Significant changes to the erection plan in the field must be approved by the Erection Engineer and accepted by the Engineer for the Department.

Basis of Payment: This work shall not be paid for separately but shall be included in the applicable pay items according to Article 505.13 of the Standard Specifications.

DIAMOND GRINDING AND SURFACE TESTING BRIDGE SECTIONS
Effective: December 6, 2004 Revised: March 29, 2017

Description. This work shall consist of diamond grinding and surface testing bridge sections.

A bridge section shall consist of the bridge deck plus the bridge approach pavement and connector pavement on each side 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 Article 1101.10(b) 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 connector pavements.

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.

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 the wheel paths of each lane, 3 ft. (1 m) from, and parallel to, the planned lane lines. A guide shall be used to maintain the required distance.

The profile trace shall have stationing indicated every 500 ft. (150 m) at a minimum. Both ends of the profile trace shall be labeled with the following information: contract number, beginning and ending stationing, which direction is up on the trace, which direction the data was taken, and the device operator name(s). The top portion of the Profile Report for Bridge Deck Smoothness (Attachment 1) shall be completed and the form secured around the trace roll.

Trace Reduction and Bump Locating Procedure. All traces shall be reduced. Traces produced by a mechanical recorder shall be reduced using an electronic scanner and computer software. This software shall calculate the profile index in inch/mile (mm/km) and indicate any bumps in excess of 0.30 inch (8 mm) with a line intersecting the profile on the printout. Computerized recorders shall provide the same information.

The average profile index and locations with deviations exceeding the 0.30 inch (8 mm) limit shall be recorded on the Profile Report for Bridge Deck Smoothness.

All traces and reports shall be provided to the Engineer within two working days of completing the testing. Traces from either a computerized profile testing device or analysis software used with a manual profile testing device shall display the settings used for the data reduction. The Engineer will compare these settings with the approved settings from the PEV Program. If the settings do not match, the results will be rejected and the section shall be retested/reanalyzed with the appropriate settings.

Corrective Actions. Within the bridge section, all deviations in excess of 0.30 inch (8 mm) in a length of 25 ft. (8 m) or less shall be corrected regardless of the profile index value. Correction of deviations shall not result in the deck thickness being less than the minimum.

Any lane within a bridge section having an average profile index greater than 25.0 inch/mile (400 mm/km), including bumps, shall be corrected to reduce the profile index to 25.0 inch/mile (400 mm/km) or less. Profile corrections 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 profile index of 25.0 inch/mile (400 mm/km) or less for each lane. The Contractor shall furnish the profile tracing(s) and the completed form(s) to the Engineer 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 Profile Report for Bridge Deck Smoothness

This form shall be prepared and submitted, along with the profile trace, to the Engineer.

Type of Report:

Initial - Testing of bridge section prior to any corrective action.

Intermediate - After some corrective action has been completed.

Final - After all corrective action has been completed.

Other Information:

Structure Numer - Numerical identification of the bridge.

Traffic Direction - NB, SB, EB and WB depending on the traffic flow of the numbered route.

Lane Description - DL (driving lane), CL (center lane), or PL (passing Lane).

Operator - Printed name of the Contractor personnel operating the profiler.

Engineer - Printed name of Department representative witnessing data collection.

Bump locations are listed by station for each track (wheel path).

Please send completed copies to:
DOT.BR.Smoothness.Testing@illinois.gov

BC 2450 (3/17)

Illinois Department of Transportation

Profile Report for Bridge Deck Smoothness

Type of Report:

☐ Initial ☐ Intermediate ☐ Final

Route:
Contract No.
County
Posted Speed
No. of Lanes Ground

Structure Number
Date Tested
Contractor
Operator
Engineer

Lane Descr.	Bridge Section Length ft. (m)	Track 1 Measured Roughness in. (mm)	Track 1 Profile Index in./mi. (mm/km)	Track 2 Measured Roughness in. (mm)	Track 2 Profile Index in./mi. (mm/km)	Average Profile Index in./mi. (mm/km)
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00

Bump Locations:
Track 1:

Track 2

Certified By

Organization

Title

BC 2450 (3/17)

EXAMPLE

Illinois Department of Transportation

Profile Report for Bridge Deck Smoothness

Type of Report:

☑ Initial ☐ Intermediate ☐ Final

Route:	I-155	Structure Number	054-0073
Contract No.	72856	Date Tested	3/29/2017
County	Logan	Contractor	John Doe Construction
Posted Speed	70	Operator	John Doe Jr.
No. of Lanes Ground	2	Engineer	Mike Smith

Lane Descr.	Bridge Section Length ft. (m)	Track 1 Measured Roughness in. (mm)	Track 1 Profile Index in./mi. (mm/km)	Track 2 Measured Roughness in. (mm)	Track 2 Profile Index in./mi. (mm/km)	Average Profile Index in./mi. (mm/km)
NBDL	663	3.2	25.48	3	23.89	24.69
NBPL	663	2.5	19.91	3.6	28.67	24.29
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00

Bump Locations:

Track 1: Station 1893+53.5 and Station 1897+65.7

Track 2: None

Certified By: David Jones

Organization: John Doe Construction

Title: Chief Profiler Operator

BC 2450 (3/17)

SLIPFORM PARAPET
Effective: June 1, 2007 Revised: April 22, 2016

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 1500ft (457 m) or less.

The slipform machine shall be self-propelled and have automatic horizontal and vertical grade control. For 34 inch (864 mm) tall parapets the machine shall be equipped with a minimum of four (4) vibrators. For 42 inch (1.067 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 inch (1.067 m) tall parapets he/she shall construct a 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, operator, concrete plant, concrete mix design, and slump as proposed for the permanent slipform parapets.

The test section shall be at least 50 feet (15 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 shown on the plans. Upon completion of the test section, the Contractor shall saw cut the test section into 2 foot (600 mm) segments and separate the segments for inspection by the Engineer.

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 speed shall not exceed 3 ft (0.9 m) per minute. Any section of parapet placed with the slipform machine moving in excess of the maximum allowed speed will be rejected. 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. Any portion of the parapet where the slipforming operation is interrupted or stopped within the 15 minute window may be subject to coring to verify acceptance.

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 ½ in. (13 mm), or any dimensions between bars differing from the plans by more than ½ 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 ±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 inch 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 three random cores shall be taken for each parapet pour. At least 2 cores shall be located to intercept the top horizontal bar. 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 representative will be responsible for evaluation the cores. Any cores showing voids of any size adjacent to the reinforcement bars, or showing voids not adjacent to reinforcement bars of 1/4 square inch (160 square millimeters) in area or more, or showing signs of segregation, or showing signs of cracking shall be considered failures and the parapet section from which it was taken will be rejected. Parapets with less than 1 1/2 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 covers 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). Additional 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 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.

WEEP HOLE DRAINS FOR ABUTMENTS, WINGWALLS, RETAINING WALLS AND CULVERTS

Effective: April 19, 2012 Revised: October 22, 2013

Delete the last paragraphs of Articles 205.05 and 502.10 and replace with the following.

"If a geocomposite wall drain according to Section 591 is not specified, a prefabricated geocomposite strip drain according to Section 1040.07 shall be placed at the back of each drain hole. The strip drain shall be 24 inches (600 mm) wide and 48 inches (1.220 m) tall. The strip drain shall be centered over the drain hole with the bottom located 12 inches (300 mm) below the bottom of the drain hole. All form boards or other obstructions shall be removed from the drain holes before placing any geocomposite strip drain."

Revise the last sentence of the first paragraph of Article 503.11 to read as follows.

"Drain holes shall be covered to prevent the leakage of backfill material according to Article 502.10."

Revise the title of Article 1040.07 to Geocomposite Wall Drains and Strip Drains.

BRIDGE DECK CONSTRUCTION

Effective: October 22, 2013 Revised: 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. ± 1/16 in. deep (3 mm wide and 5 mm ± 1.5 mm deep), with a uniform spacing of 3/4 in. ± 1/16 in. (20 mm ± 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. ± 1 in. (150 mm ± 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).

HOT DIP GALVANIZING FOR STRUCTURAL STEEL
Effective: June 22, 1999 Revised: October 20, 2017

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.

To insure 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 insure 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. After galvanizing and prior to shipping, contact surfaces for any bolted connections shall be roughened by hand wire brushing or according to SSPC-SP7 (Brush-Off Blast Cleaning). Power wire brushing is not allowed.

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 4, 2016

Revise Section 516 of the Standard Specifications to read:

"SECTION 516. DRILLED SHAFTS

516.01 Description. This work shall consist of constructing drilled shaft foundations.

516.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Portland Cement Concrete (Note 1)	1020
(b) Reinforcement Bars	1006.10
(c) Grout (Note 2)	1024.01
(d) Permanent Steel Casing	1006.05(d)
(e) Slurry (Note 3)	

Note 1. When the soil contains sulfate contaminates, ASTM C 1580 testing will be performed to assess the severity of sulfate exposure to the concrete. If the sulfate contaminate is >0.10 to < 0.20 percent by mass, a Type II (MH) cement shall be used. If the sulfate contaminate is >0.20 to < 2.0 percent by mass, a Type V cement shall be used. If the sulfate contaminate is ≥ 2.0 percent by mass, refer to ACI 201.2R for guidance.

Note 2. The sand-cement grout mix shall be according to Section 1020 and shall be two to five parts sand and one part Type I or II cement. The maximum water cement ratio shall be sufficient to provide a flowable mixture with a typical slump of 10 in. (250 mm).

Note 3. Slurry shall be bentonite, emulsified polymer, or dry polymer, and shall be approved by the Engineer.

516.03 Equipment. Equipment shall be according to the following.

Item	Article/Section
(a) Concrete Equipment	1020.03
(b) Drilling Equipment (Note 1)	
(c) Hand Vibrator	1103.17(a)
(d) Underwater Concrete Placement Equipment	1103.18

Note 1. The drilling equipment shall have adequate capacity, including power, torque and down thrust, to create a shaft excavation of the maximum diameter specified to a depth of 20 percent beyond the depths shown on the plans.

516.04 Submittals. The following information shall be submitted on form BBS 133.

(a) Qualifications. At the time of the preconstruction conference, the Contractor shall provide the following documentation.

(1) References. A list containing at least three projects completed within the three years prior to this project's bid date which the Contractor performing this work has installed drilled shafts of similar diameter, length, and site conditions to those shown in the plans. The list of projects shall contain names and phone numbers of owner's representatives who can verify the Contractor's participation on those projects.

(2) Experience. Name and experience record of the drilled shaft supervisor, responsible for all facets of the shaft installation, and the drill operator(s) who will be assigned to this project. The supervisor and operator(s) shall each have a minimum of three years experience in the construction of drilled shafts.

(b) Installation Procedure. A detailed installation procedure shall be submitted to the Engineer for acceptance at least 28 days prior to drilled shaft construction and shall address each of the following items unless otherwise directed by the Engineer in writing.

(1) Equipment List. List of proposed equipment to be used including cranes, drill rigs, augers, belling tools, casing, vibratory hammers, core barrels, bailing buckets, final cleaning equipment, slurry equipment, tremies, or concrete pumps, etc.

(2) General Sequence. Details of the overall construction operation sequence, equipment access, and the sequence of individual shaft construction within each substructure bent or footing group. The submittal shall address the Contractor's proposed time delay and/or the minimum concrete strength necessary before initiating a shaft excavation adjacent to a recently installed drilled shaft.

(3) Shaft Excavation. A site specific step by step description of how the Contractor anticipates the shaft excavation to be advanced based on their evaluation of the subsurface data and conditions expected to be encountered. This sequence shall note the method of casing advancement, anticipated casing lengths, tip elevations and diameters, the excavation tools used and drilled diameters created. The Contractor shall indicate whether wet or dry drilling conditions are expected and if groundwater will be sealed from the excavation.

(4) Slurry. When the use of slurry is proposed, details on the types of additives to be used and their manufacturers shall be provided. In addition, details covering the measurement and control of the hardness of the mixing water, agitation, circulation, de-sanding, sampling, testing, and chemical properties of the slurry shall be submitted.

(5) Shaft Cleaning. Method(s) and sequence proposed for the shaft cleaning operation.

(6) Reinforcement Cage and Permanent Casing. Details of reinforcement placement including rolling spacers to be used and method to maintain proper elevation and location of the reinforcement cage within the shaft excavation during concrete placement. The method(s) of adjusting the reinforcement cage length and permanent casing if rock is encountered at an elevation other than as shown on the plans. As an option, the Contractor may perform soil borings and rock cores at the drilled shaft locations to determine the required reinforcement cage and permanent casing lengths.

(7) Concrete Placement. Details of concrete placement including proposed operational procedures for free fall, tremie or pumping methods. The sequence and method of casing removal shall also be stated along with the top of pour elevation, and method of forming through water above streambed.

(8) Mix Design. The proposed concrete mix design(s).

(9) Disposal Plan. Containment and disposal plan for slurry and displaced water. Containment and disposal plan for contaminated concrete pushed out of the top of the shaft by uncontaminated concrete during concrete placement.

(10) Access and Site Protection Plan. Details of access to the drilled shafts and safety measures proposed. This shall include a list of casing, scaffolding, work platforms, temporary walkways, railings, and other items needed to provide safe access to the drilled shafts. Provisions to protect open excavations during non-working hours shall be included.

The Engineer will evaluate the drilled shaft installation procedure and notify the Contractor of acceptance, need for additional information, or concerns with the installation's effect on the existing or proposed structure(s).

CONSTRUCTION REQUIREMENTS

516.05 General. Excavation for drilled shaft(s) shall not proceed until written authorization is received from the Engineer. The Contractor shall be responsible for verification of the dimensions and alignment of each shaft excavation as directed by the Engineer.

Unless otherwise approved in the Contractor's installation procedure, no shaft excavation, casing installation, or casing removal with a vibratory hammer shall be made within four shaft diameters center to center of a shaft with concrete that has a compressive strength less than 1500 psi (10,300 kPa). The site-specific soil strengths and installation methods selected will determine the actual required minimum spacing, if any, to address vibration and blow out concerns.

Lost tools shall not remain in the shaft excavation without the approval of the Engineer.

Blasting shall not be used as a method of shaft excavation.

516.06 Shaft Excavation Protection Methods. The construction of drilled shafts may involve the use of one or more of the following methods to support the excavation during the various phases of shaft excavation, cleaning, and concrete placement dependent on the site conditions encountered. Surface water shall not flow uncontrolled into the shaft excavation, however water may be placed into the shaft excavation in order to meet head pressure requirements according to Articles 516.06(c) and 516.13.

The following are general descriptions indicating the conditions when these methods may be used.

(a) Dry Method. The dry construction method shall only be used at sites where the groundwater and soil conditions are suitable to permit the drilling and dewatering of the excavation without causing subsidence of adjacent ground, boiling of the base soils, squeezing, or caving of the shaft side walls. The dry method shall consist of drilling the shaft excavation, removing accumulated water, cleaning the shaft base, and placing the reinforcement cage and concrete in a predominately dry excavation.

(b) Slurry Method. The slurry construction method may be used at sites where dewatering the excavation would cause collapse of the shaft sidewalls or when the volume and head of water flowing into the shaft is likely to contaminate the concrete during placement resulting in a shaft defect. This method uses slurry, or in rare cases water, to maintain stability of the shaft sidewall while advancing the shaft excavation. After the shaft excavation is completed, the slurry level in the shaft shall be kept at an elevation to maintain stability of the shaft sidewall, maintain stability of the shaft base, and prevent additional groundwater from entering the shaft. The shaft base shall be cleaned, the reinforcement cage shall be set, and the concrete shall be discharged at the bottom of the shaft excavation, displacing the slurry upwards.

(c) Temporary Casing Method. Temporary casing shall be used when either the dry or slurry methods provide inadequate support to prevent sidewall caving or excessive deformation of the shaft excavation. Temporary casing may be used with slurry or be used to reduce the flow of water into the excavation to allow dewatering and concrete placement in a dry shaft excavation. Temporary casing shall not be allowed to remain permanently without the approval of the Engineer.

During removal of the temporary casing, the level of concrete in the casing shall be maintained at a level such that the head pressure inside the casing is a minimum of 1.25 times the head pressure outside the casing, but in no case is less than 5 ft (1.5 m) above the bottom of the casing. Casing removal shall be at a slow, uniform rate with the pull in line with the shaft axis. Excessive rotation of the casing shall be avoided to limit deformation of the reinforcement cage. In addition, the slump requirements during casing removal shall be according to Article 516.12.

When called for on the plans, the Contractor shall install a permanent casing as specified. Permanent casing may be used as a shaft excavation support method or may be installed after shaft excavation is completed using one of the above methods. After construction, if voids are present between the permanent casing and the drilled excavation, the voids shall be filled with grout. Permanent casing shall not remain in place beyond the limits shown on the plans without the specific approval of the Engineer.

When the shaft extends above the streambed through a body of water and permanent casing is not shown, the portion above the streambed shall be formed with removable casings, column forms, or other forming systems as approved by the Engineer. The forming system shall not scar or spall the finished concrete or leave in place any forms or casing within the removable form limits as shown on the plans unless approved as part of the installation procedure. The forming system shall not be removed until the concrete has attained a minimum compressive strength of 2500 psi (17,200 kPa) and cured for a minimum of 72 hours. For shafts extending through water, the concrete shall be protected from water action after placement for a minimum of seven days.

516.07 Slurry. When slurry is used, the Contractor shall provide a technical representative of the slurry additive manufacturer at the site prior to introduction of the slurry into the first shaft where slurry will be used, and during drilling and completion of a minimum of one shaft to adjust the slurry mix to the specific site conditions. During construction, the level of the slurry shall be maintained a minimum of 5 feet (1.5 m) above the height required to prevent caving of the shaft excavation. In the event of a sudden or significant loss of slurry in the shaft excavation, the construction of that foundation shall be stopped and the shaft excavation backfilled or supported by temporary casing, until a method to stop slurry loss, or an alternate construction procedure, has been approved by the Engineer.

(a) General Properties. The material used to make the slurry shall not be detrimental to the concrete or surrounding ground. Mineral slurries shall have both a mineral grain size that remains in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. Polymer slurries shall have sufficient viscosity and gel characteristics to transport excavated material to suitable screening systems or settling tanks. The percentage and specific gravity of the material used to make the slurry shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement.

If approved by the Engineer, the Contractor may use water and excavated soils as drilling slurry. In this case, the range of acceptable values for density, viscosity and pH, as shown in the following table for bentonite slurry shall be met.

When water is used as the slurry to construct rock sockets in limestone, dolomite, sandstone or other formations that are not erodible, the requirements for slurry testing shall not apply if the entire fluid column is replaced with fresh water after drilling. To do so, fresh water shall be introduced at the top of the shaft excavation and existing water used during drilling shall be pumped out of the shaft excavation from the bottom of the shaft excavation until the entire volume of fluid has been replaced.

(b) Preparation. Prior to introduction into the shaft excavation, the manufactured slurry admixture shall be pre-mixed thoroughly with clean, fresh water and for adequate time in accordance with the slurry admixture manufacturer's recommendations. Slurry tanks of adequate capacity shall be used for slurry mixing, circulation, storage and treatment. No excavated slurry pits will be allowed in lieu of slurry tanks without approval from the Engineer. Adequate desanding equipment shall be provided to control slurry properties during the drilled shaft excavation in accordance with the values provided in Table 1.

(c) Quality Control. Quality control tests shall be performed on the slurry to determine density, viscosity, sand content and pH of freshly mixed slurry, recycled slurry and slurry in the shaft excavation. Tests of slurry samples from within two feet of the bottom and at mid-height of the shaft excavation shall be conducted in each shaft excavation during the excavation process to measure the consistency of the slurry. A minimum of four sets of tests shall be conducted during the first eight hours of slurry use on the project. When a series of four test results do not change more than 1% from the initial test, the testing frequency may be decreased to one set every four hours of slurry use. Reports of all tests, signed by an authorized representative of the Contractor, shall be furnished to the Engineer upon completion of each drilled shaft. The physical properties of the slurry shall be as shown in Table 1.

The slurry shall be sampled and tested less than 1 hour before concrete placement. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be removed. The contractor shall perform final shaft bottom cleaning after suspended solids have settled from the slurry. Concrete shall not be placed if the slurry does not have the required physical properties.

Table 1 – SLURRY PROPERTIES

	Bentonite	Emulsified Polymer	Dry Polymer	Test Method
Density, lb/cu ft (kg/cu m) (at introduction)	65.2 ± 1.6[1] (1043.5 ± 25.6)	63 (1009.0) max.	63 (1009.0) max.	ASTM D 4380
Density, lb/cu ft (kg/cu m) (prior to concrete placement)	67.0 ± 3.5[1] (1073.0 ± 56.0)	63 (1009.0) max.	63 (1009.0) max.	ASTM D 4380
Viscosity[2], sec/qt (sec/L)	46 ± 14 (48 ± 14)	38 ± 5 (40 ± 5)	65 ± 15 (69 ± 16)	ASTM D 6910
pH	9.0 ± 1.0	9.5 ± 1.5	9.0 ± 2.0	ASTM D 4972
Sand Content, percent by volume (at introduction)	4 max.	1 max.	1 max.	ASTM D 4381
Sand Content, percent by volume (prior to concrete placement)	10 max.	1 max.	1 max.	ASTM D 4381
Contact Time[3], hours	4 max.	72 max.	72 max	

Note 1. When the slurry consists of only water and excavated soils, the density shall not exceed 70 lb/cu ft (1121 kg/cu m).
Note 2. Higher viscosities may be required in loose or gravelly sand deposits.
Note 3. Contact time is the time without agitation and sidewall cleaning.

516.08 Obstructions. An obstruction is an unknown isolated object that causes the shaft excavation method to experience a significant decrease in the actual production rate and requires the Contractor to core, break up, push aside, or use other means to mitigate the obstruction. Subsurface conditions such as boulders, cobbles, or logs and buried infrastructure such as footings, piling, or abandoned utilities, when shown on the plans, shall not constitute an obstruction. When an obstruction is encountered, the Contractor shall notify the Engineer immediately and upon concurrence of the Engineer, the Contractor shall mitigate the obstruction with an approved method.

516.09 Top of Rock. The top of rock will be considered as the point where rock, defined as bedded deposits and conglomerate deposits exhibiting the physical characteristics and difficulty of rock removal as determined by the Engineer, is encountered which cannot be drilled with augers and/or underreaming tools configured to be effective in the soils indicated in the contract documents.

516.10 Design Modifications. If the top of rock elevation differs from that shown on the plans by more than 10 percent of the length of the drilled shaft above the rock, the Engineer shall be contacted to determine if any drilled shaft design changes may be required. In addition, if the type of soil or rock encountered is not similar to that shown in the subsurface exploration data, the Contractor may be required to extend the drilled shaft length(s) beyond those specified in the plans. In either case, the Engineer will determine if revisions are necessary and the extent of the modifications required.

516.11 Excavation Cleaning and Inspection. Materials removed or generated from the shaft excavations shall be disposed of according to Article 202.03.

After excavation, each shaft shall be cleaned. For a drilled shaft terminating in soil, the depth of sediment or debris shall be a maximum of 1 1/2 in. (38 mm). For a drilled shaft terminating in rock, the depth of sediment or debris shall be a maximum of 1/2 in. (13 mm).

A shaft excavation shall be overreamed when, in the opinion of the Engineer, the sidewall has softened, swelled, or has a buildup of slurry cake. Overreaming may also be required to correct a shaft excavation which has been drilled out of tolerance. Overreaming may be accomplished with a grooving tool, overreaming bucket, or other approved equipment. Overreaming thickness shall be a minimum of 1/2 in. (13 mm) and a maximum of 3 in. (75 mm).

516.12 Reinforcement. This work shall be according to Section 508 and the following.

The shaft excavation shall be cleaned and inspected prior to placing the reinforcement cage. The reinforcement cage shall be completely assembled prior to drilling and be ready for adjustment in length as required by the conditions encountered. The reinforcement cage shall be lifted using multiple point sling straps or other approved methods to avoid reinforcement cage distortion or stress. Cross frame stiffeners may be required for lifting or to keep the reinforcement cage in proper position during lifting and concrete placement.

The Contractor shall attach rolling spacers to keep the reinforcement cage centered within the shaft excavation during concrete placement and to ensure that at no point will the finished shaft have less than the minimum concrete cover(s) shown on the plans. The rolling spacers or other approved non-corrosive spacing devices shall be installed within 2 ft (0.6 m) of both the top and bottom of the drilled shaft and at intervals not exceeding 10 ft (3 m) throughout the length of the shaft to ensure proper reinforcement cage alignment and clearance for the entire shaft. The number of rolling spacers at each level shall be one for each 1.0 ft (300 mm) of shaft diameter, with a minimum of four rolling spacers at each level. For shafts with different shaft diameters throughout the length of the excavation, different sized rolling spacers shall be provided to ensure the reinforcement cage is properly positioned throughout the entire length of the shaft.

When a specific concrete cover between the base of the drilled shaft and the reinforcement cage is shown on the plans, the bottom of the reinforcement cage shall be supported so that the proper concrete cover is maintained.

If the conditions differ such that the length of the shaft is increased, additional longitudinal bars shall be either mechanically spliced or lap spliced to the lower end of the reinforcement cage and confined with either hoop ties or spirals. The Contractor shall have additional reinforcement available or fabricate the reinforcement cages with additional length as necessary to make the required adjustments in a timely manner as dictated by the encountered conditions. The additional reinforcement may be non-epoxy coated.

516.13 Concrete Placement. Concrete work shall be performed according to the following.

Throughout concrete placement the head pressure inside the drilled shaft shall be at least 1.1 times the head pressure outside the drilled shaft.

Concrete placement shall begin within 1 hour of shaft cleaning and inspection. The pour shall be made in a continuous manner from the bottom to the top elevation of the shaft as shown on the contract plan or as approved in the Contractor's installation procedure. Concrete placement shall continue after the shaft excavation is full and until 18 in. (450 mm) of good quality, uncontaminated concrete is expelled at the top of shaft. Vibration of the concrete will not be allowed when the concrete is displacing slurry or water. In dry excavations, the concrete in the top 10 ft (3 m) of the shaft shall be vibrated.

When using temporary casing or placing concrete under water or slurry, a minimum of seven days prior to concrete placement, a 4 cu yd (3 cu m) trial batch of the concrete mixture shall be performed to evaluate slump retention. Temporary casing shall be withdrawn before the slump of the concrete drops below 6 in. (150 mm). For concrete placed using the slurry method of construction, the slump of all concrete placed shall be a minimum of 6 in. (150 mm) at the end of concrete placement.

Devices used to place concrete shall have no aluminum parts in contact with concrete.

When the top of the shaft is at the finished elevation and no further concrete placement above the finished elevation is specified, the top of the shaft shall be level and finished according to Article 503.15(a).

Concrete shall be placed by free fall, tremie, or concrete pump subject to the following conditions.

(a) Free Fall Placement. Concrete shall only be placed by free fall when the rate of water infiltration into the shaft excavation is less than 12 in. (300 mm) per hour and the depth of water in the shaft excavation is less than 3 in. (75 mm) at the time of concrete placement.

    Concrete placed by free fall shall fall directly to the base without contacting the reinforcement cage, cross frame stiffeners, or shaft sidewall. Drop chutes may be used to direct concrete to the base during free fall placement.

Drop chutes used to direct placement of free fall concrete shall consist of a smooth tube. Concrete may be placed through either a hopper at the top of the tube or side openings as the drop chute is retrieved during concrete placement. The drop chute shall be supported so that free fall does not exceed 60 ft (18.3 m) for conventional concrete or 30 ft (9.1 m) for self-consolidating concrete. If placement cannot be satisfactorily accomplished by free fall in the opinion of the Engineer, either a tremie or pump shall be used to accomplish the pour.

(b) Tremie and Concrete Pump Placement. Concrete placement shall be according to Article 503.08, except the discharge end of the steel pipe shall remain embedded in the concrete a minimum of 10 ft (3.0 m) throughout concrete placement when displacing slurry or water.

516.14 Construction Tolerances. The following construction tolerances shall apply to all drilled shafts.

(a) Center of Shaft. The center of the drilled shaft shall be within 3 in. (75 mm) of the plan station and offset at the top of the shaft.

(b) Center of Reinforcement Cage. The center of the reinforcement cage shall be within 1 1/2 in. (40 mm) of plan station and offset at the top of the shaft.

(c) Vertical Plumbness of Shaft. The out of vertical plumbness of the shaft shall not exceed 1.5 percent.

(d) Vertical Plumbness of Reinforcement Cage. The out of vertical plumbness of the shaft reinforcement cage shall not exceed 0.83 percent.

(e) Top of Shaft. The top of the shaft shall be no more than 1 in. (25 mm) above and no more than 3 in. (75 mm) below the plan elevation.

(f) Top of Reinforcement Cage. The top of the reinforcement cage shall be no more than 1 in. (25 mm) above and no more than 3 in. (75 mm) below the plan elevation.

(g) Bottom of shaft. Excavation equipment and methods used to complete the shaft excavation shall have a nearly planar bottom. The cutting edges of excavation equipment used to create the bottom of shafts in rock shall be normal to the vertical axis of the shaft within a tolerance of 6.25 percent.

516.15 Method of Measurement. This work will be measured for payment in place and the volume computed in cubic yards (cubic meters). The volume will be computed using the plan diameter of the shaft multiplied by the measured length of the shaft. The length of shaft in soil will be computed as the difference in elevation between the top of the drilled shaft shown on the plans, or as installed as part of the Contractor's installation procedure, and the bottom of the shaft or the top of rock (when present) whichever is higher. The length of shaft in rock will be computed as the difference in elevation between the measured top of rock and the bottom of the shaft.

When permanent casing is specified, it will be measured for payment in place, in feet (meters). Permanent casing installed at the Contractor's option will not be measured for payment.

Reinforcement furnished and installed will be measured for payment according to Article 508.07.

516.16 Basis of Payment. This work will be paid for at the contract unit price per cubic yard (cubic meter) for DRILLED SHAFT IN SOIL, and/or DRILLED SHAFT IN ROCK.

Permanent casing will be paid for at the contract unit price per foot (meter) for PERMANENT CASING.

Reinforcement furnished and installed will be paid for according to Article 508.08.

Obstruction mitigation will be paid for according to Article 109.04."

PREFORMED PAVEMENT JOINT SEAL
Effective: October 4, 2016

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.
- 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 G155-00A
Density of Cellular Polyurethane Foam	12.5lb/ cu ft (200kg/cu m)	ASTM D545
Heat Aging Effects (Silicone Coating)	No cracking, chalking	ASTM C 792
Resilience (Silicone Coating)	≥ 95%	ASTM D 5329
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	+100/-50%	ASTM C 719
Elongation at Break	>1400%	ASTM D 412
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	≥ 95%	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	
Color	Black	Visual

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	ATSM 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	ATSM D 1217
Product Flash Point (◦F, T.C.C.)	48	ATSM D 56
Package Stability	N/A	One year in tightly sealed containers
Cleaning	N/A	Mineral Spirits
VOC (g/L)	520	ATSM D 3960

(d) Bonded Preformed Joint Seal. This joint system shall consist of preformed elastomeric seal bonded to the side walls of the joint opening using an adhesive as specified by the Manufacturer of the joint seal.

The bonded preformed joint seal shall be according to Table 1 of ASTM D2628 with the following exceptions: Compression set shall not be over 40 percent when tested according to Method B (Modified) of ASTM D 395 after 70 hours at 212 ºF (100 ºC). 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 ºF (93 ºC) shall not reduce bond strength. At 68 ºF (20 ºC), 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 ºF (10 ºC) 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 insure 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.

CROSSHOLE SONIC LOGGING TESTING OF DRILLED SHAFTS
Effective: April 20, 2016

Description. This work shall consist of furnishing and installing materials and equipment necessary to install access ducts in all drilled shafts of structures identified on the plans, and to perform Crosshole Sonic Logging (CSL) testing of selected drilled shafts on these structures. This work shall be according to Illinois Modified ASTM D6760. This work also includes analysis of the CSL data, preparation of reports summarizing the CSL data, and investigating anomalies identified in the CSL data. This work shall also include grouting of all access ducts after testing and approval by the Engineer.

Materials. Materials shall be according to the following.

(a) Grout (Note 1)……1024.01

Note 1. Grout shall attain a minimum strength equal to the required strength of the drilled shaft concrete at 14 days.

Qualifications. A consulting firm experienced in CSL testing shall conduct this work. The CSL consulting firm shall be a company independent from the Contractor with a minimum of 3 years of experience in performing CSL testing of drilled shafts. The individual employee of the CSL consulting firm performing analysis of the CSL data and preparing the report shall be an Illinois Licensed Professional Engineer and have experience on a minimum of 5 projects performing CSL testing of drilled shafts.

The name, contact information, and qualifications of the CSL consulting firm, including the names and experience of the individual employees performing and analyzing the test results and preparing the report, shall be submitted to the Engineer at least 30 days prior to drilled shaft construction.

Construction. Access ducts shall be placed in all drilled shafts for the structures indicated on the plans, attached to the reinforcement cage and situated symmetrically around the diameter of the shaft according to the Illinois Modified ASTM D6760. The Engineer will determine which drilled shafts shall have CSL testing performed after the concrete has been placed in the drilled shafts, and may direct additional tests, if necessary, due to problems encountered or observed during drilled shaft construction.

After permission is given by the Engineer, the access ducts shall be grouted. The grout shall be placed with a pump, starting at the bottom of each access duct.

Superimposed loads, either dead or live, shall not be applied to a drilled shaft until CSL testing is completed, CSL reports have been submitted, any necessary repairs have been completed, access ducts have been grouted, and permission has been granted by the Engineer.

Reports. Reports shall be according to Illinois Modified ASTM D6760. Each anomalous zone detected by the CSL testing shall be identified and discussed in the report. An anomalous zone shall be defined as areas where velocity reduction exceeds 20 percent of the average velocity of properly placed and cured shaft concrete at the time of testing.

Anomalies. If anomalies are identified, they shall be investigated by coring or other methods approved by the Engineer.

Correction of Drilled Shaft Defects. When testing determines that a defect is present, the Engineer will direct the Contractor to submit remedial measures for approval. No compensation will be made for remedial work, or losses, or damage, due to remedial work of drilled shafts found defective or not in accordance with the drilled shaft specifications or plans. Modifications to the drilled shaft design, or any load transfer mechanisms required by the remedial action, must be designed, detailed, and sealed by an Illinois Licensed Structural Engineer, and submitted for approval.

Method of Measurement. Installation and grouting of access ducts will be measured for payment per shaft by the linear foot of drilled shaft(s) with access ducts.

CSL testing, analysis, and reporting will be measured for payment by each drilled shaft foundation tested.

Investigation of anomalies will not be measured for payment.

Basis of Payment. Installation and grouting of access ducts will be paid for at the contract unit price per foot for CROSSHOLE SONIC LOGGING ACCESS DUCTS. CSL testing, analysis, and reporting will be paid for at the contract unit price per each for CROSSHOLE SONIC LOGGING TESTING.

ILLINOIS MODIFIED ASTM D6760
Effective Date: April 20, 2016
Standard Test Method for
Integrity Testing of Concrete Deep Foundations by Ultrasonic Crosshole Testing
Reference ASTM D6760-14

<table>
<tr><th>ASTM SECTION</th><th>Illinois Modification</th></tr>
<tr><td>3.1.1</td><td>Revise this section as follows:
access ducts, n – preformed steel tubes or drilled boreholes, placed in the concrete to allow probe entry in pairs to measure pulse transmission in the concrete between the probes.</td></tr>
<tr><td>6.1</td><td>Revise the second sentence of this section as follows:
The tubes shall be mild steel.
Delete the third, fourth, and fifth sentences of this section.</td></tr>
<tr><td>7.1.1</td><td>Revise this section as follows:
The access ducts shall be installed during construction of the drilled shaft.

For drilled shafts foundations, access ducts shall be provided according to the following table.
<table>
<tr><th>Reinforcing Cage Diameter (feet)</th><th>Number of access ducts</th></tr>
<tr><td>≤ 4.0</td><td>3</td></tr>
<tr><td>4.1 to 5.0</td><td>4</td></tr>
<tr><td>5.1 to 7.0</td><td>6</td></tr>
<tr><td>> 7.1</td><td>8</td></tr>
</table>
Access ducts shall be spread equally around the perimeter and spaced at an equal distance from the axis.

Delete Fig. 4.</td></tr>
<tr><td>7.1.2</td><td>Revise the second sentence of this section as follows:
The exterior tube surface shall be free from contamination (for example, oil, dirt, loose rust, mill scale, etc.) to ensure a good bond between the tube surface and the surrounding concrete.</td></tr>
<tr><td>7.1.3</td><td>Delete the third sentence of this section.</td></tr>
</table>

ILLINOIS MODIFIED ASTM D6760
Effective Date: April 20, 2016
Standard Test Method for
Integrity Testing of Concrete Deep Foundations by Ultrasonic Crosshole Testing
Reference ASTM D6760-14

7.2	Revise the first sentence of this section as follows: The access tubes shall be installed such that their bottom is within 4 inches of the bottom of the concrete deep foundation element so that the bottom condition can be tested. Revise the sixth sentence of this section as follows: Access tubes shall be filled with water prior to concrete placement to assure good bonding of the concrete to the tube after the concrete cools. The access tubes shall be kept full of water until the tubes are grouted.
7.3	Revise the first sentence of this section as follows: In cases where drilled shafts to be tested have access ducts that do not permit passage of the probes, do not retain water, are not plumb, are debonded from the concrete, or cannot be used for testing for other reasons, drilled boreholes shall be used to provide probe access.
7.4.2	Revise the second sentence of this section as follows: The tests shall be performed no later than 21 days after concrete casting.
7.6	Delete this section.
7.8.1	Revise the first sentence of this section as follows: If the ultrasonic profile indicates an anomaly, then the suspect anomaly zone shall be further investigated by special test procedures such as fan shaped tests, tests with the probes raised at a fixed offset distance, or other tomographical techniques (1, 2).
7.8.2	Delete Note 5 of this section.

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, tons = A x D x (G_{mb} x 46.8) / 2000. For HMA mixtures measured in square meters: Q, metric tons = A x D x (G_{mb} x 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, tons = V x 8.33 lb/gal x SG / 2000
For bituminous materials measured in liters: Q, metric tons = V x 1.0 kg/L x 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.

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 MIX DESIGN – DEPARTMENT PROVIDED (BDE)
Effective: January 1, 2012 Revised: April 1, 2016

For the concrete mix design requirements in Article 1020.05(a) of the Standard Specifications, the Contractor has the option to request the Engineer determine mix design material proportions for Class PV, PP, RR, BS, DS, SC, and SI concrete. A single mix design for each class of concrete will be provided. Acceptance by the Contractor to use the mix design developed by the Engineer shall not relieve the Contractor from meeting specification requirements.

CONTRAST PREFORMED PLASTIC PAVEMENT MARKING (BDE)
Effective: November 1, 2017

Revise the first paragraph of Article 780.07(b) of the Standard Specifications to read:

"(b) Type B or C - Standard Application. Standard application of conventional preformed plastic pavement markings shall consist of applying the markings to the pavement surface or to the bottom of a groove recessed in the pavement surface as specified on the plans. Standard application of contrast preformed plastic pavement markings shall consist of applying the markings to the bottom of a groove recessed in the pavement surface. Both conventional and contrast preformed plastic pavement markings shall only be applied when the air temperature is at least 50 °F (10 °C) and rising and the pavement temperature is at least 70 °F (21 °C). However, application of the markings will not be allowed after October 15."

Add the following paragraph after the fourth paragraph of Article 780.14 of the Standard Specifications:

"The applied line width specified for contrast pavement markings shall include both the white/yellow reflective portion and the black nonreflective portion of the marking."

Revise the first paragraph of Article 1095.03 of the Standard Specifications to read:

"**1095.03 Preformed Plastic Pavement Markings.** The material shall consist of a white or yellow (as specified) weather resistant, reflective film meeting the requirements specified herein. Where contrast markings are specified, the white or yellow reflective film shall be bordered along both the left and right edges by a 1 1/2 in. (38 mm) wide black weather resistant, nonreflective film also meeting the requirements specified herein."

Revise the table in Article 1095.03(a) of the Standard Specifications to read:

"Components	Minimum Percent By Weight	
	White or Yellow	Black
Resins and Plasticizers	20 %	20 %
Pigment and Fillers	30 %	30 %
Graded Glass Beads	25 %	- - "

Revise the first paragraph of Article 1095.03(h) of the Standard Specifications to read:

"Glass beads shall be uniformly distributed throughout the white or yellow portions of the material only. A top coating of beads shall be bonded to or directly embedded into the surface of the markings in order to produce immediate retroreflectivity."

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)
Effective: September 1, 2000 Revised: March 2, 2019

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR Part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract the Contractor signs with a subcontractor.

The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

(a) Withholding progress payments;

(b) Assessing sanctions;

(c) Liquidated damages; and/or

(d) Disqualifying the Contractor from future bidding as non-responsible.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR Part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. The determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates, in the absence of unlawful discrimination and in an arena of fair and open competition, DBE companies can be expected to perform **TBD%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

(a) The bidder documents enough DBE participation has been obtained to meet the goal or,

(b) The bidder documents a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders shall consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217) 785-4611, or by visiting the Department's website at:
http://www.idot.illinois.gov/doing-business/certifications/disadvantaged-business-enterprise-certification/il-ucp-directory/index.

BIDDING PROCEDURES. Compliance with this Special Provision is a material bidding requirement and failure of the bidder to comply will render the bid not responsive.

The bidder shall submit a DBE Utilization Plan (form SBE 2026), and a DBE Participation Statement (form SBE 2025) for each DBE company proposed for the performance of work to achieve the contract goal, with the bid. If the Utilization Plan indicates the contract goal will not be met, documentation of good faith efforts shall also be submitted. The documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor is selected over a DBE for work on the contract. The required forms and documentation must 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 Utilization Plan if it does not meet the bidding procedures set forth herein and the bid will be declared not responsive. In the event the bid is declared not 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.

GOOD FAITH EFFORT PROCEDURES. 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 enough DBE participation has been obtained or document the good faith efforts of the bidder, in the event enough DBE participation has not been obtained, before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan documents sufficient commercially useful DBE work to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A. This means the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts the bidder has made. Mere *pro forma* efforts, in other words efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

(a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases and will be considered by the Department.

(1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.

(2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Contractor might otherwise prefer to perform these work items with its own forces.

(3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.

b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable. In accordance with the above Bidding Procedures, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.

(5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.

(7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.

(8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.

(b) If the Department determines the bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided it is otherwise eligible for award. If the Department determines the bidder has failed to meet the requirements of this Special Provision or that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification will also include a statement of reasons for the adverse determination. If the Utilization Plan is not approved because it is deficient as a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no more than a five calendar day period to cure the deficiency.

(c) The bidder may request administrative reconsideration of an adverse determination by emailing the Department at "DOT.DBE.UP@illinois.gov" within the five calendar days after the receipt of the notification of the determination. The determination shall become final if a request is not made on or before the fifth calendar day. A request may provide additional written documentation or argument concerning the issues raised in the determination statement of reasons, provided the documentation and arguments address efforts made prior to submitting the bid. The request will be reviewed by the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person to consider all issues of documentation and whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR Part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR Part 26.55, the provisions of which govern over the summary contained herein.

(a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.

(b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.

(c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.

(d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contract. Credit will be given for the following:

    (1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.

    (2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission is receives as a result of the lease arrangement.

(e) DBE as a material supplier:

    (1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.

    (2) 100 percent goal credit for the cost of materials of supplies obtained from a DBE manufacturer.

(3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a DBE regular dealer or DBE manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal. All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the DBE Participation Commitment Statement.

(a) NO AMENDMENT. No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be emailed to the Department at DOT.DBE.UP@illinois.gov.

(b) **CHANGES TO WORK**. Any deviation from the DBE condition-of-award or contract plans, specifications, or special provisions must be approved, in writing, by the Department as provided elsewhere in the Contract. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract. Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A or AER 260A, must be signed and submitted. If the commitment of work is in the form of additional tasks assigned to an existing subcontract, a new Request for Approval of Subcontractor will not be required. However, the Contractor must document efforts to assure the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.

(c) **SUBCONTRACT.** The Contractor must provide copies of 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.

(d) **ALTERNATIVE WORK METHODS**. In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:

(1) The replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or

(2) The DBE is aware its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or

(3) The DBE is not capable of performing the replacement work or has declined to perform the work at a reasonable competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.

(e) **TERMINATION AND REPLACEMENT PROCEDURES**. The Contractor shall not terminate or replace a DBE listed on the approved Utilization Plan, or perform with other forces work designated for a listed DBE except as provided in this Special Provision. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the Department's written consent as provided in subsection (a) of this part. Unless Department consent is provided for termination of a DBE subcontractor, the Contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the DBE in the Utilization Plan.

As stated above, the Contractor shall not terminate or replace a DBE subcontractor listed in the approved Utilization Plan without prior written consent. This includes, but is not limited to, instances in which the Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Written consent will be granted only if the Bureau of Small Business Enterprises agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate or replace the DBE firm. Before transmitting to the Bureau of Small Business Enterprises any request to terminate and/or substitute a DBE subcontractor, the Contractor shall give notice in writing to the DBE subcontractor, with a copy to the Bureau, of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor shall give the DBE five days to respond to the Contractor's notice. The DBE so notified shall advise the Bureau and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Bureau should not approve the Contractor's action. If required in a particular case as a matter of public necessity, the Bureau may provide a response period shorter than five days.

For purposes of this paragraph, good cause includes the following circumstances:

(1) The listed DBE subcontractor fails or refuses to execute a written contract;

(2) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Contractor;

(3) The listed DBE subcontractor fails or refuses to meet the Contractor's reasonable, nondiscriminatory bond requirements;

(4) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;

(5) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1200 or applicable state law.

(6) The Contractor has determined the listed DBE subcontractor is not a responsible contractor;

(7) The listed DBE subcontractor voluntarily withdraws from the projects and provides written notice to the Contractor of its withdrawal;

(8) The listed DBE is ineligible to receive DBE credit for the type of work required;

(9) A DBE owner dies or becomes disabled with the result that the listed DBE subcontractor is unable to complete its work on the contract;

(10) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE contractor was engaged or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.

When a DBE is terminated or fails to complete its work on the Contract for any reason, the Contractor shall make a good faith effort to find another DBE to substitute for the original DBE to perform at least the same amount of work under the contract as the terminated DBE to the extent needed to meet the established Contract goal. The good faith efforts shall be documented by the Contractor. If the Department requests documentation under this provision, the Contractor shall submit the documentation within seven days, which may be extended for an additional seven days if necessary at the request of the Contractor. The Department will provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

(f) **FINAL PAYMENT**. After the performance of the final item of work or delivery of material by a DBE and final payment therefore to the DBE by the Contractor, but not later than 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 on Department form SBE 2115 to the Resident Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (h) of this part.

(g) **ENFORCEMENT.** The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.

(h) **RECONSIDERATION**. Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of "Good Faith Effort Procedures" of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

DISPOSAL FEES (BDE)
Effective: November 1, 2018

Replace Articles 109.04(b)(5) – 109.04(b)(8) of the Standard Specifications with the following:

"(5) Disposal Fees. When the extra work performed includes paying for disposal fees at a clean construction and demolition debris facility, an uncontaminated soil fill operation or a landfill, the Contractor shall receive, as administrative costs, an amount equal to five percent of the first $10,000 and one percent of any amount over $10,000 of the total approved costs of such fees.

(6) Miscellaneous. No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

(7) Statements. No payment will be made for work performed on a force account basis until the Contractor has furnished the Engineer with itemized statements of the cost of such force account work. Statements shall be accompanied and supported by invoices for all materials used and transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from his/her stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

Itemized statements at the cost of force account work shall be detailed as follows.

a. Name, classification, date, daily hours, total hours, rate, and extension for each laborer and foreman. Payrolls shall be submitted to substantiate actual wages paid if so requested by the Engineer.
b. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.
c. Quantities of materials, prices and extensions.
d. Transportation of materials.
e. Cost of property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions, and social security tax.

(8) Work Performed by an Approved Subcontractor. When extra work is performed by an approved subcontractor, the Contractor shall receive, as administrative costs, an amount equal to five percent of the total approved costs of such work with the minimum payment being $100.

(9) All statements of the cost of force account work shall be furnished to the Engineer not later than 60 days after receipt of the Central Bureau of Construction form "Extra Work Daily Report". If the statement is not received within the specified time frame, all demands for payment for the extra work are waived and the Department is released from any and all such demands. It is the responsibility of the Contractor to ensure that all statements are received within the specified time regardless of the manner or method of delivery."

EQUIPMENT PARKING AND STORAGE (BDE)
Effective: November 1, 2017

Replace the first paragraph of Article 701.11 of the Standard Specifications with the following.

"**701.11 Equipment Parking and Storage.** During working hours, all vehicles and/or nonoperating equipment which are parked, two hours or less, shall be parked at least 8 ft (2.5 m) from the open traffic lane. For other periods of time during working and for all nonworking hours, all vehicles, materials, and equipment shall be parked or stored as follows.

(a) When the project has adequate right-of-way, vehicles, materials, and equipment shall be located a minimum of 30 ft (9 m) from the pavement.

(b) When adequate right-of-way does not exist, vehicles, materials, and equipment shall be located a minimum of 15 ft (4.5 m) from the edge of any pavement open to traffic.

(c) Behind temporary concrete barrier, vehicles, materials, and equipment shall be located a minimum of 24 in. (600 mm) behind free standing barrier or a minimum of 6 in. (150 mm) behind barrier that is either pinned or restrained according to Article 704.04. The 24 in. or 6 in. measurement shall be from the base of the non-traffic side of the barrier.

(d) Behind other man-made or natural barriers meeting the approval of the Engineer."

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:

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.

GROOVING FOR RECESSED PAVEMENT MARKINGS (BDE)
Effective: November 1, 2012 Revised: November 1, 2017

Description. This work shall consist of grooving the pavement surface in preparation for the application of recessed pavement markings.

Equipment. Equipment shall be according to the following.

(a) Preformed Plastic Pavement Marking Installations. The grooving equipment shall have a free-floating saw blade cutting head equipped with gang-stacked diamond saw blades. The diamond saw blades shall be of uniform wear and shall produce a smooth textured surface. Any ridges in the groove shall have a maximum height of 15 mils (0.38 mm).

(b) Liquid and Thermoplastic Pavement Marking Installations. The grooving equipment shall be equipped with either a free-floating saw blade cutting head or a free-floating grinder cutting head configuration with diamond or carbide tipped cutters and shall produce an irregular textured surface.

CONSTRUCTION REQUIREMENTS

General. The Contractor shall supply the Engineer with a copy of the pavement marking material manufacturer's recommendations for constructing a groove.

Pavement Grooving Methods. The grooves for recessed pavement markings shall be constructed using the following methods.

(a) Wet Cutting Head Operation. When water is required or used to cool the cutting head, the groove shall be flushed with high pressure water immediately following the cut to avoid build up and hardening of slurry in the groove. The pavement surface shall be allowed to dry for a minimum of 24 hours prior to the final cleaning of the groove and application of the pavement marking material.

(b) Dry Cutting Head Operation. When used on HMA pavements, the groove shall be vacuumed or cleaned by blasting with high-pressure air to remove loose aggregate, debris, and dust generated during the cutting operation. When used on PCC pavements, the groove shall be flushed with high pressure water or shot blasted to remove any PCC particles that may have become destabilized during the grooving process. If high pressure water is used, the pavement surface shall be allowed to dry for a minimum of 24 hours prior to the final cleaning of the groove and application of the pavement marking material.

Pavement Grooving. Grooving shall not cause ravels, aggregate fractures, spalling or disturbance of the joints to the underlying surface of the pavement. Grooves shall be cut into the pavement prior to the application of the pavement marking material. Grooves shall be cut such that the width is 1 in. (25 mm) greater than the width of the pavement marking line as specified on the plans. Grooves for letters and symbols shall be cut in a square or rectangular shape so that the entire marking will fit within the limits of the grooved area. The position of the edge of the grooves shall be a minimum of 2 in. (50 mm) from the edge of all longitudinal joints. The depth of the groove shall not be less than the manufacturer's recommendations for the pavement marking material specified, but shall be installed to a minimum depth of 110 mils (2.79 mm) and a maximum depth of 200 mils (5.08 mm) for pavement marking tapes thermoplastic markings and a minimum depth of 40 mils (1.02 mm) and a maximum depth of 80 mils (2.03 mm) for liquid markings. The cutting head shall be operated at the appropriate speed in order to prevent undulation of the cutting head and grooving at an inconsistent depth.

At the start of grooving operations, a 50 ft (16.7 m) test section shall be installed and depth measurements shall be made at 10 ft (3.3 m) intervals within the test section. The individual depth measurements shall be within the allowable ranges according to this Article. If it is determined the test section has not been grooved at the appropriate depth or texture, adjustments shall be made to the cutting head and another 50 ft (16.7 m) test section shall be installed and checked. This process shall continue until the test section meets the requirements of this Article.

For new HMA pavements, grooves shall not be installed within 10 days of the placement of the final course of pavement.

Final Cleaning. Immediately prior to the application of the pavement marking material or primer sealer, the groove shall be cleaned with high-pressure air blast.

Method of Measurement. This work will be measured for payment in place, in feet (meter) for the groove width specified.

Grooving for letter, numbers and symbols will be measured in square feet (square meters).

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for GROOVING FOR RECESSED PAVEMENT MARKING of the groove width specified, and per square foot (square meter) for GROOVING FOR RECESSED PAVEMENT MARKING, LETTERS AND SYMBOLS.

The following shall only apply when preformed plastic pavement markings are to be recessed:

Add the following paragraph after the first paragraph of Article 780.07 of the Standard Specifications.

"The markings shall be capable of being applied in a grooved slot on new and existing portland cement concrete and HMA surfaces, by means of a pressure-sensitive, precoated adhesive, or liquid contact cement which shall be applied at the time of installation. A primer sealer shall be applied with a roller and shall cover and seal the entire bottom of the groove. The primer sealer shall be recommended by the manufacturer of the pavement marking material and shall be compatible with the material being used. The Contractor shall install the markings in the groove as soon as possible after the primer sealer cures according to the manufacturer's recommendations. The markings placed in the groove shall be rolled and tamped into the groove with a roller or tamper cart cut to fit the groove and loaded with or weighing at least 200 lb (90kg). Vehicle tires shall not be used for tamping. The Contractor shall roll and tamp the material with a minimum of 6 passes to prevent easy removal or peeling."

HOT-MIX ASPHALT - DENSITY TESTING OF LONGITUDINAL JOINTS (BDE)
Effective: January 1, 2010 Revised: August 1, 2018

Description. This work shall consist of testing the density of longitudinal joints as part of the quality control/quality assurance (QC/QA) of hot-mix asphalt (HMA). Work shall be according to Section 1030 of the Standard Specifications except as follows.

Quality Control/Quality Assurance (QC/QA). Delete the second and third sentence of the third paragraph of Article 1030.05(d)(3) of the Standard Specifications.

Add the following paragraphs to the end of Article 1030.05(d)(3) of the Standard Specifications:

"Longitudinal joint density testing shall be performed at each random density test location. Longitudinal joint testing shall be located at a distance equal to the lift thickness or a minimum of 4 in. (100 mm), from each pavement edge. (i.e. for a 5 in. (125 mm) lift the near edge of the density gauge or core barrel shall be within 5 in. (125 mm) from the edge of pavement.) Longitudinal joint density testing shall be performed using either a correlated nuclear gauge or cores.

a. Confined Edge. Each confined edge density shall be represented by a one-minute nuclear density reading or a core density and shall be included in the average of density readings or core densities taken across the mat which represents the Individual Test.

b. Unconfined Edge. Each unconfined edge joint density shall be represented by an average of three one-minute density readings or a single core density at the given density test location and shall meet the density requirements specified herein. The three one-minute readings shall be spaced 10 ft (3 m) apart longitudinally along the unconfined pavement edge and centered at the random density test location.

When a longitudinal joint sealant (LJS) is applied, longitudinal joint density testing will not be required on the joint(s) sealed."

Revise the Density Control Limits table in Article 1030.05(d)(4) of the Standard Specifications to read:

"Mixture Composition	Parameter	Individual Test (includes confined edges)	Unconfined Edge Joint Density Minimum
IL-4.75	Ndesign = 50	93.0 – 97.4% 1/	91.0%
IL-9.5	Ndesign = 90	92.0 – 96.0%	90.0%
IL-9.5,IL-9.5L	Ndesign < 90	92.5 – 97.4%	90.0%
IL-19.0	Ndesign = 90	93.0 – 96.0%	90.0%
IL-19.0, IL-19.0L	Ndesign < 90	93.0 2/– 97.4%	90.0%
SMA	Ndesign = 50 & 80	93.5 – 97.4%	91.0%"

HOT-MIX ASPHALT – OSCILLATORY ROLLER (BDE)
Effective: August 1, 2018 Revised: November 1, 2018

Add the following to Article 406.03 of the Standard Specifications:

"(j) Oscillatory Roller .....1101.01"

Revise Table 1 and Note 3/ of Table 1 in Article 406.07(a) of the Standard Specifications to read:

"TABLE 1 - MINIMUM ROLLER REQUIREMENTS FOR HMA				
	Breakdown Roller (one of the following)	Intermediate Roller	Final Roller (one or more of the following)	Density Requirement
Level Binder: (When the density requirements of Article 406.05(c) do not apply.)	P 3/	- -	V_S, P 3/, T_B, T_F, 3W, O_T	To the satisfaction of the Engineer.
Binder and Surface 1/ Level Binder 1/: (When the density requirements of Article 406.05(c) apply.)	V_D, P 3/, T_B, 3W, O_T, O_B	P 3/, O_T, O_B	V_S, T_B, T_F, O_T	As specified in Articles: 1030.05(d)(3), (d)(4), and (d)(7).
IL-4.75 and SMA 4/ 5/	T_B, 3W, O_T	- -	T_F, 3W, O_T	
Bridge Decks 2/	T_B	- -	T_F	As specified in Articles 582.05 and 582.06.

3/ A vibratory roller (V_D) or oscillatory roller (O_T or O_B) may be used in lieu of the pneumatic-tired roller on mixtures containing polymer modified asphalt binder."

Add the following to EQUIPMENT DEFINITION in Article 406.07(a) contained in the Errata of the Supplemental Specifications:

"O_T - Oscillatory roller, tangential impact mode. Maximum speed is 3.0 mph (4.8 km/h) or 264 ft/min (80 m/min).

O_B - Oscillatory roller, tangential and vertical impact mode, operated at a speed to produce not less than 10 vertical impacts/ft (30 impacts/m)."

Add the following to Article 1101.01 of the Standard Specifications:

"(h) Oscillatory Roller. The oscillatory roller shall be self-propelled and provide a smooth operation when starting, stopping, or reversing directions. The oscillatory roller shall be able to operate in a mode that will provide tangential impact force with or without vertical impact force by using at least one drum. The oscillatory roller shall be equipped with water tanks and sprinkling devices, or other approved methods, which shall be used to wet the drums to prevent material pickup. The drum(s) amplitude and frequency of the tangential and vertical impact force shall be approximately the same in each direction and meet the following requirements:

(1) The minimum diameter of the drum(s) shall be 42 in. (1070 mm);

(2) The minimum length of the drum(s) shall be 57 in. (1480 mm);

(3) The minimum unit static force on the drum(s) shall be 125 lb/in. (22 N/m); and

(4) The minimum force on the oscillatory drum shall be 18,000 lb (80 kN)."

HOT-MIX ASPHALT – TACK COAT (BDE)
Effective: November 1, 2016

Revise Article 1032.06(a) of the Standard Specifications to read:

"(a) Anionic Emulsified Asphalt. Anionic emulsified asphalts shall be according to AASHTO M 140. SS-1h emulsions used as a tack coat shall have the cement mixing test waived."

LIGHTS ON BARRICADES (BDE)
Effective: January 1, 2018

Revise Article 701.16 of the Standard Specifications to read:

"**701.16 Lights.** Lights shall be used on devices as required in the plans, the traffic control plan, and the following table.

Circumstance	Lights Required
Daylight operations	None
First two warning signs on each approach to the work involving a nighttime lane closure and "ROUGH GROOVED SURFACE" (W8-I107) signs	Flashing mono-directional lights
Devices delineating isolated obstacles, excavations, or hazards at night (Does not apply to patching)	Flashing bi-directional lights
Devices delineating obstacles, excavations, or hazards exceeding 100 ft (30 m) in length at night (Does not apply to widening)	Steady burn bi-directional lights
Channelizing devices for nighttime lane closures on two-lane roads	None
Channelizing devices for nighttime lane closures on multi-lane roads	None
Channelizing devices for nighttime lane closures on multi-lane roads separating opposing directions of traffic	None
Channelizing devices for nighttime along lane shifts on multilane roads	Steady burn mono-directional lights
Channelizing devices for night time along lane shifts on two lane roads	Steady burn bi-directional lights
Devices in nighttime lane closure tapers on Standards 701316 and 701321	Steady burn bi-directional lights
Devices in nighttime lane closure tapers	Steady burn mono-directional lights
Devices delineating a widening trench	None
Devices delineating patches at night on roadways with an ADT less than 25,000	None
Devices delineating patches at night on roadways with an ADT of 25,000 or more	None

Batteries for the lights shall be replaced on a group basis at such times as may be specified by the Engineer."

Delete the fourth sentence of the first paragraph of Article 701.17(c)(2) of the Standard Specifications.

Revise the first paragraph of Article 603.07 of the Standard Specifications to read:

"**603.07 Protection Under Traffic.** After the casting has been adjusted and Class SI concrete has been placed, the work shall be protected by a barricade for at least 72 hours."

MANHOLES, VALVE VAULTS, AND FLAT SLAB TOPS (BDE)
Effective: January 1, 2018 Revised: March 1, 2019

Description. In addition to those manufactured according to the current standards included in this contract, manholes, valve vaults, and flat slab tops manufactured prior to March 1, 2019, according to the previous Highway Standards listed below will be accepted on this contract:

Product	Previous Standards		
Precast Manhole Type A, 4' (1.22 m) Diameter	602401-05	602401-04	602401-03
Precast Manhole Type A, 5' (1.52 m) Diameter	602402-01	602402	602401-03
Precast Manhole Type A, 6' (1.83 m) Diameter	602406-09	602406-08	602406-07
Precast Manhole Type A, 7' (2.13 m) Diameter	602411-07	602411-06	602411-05
Precast Manhole Type A, 8' (2.44 m) Diameter	602416-07	602416-06	602416-05
Precast Manhole Type A, 9' (2.74 m) Diameter	602421-07	602421-06	602421-05
Precast Manhole Type A, 10' (3.05 m) Diameter	602426-01	602426	
Precast Valve Vault Type A, 4' (1.22 m) Diameter	602501-04	602501-03	602501-02
Precast Valve Vault Type A, 5' (1.52 m) Diameter	602506-01	602506	602501-02
Precast Reinforced Concrete Flat Slab Top	602601-05	602601-04	

The following revisions to the Standard Specifications shall apply to manholes, valve vaults, and flat slab tops manufactured according to the current standards included in this contract:

Revise Article 602.02(g) of the Standard Specifications to read:

"(g) Structural Steel (Note 4) 1006.04

Note 4. All components of the manhole joint splice shall be galvanized according to the requirements of AASHTO M 111 or M 232 as applicable."

Add the following to Article 602.02 of the Standard Specifications:

"(s) Anchor Bolts and Rods (Note 5) 1006.09

Note 5. The threaded rods for the manhole joint splice shall be according to the requirements of ASTM F 1554, Grade 55, (Grade 380)."

Revise the second paragraph of Article 1042.10 of the Standard Specifications to read:

"Catch basin Types A, B, C, and D; Manhole Type A; Inlet Types A and B; Drainage Structures Types 1, 2, 3, 4, 5, and 6; Valve Vault Type A; and reinforced concrete flat slab top (Highway Standard 602601) shall be manufactured according to AASHTO M 199 (M 199M), except as shown on the plans. Additionally, catch basins, inlets, and drainage structures shall have a minimum concrete compressive strength of 4500 psi (31,000 kPa) at 28 days and manholes, valve vaults, and reinforced concrete flat slab tops shall have a minimum concrete compressive strength of 5000 psi (34,500 kPa) at 28 days."

MAST ARM ASSEMBLY AND POLE (BDE)
Effective: August 1, 2018

Revise the first sentence of Article 1077.03(b) of the Standard Specifications to read:

"Anchor rods shall be according to Article 1006.09, Grade 105, and shall be threaded a minimum of 7 1/2 in. (185 mm) at one end and threaded a minimum of 2 in. (50 mm) with matching hex head nut at the other end."

PAVEMENT MARKING REMOVAL (BDE)
Effective: July 1, 2016

Revise Article 783.02 of the Standard Specifications to read:

"**783.02 Equipment.** Equipment shall be according to the following.

Item	Article/Section
(a) Grinders (Note 1)	
(b) Water Blaster with Vacuum Recovery	1101.12

Note 1. Grinding equipment shall be approved by the Engineer."

Revise the first paragraph of Article 783.03 of the Standard Specifications to read:

"**783.03 Removal of Conflicting Markings.** Existing pavement markings that conflict with revised traffic patterns shall be removed. If darkness or inclement weather prohibits the removal operations, such operations shall be resumed the next morning or when weather permits. In the event of removal equipment failure, such equipment shall be repaired, replaced, or leased so removal operations can be resumed within 24 hours."

Revise the first and second sentences of the first paragraph of Article 783.03(a) of the Standard Specifications to read:

"The existing pavement markings shall be removed by the method specified and in a manner that does not materially damage the surface or texture of the pavement or surfacing. Small particles of tightly adhering existing markings may remain in place, if in the opinion of the Engineer, complete removal of the small particles will result in pavement surface damage."

Revise the first paragraph of Article 783.04 of the Standard Specifications to read:

"**783.04 Cleaning.** The roadway surface shall be cleaned of debris or any other deleterious material by the use of compressed air or water blast."

Revise the first paragraph of Article 783.06 of the Standard Specifications to read:

"**783.06 Basis of Payment.** This work will be paid for at the contract unit price per each for RAISED REFLECTIVE PAVEMENT MARKER REMOVAL, or at the contract unit price per square foot (square meter) for PAVEMENT MARKING REMOVAL – GRINDING and/or PAVEMENT MARKING REMOVAL – WATER BLASTING."

Delete Article 1101.13 from the Standard Specifications.

PAYMENTS TO SUBCONTRACTORS (BDE)
Effective: November 2, 2017

Add the following to the end of the fourth paragraph of Article 109.11 of the Standard Specifications:

"If reasonable cause is asserted, written notice shall be provided to the applicable subcontractor and/or material supplier and the Engineer within five days of the Contractor receiving payment. The written notice shall identify the contract number, the subcontract or material purchase agreement, a detailed reason for refusal, the value of payment being withheld, and the specific remedial actions required of the subcontractor and/or material supplier so that payment can be made."

PORTLAND CEMENT CONCRETE (BDE)
Effective: November 1, 2017

Revise the Air Content % of Class PP Concrete in Table 1 Classes of Concrete and Mix Design Criteria in Article 1020.04 of the Standard Specifications to read:

"TABLE 1. CLASSES OF CONCRETE AND MIX DESIGN CRITERIA

Class of Conc.	Use	Air Content %
PP	Pavement Patching Bridge Deck Patching (10)	
	PP-1	4.0 - 8.0"
	PP-2	
	PP-3	
	PP-4	
	PP-5	

Revise Note (4) at the end of Table 1 Classes of Concrete and Mix Design Criteria in Article 1020.04 of the Standard Specifications to read:

"(4) For all classes of concrete, the maximum slump may be increased to 7 in (175 mm) when a high range water-reducing admixture is used. For Class SC, the maximum slump may be increased to 8 in. (200 mm). For Class PS, the maximum slump may be increased to 8 1/2 in. (215 mm) if the high range water-reducing admixture is the polycarboxylate type."

PORTLAND CEMENT CONCRETE BRIDGE DECK CURING (BDE)
Effective: April 1, 2015 Revised: November 1, 2017

Revise the following two entries in the table in Article 1020.13 of the Standard Specifications to read:

"INDEX TABLE OF CURING AND PROTECTION OF CONCRETE CONSTRUCTION			
TYPE OF CONSTRUCTION	CURING METHODS	CURING PERIOD DAYS	LOW AIR TEMPERATURE PROTECTION METHODS
Superstructure (Approach Slab)	1020.13(a)(5)(6) 19/	3	1020.13(d)(1)(2) 17/
Deck	1020.13(a)(5)(6) 19/	7	1020.13(d)(1)(2) 17/

Add the following footnote to the end of the Index Table of Curing and Protection of Concrete Construction in Article 1020.13 of the Standard Specifications:

"19/ The cellulose polyethylene or synthetic fiber with polymer polyethylene blanket method shall not be used on latex modified concrete."

Revise Article 1020.13(a)(5) of the Standard Specifications to read:

"(5) Wetted Cotton Mat Method. After the surface of concrete has been textured or finished, it shall be covered immediately with dry or damp cotton mats. Cotton mats in poor condition will not be allowed. The cotton mats shall be placed in a manner which will not create indentations greater than 1/4 in. (6 mm) in the concrete surface. Minor marring of the surface is tolerable and is secondary to the importance of timely curing. The cotton mats shall then be wetted immediately and thoroughly soaked with a gentle spray of water. Thereafter, the cotton mats shall be covered with white polyethylene sheeting or burlap-polyethylene blankets. The cotton mats shall be kept saturated with water.

a. Bridge Decks. For bridge decks, a foot bridge shall be used to place and wet the cotton mats. The cotton mats shall be maintained in a wetted condition until the concrete has hardened sufficiently to place soaker hoses without indentations to the concrete surface. The soaker hoses shall be placed on top of the cotton mats at a maximum 4 ft (1.2 m) spacing. The cotton mats shall be kept wet with a continuous supply of water for the remainder of the curing period. Other continuous wetting systems may be used if approved by the Engineer.

For areas inaccessible to the cotton mats, curing shall be according to Article 1020.13(a)(3)."

Add the following to Article 1020.13(a) of the Standard Specifications.

"(6) Cellulose Polyethylene Blanket Method and Synthetic Fiber with Polymer Polyethylene Blanket Method. After the surface of concrete has been textured or finished, it shall be covered immediately with a cellulose polyethylene or synthetic fiber with polymer polyethylene blanket. Damaged blankets will not be allowed. The blankets shall be installed with the white perforated polyethylene side facing up. Adjoining blankets shall overlap a minimum of 8 in. (200 mm). Any air bubbles trapped during placement shall be removed. The blankets fiber side shall be wetted immediately prior to placement or as the blanket is being placed, and the polyethylene side shall be thoroughly soaked with a gentle spray of water immediately after placement. Thereafter, the blankets shall be kept saturated with water. For bridge decks, the blankets shall be placed and kept wet according to Article 1020.13(a)(5)a."

Revise the first paragraph of Article 1022.03 of the Standard Specifications to read:

"**1022.03 Waterproof Paper Blankets, White Polyethylene Sheeting, Burlap-Polyethylene Blankets, Cellulose Polyethylene Blankets, and Synthetic Fiber with Polymer Polyethylene Blankets.** These materials shall be white and according to ASTM C 171.

The cellulose polyethylene blanket shall consist of a perforated white polyethylene sheeting with cellulose fiber backing and shall be limited to single use only. The cellulose polyethylene blankets shall be delivered to the jobsite unused and in the manufacturer's unopened packaging until ready for installation. Each roll shall be clearly labeled with product name, manufacturer, and manufacturer's certification of compliance with ASTM C 171.

The synthetic fiber with polymer polyethylene blanket shall consist of a perforated white polyethylene sheeting with absorbent synthetic fibers and super absorbent polymer backing, and shall be limited to single use only. The synthetic fiber with polymer polyethylene blankets shall be delivered to the jobsite unused and in the manufacturer's unopened packaging until ready for installation. Each roll shall be clearly labeled on the product with product name, manufacturer, and manufacturer's certification of compliance with ASTM C 171."

PROGRESS PAYMENTS (BDE)
Effective: November 2, 2013

Revise Article 109.07(a) of the Standard Specifications to read:

"(a) Progress Payments. At least once each month, the Engineer will make a written estimate of the quantity of work performed in accordance with the contract, and the value thereof at the contract unit prices. The amount of the estimate approved as due for payment will be vouchered by the Department and presented to the State Comptroller for payment. No amount less than $1000.00 will be approved for payment other than the final payment.

Progress payments may be reduced by liens filed pursuant to Section 23(c) of the Mechanics' Lien Act, 770 ILCS 60/23(c).

If a Contractor or subcontractor has defaulted on a loan issued under the Department's Disadvantaged Business Revolving Loan Program (20 ILCS 2705/2705-610), progress payments may be reduced pursuant to the terms of that loan agreement. In such cases, the amount of the estimate related to the work performed by the Contractor or subcontractor, in default of the loan agreement, will be offset, in whole or in part, and vouchered by the Department to the Working Capital Revolving Fund or designated escrow account. Payment for the work shall be considered as issued and received by the Contractor or subcontractor on the date of the offset voucher. Further, the amount of the offset voucher shall be a credit against the Department's obligation to pay the Contractor, the Contractor's obligation to pay the subcontractor, and the Contractor's or subcontractor's total loan indebtedness to the Department. The offset shall continue until such time as the entire loan indebtedness is satisfied. The Department will notify the Contractor and Fund Control Agent in a timely manner of such offset. The Contractor or subcontractor shall not be entitled to additional payment in consideration of the offset.

The failure to perform any requirement, obligation, or term of the contract by the Contractor shall be reason for withholding any progress payments until the Department determines that compliance has been achieved."

RECLAIMED ASPHALT PAVEMENT AND RECLAIMED ASPHALT SHINGLES (BDE)
Effective: November 1, 2012

Revise: January 1, 2019

Revise Section 1031 of the Standard Specifications to read:

"**SECTION 1031. RECLAIMED ASPHALT PAVEMENT AND RECLAIMED ASPHALT SHINGLES**

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

(a) Reclaimed Asphalt Pavement (RAP). RAP is the material produced by cold milling or crushing an existing hot-mix asphalt (HMA) pavement. The Contractor shall supply written documentation that the RAP originated from routes or airfields under federal, state, or local agency jurisdiction.

(b) Reclaimed Asphalt Shingles (RAS). Reclaimed asphalt shingles (RAS). RAS is from the processing and grinding of preconsumer or post-consumer shingles. RAS shall be a clean and uniform material with a maximum of 0.5 percent unacceptable material, as defined in Central Bureau of Materials Policy Memorandum, "Reclaimed Asphalt Shingle (RAS) Sources", by weight of RAS. All RAS used shall come from a Central Bureau of Materials approved processing facility where it shall be ground and processed to 100 percent passing the 3/8 in. (9.5 mm) sieve and 93 percent passing the #4 (4.75 mm) sieve based on a dry shake gradation. RAS shall be uniform in gradation and asphalt binder content and shall meet the testing requirements specified herein. In addition, RAS shall meet the following Type 1 or Type 2 requirements.

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

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

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

(a) RAP Stockpiles. The Contractor shall construct individual, sealed RAP stockpiles meeting one of the following definitions. No additional RAP shall be added to the pile after the pile has been sealed. Stockpiles shall be sufficiently separated to prevent intermingling at the base. Stockpiles shall be identified by signs indicating the type as listed below (i.e. “Homogeneous Surface”).

Prior to milling, the Contractor shall request the District provide documentation on the quality of the RAP to clarify the appropriate stockpile.

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

Mixture FRAP will be used in:	Sieve Size that 100 % of FRAP Shall Pass
IL-19.0	1 1/2 in. (40 mm)
IL-9.5	3/4 in. (20 mm)
IL-4.75	1/2 in. (13 mm)

(2) Homogeneous. Homogeneous RAP stockpiles shall consist of RAP from Class I, HMA (High and Low ESAL) mixtures and represent: 1) the same aggregate quality, but shall be at least C quality; 2) the same type of crushed aggregate (either crushed natural aggregate, ACBF slag, or steel slag); 3) similar gradation; and 4) similar asphalt binder content. If approved by the Engineer, combined single pass surface/binder millings may be considered “homogeneous” with a quality rating dictated by the lowest coarse aggregate quality present in the mixture.

(3) Conglomerate. Conglomerate RAP stockpiles shall consist of RAP from Class I, HMA (High and Low ESAL) mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality, but shall be at least C quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate RAP shall be processed prior to testing by crushing to where all RAP shall pass the 5/8 in. (16 mm) or smaller screen. Conglomerate RAP stockpiles shall not contain steel slag.

(4) Non-Quality. RAP stockpiles that do not meet the requirements of the stockpile categories listed above shall be classified as “Non-Quality”.

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

(b) RAS Stockpiles. Type 1 and Type 2 RAS shall be stockpiled separately and shall not be intermingled. Each stockpile shall be signed indicating what type of RAS is present.

Unless otherwise specified by the Engineer, mechanically blending manufactured sand (FM 20 or FM 22) up to an equal weight of RAS with the processed RAS will be permitted to improve workability. The sand shall be “B Quality” or better from an approved Aggregate Gradation Control System source. The sand shall be accounted for in the mix design and during HMA production.

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

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

(a) RAP/FRAP Testing. When used in HMA, the RAP/FRAP shall be sampled and tested either during or after stockpiling.

(1) During Stockpiling. For testing during stockpiling, washed extraction samples shall be run at the minimum frequency of one sample per 500 tons (450 metric tons) for the first 2000 tons (1800 metric tons) and one sample per 2000 tons (1800 metric tons) thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons (3600 metric tons).

(2) After Stockpiling. For testing after stockpiling, the Contractor shall submit a plan for approval to the District proposing a satisfactory method of sampling and testing the RAP/FRAP pile either in-situ or by restockpiling. The sampling plan shall meet the minimum frequency required above and detail the procedure used to obtain representative samples throughout the pile for testing.

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

(b) RAS Testing. RAS or RAS blended with manufactured sand shall be sampled and tested during stockpiling according to Central Bureau of Materials Policy Memorandum, "Reclaimed Asphalt Shingle (RAS) Source".

Samples shall be collected during stockpiling at the minimum frequency of one sample per 200 tons (180 metric tons) for the first 1000 tons (900 metric tons) and one sample per 250 tons (225 metric tons) thereafter. A minimum of five samples are required for stockpiles less than 1000 tons (900 metric tons). Once a ≤ 1000 ton (900 metric ton), five-sample/test stockpile has been established it shall be sealed. Additional incoming RAS or RAS blended with manufactured sand shall be stockpiled in a separate working pile as designated in the Quality Control plan and only added to the sealed stockpile when the test results of the working pile are complete and are found to meet the tolerances specified herein for the original sealed RAS stockpile.

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

If the sampling and testing was performed at the shingle processing facility in accordance with the QC Plan, the Contractor shall obtain and make available all of the test results from start of the initial stockpile.

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

(a) Evaluation of RAP/FRAP Test Results. All of the extraction results shall be compiled and averaged for asphalt binder content and gradation, and when applicable G_{mm}. Individual extraction test results, when compared to the averages, will be accepted if within the tolerances listed below.

Parameter	FRAP/Homogeneous/ Conglomerate
1 in. (25 mm)	
1/2 in. (12.5 mm)	± 8 %
No. 4 (4.75 mm)	± 6 %
No. 8 (2.36 mm)	± 5 %
No. 16 (1.18 mm)	
No. 30 (600 µm)	± 5 %
No. 200 (75 µm)	± 2.0 %
Asphalt Binder	± 0.4 % 1/
G_{mm}	± 0.03

1/ The tolerance for FRAP shall be ± 0.3 %.

If more than 20 percent of the individual sieves and/or asphalt binder content tests are out of the above tolerances, the RAP/FRAP shall not be used in HMA unless the RAP/FRAP representing the failing tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the District for evaluation.

With the approval of the Engineer, the ignition oven may be substituted for extractions according to the ITP, "Calibration of the Ignition Oven for the Purpose of Characterizing Reclaimed Asphalt Pavement (RAP)".

(b) Evaluation of RAS and RAS Blended with Manufactured Sand Test Results. All of the test results, with the exception of percent unacceptable materials, shall be compiled and averaged for asphalt binder content and gradation. Individual test results, when compared to the averages, will be accepted if within the tolerances listed below.

Parameter	RAS
No. 8 (2.36 mm)	± 5 %
No. 16 (1.18 mm)	± 5 %
No. 30 (600 µm)	± 4 %
No. 200 (75 µm)	± 2.0 %
Asphalt Binder Content	± 1.5 %

If more than 20 percent of the individual sieves and/or asphalt binder content tests are out of the above tolerances, or if the percent unacceptable material exceeds 0.5 percent by weight of material retained on the # 4 (4.75 mm) sieve, the RAS or RAS blend shall not be used in Department projects. All test data and acceptance ranges shall be sent to the District for evaluation.

1031.05 Quality Designation of Aggregate in RAP/FRAP.

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

(1) RAP from Class I, Superpave/HMA (High ESAL), or (Low ESAL) IL-9.5L surface mixtures are designated as containing Class B quality coarse aggregate.

(2) RAP from Class I binder, Superpave/HMA (High ESAL) binder, or (Low ESAL) IL-19.0L binder mixtures are designated as containing Class C quality coarse aggregate.

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

If the quality is not known, the quality shall be determined as follows. Coarse and fine FRAP stockpiles containing plus #4 (4.75 mm) sieve coarse aggregate shall have a maximum tonnage of 5000 tons (4500 metric tons). The Contractor shall obtain a representative sample witnessed by the Engineer. The sample shall be a minimum of 50 lb (25 kg). The sample shall be extracted according to Illinois Modified AASHTO T 164 by a consultant laboratory prequalified by the Department for the specified testing. The consultant laboratory shall submit the test results along with the recovered aggregate to the District Office. The cost for this testing shall be paid by the Contractor. The District will forward the sample to the Central Bureau of Materials Aggregate Lab for MicroDeval Testing, according to ITP 327. A maximum loss of 15.0 percent will be applied for all HMA applications.

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

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

(1) Coarse Aggregate Size. The coarse aggregate in all RAP shall be equal to or less than the nominal maximum size requirement for the HMA mixture to be produced.

(2) Steel Slag Stockpiles. Homogeneous RAP stockpiles containing steel slag will be approved for use in all HMA (High ESAL and Low ESAL) Surface and Binder Mixture applications.

(3) Use in HMA Surface Mixtures (High and Low ESAL). RAP/FRAP stockpiles for use in HMA surface mixtures (High and Low ESAL) shall be FRAP or homogeneous in which the coarse aggregate is Class B quality or better. FRAP from Conglomerate stockpiles shall be considered equivalent to limestone for frictional considerations. Known frictional contributions from plus #4 (4.75 mm) homogeneous FRAP stockpiles will be accounted for in meeting frictional requirements in the specified mixture.

(4) Use in HMA Binder Mixtures (High and Low ESAL), HMA Base Course, and HMA Base Course Widening. RAP/FRAP stockpiles for use in HMA binder mixtures (High and Low ESAL), HMA base course, and HMA base course widening shall be FRAP, homogeneous, or conglomerate, in which the coarse aggregate is Class C quality or better.

(5) Use in Shoulders and Subbase. RAP/FRAP stockpiles for use in HMA shoulders and stabilized subbase (HMA) shall be FRAP, homogeneous, or conglomerate.

(6) When the Contractor chooses the RAP option, the percentage of RAP shall not exceed the amounts indicated in Article 1031.06(c)(1) below for a given Ndesign.

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

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

(1) RAP/RAS. When RAP is used alone or RAP is used in conjunction with RAS, the percentage of virgin asphalt binder replacement shall not exceed the amounts listed in the Max RAP/RAS ABR table listed below for the given Ndesign.

RAP/RAS Maximum Asphalt Binder Replacement (ABR) Percentage

HMA Mixtures 1/, 2/	RAP/RAS Maximum ABR %		
Ndesign	Binder/Leveling Binder	Surface	Polymer Modified
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). If warm mix asphalt (WMA) technology is utilized and production temperatures do not exceed 275 °F (135 °C), the high and low virgin asphalt binder grades shall each be reduced by one grade when RAP/RAS ABR exceeds 25 percent (i.e. 26 percent RAP/RAS ABR would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).

(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 FRAP/RAS table listed below for the given Ndesign.

FRAP/RAS Maximum Asphalt Binder Replacement (ABR) Percentage

HMA Mixtures 1/, 2/	FRAP/RAS Maximum ABR %					
Ndesign	Binder/Leveling Binder		Surface		Polymer Modified	
	w/o I-FIT	with I-FIT	w/o I-FIT	with I-FIT	w/o I-FIT	with I-FIT
30	50	55	40	45	10	15
50	40	45	35	40	10	15
70	40	45	30	35	10	15
90	40	45	30	35	10	15
SMA	- -	- -	- -	- -	20	25
IL-4.75	- -	- -	- -	- -	30	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). If warm mix asphalt (WMA) technology is utilized and production temperatures do not exceed 275 °F (135 °C), the high and low virgin asphalt binder grades shall each be reduced by one grade when FRAP/RAS ABR exceeds 25 percent (i.e. 26 percent ABR would require a virgin asphalt binder grade of PG 64-22 to be reduced to a PG 58-28).

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

(a) RAP/FRAP and/or RAS. RAP/FRAP and/or RAS mix designs shall be submitted for verification. If additional RAP/FRAP and/or RAS stockpiles are tested and found that no more than 20 percent of the results, as defined under "Testing" herein, are outside of the control tolerances set for the original RAP/FRAP and/or RAS stockpile and HMA mix design, and meets all of the requirements herein, the additional RAP/FRAP and/or RAS stockpiles may be used in the original mix design at the percent previously verified.

(b) RAS. Type 1 and Type 2 RAS are not interchangeable in a mix design.

The RAP, FRAP, and RAS stone bulk specific gravities (G_{sb}) shall be according to the "Determination of Aggregate Bulk (Dry) Specific Gravity (G_{sb}) of Reclaimed Asphalt Pavement (RAP) and Reclaimed Asphalt Shingles (RAS)" procedure in the Department's Manual of Test Procedures for Materials.

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

(a) RAP/FRAP. The coarse aggregate in all RAP/FRAP used shall be equal to or less than the nominal maximum size requirement for the HMA mixture being produced.

To remove or reduce agglomerated material, a scalping screen, gator, crushing unit, or comparable sizing device approved by the Engineer shall be used in the RAP feed system to remove or reduce oversized material.

If the RAP/FRAP control tolerances or QC/QA test results require corrective action, the Contractor shall cease production of the mixture containing RAP/FRAP and either switch to the virgin aggregate design or submit a new RAP/FRAP design.

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

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

(1) Dryer Drum Plants.

a. Date, month, year, and time to the nearest minute for each print.

b. HMA mix number assigned by the Department.

c. Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).

d. Accumulated dry weight of RAP/FRAP/RAS in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).

e. Accumulated mineral filler in revolutions, tons (metric tons), etc. to the nearest 0.1 unit.

f. Accumulated asphalt binder in gallons (liters), tons (metric tons), etc. to the nearest 0.1 unit.

g. Residual asphalt binder in the RAP/FRAP material as a percent of the total mix to the nearest 0.1 percent.

h. Aggregate and RAP/FRAP moisture compensators in percent as set on the control panel. (Required when accumulated or individual aggregate and RAP/FRAP are printed in wet condition.)

(2) Batch Plants.

a. Date, month, year, and time to the nearest minute for each print.

b. HMA mix number assigned by the Department.

c. Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram).

d. Mineral filler weight to the nearest pound (kilogram).

e. RAP/FRAP/RAS weight to the nearest pound (kilogram).

f. Virgin asphalt binder weight to the nearest pound (kilogram).

g. Residual asphalt binder in the RAP/FRAP/RAS material as a percent of the total mix to the nearest 0.1 percent.

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

1031.09 RAP in Aggregate Surface Course and Aggregate Wedge Shoulders, Type B. The use of RAP in aggregate surface course (temporary access entrances only) and aggregate wedge shoulders, Type B shall be as follows.

(a) Stockpiles and Testing. RAP stockpiles may be any of those listed in Article 1031.02, except “Non-Quality” and “FRAP”. The testing requirements of Article 1031.03 shall not apply. RAP used shall be according to the current Central Bureau of Materials Policy Memorandum, “Reclaimed Asphalt Pavement (RAP) for Aggregate Applications”.

(b) Gradation. One hundred percent of the RAP material shall pass the 1 1/2 in. (37.5 mm) sieve. The RAP material shall be reasonably well graded from coarse to fine. RAP material that is gap-graded or single sized will not be accepted.”

STEEL COST ADJUSTMENT (BDE)
Effective: April 2, 2004 Revised: August 1, 2017

Description. Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in steel prices when optioned by the Contractor. The bidder shall indicate with their bid whether or not this special provision will be part of the contract. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment.

Types of Steel Products. An adjustment will be made for fluctuations in the cost of steel used in the manufacture of the following items:

Metal Piling (excluding temporary sheet piling)
Structural Steel
Reinforcing Steel

Other steel materials such as dowel bars, tie bars, mesh reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), and frames and grates will be subject to a steel cost adjustment when the pay items they are used in have a contract value of $10,000 or greater.

The adjustments shall apply to the above items when they are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply when the item is added as extra work and paid for at a lump sum price or by force account.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

(a) The dates and quantity of steel, in lb (kg), shipped from the mill to the fabricator.

(b) The quantity of steel, in lb (kg), incorporated into the various items of work covered by this special provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment. Steel cost adjustments will be computed as follows:

SCA = Q X 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:

Percent Difference = $\{(MPI_L - MPI_M) \div MPI_L\} \times 100$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Attachment

Item	Unit Mass (Weight)
Metal Piling (excluding temporary sheet piling)	
Furnishing Metal Pile Shells 12 in. (305 mm), 0.179 in. (3.80 mm) wall thickness)	23 lb/ft (34 kg/m)
Furnishing Metal Pile Shells 12 in. (305 mm), 0.250 in. (6.35 mm) wall thickness)	32 lb/ft (48 kg/m)
Furnishing Metal Pile Shells 14 in. (356 mm), 0.250 in. (6.35 mm) wall thickness)	37 lb/ft (55 kg/m)
Other piling	See plans
Structural Steel	See plans for weights (masses)
Reinforcing Steel	See plans for weights (masses)
Dowel Bars and Tie Bars	6 lb (3 kg) each
Mesh Reinforcement	63 lb/100 sq ft (310 kg/sq m)
Guardrail	
Steel Plate Beam Guardrail, Type A w/steel posts	20 lb/ft (30 kg/m)
Steel Plate Beam Guardrail, Type B w/steel posts	30 lb/ft (45 kg/m)
Steel Plate Beam Guardrail, Types A and B w/wood posts	8 lb/ft (12 kg/m)
Steel Plate Beam Guardrail, Type 2	305 lb (140 kg) each
Steel Plate Beam Guardrail, Type 6	1260 lb (570 kg) each
Traffic Barrier Terminal, Type 1 Special (Tangent)	730 lb (330 kg) each
Traffic Barrier Terminal, Type 1 Special (Flared)	410 lb (185 kg) each
Steel Traffic Signal and Light Poles, Towers and Mast Arms	
Traffic Signal Post	11 lb/ft (16 kg/m)
Light Pole, Tenon Mount and Twin Mount, 30 - 40 ft (9 – 12 m)	14 lb/ft (21 kg/m)
Light Pole, Tenon Mount and Twin Mount, 45 - 55 ft (13.5 – 16.5 m)	21 lb/ft (31 kg/m)
Light Pole w/Mast Arm, 30 - 50 ft (9 – 15.2 m)	13 lb/ft (19 kg/m)
Light Pole w/Mast Arm, 55 - 60 ft (16.5 – 18 m)	19 lb/ft (28 kg/m)
Light Tower w/Luminaire Mount, 80 - 110 ft (24 – 33.5 m)	31 lb/ft (46 kg/m)
Light Tower w/Luminaire Mount, 120 - 140 ft (36.5 – 42.5 m)	65 lb/ft (97 kg/m)
Light Tower w/Luminaire Mount, 150 - 160 ft (45.5 – 48.5 m)	80 lb/ft (119 kg/m)
Metal Railings (excluding wire fence)	
Steel Railing, Type SM	64 lb/ft (95 kg/m)
Steel Railing, Type S-1	39 lb/ft (58 kg/m)
Steel Railing, Type T-1	53 lb/ft (79 kg/m)
Steel Bridge Rail	52 lb/ft (77 kg/m)
Frames and Grates	
Frame	250 lb (115 kg)
Lids and Grates	150 lb (70 kg)

STEEL PLATE BEAM GUARDRAIL MANUFACTURING (BDE)
Effective: January 1, 2019

Revise the first three paragraphs of Article 1006.25 of the Standard Specifications to read:

"**1006.25 Steel Plate Beam Guardrail.** Steel plate beam guardrail, including bolts, nuts, and washers, shall be according to AASHTO M 180. The guardrail shall be Class A, with a Type II galvanized coating.

Steel plates for mounting guardrail on existing culverts shall be according to AASHTO M 270 Grade 36 (M 270M Grade 250) and zinc coated according to AASHTO M 111.

The Department will accept guardrail based on the "Brand Registration and Guarantee" requirements of AASHTO M 180 and the manufacturer shall be listed as compliant through the NTPEP Program. The Department will maintain a qualified product list."

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%"

TEMPORARY PAVEMENT MARKING (BDE)
Effective: April 1, 2012 Revised: April 1, 2017

Revise Article 703.02 of the Standard Specifications to read:

"**703.02 Materials.** Materials shall be according to the following.

(a) Pavement Marking Tape, Type I and Type III 1095.06
(b) Paint Pavement Markings 1095.02
(c) Pavement Marking Tape, Type IV .....1095.11"

Revise the second paragraph of Article 703.05 of the Standard Specifications to read:

"Type I marking tape or paint shall be used at the option of the Contractor, except paint shall not be applied to the final wearing surface unless authorized by the Engineer for late season applications where tape adhesion would be a problem. Type III or Type IV marking tape shall be used on the final wearing surface when the temporary pavement marking will conflict with the permanent pavement marking such as on tapers, crossovers and lane shifts."

Revise Article 703.07 of the Standard Specifications to read:

"**703.07 Basis of Payment.** This work will be paid for as follows.

a) Short Term Pavement Marking. Short term pavement marking will be paid for at the contract unit price per foot (meter) for SHORT TERM PAVEMENT MARKING. Removal of short term pavement markings will be paid for at the contract unit price per square foot (square meter) for SHORT TERM PAVEMENT MARKING REMOVAL.

b) Temporary Pavement Marking. Where the Contractor has the option of material type, temporary pavement marking will be paid for at the contract unit price per foot (meter) for TEMPORARY PAVEMENT MARKING of the line width specified, and at the contract unit price per square foot (square meter) for TEMPORARY PAVEMENT MARKING LETTERS AND SYMBOLS.

Where the Department specifies the use of pavement marking tape, the Type III or Type IV temporary pavement marking will be paid for at the contract unit price per foot (meter) for PAVEMENT MARKING TAPE, TYPE III or PAVEMENT MARKING TAPE, TYPE IV of the line width specified and at the contract unit price per square feet (square meter) for PAVEMENT MARKING TAPE, TYPE III - LETTERS AND SYMBOLS or PAVEMENT MARKING TAPE, TYPE IV – LETTERS AND SYMBOLS.

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

When temporary pavement marking is shown on the Standard, the cost of the temporary pavement marking and its removal will be included in the cost of the Standard."

Add the following to Section 1095 of the Standard Specifications:

"**1095.11 Pavement Marking Tape, Type IV.** The temporary, preformed, patterned markings shall consist of a white or yellow tape with wet retroreflective media incorporated to provide immediate and continuing retroreflection during both wet and dry conditions. The tape shall be manufactured without the use of heavy metals including lead chromate pigments or other similar, lead-containing chemicals.

The white and yellow Type IV marking tape shall meet the Type III requirements of Article 1095.06 and the following.

(a) Composition. The retroreflective pliant polymer pavement markings shall consist of a mixture of high-quality polymeric materials, pigments and glass beads distributed throughout its base cross-sectional area, with a layer of wet retroreflective media bonded to a durable polyurethane topcoat surface. The patterned surface shall have approximately 40% ± 10% of the surface area raised and presenting a near vertical face to traffic from any direction. The channels between the raised areas shall be substantially free of exposed beads or particles.

(b) Retroreflectance. The white and yellow markings shall meet the following for initial dry and wet retroreflectance.

(1) Dry Retroreflectance. Dry retroreflectance shall be measured under dry conditions according to ASTM D 4061 and meet the values described in Article 1095.06 for Type III tape.

(2) Wet Retroreflectance. Wet retroreflectance shall be measured under wet conditions according to ASTM E 2177 and meet the values shown in the following table.

Wet Retroreflectance, Initial R_L

Color	**R_L 1.05/88.76**
White	300
Yellow	200

(c) Color. The material shall meet the following requirements for daylight reflectance and color, when tested, using a color spectrophotometer with 45 degrees circumferential/zero degree geometry, illuminant D65, and a two degree observer angle. The color instrument shall measure the visible spectrum from 380 to 720 nm with a wavelength measurement interval and spectral bandpass of 10 nm.

Color	**Daylight Reflectance %Y**
White	65 minimum
*Yellow	36-59

*Shall match Federal 595 Color No. 33538 and the chromaticity limits as follows.

x	0.490	0.475	0.485	0.530
y	0.470	0.438	0.425	0.456

(d) Skid Resistance. The surface of the markings shall provide an average minimum skid resistance of 50 BPN when tested according to ASTM E 303.

(e) Sampling, Testing, Acceptance, and Certification. Prior to approval and use of the wet reflective, temporary, removable 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 certification test report shall state the lot tested, manufacturer's name, and date of manufacture.

After approval by the Department, samples and certification by the manufacturer shall be submitted for each batch used. The manufacturer shall submit a certification stating that the material meets the requirements as set forth herein and is essentially identical to the material sent for qualification. The certification shall state the lot tested, manufacturer's name, and date of manufacture.

All costs of testing (other than tests conducted by the Department) shall be borne by the manufacturer."

TRAINING SPECIAL PROVISIONS (BDE)
Effective: October 15, 1975

This Training Special Provision supersedes Section 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," and is in implementation of 23 U.S.C. 140(a).

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade or job classification involved. The number of trainees to be trained under this contract will be **TBD**. In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within the reasonable area of recruitment. Prior to commencing construction, the Contractor shall submit to the Illinois Department of Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g. by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the Illinois Department of Transportation and the Federal Highway Administration. The Illinois Department of Transportation and the Federal Highway Administration shall approve a program, if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved by not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather then clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Illinois Department of Transportation and the Federal Highway Administration. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirement of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program.

It is not required that all trainees be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The Contractor shall provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

Method of Measurement. The unit of measurement is in hours.

Basis of Payment. This work will be paid for at the contract unit price of 80 cents per hour for TRAINEES. The estimated total number of hours, unit price, and total price have been included in the schedule of prices.

IDOT TRAINING PROGRAM GRADUATE ON-THE-JOB TRAINING SPECIAL PROVISION
Effective: August 1, 2012 Revised: February 2, 2017

In addition to the Contractor's equal employment opportunity (EEO) affirmative action efforts undertaken as required by this Contract, the Contractor is encouraged to participate in the incentive program described below to provide additional on-the-job training to certified graduates of the IDOT pre-apprenticeship training program, as outlined in this Special Provision.

IDOT funds, and various Illinois community colleges operate, pre-apprenticeship training programs throughout the State to provide training and skill-improvement opportunities to promote the increased employment of minority groups, disadvantaged persons and women in all aspects of the highway construction industry. The intent of this IDOT Pre-Apprenticeship Training Program Graduate (TPG) special provision (Special Provision) is to place these certified program graduates on the project site for this Contract in order to provide the graduates with meaningful on-the-job training. Pursuant to this Special Provision, the Contractor must make every reasonable effort to recruit and employ certified TPG trainees to the extent such individuals are available within a practicable distance of the project site.

Specifically, participation of the Contractor or its subcontractor in the Program entitles the participant to reimbursement for graduates' hourly wages at $15.00 per hour per utilized TPG trainee, subject to the terms of this Special Provision. Reimbursement payment will be made even though the Contractor or subcontractor may also receive additional training program funds from other non-IDOT sources for other non-TPG trainees on the Contract, provided such other source does not specifically prohibit the Contractor or subcontractor from receiving reimbursement from another entity through another program, such as IDOT through the TPG program. With regard to any IDOT funded construction training program other than TPG, however, additional reimbursement for other IDOT programs will not be made beyond the TPG Program described in this Special Provision when the TPG Program is utilized.

No payment will be made to the Contractor if the Contractor or subcontractor fails to provide the required on-site training to TPG trainees, as solely determined by IDOT. A TPG trainee must begin training on the project as soon as the start of work that utilizes the relevant trade skill and the TPG trainee must remain on the project site through completion of the Contract, so long as training opportunities continue to exist in the relevant work classification. Should a TPG trainee's employment end in advance of the completion of the Contract, the Contractor must promptly notify the IDOT District EEO Officer for the Contract that the TPG's involvement in the Contract has ended. The Contractor must supply a written report for the reason the TPG trainee involvement terminated, the hours completed by the TPG trainee on the Contract, and the number of hours for which the incentive payment provided under this Special Provision will be, or has been claimed for the separated TPG trainee.

Finally, the Contractor must maintain all records it creates as a result of participation in the Program on the Contract, and furnish periodic written reports to the IDOT District EEO Officer that document its contractual performance under and compliance with this Special Provision. Finally, through participation in the Program and reimbursement of wages, the Contractor is not relieved of, and IDOT has not waived, the requirements of any federal or state labor or employment law applicable to TPG workers, including compliance with the Illinois Prevailing Wage Act.

Method of Measurement: The unit of measurement is in hours.

Basis of Payment: This work will be paid for at the contract unit price of $15.00 per hour for each utilized certified TPG Program trainee (TRAINEES TRAINING PROGRAM GRADUATE). The estimated total number of hours, unit price, and total price must be included in the schedule of prices for the Contract submitted by Contractor prior to beginning work. The initial number of TPG trainees for which the incentive is available for this contract is **TBD**.

The Department has contracted with several educational institutions to provide screening, tutoring and pre-training to individuals interested in working as a TPG trainee in various areas of common construction trade work. Only individuals who have successfully completed a Pre-Apprenticeship Training Program at these IDOT approved institutions are eligible to be TPG trainees. To obtain a list of institutions that can connect the Contractor with eligible TPG trainees, the Contractor may contact: HCCTP TPG Program Coordinator, Office of Business and Workforce Diversity (IDOT OBWD), Room 319, Illinois Department of Transportation, 2300 S. Dirksen Parkway, Springfield, Illinois 62764. Prior to commencing construction with the utilization of a TPG trainee, the Contractor must submit documentation to the IDOT District EEO Officer for the Contract that provides the names and contact information of the TPG trainee(s) to be trained in each selected work classification, proof that that the TPG trainee(s) has successfully completed a Pre-Apprenticeship Training Program, proof that the TPG is in an Apprenticeship Training Program approved by the U.S. Department of Labor Bureau of Apprenticeship Training, and the start date for training in each of the applicable work classifications.

To receive payment, the Contractor must provide training opportunities aimed at developing a full journeyworker in the type of trade or job classification involved. During the course of performance of the Contract, the Contractor may seek approval from the IDOT District EEO Officer to employ additional eligible TPG trainees. In the event the Contractor subcontracts a portion of the contracted work, it must determine how many, if any, of the TPGs will be trained by the subcontractor. Though a subcontractor may conduct training, the Contractor retains the responsibility for meeting all requirements imposed by this Special Provision. The Contractor must also include this Special Provision in any subcontract where payment for contracted work performed by a TPG trainee will be passed on to a subcontractor.

Training through the Program is intended to move TPGs toward journeyman status, which is the primary objective of this Special Provision. Accordingly, the Contractor must make every effort to enroll TPG trainees by recruitment through the Program participant educational institutions to the extent eligible TPGs are available within a reasonable geographic area of the project. The Contractor is responsible for demonstrating, through documentation, the recruitment efforts it has undertaken prior to the determination by IDOT whether the Contractor is in compliance with this Special Provision, and therefore, entitled to the Training Program Graduate reimbursement of $15.00 per hour.

Notwithstanding the on-the-job training requirement of this TPG Special Provision, some minimal off-site training is permissible as long as the offsite training is an integral part of the work of the contract, and does not compromise or conflict with the required on-site training that is central to the purpose of the Program. No individual may be employed as a TPG trainee in any work classification in which he/she has previously successfully completed a training program leading to journeyman status in any trade, or in which he/she has worked at a journeyman level or higher.

TRAFFIC BARRIER TERMINAL, TYPE 1 SPECIAL (BDE)
Effective: November 1, 2018

Revise Article 631.04 of the Supplemental Specifications to read:

"**631.04 Traffic Barrier Terminal, Type 1 Special (Tangent) and Traffic Barrier Terminal, Type 1 Special (Flared).** These terminals shall be on the Department's qualified product list.

The terminal shall be installed according to the manufacturer's specifications. The beginning length of need point of the terminal shall be placed within 12 ft 6 in (3.8 m) of the length of need point shown on the plans.

The terminal shall be delineated with a terminal marker direct applied. No other guardrail delineation shall be attached to the terminal section."

Revise the first paragraph of Article 631.12 of the Standard Specifications to read:

"**631.12 Method of Measurement.** The various types of traffic barrier terminals will be measured for payment, complete in place, in units of each. The pay limit between the traffic barrier terminal and the adjacent guardrail shall be as shown on the plans, except for the following:

(a) Traffic Barrier Type 1, Special. The pay limit for a traffic barrier, Type 1 special shall be as shown on the manufacturer's drawing(s).

(b) Traffic Barrier Type 10. The pay limit for the traffic barrier terminal, Type 10 shall be at the centerline of the end shoe splice."

TRAFFIC CONTROL DEVICES - CONES (BDE)
Effective: January 1, 2019

Revise Article 701.15(a) of the Standard Specifications to read:

"(a) Cones. Cones are used to channelize traffic. Cones used to channelize traffic at night shall be reflectorized; however, cones shall not be used in nighttime lane closure tapers or nighttime lane shifts."

Revise Article 1106.02(b) of the Standard Specifications to read:

"(b) Cones. Cones shall be predominantly orange. Cones used at night that are 28 to 36 in. (700 to 900 mm) in height shall have two white circumferential stripes. If non-reflective spaces are left between the stripes, the spaces shall be no more than 2 in. (50mm) in width. Cones used at night that are taller than 36 in. (900 mm) shall have a minimum of two white and two fluorescent orange alternating, circumferential stripes with the top stripe being fluorescent orange. If non-reflective spaces are left between the stripes, the spaces shall be no more than 3 in. (75 mm) in width.

The minimum weights for the various cone heights shall be 4 lb for 18 in. (2 kg for 450 mm), 7 lb for 28 in. (3 kg for 700 mm), and 10 lb for 36 in. (5 kg for 900 mm) with a minimum of 60 percent of the total weight in the base. Cones taller than 36 in. shall be weighted per the manufacturer's specifications such that they are not moved by wind or passing traffic."

WARM MIX ASPHALT (BDE)
Effective: January 1, 2012 Revised: April 1, 2016

Description. This work shall consist of designing, producing and constructing Warm Mix Asphalt (WMA) in lieu of Hot Mix Asphalt (HMA) at the Contractor's option. Work shall be according to Sections 406, 407, 408, 1030, and 1102 of the Standard Specifications, except as modified herein. In addition, any references to HMA in the Standard Specifications, or the special provisions shall be construed to include WMA.

WMA is an asphalt mixture which can be produced at temperatures lower than allowed for HMA utilizing approved WMA technologies. WMA technologies are defined as the use of additives or processes which allow a reduction in the temperatures at which HMA mixes are produced and placed. WMA is produced by the use of additives, a water foaming process, or combination of both. Additives include minerals, chemicals or organics incorporated into the asphalt binder stream in a dedicated delivery system. The process of foaming injects water into the asphalt binder stream, just prior to incorporation of the asphalt binder with the aggregate.

Approved WMA technologies may also be used in HMA provided all the requirements specified herein, with the exception of temperature, are met. However, asphalt mixtures produced at temperatures in excess of 275 °F (135 °C) will not be considered WMA when determining the grade reduction of the virgin asphalt binder grade.

Equipment.

Revise the first paragraph of Article 1102.01 of the Standard Specifications to read:

"**1102.01 Hot-Mix Asphalt Plant.** The hot-mix asphalt (HMA) plant shall be the batch-type, continuous-type, or dryer drum plant. The plants shall be evaluated for prequalification rating and approval to produce HMA according to the current Bureau of Materials and Physical Research Policy Memorandum, "Approval of Hot-Mix Asphalt Plants and Equipment". Once approved, the Contractor shall notify the Bureau of Materials and Physical Research to obtain approval of all plant modifications. The plants shall not be used to produce mixtures concurrently for more than one project or for private work unless permission is granted in writing by the Engineer. The plant units shall be so designed, coordinated and operated that they will function properly and produce HMA having uniform temperatures and compositions within the tolerances specified. The plant units shall meet the following requirements."

Add the following to Article 1102.01(a) of the Standard Specifications.

"(11) Equipment for Warm Mix Technologies.

a. Foaming. Metering equipment for foamed asphalt shall have an accuracy of ± 2 percent of the actual water metered. The foaming control system shall be electronically interfaced with the asphalt binder meter.

b. Additives. Additives shall be introduced into the plant according to the supplier's recommendations and shall be approved by the Engineer. The system for introducing the WMA additive shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all rates of production and batch sizes."

Mix Design Verification.

Add the following to Article 1030.04 of the Standard Specifications.

"(e) Warm Mix Technologies.

(1) Foaming. WMA mix design verification will not be required when foaming technology is used alone (without WMA additives). However, the foaming technology shall only be used on HMA designs previously approved by the Department.

(2) Additives. WMA mix designs utilizing additives shall be submitted to the Engineer for mix design verification."

Construction Requirements.

Revise the second paragraph of Article 406.06(b)(1) of the Standard Specifications to read:

"The HMA shall be delivered at a temperature of 250 to 350 °F (120 to 175 °C). WMA shall be delivered at a minimum temperature of 215 °F (102 °C)."

Basis of Payment.

This work will be paid at the contract unit price bid for the HMA pay items involved. Anti-strip will not be paid for separately, but shall be considered as included in the cost of the work.

WEEKLY DBE TRUCKING REPORTS (BDE)
Effective: June 2, 2012 Revised: April 2, 2015

The Contractor shall submit a weekly report of Disadvantaged Business Enterprise (DBE) trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) that are used for DBE goal credit.

The report shall be submitted to the Engineer on Department form “SBE 723” within ten business days following the reporting period. The reporting period shall be Monday through Sunday for each week reportable trucking activities occur.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

STORM WATER PREVENTION POLLUTION PLAN (BDE 2342)

Illinois Department of Transportation

Storm Water Pollution Prevention Plan

Route	Marked Route	Section
FAP 317	US 150 McCluggage Bridge	(15B;[(102-1),(14HB)]BR)BR
Project Number	**County**	**Contract Number**
C-94-052-13	Peoria / Tazewell	68B46

This plan has been prepared to comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit No. ILR10 (Permit ILR10), issues by the Illinois Environmental Protection Agency (IEPA) for storm water discharges from construction site activities.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name	Title	Agency
Kenneth A. Garnett	Region 3 Engineer	IDOT D4
Signature		**Date**
		12/4/18

I. Site Description

A. Provide a description of the project location (include latitude and longitude):

The work on this project is located on US 150, IL 29, and IL 116 in Peoria and Tazewell Counties in Section 35 in Township 9N, Range 8E, 4th PM and in Sections 10, 11, and 14 in Township 26N, Range 4W,3rd PM.
The project begins at a point on US Route 150, approximately 0.20 miles west of the centerline of IL Route 29 in Peoria County, and extends east over the Illinois River to a point 0.1 miles west of the centerline of IL Route 116 in Tazewell County. The project extends south of US 150 along both IL Route 29 (0.2 miles south of the EB US 150 centerline) and IL 116 (0.8 miles south of the EB US 150 centerline).
Latitude: 40^14'13"N, Longitude: 89^32'48"W

B. Provide a description of the construction activity which is subject of this plan:

New construction of SN's 090-0180 (US 150 EB over Illinois River), 072-0250 (US 150 EB over IL Route 29) and 090-2020 (Ramp SW over Illinois River Tributary) and removal of SN's 090-0070 (US 150 over Illinois River) and 072-0167 (US 150 EB over IL Route 29).
Roadway improvements include resurfacing, reconstruction, and widening along EB US 150 both east and west of the river crossing along with improvements to various ramps at the IL 29/US 150 Interchange in Peoria County and the IL 116/US 24/US 150 Interchange in Tazewell County.
Additional work to be performed under this contract shall include, but not be limited to removal of existing pavement, shoulder, sidewalk, curb and gutter, and other roadway appurtenances, earthwork and embankment, erosion control measures, drainage items, subbase improvements, curb and gutter, hot-mix asphalt and concrete roadway paving, roadway lighting, traffic signal improvements, sidewalks and driveways with ADA ramps, pavement marking, signing and landscape restoration as well as all incidental and collateral work necessary to complete the project as shown on the plans and as described herein.

C. Provide the estimated duration of this project:

4 years

D. The total area of the construction site is estimated to be 35.7 acres.

The total area of the site estimated to be disturbed by excavation, grading or other activities is 22.5 acres.

E. The following is a weighted average of the runoff coefficient for this project after construction activities are completed:

West Side of Illinois River: Proposed C=0.76* Existing C=0.60
East Side of Illinois River: Proposed C=0.56, Existing C=0.44
(*Note: conservatively assumes C=0.95 for permeable pavement)

F. List all soils found within project boundaries. Include map unit name, slope information and erosivity:

Based on USDA Natural Resources Conservation Service Web Soil Survey project area includes Warsaw loam 0-2% slopes, Orthents 0-20% slopes, LaHogue loam 0-2% slopes, Camden silt loam 2%-5% slopes, Cresent loam 0-2% slopes, Slacwater silt loam 0-2% slopes, and areas of Urban land.

G. Provide an aerial extent of wetland acreage at the site:

There are three wetlands that are impacted by the project; 1 on the west side of the Illinois River and 2 on the east side of the Illinois River. The two on the east side of the river are impacted by the placement of fill material needed to create the embankment for the eastbound roadway and multi-use path. On the west side of the river, the placement of the new bridge pier will impact a forested wetland. The total impact from these three sites is estimated at 1.13 acres.

H. Provide a description of potentially erosive areas associated with this project:

Much of the project area is paved in both the existing and proposed condition limiting the potential erosive areas. Roadway slopes along US150 are as steep as 2H:1V, disturbed areas of these slopes are proposed to be stabilized with heavy duty erosion control blanket or turf reinforcement mat. Concrete slopewalls are proposed on steep slope under proposed bridges. Proposed pipe culvert and drainage structure discharges in steep area are proposed to be protected with riprap.

I. The following is a description of soil disturbing activities by stages, their locations, and their erosive factors (e.g. steepness of slopes, length of scopes, etc.):

This project will be completed in 4 Stages. The following stages involve soil disturbing activities; Stage 1 - remove pavement along Ramp A, Ramp B, US 150 and IL 116, construct EB US 150 bridge over Illinois River partial and Ramp SW - including box culvert. Stage 3 - build bike trail and parking area along Ramp E and US 150, remove Ramp SW. Stage 4 - demo EB US 150 bridge over IL 29, Tazewell & Peoria Railroad and the Illinois River. This project includes installation, maintenance and removal of ESC measures and will be permanently stabilized with Class 2A, 3, and 5B seed.

J. See the erosion control plans and/or drainage plans for this contract for information regarding drainage patterns, approximate slopes anticipated before and after major grading activities, locations where vehicles enter or exit the site and controls to prevent off site sediment tracking (to be added after contractor identifies locations), areas of soil disturbance, the location of major structural and non-structural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands) and locations where storm water is discharged to surface water including wetlands.

K. Identify who owns the drainage system (municipality or agency) this project will drain into:

City of Peoria and Illinois Department of Transportation

L. The following is a list of General NPDES ILR40 permittees within whose reporting jurisdiction this project is located.

Illinois Department of Transportation, Tazewell County, Peoria County, City of Peoria, City of East Peoria

M. The following is a list of receiving water(s) and the ultimate receiving water(s) for this site. The location of the receiving waters can be found on the erosion and sediment control plans:

The receieved water for sites on both sides of the river is the Illinois River. On the west side of the river a portion of runoff is received by City of Peoria and IDOT storm sewer systems which discharge to an unnamed tributary of the Illinois River, and a portion of the runoff is received by City of Peoria and IDOT storm sewer systems which discharges to the Illinois River. On the east side of the river runoff is received by an unnamed tributary which discharges to the Illinois River.

N. Describe areas of the site that are to be protected or remain undisturbed. These areas may include steep slopes, highly erodible soils, streams, stream buffers, specimen trees, natural vegetation, nature preserves, etc.

Much of the project area is paved, protected by riprap or grassed area in the existing and proposed condition. There is minimal vegetation in the disturbed areas. The construction limits have been limited to only those areas necessary for construction to minimize the disturbed area.

O. The following sensitive environmental resources are associated with this project, and may have the potential to be impacted by the proposed development:

- ☒ Floodplain
- ☒ Wetland Riparian
- ☐ Threatened and Endangered Species
- ☐ Historic Preservation
- ☐ 303(d) Listed receiving waters for suspended solids, turbidity, or siltation
- ☐ Receiving waters with Total Maximum Daily Load (TMDL) for sediment, total suspended solids, turbidity, or siltation
- ☐ Applicable Federal, Tribal, State or Local Programs
- ☐ Other

1. 303(d) Listed receiving waters (fill out this section if checked above):

Illinois River

a. The name(s) of the listed water body, and identification of all pollutants causing impairment:

Illinois River Segment IL-D-30 is listed on the 2018 IEPA 303(d) list. Fish consumption use impaired by mercury and polychlorinated biphenyles.

b. Provide a description of how erosion and sediment control practices will prevent a discharge of sediment resulting from a storm event equal to or greater than a twenty-five (25) year, twenty-four (24) hour rainfall event:

N/A

c. Provide a description of the location(s) of direct discharge from the project site to the 303(d) water body:

N/A

d. Provide a description of the location(s) of any dewatering discharges to the MS4 and/or water body:

N/A

2. TMDL (fill out this section if checked above)

a. The name(s) of the listed water body:

N/A

b. Provide a description of the erosion and sediment control strategy that will be incorporated into the site design that is consistent with the assumptions and requirements of the TMDL:

N/A

c. If a specific numeric waste load allocation has been established that would apply to the project's discharges, provide a description of the necessary steps to meet the allocation:

N/A

P. The following pollutants of concern will be associated with this construction project:

- ☒ Soil Sediment
- ☒ Concrete
- ☒ Petroleum (gas, diesel, oil, kerosene, hydraulic oil / fluids)
- ☒ Antifreeze / Coolants

☒ Concrete Truck waste	☒ Waste water from cleaning construction equipment
☒ Concrete Curing Compounds	☐ Other (specify) _____
☒ Solid waste Debris	☐ Other (specify) _____
☒ Paints	☐ Other (specify) _____
☒ Solvents	☐ Other (specify) _____
☒ Fertilizers / Pesticides	☐ Other (specify) _____

II. Controls

This section of the plan addresses the controls that will be implemented for each of the major construction activities described in I.C. above and for all use areas, borrow sites, and waste sites. For each measure discussed, the Contractor will be responsible for its implementation as indicated. The Contractor shall provide to the Resident Engineer a plan for the implementation of the measures indicated. The Contractor and subcontractors, will notify the Resident Engineer of any proposed changes, maintenance, or modifications to keep construction activities compliant with the Permit ILR10. Each such Contractor has signed the required certification on forms which are attached to, and are a part of, this plan:

A. **Erosion and Sediment Controls:** At a minimum, controls must be coordinated, installed, and maintained to:
   1. Minimize the amount of soil exposed during construction activity;
   2. Minimize the disturbance of steep slopes;
   3. Maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration, unless infeasible;
   4. Minimize soil compaction and, unless infeasible, preserve topsoil.

B. **Stabilization Practices:** Provided below is a description of interim and permanent stabilization practices, including site- specific scheduling of the implementation of the practices. Site plans will ensure that existing vegetation is preserved where attainable and disturbed portions of the site will be stabilized. Stabilization practices may include but are not limited to: temporary seeding, permanent seeding, mulching, geotextiles, sodding, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Except as provided below in II(B)(1) and II(B)(2), stabilization measures shall be initiated **immediately** where construction activities have temporarily or permanently ceased, but in no case more than **one (1) day** after the construction activity in that portion of the site has temporarily or permanently ceases on all disturbed portions of the site where construction will not occur for a period of fourteen (14) or more calendar days.

   1. Where the initiation of stabilization measures is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.
   2. On areas where construction activity has temporarily ceased and will resume after fourteen (14) days, a temporary stabilization method can be used.

The following stabilization practices will be used for this project:

☒ Preservation of Mature Vegetation	☒ Erosion Control Blanket / Mulching
☐ Vegetated Buffer Strips	☐ Sodding
☐ Protection of Trees	☐ Geotextiles
☒ Temporary Erosion Control Seeding	☒ Other (specify) Heavy Duty Erosion Control Blanket
☐ Temporary Turf (Seeding, Class 7)	☒ Other (specify) Turf Reinforcement Mat
☒ Temporary Mulching	☐ Other (specify) _____
☒ Permanent Seeding	☐ Other (specify) _____

Describe how the stabilization practices listed above will be utilized during construction:

1. Preservation of Mature Vegetation will be used throughout the project duration. The Contractor shall take whatever precautions are necessary to limit the amount of vegetation removed by construction operations, protect vegetation outside the limits of construction from damage, and remove only vegetation necessary for completion of the project.
2. Temporary Erosion Control Seeding will be used as a temporary erosion method when permanent seeding cannot be accomplished to minimize the amount of exposed erodible/bare surface area.
3. Temporary Mulching and Temporary Erosion Control Blanket will be used as a temporary erosion control method to prevent sheet erosion of areas that are to altered during a later construction phase.
4. Permanent Seeding and Erosion Control Blanket, Heavy Duty Erosion Control Blanket, and Turf Reinforcement Mat, where necessary, will be applied to all proposed grassed areas immediately following the finished grading.
5. Staged construction will minimize the duration of exposed soils. Where possible work will be completed leaving a stabilized surface or temporary stabilization before work is moved to subsequent stages.

Describe how the stabilization practices listed above will be utilized after construction activities have been completed:

Stabilization practices listed above will maintain existing vegetation adjacent to the construction zone and minimize the duration that soils are exposed, minimizing the potential for erosion.

C. **Structural Practices:** Provided below is a description of structural practices that will be implemented, to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include but are not limited to: perimeter erosion barrier, earth dikes, drainage swales, sediment traps, ditch checks, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. The installation of these devices may be subject to Section 404 of the Clean Water Act.

The following stabilization practices will be used for this project:

☒ Perimeter Erosion Barrier	☐ Rock Outlet Protection
☒ Temporary Ditch Check	☒ Riprap
☒ Storm Drain Inlet Protection	☐ Gabions
☐ Sediment Trap	☐ Slope Mattress
☐ Temporary Pipe Slope Drain	☐ Retaining Walls
☐ Temporary Sediment Basin	☐ Slope Walls
☐ Temporary Stream Crossing	☐ Concrete Revetment Mats
☒ Stabilized Construction Exits	☐ Level Spreaders
☐ Turf Reinforcement Mats	☒ Other (specify) Heavy Duty Erosion Control Blanket
☐ Permanent Check Dams	☐ Other (specify) _____
☐ Permanent Sediment Basin	☐ Other (specify) _____
☐ Aggregate Ditch	☐ Other (specify) _____
☐ Paved Ditch	☐ Other (specify) _____

Describe how the structural practices listed above will be utilized during construction:

1. Perimeter Erosion Barrier will be used to prevent sediment loss by sheet flow. This item should be placed as shown on the plans.
2. Temporary Ditch Checks will be used to reduce the velocity of water as concentrated flow to prevent erosion or scour of swales and ditches. These should be placed as shown on the plans.
3. Inlet and Pipe Protection is to be placed at all existing inlets within the construction limits and all new inlets constructed. Inlet and pipe protection controls the loss of sediment from the project site.
4. Stabilized Construction Exits will be placed at all points of construction ingress/egress where sediment can be deposited onto roadways via construction equipment/vehicles. Adjacent streets shall be swept regularly to remove sediment tracked onto the roadway from construction activities.
5. Riprap will be placed on slopes at pipe culvert and drainage structure outlets as shown on the plans to stabilize steep slopes and prevent erosion of slopes.
6. Turf Reinforcement Mat or Heavy Duty Erosion Control Blanket will be placed on slopes steeper than 3H:1V as shown on the plans to stabilize steep slopes and prevent erosion of slopes.
6. Silt fence should only be used as Perimeter Erosion Barrier (PEB) in areas where the work area is higher than the perimeter. The use of silt fence at the top of the slope/elevations higher than the work area should always be avoided. If necessary, temporary fence should be utilized in these locations (where the top of slope /elevation is higher than the work area) in lieu of silt fence.
7. Pipe Inlet Protection shown on IDOT Highway Standard 280001 should be avoided since improper installation risks flooding. Straw bales and silt fence should not be used as Pipe Inlet Protection. Pipe Inlet Protection should be comprised of ditch checks, temporary seeding, temporary erosion control blanket or inlet filters.
8. All work associated with installation and maintenance of Stabilized Construction Exits, Concrete Washouts are incidental to the contract.
9. Maintenance will be required for all temporary erosion control devices throughout the construction period as noted in Section III below.

Describe how the structural practices listed above will be utilized after construction activities have been completed:

Once all stages of work are complete in an area and permanent turf has been established to the satisfaction of the Engineer, all temporary erosion control measures shall be removed.

D. **Treatment Chemicals**

Will polymer flocculents or treatment chemicals be utilized on this project: ☐ Yes ☒ No

If yes above, identify where and how polymer flocculents or treatment chemicals will be utilized on this project.

E. **Permanent Storm Water Management Controls:** Provided below is a description of measures that will be installed during the construction process to control volume and pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the Clean Water act.

1. Such practices may include but are not limited to: storm water detention structures (including wet ponds), storm water retention structures, flow attenuation by use of open vegetated swales and natural depressions, infiltration of runoff on site, and sequential systems (which combine several practices).

   The practices selected for implementation were determined on the basis of the technical guidance in Chapter 41 (Construction Site Storm Water Pollution Control) of the IDOT Bureau of Design & Environment Manual. If practices other than those discussed in Chapter 41 are selected for implementation or if practices are applied to situations different from those covered in Chapter 41, the technical basis for such decisions will be explained below.
2. Velocity dissipation devices will be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

   Description of permanent storm water management controls:

1. Permanent Seeding will be used on all areas that have been hydraulically determined to have flow velocities and shear stress below levels that would cause erosion and scour.
2. Stone Riprap will be utilized at the outlets of culverts and drainage structures with high exit velocities or which discharge to steep slopes to stabilize slopes and prevent erosion.

F. **Approved State or Local Laws:** The management practices, controls, and provisions contained in this plan will be in accordance with IDOT specifications, which are at least as protective as the requirements contained in the Illinois Environmental Protection Agency's Illinois Urban Manual. Procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials shall be described or incorporated by reference in the space provided below. Requirements specified in sediment and erosion site plans, site permits, storm water management site plans or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of an NOI, to be authorized to discharge under the Permit ILR10 incorporated by reference and are enforceable under this permit even if they are not specifically included in the plan.

Description of procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials:

N/A

G. **Contractor Required Submittals:** Prior to conducting any professional services at the site covered by this plan, the Contractor and each subcontractor responsible for compliance with the permit shall submit to the Resident Engineer a Contractor Certification Statement, BDE 2342a.

1. The Contractor shall provide a construction schedule containing an adequate level of detail to show major activities with implementation of pollution prevention BMPs, including the following items:
    - Approximate duration of the project, including each stage of the project
    - Rainy season, dry season, and winter shutdown dates
    - Temporary stabilization measures to be employed by contract phases
    - Mobilization time frame
    - Mass clearing and grubbing/roadside clearing dates
    - Deployment of Erosion Control Practices
    - Deployment of Sediment Control Practices (including stabilized construction entrances/exits)
    - Deployment of Construction Site Management Practices (including concrete washout facilities, chemical storage, refueling locations, etc.)
    - Paving, saw-cutting, and any other pavement related operations
    - Major planned stockpiling operations
    - Time frame for other significant long-term operations or activities that may plan non-storm water discharges such as dewatering, grinding, etc.
    - Permanent stabilization activities for each area of the project
2. The Contractor and each subcontractor shall provide, as an attachment to their signed Contractor Certification Statement, a discussion of how they will comply with the requirements of the permit in regard to the following items and provide a graphical representation showing location and type of BMPs to be used when applicable:
    - Vehicle Entrances and Exits - Identify type and location of stabilized construction entrances and exits to be used and how they will be maintained.
    - Material delivery, Storage, and Use - Discuss where and how materials including chemicals, concrete curing compounds, petroleum products, etc. will be stored for this project.
    - Stockpile Management - Identify the location of both on-site and off-site stockpiles. Discuss what BMPs will be used to prevent pollution of storm water from stockpiles.
    - Waste Disposal - Discuss methods of waste disposal that will be used for this project.
    - Spill Prevention and Control - Discuss steps that will be taken in the event of a material spill (chemicals, concrete curing compounds, petroleum, etc.).
    - Concrete Residuals and Washout Wastes - Discuss the location and type of concrete washout facilities to be used on this project and how they will be signed and maintained.
    - Litter Management - Discuss how litter will be maintained for this project (education of employees, number of dumpsters, frequency of dumpster pick-up, etc.).
    - Vehicle and Equipment Cleaning and Maintenance - Identify where equipment cleaning and maintenance locations for this project and what BMPs will be used to ensure containment and spill prevention.

- Dewatering Activities - Identify the controls which will be used during dewatering operations to ensure sediments will not leave the construction site.
- Polymer Flocculants and Treatment Chemicals - Identify the use and dosage of treatment chemicals and provide the Resident Engineer with Material Safety Data Sheets. Describe procedures on how the chemicals will be used and identify who will be responsible for the use and application of these chemicals. The selected individual must be trained on the established procedures.
- Additional measures indicated in the plan.

III. Maintenance

When requested by the Contractor, the Resident Engineer will provide general maintenance guides to the Contractor for the practices associated with this project. The following additional procedures will be used to maintain, in good and effective operating conditions, the vegetation, erosion and sediment control measures and other protective measures identified in this plan. It will be Contractor's responsibility to attain maintenance guidelines for any manufactured BMPs which are to be installed and maintained per manufacture's specifications.

1. Temporary Erosion Control Seeding: Reapply seed if stabilization has not been achieved. Temporary mulch may be required on slopes where seeds have been washed into ditch bottoms. Rills greater than 4 inches deep will need to be restored on slopes steeper than 1V:4H to prevent concentrated flow patterns. Mowing may be required to promote proper seed/soil contact in areas where excessive weed development occurs. Supplementation of a BMP will be required if weather conditions are not conducive for seed germination.
2. Mulch: Repair straw if blown/washed away and repair hydraulic mulch if washed away. A tackifier or erosion control blanket may be required if mulch fails to control erosion.
3. Perimeter Erosion Barrier: Repair any tears, gaps, undermining, or leaning PEB (including any missing or broken stakes). Remove sediment from PEB prior to or when accumulated sediment reaches 1/3 of the height of the barrier. Remove PEB once final stabilization has been successfully achieved.
4. Temporary Ditch Checks: Repair or replace TDC's with tears, splits, unraveling, or compressed excelsior. Replace any torn fabric mat that may allow undermining. Remove sediment from TDC's prior to or when accumulated sediment reaches 1/2 of the height of the ditch check and remove debris when observed. Ensure runoff is flowing over the center of the TDC and extend any TDC's where runoff is flowing around the TDC. Remove all TDC's once final stabilization has been successfully achieved.
5. Inlet & Pipe Protection: Remove sediment from inlet filter baskets when 25% full or 50% of the fabric pores are covered with silt. Remove ponded water from road surfaces and clean filter if standing water is present 1 hour after rain event. Remove debris when observed and replace any torn filters.
6. Turf Reinforcement Mat: Repair improper toe entrenching, correct undermining, gaps, displacement or storm water flowing around or under the TRM.
7. Erosions Control Blanket and Heavy Duty Erosion Control Blanket: Repair damage due to water running beneath the blanket and restore ECBs when displacement occurs and reseed as needed. Replace all displaced ECBs and restaple.
8. Stabilized Construction Exits: Replenish stone/replace exit if construction vehicles continue to deposit sediment onto the roadway and remove sediment from the roadway surface immediately. Check that any culverts are damage free.

All maintenance is the responsibility of the contractor. The contractor shall check all ESC measures weekly and after each rainfall, 0.5 inches or greater in a 24 hour period, or equivalent snowfall. Additionally, during winter months, all measures should be checked by the contractor after each significant snowmelt. Information/guidance on these and many other BMP's may be found in the IDOT Erosion and Sediment Control Field Guide for Construction Inspection and/or the IDOT Best Management Practices - Maintenance Guide located on the IDOT website at http://www.idot.illinois.gov/transporation-system/environment/erosion-and-sediment-control.

IV. Inspections

Qualified personnel shall inspect disturbed areas of the construction site which have not yet been finally stabilized, structural control measures, and locations where vehicles and equipment enter and exit the site using IDOT Storm Water Pollution Prevention Plan Erosion Control Inspection Report (BC 2259). Such inspections shall be conducted at least once every seven (7) calendar days and within twenty-four (24) hours of the end of a storm or by the end of the following business or work day that is 0.5 inch or greater or equivalent snowfall.

Inspections may be reduced to once per month when construction activities have ceased due to frozen conditions. Weekly inspections will recommence when construction activities are conducted, or if there is 0.5" or greater rain event, or a discharge due to snowmelt occurs.

If any violation of the provisions of this plan is identified during the conduct of the construction work covered by this plan, the Resident Engineer shall notify the appropriate IEPA Field Operations Section office by e-mail at: epa.swnoncomp@illinois.gov, telephone or fax within twenty-four (24) hours of the incident. The Resident Engineer shall then complete and submit an "Incidence of Non-Compliance" (ION) report for the identified violation within five (5) days of the incident. The Resident Engineer shall use forms provided by IEPA and shall include specific information on the cause of noncompliance, actions which were taken to prevent any further causes of noncompliance, and a statement detailing any environmental impact which may have resulted from the noncompliance. All reports of non-compliance shall be signed by a responsible authority in accordance with Part VI. G of the Permit ILR10.

The Incidence of Non-Compliance shall be mailed to the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attn: Compliance Assurance Section
1021 North Grand East
Post Office Box 19276
Springfield, Illinois 62794-9276

Additional Inspections Required:

All offsite borrow, waste, and use areas are part of the construction site and are to be inspected according to the language in this section.

V. Failure to Comply

Failure to comply with any provisions of this Storm Water Pollution Prevention Plan will result in the implementation of a National Pollutant Discharge Elimination System/Erosion and Sediment Control Deficiency Deduction against the Contractor and/or penalties under the Permit ILR10 which could be passed on to the Contractor.

Illinois Department of Transportation

Contractor Certification Statement

Prior to conducting any professional services at the site covered by this contract, the Contractor and every subcontractor must complete and return to the Resident Engineer the following certification. A separate certification must be submitted by each firm. Attach to this certification all items required by Section II.G of the Storm Water Pollution Prevention Plan (SWPPP) which will be handled by the Contractors/subcontractor completing this form.

Route	Marked Route	Section
FAP 317	US 150 McCuggage Bridge	(15B;[(102-1),(14HB)BR)BR
Project Number	**County**	**Contract Number**
C-98-052-13	Peoria / Tazewell	68B46

This certification statement is a part of SWPPP for the project described above, in accordance with the General NPDES Permit No. ILR10 issued by the Illinois Environmental Protection Agency.

I certify under penalty of law that I understand the terms of the Permit No. ILR10 that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

In addition, I have read and understand all of the information and requirements stated in SWPPP for the above mentioned project; I have received copies of all appropriate maintenance procedures; and, I have provided all documentation required to be in compliance with the Permit ILR10 and SWPPP and will provide timely updates to these documents as necessary.

☐ Contractor

☐ Sub-Contractor

Print Name	Signature
Title	**Date**
Name of Firm	**Telephone**
Street Address	**City/State/Zip**

Items which the Contractor/subcontractor will be responsible for as required in Section II.G. of SWPPP:

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection

for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each

classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1**. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of

Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

Contract Provision - Cargo Preference Requirements

In accordance with Title 46 CFR § 381.7 (b), the contractor agrees—

"(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract."

Provisions (1) and (2) apply to materials or equipment that are acquired solely for the project. The two provisions do not apply to goods or materials that come into inventories independent of the project, such as shipments of Portland cement, asphalt cement, or aggregates, when industry suppliers and contractors use these materials to replenish existing inventories.