29

April 28, 2023 Letting

Notice to Bidders, Specifications and Proposal

Illinois Department of Transportation

Contract No. 68H57
PEORIA County
Section D4 ITS SYSTEM 2023-2
Route FAP 317A/ FAU 6675
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. **TIME AND PLACE OF OPENING BIDS.** Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). All bids must be submitted to the iCX system prior to 12:00 p.m. April 28, 2023 prevailing time at which time the bids will be publicly opened from the iCX SecureVault.

2. **DESCRIPTION OF WORK**. The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

   Contract No. 68H57
   PEORIA County
   Section D4 ITS SYSTEM 2023-2
   Route FAP 317A/ FAU 6675
   District 4 Construction Funds

Installation of fiber optic cable within existing conduit along US 150 (War Memorial Drive) from IL 29 interchange to Koerner/Trigger Road in Peoria.

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

   (b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.

4. **AWARD CRITERIA AND REJECTION OF BIDS**. This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.

By Order of the
Illinois Department of Transportation

Omer Osman,
Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2023

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

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 1-1-22) (Revised 1-1-23)

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 January 1, 2022, the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways," and the "Manual of Test Procedures for Materials" in effect on the date of invitation for bids, and the Supplemental Specifications and Recurring Special Provisions indicated on the Check Sheet included herein which apply to and govern the construction of FAP Route 317A/FAU Route 6675 (US 150), Section D4 ITS System 2023-2, Peoria County, Contract No. 68H57 and in case of conflict with any part or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

LOCATION OF PROJECT

This project is located along US Route 150 (War Memorial Drive) in Peoria County from Illinois Route 29 (Adams Street) to Koerner/Trigger Roads.

DESCRIPTION OF PROJECT

This project consists of installing conduit, double handholes, fiber optic cable, and all related collateral work necessary to complete the improvements on the project.

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.

TRAFFIC CONTROL PLAN

Effective: December 15, 2022

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:

701001	701006	701101	701106	701421
701601	701701	701801	701901	

All traffic control devices shall be furnished, erected, maintained, and removed by the Contractor in accordance with the Standard Specifications. Where possible, all post-mounted signs shall be placed a minimum of two feet (2') (0.6 m) beyond the curb or edge of shoulder. Proposed sign spacing may be modified as approved by the Engineer in order to meet existing field conditions or to prevent obstruction of the motorist’s view of permanent signing and lane restrictions at all times.

Traffic shall be maintained on the associated roadways at all times during construction. All lane closures shall be made during off-peak traffic hours, defined as time periods from 8:30 A.M. to 3:00 P.M. and 5:30 P.M. to 7:00 A.M. The Contractor shall notify the Engineer forty-eight (48) hours before the time of a planned closure. The exact time and duration of all lane closures, however, shall be as determined by the Engineer.

Method of Measurement: Traffic Control and Protection will be measured by the unit "Lump Sum", complete.

Basis of Payment: This work shall be paid for at the contract unit price per Lump Sum for TRAFFIC CONTROL AND PROTECTION, (SPECIAL), which shall be payment in full for all labor, materials, and equipment required to furnish, install, and remove the traffic control with the Highway Standards listed above.

PCC QMP ELECTRONIC REPORT SUBMITTALS

Effective January 13, 2022

The Contractor's QC personnel shall be responsible for electronically submitting the following reports to the Department: PRO and IND data for BMPR MI654 "Air, Slump, & Quantity"; PRO data for BMPR MI655 "PCC Strength"; and PRO data for BMPR MI504 "Field/Lab Gradation". The format for the electronic submittals will be the "QMP" 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.

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 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 every 100 ft., communication vaults, handholes, and junction boxes 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.

SEEDING, MINOR AREAS

Effective July 1, 1990 Revised January 1, 2007

Seeding, fertilizing, and mulching shall be done in accordance with Article 250 of the Standard Specifications except for the following revisions:

All areas disturbed by the work performed shall be seeded, fertilized, and mulched in accordance with Article 251.03(a). The materials may be purchased locally and placed as directed by the engineer.

The estimated area is approximately .001 Acre. The seed mixture shall be applied at 100 pounds/acre (110 kg/ha). The mixture shall be one that contains a high percentage of Kentucky Blue Grass. All seeds shall meet the purity and noxious weed requirements of Article 1081.04 of the Standard Specifications and be approved by the Engineer.

The fertilizer nutrients shall be applied at a rate of 270 lbs. (300 kg) of actual nutrients per acre (hectare). The fertilizer furnished shall be ready mixed material having a ratio of (1-1-1).

The Contractor shall provide the engineer with the test results from the seed container and the chemical analysis of the fertilizer nutrients.

Basis of Payment: The seed, fertilizer, and mulch will not be measured for payment but shall be included in the contract bid price for the pay item for UNDERGROUND CONDUIT of the size specified.

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 regard 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 an orange 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.)
Prop. Double Handhole	200.0
Ex. Double Handhole	100.0
Handhole	30.0
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, SINGLE MODE 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 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 documentation has been submitted to the Department. Manufacturer certification is required for the model(s) of closure supplied. It is not necessary to subject each supplied closure to the actual tests described herein.

CONSTRUCTION REQUIREMENTS.

The closure shall be installed according to the manufacturer's recommended guidelines. For 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 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.

DOUBLE 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 DOUBLE 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.

FIBER OPTIC ETHERNET DROP AND REPEAT SWITCH

The Contractor shall furnish a fiber optic drop and repeat switch (material only) complete with the accessories as specified (SFP+ Modules) and deliver these items to the Department.

The fiber optic drop and repeat switch shall meet or exceed the following minimum specifications:

Approved Models: Planet Technology USA Model IGS-6325-8T4X Layer 3 Managed Switch with 8 10/100/1000T and 4 1000X/2.5G/10G SFP+ ports IP30 Rated Industrial Ethernet Switch with -40 to 75 C operating temperature or approved equal.

Features

Physical Port

- 8/16 10/100/1000BASE-T RJ45 copper ports
- 8/4 100/1000BASE-X SFP slots for SFP type auto detection
- 4 10GBASE-SR/LR SFP+ slots, compatible with
- 1000BASE-X SFP(IGS-6325-8T4X and IGS-6325-8T8S4X)
- One RJ45-to-RS232 console interface for basic management and setup

Industrial Hardened Design

- Dual power input, redundant power with reverse polarity protection
- DC 9/12 to 48V input or AC 24V input
- Active-active redundant power failure protection
- Backup of catastrophic power failure on one supply
- Fault tolerance and resilience
- DIN-rail and wall-mountable designs
- IP30 aluminum case
- Supports 6KV DC Ethernet ESD protection
- -40 to 75 degrees C operating temperature

Digital Input and Digital Output

- 2 Digital Input (DI)
- 2 Digital Output (DO)
- Integrates sensors into auto alarm system
- Transfers alarm to IP network via email and SNMP trap

Layer 3 IP Routing Features

- IP dynamic routing protocol supports OSPFv2
- IPv4/IPv6 hardware static routing
- Routing interface provides per VLAN routing mode

Layer 2 Features

- High performance of Store-and-Forward architecture, and runt/CRC filtering eliminates erroneous packets to optimize the network bandwidth
- Storm control support
- Broadcast/Multicast/Unknown unicast

Supports VLAN

- IEEE 802.1Q tagged VLAN
- Up to 255 VLANs groups, out of 4095 VLAN IDs
- Supports provider bridging (VLAN Q-in-Q IEEE 802.1ad)
- Private VLAN Edge (PVE)
- Protocol-based VLAN
- MAC-based VLAN
- Voice VLAN
- GVRP (GARP VLAN Registration Protocol)

Supports Spanning Tree Protocol

- IEEE 802.1D Spanning Tree Protocol (STP)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP),spanning tree by VLAN
- BPDU Guard

Supports Link Aggregation

- 802.3ad Link Aggregation Control Protocol (LACP)
- Cisco ether-channel (static trunk)
- Maximum 14 trunk groups, with 16 ports for each trunk
- Up to 80Gbps bandwidth (full duplex mode)
- Provides port mirror (many-to-1)
- Port mirroring to monitor the incoming or outgoing traffic on a particular port
- Loop protection to avoid broadcast loops
- Link Layer Discovery Protocol (LLDP)
- Compatible with Cisco uni-directional link detection(UDLD) that monitors a link between two switches and blocks the ports on both ends of the link if the link fails at any point between the two devices
- Supports G.8032 ERPS (Ethernet Ring Protection Switching)
- IEEE 1588v2 TC and Synchronous Ethernet network timing

Multicast

- Supports IPv4 IGMP snooping v1, v2 and v3
- Supports IPv6 MLD snooping v1 and v2
- Querier mode support
- IPv4 IGMP snooping port filtering
- IPv6 MLD snooping port filtering
- MVR (Multicast VLAN Registration)

Quality of Service

- Ingress shaper and egress rate limit per port bandwidth control
- 8 priority queues on all switch ports
- Traffic classification - IEEE 802.1p CoS, ToS/DSCP/IP Precedence of IPv4/IPv6 packets, IP TCP/UDP port number, Typical network application
- Strict priority and Weighted Round Robin (WRR) CoS policies
- Traffic-policing on the switch port
- DSCP remarking
- Voice VLAN

Security

- Authentication - IEEE 802.1x port-based/MAC-based network access authentication, IEEE 802.1x authentication with guest VLAN
- Built-in RADIUS client to cooperate with the RADIUS servers
- RADIUS/TACACS+ users access authentication
- Guest VLAN assigns clients to a restricted VLAN with limited services
- Access Control List - IP-based Access Control List (ACL), MAC-based Access Control List (ACL)
- Source MAC/IP address binding
- DHCP Snooping to filter distrusted DHCP messages
- Dynamic ARP Inspection discards ARP packets with invalid MAC address to IP address binding
- IP Source Guard prevents IP spoofing attacks

- IP address access management to prevent unauthorized intruders

Management

- IPv4 and IPv6 dual stack management
- Switch Management Interfaces – Console and Telnet Command Line Interface, HTTP web switch management, SNMP v1 and v2c switch management, SSH, TLS, SSL and SNMP v3 secure access
- SNMP Management – Four RMON groups (history, statistics, alarms, and events), SNMP trap for interface Link Up and Link Down notification
- IPv6 IP address/NTP/DNS management
- Built-in Trivial File Transfer Protocol (TFTP) client
- BOOTP and DHCP for IP address assignment
- System Maintenance – Firmware upload/download via HTTP, Reset button for system reboot or reset to factory default, Dual images
- DHCP Relay
- DHCP Option 82
- DHCP Server
- User Privilege levels control
- Network Time Protocol (NTP)
- Network Diagnostic – SFP-DDM (Digital Diagnostic Monitor), Cable diagnostic technology provides the mechanism to detect and report potential cabling issues, ICMPv6/ICMPv4 remote ping
- SMTP/Syslog remote alarm
- System Log
- NMS System and Smart Discovery Utility for deployment management

Compliance

- All equipment shall be TAA Compliant

Warranty

- Lifetime Warranty

Hardware Specifications

- Copper Ports: 8 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports
- SFP+ Ports: 4 10GbBASE-SR/LR SFP+ interfaces Compatible with 1000BASE-SX/LX/BX and 2500BASE-X SFP transceivers
- Console: 1 x RJ45-to-RS232 serial port (115200, 8, N, 1)
- Switch Architecture: Store-and-Forward
- Switch Fabric: 96Gbps/non-blocking
- Throughput: 71.43Mpps@64Bytes
- Address Table: 16K entries, automatic source address learning and aging
- Shared Data Buffer: 32Mbits
- Jumbo Frame: 10K bytes
- SDRAM: 512Mbytes
- Flash Memory: 64Mbytes
- Flow Control: IEEE 802.3x pause frame for full duplex, Back pressure for half duplex

- Reset Button: < 5 sec: System reboot; > 5 sec: Factory default
- Connector: Removable 6-pin terminal block for power input; Pin 1/2 for Power 1, Pin 3/4 for fault alarm, Pin 5/6 for Power 2; Removable 6-pin terminal block for DI/DO interface; Pin 1/2 for DI 1 & 2, Pin 3/4 for DO 1 & 2, Pin 5/6 for GND
- Alarm: One relay output for power failure. Alarm relay current carry ability: 1A @ 24V DC
- Digital Input (DO): 2 digital input: Level 0: -24~2.1V (±0.1V); Level 1: 2.1~24V (±0.1V); Input load to 24V DC, 10mA max.
- Digital Output (DO): 2 digital output: Open collector to 24VDC, 100mA
- Enclosure: IP30 aluminum case
- Installation: DIN-rail or wall mounting
- Dimensions (W x D x H): 76 x 107 x 152 mm
- Weight: 1,250g
- Power Requirements: DC 12~48V, 4A max.; AC 24V, 1.5A max.
- Power Consumption: DC input: Max. 10 watts/35BTU (system on); Max. 29 watts/99 BTU (Full loading) AC 24V input: Max. 12 watts/41BTU (system on); Max. 30 watts/103 BTU (Full loading)
- ESD Protection: 6KV DC
- Surge Protection: 4KV DC
- LED Indicators: System: Power 1 (Green), Power 2 (Green); Fault Alarm (Red); Ring (Green), Ring Owner (Green); DIDO (Red) Per 10/100/1000T RJ45 Port: 1000Mbps LNK/ACT (Green); 10/100Mbps LNK/ACT (Amber) Per SFP+ Port: 10Gbps LNK/ACT (Amber), 1Gbps LNK/ACT (Green)

Layer 2 Functions

- Port Configuration: Port disable/enable; Auto-negotiation 10/100/1000Mbps full and half duplex mode selection; Flow control disable/enable; Port link capability control
- Port Status: Display each port's speed duplex mode, link status, flow control status, auto-negotiation status, trunk status
- Port Mirroring: TX/RX/Both; Many-to-1 monitor
- VLAN: 802.1Q tagged VLAN; Q-in-Q tunneling; Private VLAN Edge (PVE); MAC-based VLAN
- Protocol-based VLAN; Voice VLAN; IP Subnet-based VLAN; MVR (Multicast VLAN registration); GVRP; Up to 4K VLAN groups, out of 4095 VLAN IDs
- Link Aggregation: IEEE 802.3ad LACP/static trunk; 14 trunk groups with 12 port per trunk group
- Spanning Tree Protocol: IEEE 802.1D Spanning Tree Protocol; IEEE 802.1w Rapid Spanning Tree Protocol; IEEE 802.1s Multiple Spanning Tree Protocol
- IGMP Snooping: IPv4 IGMP (v1/v2/v3) snooping; IPv4 IGMP querier mode support; Supports 255 IGMP groups
- MLD Snooping: IPv6 MLD (v1/v2) snooping; IPv6 MLD querier mode support; Supports 255 MLD groups
- Access Control List: IP-based ACL/MAC-based ACL, ACL based on: MAC Address, IP Address, Ethertype, Protocol Type, VLAN ID, DSCP, 802.1p Priority; Up to 256 entries
- Bandwidth Control: Per port bandwidth control; Ingress: 100Kbps~1000Mbps; Egress: 100Kbps~1000Mbps
- QoS: Traffic classification based, strict priority and WRR; 8-level priority for switching: Port number, 802.1p priority, 802.1Q VLAN tag, DSCP/ToS field in IP packet
- Synchronization: IEEE 1588v2 PTP(Precision Time Protocol); Peer-to-peer transparent clock and End-to-end transparent clock

Layer 3 Functions

- IP Interfaces: Max. 128 VLAN interfaces
- Routing Table Max.: 128 routing entries
- Routing Protocols: IPv4 hardware static routing, IPv6 hardware static routing, OSPFv2 dynamic routing

Management

- Basic Management Interfaces: Console; Telnet; Web browser; SNMP v1, v2c
- Secure Management Interfaces: SSHv1/v2, TLS v1.1/v1.2, SSL, SNMPv3
- System Management: Firmware upgrade by HTTP protocol through Ethernet network; Configuration upload/download through HTTP; Remote Syslog; System log; LLDP protocol; NTP; Smart Discovery Utility
- SNMP MIBs: RFC 1213 MIB-II; RFC 1493 Bridge MIB; RFC 1643 Ethernet MIB; RFC 2863 Interface MIB; RFC 2665 Ether-Like MIB; RFC 2819 RMON MIB (Group 1, 2, 3 and 9); RFC 2737 Entity MIB; RFC 2618 RADIUS Client MIB; RFC 2863 IF-MIB; RFC 2933 IGMP-STD-MIB; RFC 3411 SNMP-Frameworks-MIB; RFC 4292 IP Forward MIB; RFC 4293 IP MIB; RFC 4836 MAU-MIB; IEEE 802.1X PAE; LLDP

Standards Conformance

- Regulatory Compliance: FCC Part 15 Class A; CE:EN55032, EN55035, EN 62368-1/IEC 62368-1: 2014

- Stability Testing: IEC60068-2-32 (free fall); IEC60068-2-27 (shock); IEC60068-2-6 (vibration)

- Standards Compliance: IEEE 802.3 10BASE-T; IEEE 802.3u 100BASE-TX/100BASE-FX; IEEE 802.3z Gigabit SX/LX; IEEE 802.3ab Gigabit 1000T; IEEE 802.3ae 10Gb/s Ethernet; IEEE 802.3x flow control and back pressure; IEEE 802.3ad port trunk with LACP; IEEE 802.1D Spanning Tree Protocol; IEEE 802.1w Rapid Spanning Tree Protocol; IEEE 802.1s Multiple Spanning Tree Protocol; IEEE 802.1p Class of Service; IEEE 802.1Q VLAN tagging; IEEE 802.1X Port Authentication Network Control; IEEE 802.1ab LLDP; IEEE 802.3ah OAM; IEEE 802.1ag Connectivity Fault Management (CFM); RFC 768 UDP; RFC 793 TFTP; RFC 791 IP; RFC 792 ICMP; RFC 2068 HTTP; RFC 1112 IGMP v1; RFC 2236 IGMP v2; RFC 3376 IGMP v3; RFC 2710 MLD v1; FRC 3810 MLD v2; RFC 2328 OSPF v2; ITU-T G.8032 ERPS Ring; ITU-T Y.1731 Performance Monitoring

Environment

- Operating: -40°C ~ 75°C
- Storage: -40°C ~ 85°C
- Humidity: 5 ~ 95% (non-condensing)

The following items shall also be included with each switch:

- SFP+ Bi-Directional Fiber Optic Module – Qty. 1 (FS.COM SFP-10G-BX-I Generic Compatible 10GBASE-BX BiDi SFP+ 1270nm-TX/1330nm-RX 20km Industrial DOM Simplex LC SMF Transceiver Module #111866 - Industrial Temperature Range -40°C to 85°C, Hot Pluggable SFP+ MSA Compliant)

- SFP+ Bi-Directional Fiber Optic Module – Qty. 1 (FS.COM SFP-10G-BX-I Generic Compatible 10GBASE-BX BiDi SFP+ 1330nm-TX/1270nm-RX 20km Industrial DOM Simplex LC SMF Transceiver Module #111868 - Industrial Temperature Range -40°C to 85°C, Hot Pluggable SFP+ MSA Compliant)

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 furnish the fiber optic Ethernet drop and repeat switch and associated equipment and deliver it to the Department.

ETHERNET MANAGE SWITCH

The Contractor shall furnish an ethernet switch (material only) complete with the accessories as specified (SFP+ Modules) and deliver these items to the Department.

The ethernet switch shall meet or exceed the following minimum specifications:

Approved Models: Planet Technology USA Model SGS-6310-48T6X Layer 3 Stackable Managed Switch with 48 10/100/1000T ports and 6 10G SFP+ ports Ethernet Switch or approved equal.

Features

Stacking Features

- Hardware Stacking
- Virtualized multiple SGS-6310 series stacked into one logical facility
- Connects with stack members via assigned 10G SFP+ interfaces
- Single IP address stack management, supporting up to 8 hardware units stacked together
- Stacking architecture supports redundant Ring mode

IP Routing Features

- IPv4 routing protocol supports RIPv1/v2 and OSPFv2
- IPv6 routing protocol supports RIPng and OSPFv3
- Routing interface provides per VLAN routing mode
- VRRPv1/v3 protocol for redundant routing deployment
- Supports route redistribution
- Supports hardware-based wire-speed VLAN routing

Multicast Routing Features

- Supports IPv4 IGMP v1/v2/v3, IGMP Snooping.
- Supports IGMP Fast Leave, MVR, IGMP filter
- Supports IPv6 MLD V1, MLD snooping

Layer 2 Features

- 6K MAC address table, automatic source address learning and aging
- Supports VLAN
- IEEE 802.1Q tag-based VLAN
    - Provider Bridging (VLAN Q-in-Q, IEEE 802.1ad) supported
    - GVRP protocol for dynamic VLAN management
    - Private VLAN Edge (PVE) supported
    - MAC-based VLAN
    - IP subnet-based VLAN
    - Voice VLAN
- Supports Link Aggregation
    - IEEE 802.3ad LACP (Link Aggregation Control Protocol)
    - Static mode and LACP mode
    - Maximum 64 trunk groups, up to 8 ports per trunk group
- Supports Spanning Tree Protocol
    - STP, IEEE 802.1D (Classic Spanning Tree Protocol)
    - RSTP, IEEE 802.1w (Rapid Spanning Tree Protocol)
    - MSTP, IEEE 802.1s (Multiple Spanning Tree Protocol, spanning tree by VLAN)
    - Supports BPDU & root guard
- Port mirroring to monitor the incoming or outgoing traffic on a particular port (one-to-one and many-to-one)
- Provides port mirror (many-to-1)
- Supports G.8032 ERPS (Ethernet Ring Protection Switching)
- Loop protection to avoid broadcast loops
- Link Layer Discovery Protocol (LLDP)
- Loop protection to avoid broadcast loops
- Compatible with Cisco UDLD (uni-directional link detection) that monitors a link between two switches and blocks the ports on both ends of the link if the link fails at any point between the two devices

Quality of Service

- 8 priority queues on all switch ports
- Support for strict priority and WRR (Weighted Round Robin) CoS policies
- Traffic classification
    - IEEE 802.1p CoS/ToS
    - IPv4/IPv6 DSCP
    - Port-based WRR

- Strict priority and WRR CoS policies

Multicast

- Supports IPv4 IGMP snooping v1, v2 and v3
- Supports IPv6 MLD v1 snooping
- Querier mode support
- Supports Multicast VLAN Register (MVR)

Security

- Authentication

    - IEEE 802.1x port-based network access authentication
    - MAC-based network access authentication
    - Built-in RADIUS client to cooperate with the RADIUS servers for IPv4 and IPv6
    - RADIUS/TACACS+ login users access authentication

- Access Control List

    - IP-based Access Control List (ACL)
    - MAC-based Access Control List
    - Time-based ACL

- DHCP snooping to filter distrusted DHCP messages
- IP Source Guard prevents IP spoofing attacks
- Dynamic ARP Inspection discards ARP packets with invalid MAC address to IP address binding

Management

- IPv4 and IPv6 dual stack management
- Switch Management Interface

    - Console/Telnet Command Line Interface
    - HTTP Web switch management
    - SNMP v1 and v2c switch management
    - SSHv1/v2, TLSv1.2 and SNMPv3 secure access

- SNMP Management
    - Four RMON groups 1, 2, 3, 9 (history, statistics, alarms and events)
    - SNMP trap for interface Link Up and Link Down notification
    - BOOTP and DHCP for IP address assignment
    - System Maintenance
    - Firmware upload/download via TFTP or HTTP Protocol for IPv4 and IPv6
    - SNTP (Simple Network Time Protocol) for IPv4 and IPv6
    - User privilege levels control
    - Syslog server for IPv4 and IPv6
    - Supports sFlow
    - DHCP Functions
        - DHCP Option82
        - DHCP server/relay/client
    - Network Diagnostic
        - Supports ping, traceroute function for IPv4 and IPv6
        - Supports DDM (Digital Diagnostic Monitor)
    - Supports ISSU (In-service Software Upgrade) to guaranteeing non-stop user data transmission when the system is upgraded.

Compliance

- All equipment shall be TAA Compliant

Warranty

- Two years

Hardware Specifications

Copper Ports: 48 10/100/1000BASE-T RJ45 copper ports (port-1 to port-48)

10G SFP+ Ports: 6 10GBASE-SR/LR SFP+ interface (port-25 to port-28), Backward compatible with 1000BASE-SX/LX/BX SFP transceiver

Console Port: 1 x RJ45-to-RS232 serial port (9600, 8, N, 1)

DRAM: 512Mbytes

Flash Memory: 16Mbytes

Dimensions (W x D x H): 440 x 280 x 44 mm

Weight: 4300g

Power Consumption: 48 watts/ 163.68 BTU

Power Requirements: AC: 100~240V, 50/60Hz

Fan: 2

LED: System:SYS, PWR Green. Ports:10/100/1000T RJ45 Port: LNK/ACT Green
1/10G SFP+ Port: LNK/ACT Green

Switching Specifications

Switch Architecture: Store-and-forward

Switch Fabric: 216Gbps/non-blocking

Switch Throughput: 160.7Mpps

Address Table: 16K MAC address table with auto learning function

ARP Table: 2K

Routing Table: 2040

VLAN Interface: 64

IP Interface: 64

ACL Table: 1024

Shared Data Buffer: 1.5MB

Jumbo Frame: 9Kbytes

Flow Control: Back pressure for half duplex, IEEE 802.3x pause frame for full duplex

IPv4 Layer 3 Functions

IP Routing Protocol: Static route, RIPv1/v2, OSPFv2, Hardware-based Layer 3 routing

Routing Features: VRRP v1/v3, ARP, ARP Proxy, IGMP Proxy

IPv6 Layer 3 Functions

IP Routing Protocol: RIPng, OSPFv3, IPv6 LPM Routing, IPv6 Policy-based Routing (PBR), IPv6 VRRPv3, IPv6 RA (Router Advertisement), Hardware-based Layer 3 routing

Routing Features: Configured Tunnels, GRE Tunnel, ISATAP Tunnel,6 to 4 tunnel, Manual tunnel

Other: ICMPv6, IPv6 ND

Layer 2 Functions

Port Configuration: Port disable/enable, Auto-negotiation 10/100/1000Mbps full and half duplex mode selection, Flow control disable/enable, Bandwidth control on each port, Port loopback detect

Port Status: Display each port's speed duplex mode, link status, flow control status and auto negotiation status

VLAN: 802.1Q tagged VLAN, up to 4K VLAN groups, 802.1ad Q-in-Q (VLAN stacking), GVRP for VLAN management, Private VLAN Edge (PVE) supported, Protocol-based VLAN, MAC-based VLAN

Spanning Tree Protocol: STP, IEEE 802.1D (Classic Spanning Tree Protocol), RSTP, IEEE 802.1w (Rapid Spanning Tree Protocol), MSTP, IEEE 802.1s (Multiple Spanning Tree Protocol, spanning tree by VLAN), Supports BPDU and root guard

Multicast: IPv4 IGMP v1/v2/v3 snooping, Querier mode support, IPv6 MLD v1 snooping, Multicast VLAN Register (MVR), Up to 1024 multicast groups (IPv4 + IPv6)

Link Aggregation: IEEE 802.3ad LACP/static trunk, Supports 64 groups with 8 ports per trunk group

Bandwidth Control: TX/RX/Both, at least 64Kbps step

QoS: 8 priority queues on all switch ports, Supports strict priority and Weighted Round Robin (WRR) CoS policies, Traffic classification:CAR, HQoS, MAC/IP/TCP/UDP/, IEEE 802.1p CoS/ToS, IPv4/IPv6 DSCP, Port-based WRR, Tail-Drop, WRED, flow monitoring and traffic shaping

Ring: Supports ITU-G G.8032 ERPS, Recovery time < 10ms @ 3units, Recovery time < 50ms @ 16units

Security Functions

Access Control List: Supports Standard and Expanded ACL, IP-based ACL/MAC-based ACL, Time-based ACL, Up to 1024 entries

Security: Port isolation, Port security, "IP+ MAC+ port" binding, MAC sticky DAI & IP source guard, PPPoE+, L2/L3/L4 ACL flow identification, Filtration Anti-attack from DDo S, TCP's SYN Flood, UDP Flood, Broadcast / multicast / unknown unicast storm-control, Supports MD5, SHA-256, RSA-1024, AES256

AAA Authentication: TACACS+ and IPv4/IPv6 over RADIUS

Network Access Control: IEEE 802.1x port-based network access control, MAC-based authentication, RADIUS/TACACS authentication

Switch Management Functions

System Configuration: Console and Telnet, Web browser, SNMP v1, v2c

Secure Management Interfaces: SSHv1/v2, TLSv1.2 and SNMPv3

System Management: Supports both IPv4 and Ipv6 addressing, Supports the user IP security inspection for Ipv4/Ipv6 SNMP, Supports MIB and TRAP, Supports RMON 1, 2, 3, 9 four groups
Supports IPv4/IPv6 FTP/TFTP, Supports IPv4/IPv6 NTP, Supports the RADIUS authentication for IPv4/IPv6 Telnet user name and password The right configuration for users to adopt RADIUS server's shell management, Supports Security IP safety net management function: avoid unlawful landing at nonrestrictive area, Supports IPv4 and IPv6 DHCP server

Event Management: Supports Syslog server for IPv4 and IPv6

Hardware Stacking: 8 members max., 2 10G SFP+ slots are functioned as Stacking Up and Down interfaces

Hardware Stacking Compatibility List: SGS-6310-24T4X, SGS-6310-24P4X, SGS-6310-16S8C4XR, SGS-6310-48T6X, SGS-6310-48P6XR

SNMP MIBs: RFC 1213 MIB-II, RFC 1215 Internet Engineering Task Force, RFC 1271 RMON, RFC 1354 IP-Forwarding MIB, RFC 1493 Bridge MIB, RFC 1643 Ether-like MIB, RFC 1907 SNMP v2, RFC 2011 IP/ICMP MIB, RFC 2012 TCP MIB, RFC 2013 UDP MIB, RFC 2096 IP forward MIB, RFC 2233 if MIB, RFC 2452 TCP6 MIB, RFC 2454 UDP6 MIB, RFC 2465 IPv6 MIB, RFC 2466, CMP6 MIB, RFC 2573 SNMP v3 notify, RFC 2574 SNMP v3 vacm, RFC 2674 Bridge MIB Extensions (IEEE 802.1Q MIB), RFC 2674 Bridge MIB Extensions (IEEE 802.1P MIB)

Standard Conformance

Regulatory Compliance: FCC Part 15 Class A, CE

Standards Compliance: IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX, IEEE 802.3z Gigabit 1000BASE-SX/LX, IEEE 802.3ab Gigabit 1000BASE-T, IEEE 802.3ae 10Gb/s Ethernet, IEEE 802.3x flow control and back pressure, IEEE 802.3ad port trunk with LACP, IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol, IEEE 802.1s Multiple Spanning Tree Protocol, IEEE 802.1p Class of Service, IEEE 802.1Q VLAN tagging, IEEE 802.1X port authentication network control, IEEE 802.1ab LLDP, IEEE 802.3af Power over Ethernet, IEEE 802.3at Power over Ethernet PLUS, RFC 768 UDP, RFC 783 TFTP, RFC 791 IP, RFC 792 ICMP, RFC 2068 HTTP, RFC 1112 IGMP v1, RFC 2236 IGMP v2, RFC 3376 IGMP v3, RFC 2710 MLD v1, RFC 2328 OSPF v2, RFC 1058 RIP v1, RFC 2453 RIP v2, ITU-T G.8032 ERPS Ring

Environment

Operating: Temperature: 0 ~ 50 degrees C, Relative Humidity: 10 ~ 90% (non-condensing)

Storage: Temperature: -20 ~ 70 degrees C, Relative Humidity: 5 ~ 95% (non-condensing)

The following items shall also be included with each switch:

- SFP+ Bi-Directional Fiber Optic Module – Qty. 3 (FS.COM SFP-10G-BX-I Generic Compatible 10GBASE-BX BiDi SFP+ 1270nm-TX/1330nm-RX 20km Industrial DOM Simplex LC SMF Transceiver Module #111866 - Industrial Temperature Range -40°C to 85°C, Hot Pluggable SFP+ MSA Compliant)

- SFP+ Bi-Directional Fiber Optic Module – Qty. 3 (FS.COM SFP-10G-BX-I Generic Compatible 10GBASE-BX BiDi SFP+ 1330nm-TX/1270nm-RX 20km Industrial DOM Simplex LC SMF Transceiver Module #111868 - Industrial Temperature Range -40°C to 85°C, Hot Pluggable SFP+ MSA Compliant)

Basis of Payment: This work will be paid for at the contract unit price per Each for ETHERNET MANAGE SWITCH which price shall be payment in full for all labor, materials, and equipment required to furnish the ethernet switch and associated equipment and deliver it to the Department.

ETHERNET SWITCH

The Contractor shall furnish an ethernet switch (material only) complete with the accessories as specified (SFP+ Modules) and deliver these items to the Department.

The ethernet switch shall meet or exceed the following minimum specifications:

Approved Models: Planet Technology USA Model SGS-6310-16S8C4XR L3 16-Port 100/1000X SFP + 8-Port Gigabit TP/SFP + 4-Port 10G SFP+ Stackable Managed Switch (Dual 100~240V AC) or approved equal.

Features

Stacking Features

- Hardware Stacking
- Virtualized multiple SGS-6310 series stacked into one logical facility
- Connects with stack members via assigned 10G SFP+ interfaces
- Single IP address stack management, supporting up to 8 hardware units stacked together
- Stacking architecture supports redundant Ring mode

IP Routing Features

- IPv4 routing protocol supports RIPv1/v2 and OSPFv2
- IPv6 routing protocol supports RIPng and OSPFv3
- Routing interface provides per VLAN routing mode
- VRRPv1/v3 protocol for redundant routing deployment
- Supports route redistribution
- Supports hardware-based wire-speed VLAN routing

Multicast Routing Features

- Supports IPv4 IGMP v1/v2/v3, IGMP Snooping.
- Supports IGMP Fast Leave, MVR, IGMP filter
- Supports IPv6 MLD V1, MLD snooping

Layer 2 Features

- 6K MAC address table, automatic source address learning and aging
- Supports VLAN
- IEEE 802.1Q tag-based VLAN
    - Provider Bridging (VLAN Q-in-Q, IEEE 802.1ad) supported
    - GVRP protocol for dynamic VLAN management
    - Private VLAN Edge (PVE) supported
    - MAC-based VLAN
    - IP subnet-based VLAN
    - Voice VLAN
- Supports Link Aggregation
    - IEEE 802.3ad LACP (Link Aggregation Control Protocol)
    - Static mode and LACP mode
    - Maximum 64 trunk groups, up to 8 ports per trunk group
- Supports Spanning Tree Protocol
    - STP, IEEE 802.1D (Classic Spanning Tree Protocol)
    - RSTP, IEEE 802.1w (Rapid Spanning Tree Protocol)
    - MSTP, IEEE 802.1s (Multiple Spanning Tree Protocol, spanning tree by VLAN)
    - Supports BPDU & root guard
- Port mirroring to monitor the incoming or outgoing traffic on a particular port (one-to-one and many-to-one)
- Provides port mirror (many-to-1)
- Supports G.8032 ERPS (Ethernet Ring Protection Switching)
- Loop protection to avoid broadcast loops
- Link Layer Discovery Protocol (LLDP)

- Loop protection to avoid broadcast loops
- Compatible with Cisco UDLD (uni-directional link detection) that monitors a link between two switches and blocks the ports on both ends of the link if the link fails at any point between the two devices

Quality of Service

- 8 priority queues on all switch ports
- Support for strict priority and WRR (Weighted Round Robin) CoS policies
- Traffic classification
    - IEEE 802.1p CoS/ToS
    - IPv4/IPv6 DSCP
    - Port-based WRR
- Strict priority and WRR CoS policies

Multicast

- Supports IPv4 IGMP snooping v1, v2 and v3
- Supports IPv6 MLD v1 snooping
- Querier mode support
- Supports Multicast VLAN Register (MVR)

Security

- Authentication
    - IEEE 802.1x port-based network access authentication
    - MAC-based network access authentication
    - Built-in RADIUS client to cooperate with the RADIUS servers for IPv4 and IPv6
    - RADIUS/TACACS+ login users access authentication
- Access Control List
    - IP-based Access Control List (ACL)
    - MAC-based Access Control List
    - Time-based ACL
- DHCP snooping to filter distrusted DHCP messages
- IP Source Guard prevents IP spoofing attacks
- Dynamic ARP Inspection discards ARP packets with invalid MAC address to IP address binding

Management

- IPv4 and IPv6 dual stack management
- Switch Management Interface
    - Console/Telnet Command Line Interface
    - HTTP Web switch management
    - SNMP v1 and v2c switch management
    - SSHv1/v2, TLSv1.2 and SNMPv3 secure access
- SNMP Management
    - Four RMON groups 1, 2, 3, 9 (history, statistics, alarms and events)
    - SNMP trap for interface Link Up and Link Down notification
    - BOOTP and DHCP for IP address assignment
    - System Maintenance
    - Firmware upload/download via TFTP or HTTP Protocol for IPv4 and IPv6
    - SNTP (Simple Network Time Protocol) for IPv4 and IPv6
    - User privilege levels control
    - Syslog server for IPv4 and IPv6
    - Supports sFlow
    - DHCP Functions
        - DHCP Option82
        - DHCP server/relay/client
    - Network Diagnostic
        - Supports ping, traceroute function for IPv4 and IPv6
        - Supports DDM (Digital Diagnostic Monitor)
    - Supports ISSU (In-service Software Upgrade) to guaranteeing non-stop user data transmission when the system is upgraded.

Compliance

- All equipment shall be TAA Compliant

Warranty

- Two years

Hardware Specifications

SFP/mini-GBIC Ports: 24 100/1000BASE-X SFP ports (ports 1 to 24), Compatible with 100BASE-FX SFP transceiver

Copper Ports: 8 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports, shared with Ports 1 to 8

10G SFP+ Ports: 4 10GBASE-SR/LR SFP+ ports (ports 25 to 28), Backward compatible with 1000BASE-SX/LX/BX SFP transceiver

Console Port: 1 x RJ45-to-RS232 serial port (9600, 8, N, 1)

DRAM: 256Mbytes

Flash Memory: 16Mbytes

Dimensions (W x D x H): 440 x 280 x 44 mm

Weight: 4000g

Power Consumption: 38 watts/129.58BTU

Power Requirements: AC: 100~240V, 50/60Hz

Fan: 2

LED: System:SYS, PWR Green, Ports:10/100/1000T RJ45 Port: LNK/ACT Green 1/10G SFP+ Port: LNK/ACT Green

Switching Specifications

Switch Architecture: Store-and-forward

Switch Fabric: 128Gbps/non-blocking

Switch Throughput: 95.23Mpps

Backplane: 128Gbps

Forwarding Rate: 96 Mbps with 64 bytes

Address Table: 16K MAC address table with auto learning function

ARP Table: 2K

Routing Table: 2040

VLAN Interface: 64

IP Interface: 64

ACL Table: 1024

Shared Data Buffer: 1.5MB

Jumbo Frame: 9Kbytes

Flow Control: Back pressure for half duplex, IEEE 802.3x pause frame for full duplex

IPv4 Layer 3 Functions

IP Routing Protocol: Static route, RIPv1/v2, OSPFv2, Hardware-based Layer 3 routing

Routing Features: VRRP v1/v3, ARP, ARP Proxy, IGMP Proxy

IPv6 Layer 3 Functions

IP Routing Protocol: RIPng, OSPFv3, IPv6 LPM Routing, IPv6 Policy-based Routing (PBR), IPv6 VRRPv3, IPv6 RA (Router Advertisement), Hardware-based Layer 3 routing

Routing Features: Configured Tunnels, GRE Tunnel, ISATAP Tunnel,6 to 4 tunnel, Manual tunnel

Other: ICMPv6, IPv6 ND

Layer 2 Functions

Port Configuration: Port disable/enable, Auto-negotiation 10/100/1000Mbps full and half duplex mode selection, Flow control disable/enable, Bandwidth control on each port, Port loopback detect

Port Status: Display each port's speed duplex mode, link status, flow control status and auto negotiation status

VLAN: 802.1Q tagged VLAN, up to 4K VLAN groups, 802.1ad Q-in-Q (VLAN stacking), GVRP for VLAN management, Private VLAN Edge (PVE) supported, Protocol-based VLAN, MAC-based VLAN, IP subnet-based VLAN

Spanning Tree Protocol: STP, IEEE 802.1D (Classic Spanning Tree Protocol), RSTP, IEEE 802.1w (Rapid Spanning Tree Protocol), MSTP, IEEE 802.1s (Multiple Spanning Tree Protocol, spanning tree by VLAN), Supports BPDU and root guard

Multicast IPv4 IGMP v1/v2/v3 snooping, Querier mode support, IPv6 MLD v1 snooping, Multicast VLAN Register (MVR), Up to 1024 multicast groups (IPv4 + IPv6)

Link Aggregation: IEEE 802.3ad LACP/static trunk, Supports 64 groups with 8 ports per trunk group

Bandwidth Control: TX/RX/Both, At least 64Kbps step

QoS: 8 priority queues on all switch ports, Supports strict priority and Weighted Round Robin (WRR) CoS policies, Traffic classification:CAR, HQoS, MAC/IP/TCP/UDP/, IEEE 802.1p CoS/ToS, IPv4/IPv6 DSCP, Port-based WRR, Tail-Drop, WRED, flow monitoring and traffic shaping

Ring: Supports ITU-G G.8032 ERPS, Recovery time < 10ms @ 3units, Recovery time < 50ms @ 16units

Security Functions

Access Control List: Supports Standard and Expanded ACL, IP-based ACL/MAC-based ACL, Time-based ACL, Up to 1024 entries

Security: Port isolation, Port security, “IP+ MAC+ port” binding, MAC sticky DAI & IP source guard, PPPoE+, L2/L3/L4 ACL flow identification, Filtration Anti-attack from DDo S, TCP’s SYN Flood, UDP Flood, Broadcast / multicast / unknown unicast storm-control, Supports MD5, SHA-256, RSA-1024, AES256

AAA Authentication: TACACS+ and IPv4/IPv6 over RADIUS

Network Access Control: IEEE 802.1x port-based network access control, MAC-based authentication, RADIUS/TACACS authentication

Switch Management Functions

System Configuration: Console and Telnet, Web browser, SNMP v1, v2c

Secure Management Interfaces: SSHv1/v2, TLSv1.2 and SNMPv3

System Management: Supports both IPv4 and Ipv6 addressing, Supports the user IP security inspection for Ipv4/Ipv6 SNMP, Supports MIB and TRAP, Supports RMON 1, 2, 3, 9 four groups
Supports IPv4/IPv6 FTP/TFTP, Supports IPv4/IPv6 NTP, Supports the RADIUS authentication for IPv4/IPv6 Telnet user name and password The right configuration for users to adopt RADIUS server’s shell management, Supports Security IP safety net management function: avoid unlawful landing at nonrestrictive area, Supports IPv4 and IPv6 DHCP server

Event Management: Supports Syslog server for IPv4 and IPv6

Hardware Stacking: 8 members max., 2 10G SFP+ slots are functioned as Stacking Up and Down interfaces

Hardware Stacking Compatibility List: SGS-6310-24T4X, SGS-6310-24P4X, SGS-6310-16S8C4XR, SGS-6310-48T6X, SGS-6310-48P6XR

SNMP MIBs: RFC 1213 MIB-II, RFC 1215 Internet Engineering Task Force, RFC 1271 RMON, RFC 1354 IP-Forwarding MIB, RFC 1493 Bridge MIB, RFC 1643 Ether-like MIB, RFC 1907 SNMP v2, RFC 2011 IP/ICMP MIB, RFC 2012 TCP MIB, RFC 2013 UDP MIB, RFC 2096 IP forward MIB, RFC 2233 if MIB, RFC 2452 TCP6 MIB, RFC 2454 UDP6 MIB, RFC 2465 IPv6 MIB, RFC 2466, CMP6 MIB, RFC 2573 SNMP v3 notify, RFC 2574 SNMP v3 vacm, RFC 2674 Bridge MIB Extensions (IEEE 802.1Q MIB), RFC 2674 Bridge MIB Extensions (IEEE 802.1P MIB)

Standard Conformance

Regulatory Compliance: FCC Part 15 Class A, CE

Standards Compliance: IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX, IEEE 802.3z Gigabit 1000BASE-SX/LX, IEEE 802.3ab Gigabit 1000BASE-T, IEEE 802.3ae 10Gb/s Ethernet, IEEE 802.3x flow control and back pressure, IEEE 802.3ad port trunk with LACP, IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol, IEEE 802.1s Multiple Spanning Tree Protocol, IEEE 802.1p Class of Service, IEEE 802.1Q VLAN tagging, IEEE 802.1X port authentication network control, IEEE 802.1ab LLDP, IEEE 802.3af Power over Ethernet, IEEE 802.3at Power over Ethernet PLUS, RFC 768 UDP, RFC 783 TFTP, RFC 791 IP, RFC 792 ICMP, RFC 2068 HTTP, RFC 1112 IGMP v1, RFC 2236 IGMP v2, RFC 3376 IGMP v3, RFC 2710 MLD v1, RFC 2328 OSPF v2, RFC 1058 RIP v1, RFC 2453 RIP v2, ITU-T G.8032 ERPS Ring

Environment

Operating: Temperature: 0 ~ 50 degrees C, Relative Humidity: 10 ~ 90% (non-condensing)

Storage: Temperature: -20 ~ 70 degrees C, Relative Humidity: 5 ~ 95% (non-condensing)

The following items shall also be included with each switch:

- SFP+ Bi-Directional Fiber Optic Module – Qty. 3 (FS.COM SFP-10G-BX-I Generic Compatible 10GBASE-BX BiDi SFP+ 1270nm-TX/1330nm-RX 20km Industrial DOM Simplex LC SMF Transceiver Module #111866 - Industrial Temperature Range -40°C to 85°C, Hot Pluggable SFP+ MSA Compliant)

- SFP+ Bi-Directional Fiber Optic Module – Qty. 3 (FS.COM SFP-10G-BX-I Generic Compatible 10GBASE-BX BiDi SFP+ 1330nm-TX/1270nm-RX 20km Industrial DOM Simplex LC SMF Transceiver Module #111868 - Industrial Temperature Range -40°C to 85°C, Hot Pluggable SFP+ MSA Compliant)

Basis of Payment: This work will be paid for at the contract unit price per Each for ETHERNET SWITCH which price shall be payment in full for all labor, materials, and equipment required to furnish the ethernet switch and associated equipment and deliver it to the Department.

BLENDED FINELY DIVIDED MINERALS (BDE)

Effective: April 1, 2021

Revise the second paragraph of Article 1010.01 of the Standard Specifications to read:

"Different sources or types of finely divided minerals shall not be mixed or used alternately in the same item of construction, except as a blended finely divided mineral product according to Article 1010.06."

Add the following article to Section 1010 of the Standard Specifications:

"**1010.06 Blended Finely Divided Minerals.** Blended finely divided minerals shall be the product resulting from the blending or intergrinding of two or three finely divided minerals. Blended finely divided minerals shall be according to ASTM C 1697, except as follows.

(a) Blending shall be accomplished by mechanically or pneumatically intermixing the constituent finely divided minerals into a uniform mixture that is then discharged into a silo for storage or tanker for transportation.

(b) The blended finely divided mineral product will be classified according to its predominant constituent or the manufacturer's designation and shall meet the chemical requirements of its classification. The other finely divided mineral constituent(s) will not be required to conform to their individual standards."

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."

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 **0.00%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

(a) The bidder documents 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.

ILLINOIS WORKS APPRENTICESHIP INITIATIVE – STATE FUNDED CONTRACTS (BDE)

Effective: June 2, 2021
Revised: September 2, 2021

Illinois Works Jobs Program Act (30 ILCS 559/20-1 et seq.). For contracts having an awarded contract value of $500,000 or more, the Contractor shall comply with the Illinois Works Apprenticeship Initiative (30 ILCS 559/20-20 to 20-25) and all applicable administrative rules. The goal of the Illinois Apprenticeship Works Initiative is that apprentices will perform either 10% of the total labor hours actually worked in each prevailing wage classification or 10% of the estimated labor hours in each prevailing wage classification, whichever is less. The Contractor may seek from the Department of Commerce and Economic Opportunity (DCEO) a waiver or reduction of this goal in certain circumstances pursuant to 30 ILCS 559/20-20(b). The Contractor shall ensure compliance during the term of the contract and will be required to report on and certify its compliance. An apprentice use plan, apprentice hours, and a compliance certification shall be submitted to the Engineer on forms provided by the Department and/or DCEO.

SEEDING (BDE)

Effective: November 1, 2022

Revise Article 250.07 of the Standard Specifications to read:

"**250.07 Seeding Mixtures.** The classes of seeding mixtures and combinations of mixtures will be designated in the plans.

When an area is to be seeded with two or more seeding classes, those mixtures shall be applied separately on the designated area within a seven day period. Seeding shall occur prior to placement of mulch cover. A Class 7 mixture can be applied at any time prior to applying any seeding class or added to them and applied at the same time.

TABLE 1 - SEEDING MIXTURES			
Class - Type		Seeds	lb/acre (kg/hectare)
1	Lawn Mixture 1/	Kentucky Bluegrass	100 (110)
		Perennial Ryegrass	60 (70)
		Festuca rubra ssp. r*ubra* (Creeping Red Fescue)	40 (50)
1A	Salt Tolerant Lawn Mixture 1/	Kentucky Bluegrass	60 (70)
		Perennial Ryegrass	20 (20)
		Festuca rubra ssp. *rubra* (Creeping Red Fescue)	20 (20)
		Festuca brevipilla (Hard Fescue)	20 (20)
		Puccinellia distans (Fults Saltgrass or Salty Alkaligrass)	60 (70)
1B	Low Maintenance Lawn Mixture 1/	Turf-Type Fine Fescue 3/	150 (170)
		Perennial Ryegrass	20 (20)
		Red Top	10 (10)
		Festuca rubra ssp. *rubra* (Creeping Red Fescue)	20 (20)
2	Roadside Mixture 1/	*Lolium arundinaceum* (Tall Fescue)	100 (110)
		Perennial Ryegrass	50 (55)
		Festuca rubra ssp. r*ubra* (Creeping Red Fescue)	40 (50)
		Red Top	10 (10)
2A	Salt Tolerant Roadside Mixture 1/	*Lolium arundinaceum* (Tall Fescue)	60 (70)
		Perennial Ryegrass	20 (20)
		Festuca rubra ssp. *rubra* (Creeping Red Fescue)	30 (20)
		Festuca brevipila (Hard Fescue)	30 (20)
		Puccinellia distans (Fults Saltgrass or Salty Alkaligrass)	60 (70)
3	Northern Illinois Slope Mixture 1/	*Elymus canadensis* (Canada Wild Rye) 5/	5 (5)
		Perennial Ryegrass	20 (20)
		Alsike Clover 4/	5 (5)
		Desmanthus illinoensis (Illinois Bundleflower) 4/ 5/	2 (2)
		Schizachyrium scoparium (Little Bluestem) 5/	12 (12)
		Bouteloua curtipendula (Side-Oats Grama) 5/	10 (10)
		Puccinellia distans (Fults Saltgrass or Salty Alkaligrass)	30 (35)
		Oats, Spring	50 (55)
		Slender Wheat Grass 5/	15 (15)
		Buffalo Grass 5/ 7/	5 (5)
3A	Southern Illinois Slope Mixture 1/	Perennial Ryegrass	20 (20)
		Elymus canadensis (Canada Wild Rye) 5/	20 (20)
		Panicum virgatum (Switchgrass) 5/	10 (10)
		Schizachyrium scoparium (Little Blue Stem) 5/	12 (12)
		Bouteloua curtipendula (Side-Oats Grama) 5/	10 (10)
		Dalea candida (White Prairie Clover) 4/ 5/	5 (5)
		Rudbeckia hirta (Black-Eyed Susan) 5/	5 (5)
		Oats, Spring	50 (55)

Class – Type		Seeds	lb/acre (kg/hectare)
4	Native Grass 2/ 6/	*Andropogon gerardi* (Big Blue Stem) 5/	4 (4)
		Schizachyrium scoparium (Little Blue Stem) 5/	5 (5)
		Bouteloua curtipendula (Side-Oats Grama) 5/	5 (5)
		Elymus canadensis (Canada Wild Rye) 5/	1 (1)
		Panicum virgatum (Switch Grass) 5/	1 (1)
		Sorghastrum nutans (Indian Grass) 5/	2 (2)
		Annual Ryegrass	25 (25)
		Oats, Spring	25 (25)
		Perennial Ryegrass	15 (15)
4A	Low Profile Native Grass 2/ 6/	*Schizachyrium scoparium* (Little Blue Stem) 5/	5 (5)
		Bouteloua curtipendula (Side-Oats Grama) 5/	5 (5)
		Elymus canadensis (Canada Wild Rye) 5/	1 (1)
		Sporobolus heterolepis (Prairie Dropseed) 5/	0.5 (0.5)
		Annual Ryegrass	25 (25)
		Oats, Spring	25 (25)
		Perennial Ryegrass	15 (15)
4B	Wetland Grass and Sedge Mixture 2/ 6/	Annual Ryegrass	25 (25)
		Oats, Spring	25 (25)
		Wetland Grasses (species below) 5/	6 (6)

Species:	% By Weight
Calamagrostis canadensis (Blue Joint Grass)	12
Carex lacustris (Lake-Bank Sedge)	6
Carex slipata (Awl-Fruited Sedge)	6
Carex stricta (Tussock Sedge)	6
Carex vulpinoidea (Fox Sedge)	6
Eleocharis acicularis (Needle Spike Rush)	3
Eleocharis obtusa (Blunt Spike Rush)	3
Glyceria striata (Fowl Manna Grass)	14
Juncus effusus (Common Rush)	6
Juncus tenuis (Slender Rush)	6
Juncus torreyi (Torrey's Rush)	6
Leersia oryzoides (Rice Cut Grass)	10
Scirpus acutus (Hard-Stemmed Bulrush)	3
Scirpus atrovirens (Dark Green Rush)	3
Bolboschoenus fluviatilis (River Bulrush)	3
Schoenoplectus tabernaemontani (Softstem Bulrush)	3
Spartina pectinata (Cord Grass)	4

Class – Type	Seeds	lb/acre (kg/hectare)
5 Forb with Annuals Mixture 2/ 5/ 6/	Annuals Mixture (Below) Forb Mixture (Below)	1 (1) 10 (10)

Annuals Mixture - Mixture not exceeding 25 % by weight of any one species, of the following:

Coreopsis lanceolata (Sand Coreopsis)
Leucanthemum maximum (Shasta Daisy)
Gaillardia pulchella (Blanket Flower)
Ratibida columnifera (Prairie Coneflower)
Rudbeckia hirta (Black-Eyed Susan)

Forb Mixture - Mixture not exceeding 5 % by weight PLS of any one species, of the following:

Amorpha canescens (Lead Plant) 4/
Anemone cylindrica (Thimble Weed)
Asclepias tuberosa (Butterfly Weed)
Aster azureus (Sky Blue Aster)
Symphyotrichum leave (Smooth Aster)
Aster novae-angliae (New England Aster)
Baptisia leucantha (White Wild Indigo) 4/
Coreopsis palmata (Prairie Coreopsis)
Echinacea pallida (Pale Purple Coneflower)
Eryngium yuccifolium (Rattlesnake Master)
Helianthus mollis (Downy Sunflower)
Heliopsis helianthoides (Ox-Eye)
Liatris aspera (Rough Blazing Star)
Liatris pycnostachya (Prairie Blazing Star)
Monarda fistulosa (Prairie Bergamot)
Parthenium integrifolium (Wild Quinine)
Dalea candida (White Prairie Clover) 4/
Dalea purpurea (Purple Prairie Clover) 4/
Physostegia virginiana (False Dragonhead)
Potentilla arguta (Prairie Cinquefoil)
Ratibida pinnata (Yellow Coneflower)
Rudbeckia subtomentosa (Fragrant Coneflower)
Silphium laciniatum (Compass Plant)
Silphium terebinthinaceum (Prairie Dock)
Oligoneuron rigidum (Rigid Goldenrod)
Tradescantia ohiensis (Spiderwort)
Veronicastrum virginicum (Culver's Root)

Class – Type		Seeds	lb/acre (kg/hectare)
5A	Large Flower Native Forb Mixture 2/ 5/ 6/	Forb Mixture (see below)	5 (5)
		Species:	% By Weight
		Aster novae-angliae (New England Aster)	5
		Echinacea pallida (Pale Purple Coneflower)	10
		Helianthus mollis (Downy Sunflower)	10
		Heliopsis helianthoides (Ox-Eye)	10
		Liatris pycnostachya (Prairie Blazing Star)	10
		Ratibida pinnata (Yellow Coneflower)	5
		Rudbeckia hirta (Black-Eyed Susan)	10
		Silphium laciniatum (Compass Plant)	10
		Silphium terebinthinaceum (Prairie Dock)	20
		Oligoneuron rigidum (Rigid Goldenrod)	10
5B	Wetland Forb 2/ 5/ 6/	Forb Mixture (see below)	2 (2)
		Species:	% By Weight
		Acorus calamus (Sweet Flag)	3
		Angelica atropurpurea (Angelica)	6
		Asclepias incarnata (Swamp Milkweed)	2
		Aster puniceus (Purple Stemmed Aster)	10
		Bidens cernua (Beggarticks)	7
		Eutrochium maculatum (Spotted Joe Pye Weed)	7
		Eupatorium perfoliatum (Boneset)	7
		Helenium autumnale (Autumn Sneeze Weed)	2
		Iris virginica shrevei (Blue Flag Iris)	2
		Lobelia cardinalis (Cardinal Flower)	5
		Lobelia siphilitica (Great Blue Lobelia)	5
		Lythrum alatum (Winged Loosestrife)	2
		Physostegia virginiana (False Dragonhead)	5
		Persicaria pensylvanica (Pennsylvania Smartweed)	10
		Persicaria l*apathifolia* (Curlytop Knotweed)	10
		Pychanthemum virginianum (Mountain Mint)	5
		Rudbeckia laciniata (Cut-leaf Coneflower)	5
		Oligoneuron riddellii (Riddell Goldenrod)	2
		Sparganium eurycarpum (Giant Burreed)	5
6	Conservation Mixture 2/ 6/	*Schizachyrium scoparium* (Little Blue Stem) 5/	5 (5)
		Elymus canadensis (Canada Wild Rye) 5/	2 (2)
		Buffalo Grass 5/ 7/	5 (5)
		Vernal Alfalfa 4/	15 (15)
		Oats, Spring	48 (55)
6A	Salt Tolerant Conservation Mixture 2/ 6/	*Schizachyrium scoparium* (Little Blue Stem) 5/	5 (5)
		Elymus canadensis (Canada Wild Rye) 5/	2 (2)
		Buffalo Grass 5/ 7/	5 (5)
		Vernal Alfalfa 4/	15 (15)
		Oats, Spring	48 (55)
		Puccinellia distans (Fults Saltgrass or Salty Alkaligrass)	20 (20)
7	Temporary Turf Cover Mixture	Perennial Ryegrass	50 (55)
		Oats, Spring	64 (70)

Notes:

1/ Seeding shall be performed when the ambient temperature has been between 45 ºF (7 ºC) and 80 ºF (27 ºC) for a minimum of seven (7) consecutive days and is forecasted to be the same for the next five (5) days according to the National Weather Service.
2/ Seeding shall be performed in late fall through spring beginning when the ambient temperature has been below 45 ºF (7 ºC) for a minimum of seven (7) consecutive days and ending when the ambient temperature exceeds 80 ºF (27 ºC) according to the National Weather Service.
3/ Specific variety as shown in the plans or approved by the Engineer.
4/ Inoculation required.
5/ Pure Live Seed (PLS) shall be used.
6/ Fertilizer shall not be used.
7/ Seed shall be primed with KNO_3 to break dormancy and dyed to indicate such.

Seeding will be inspected after a period of establishment. The period of establishment shall be six (6) months minimum, but not to exceed nine (9) months. After the period of establishment, areas not exhibiting 75 percent uniform growth shall be interseeded or reseeded, as determined by the Engineer, at no additional cost to the Department."

SUBCONTRACTOR AND DBE PAYMENT REPORTING (BDE)
Effective: April 2, 2018

Add the following to Section 109 of the Standard Specifications.

"**109.14 Subcontractor and Disadvantaged Business Enterprise Payment Reporting.** The Contractor shall report all payments made to the following parties:

(a) first tier subcontractors;

(b) lower tier subcontractors affecting disadvantaged business enterprise (DBE) goal credit;

(c) material suppliers or trucking firms that are part of the Contractor's submitted DBE utilization plan.

The report shall be made through the Department's on-line subcontractor payment reporting system within 21 days of making the payment."

SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)

Effective: November 2, 2017
Revised: April 1, 2019

Replace the second paragraph of Article 109.12 of the Standard Specifications with the following:

"This mobilization payment shall be made at least seven days prior to the subcontractor starting work. The amount paid shall be at the following percentage of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor's work.

Value of Subcontract Reported on Form BC 260A	Mobilization Percentage
Less than $10,000	25%
$10,000 to less than $20,000	20%
$20,000 to less than $40,000	18%
$40,000 to less than $60,000	16%
$60,000 to less than $80,000	14%
$80,000 to less than $100,000	12%
$100,000 to less than $250,000	10%
$250,000 to less than $500,000	9%
$500,000 to $750,000	8%
Over $750,000	7%"

SUBMISSION OF PAYROLL RECORDS (BDE)

Effective: April 1, 2021 Revised: November 1, 2022

FEDERAL AID CONTRACTS. Revise the following section of Check Sheet #1 of the Recurring Special Provisions to read:

"STATEMENTS AND PAYROLLS

The payroll records shall include the worker's name, the worker's address, the worker's telephone number when available, the worker's social security number, the worker's classification or classifications, the worker's gross and net wages paid in each pay period, the worker's number of hours worked each day, and the worker's starting and ending times of work each day. However, any Contractor or subcontractor who remits contributions to a fringe benefit fund that is not jointly maintained and jointly governed by one or more employers and one or more labor organization must additionally submit the worker's hourly wage rate, the worker's hourly overtime wage rate, the worker's hourly fringe benefit rates, the name and address of each fringe benefit fund, the plan sponsor of each fringe benefit, if applicable, and the plan administrator of each fringe benefit, if applicable.

The Contractor and each subcontractor shall certify and submit payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers shall not be included on weekly submittals. Instead, the payrolls shall include an identification number for each employee (e.g., the last four digits of the employee's social security number). In addition, starting and ending times of work each day may be omitted from the payroll records submitted. The submittals shall be made using LCPtracker Pro software.

The software is web-based and can be accessed at https://lcptracker.com/. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option ("No Work", "Suspended", or "Complete") selected."

STATE CONTRACTS. Revise Item 3 of Section IV of Check Sheet #5 of the Recurring Special Provisions to read:

"3. Submission of Payroll Records. The Contractor and each subcontractor shall, no later than the 15th day of each calendar month, file a certified payroll for the immediately preceding month to the Illinois Department of Labor (IDOL) through the Illinois Prevailing Wage Portal in compliance with the State Prevailing Wage Act (820 ILCS 130). The portal can be found on the IDOL website at https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/Prevailing-Wage-Portal.aspx. Payrolls shall be submitted in the format prescribed by the IDOL.

In addition to filing certified payroll(s) with the IDOL, the Contractor and each subcontractor shall certify and submit payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers shall not be included on weekly submittals. Instead, the payrolls shall include an identification number for each employee (e.g., the last four digits of the employee's social security number). In addition, starting and ending times of work each day may be omitted from the payroll records submitted. The submittals shall be made using LCPtracker Pro software. The software is web-based and can be accessed at https://lcptracker.com/. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option ("No Work", "Suspended", or "Complete") selected."

VEHICLE AND EQUIPMENT WARNING LIGHTS (BDE)

Effective: November 1, 2021
Revised: November 1, 2022

Add the following paragraph after the first paragraph of Article 701.08 of the Standard Specifications:

"The Contractor shall equip all vehicles and equipment with high-intensity oscillating, rotating, or flashing, amber or amber-and-white, warning lights which are visible from all directions. In accordance with 625 ILCS 5/12-215, the lights may only be in operation while the vehicle or equipment is engaged in construction operations."

WEEKLY DBE TRUCKING REPORTS (BDE)

Effective: June 2, 2012 Revised: November 1, 2021

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 Sunday through Saturday for each week reportable trucking activities occur.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

WORK ZONE TRAFFIC CONTROL DEVICES (BDE)

Effective: March 2, 2020

Add the following to Article 701.03 of the Standard Specifications:

"(q) Temporary Sign Supports .....1106.02"

Revise the third paragraph of Article 701.14 of the Standard Specifications to read:

"For temporary sign supports, the Contractor shall provide a FHWA eligibility letter for each device used on the contract. The letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device. The signs shall be supported within 20 degrees of vertical. Weights used to stabilize signs shall be attached to the sign support per the manufacturer's specifications."

Revise the first paragraph of Article 701.15 of the Standard Specifications to read:

"**701.15 Traffic Control Devices.** For devices that must meet crashworthiness standards, the Contractor shall provide a manufacturer's self-certification or a FHWA eligibility letter for each Category 1 device and a FHWA eligibility letter for each Category 2 and Category 3 device used on the contract. The self-certification or letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device."

Revise the first six paragraphs of Article 1106.02 of the Standard Specifications to read:

"**1106.02 Devices.** Work zone traffic control devices and combinations of devices shall meet crashworthiness standards for their respective categories. The categories are as follows.

Category 1 includes small, lightweight, channelizing and delineating devices that have been in common use for many years and are known to be crashworthy by crash testing of similar devices or years of demonstrable safe performance. These include cones, tubular markers, plastic drums, and delineators, with no attachments (e.g. lights). Category 1 devices manufactured after December 31, 2019 shall be MASH-16 compliant. Category 1 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350 or MASH 2009, may be used on contracts let before December 31, 2024.

Category 2 includes devices that are not expected to produce significant vehicular velocity change but may otherwise be hazardous. These include vertical panels with lights, barricades, temporary sign supports, and Category 1 devices with attachments (e.g. drums with lights). Category 2 devices manufactured after December 31, 2019 shall be MASH-16 compliant. Category 2 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350 or MASH 2009, may be used on contracts let before December 31, 2024.

Category 3 includes devices that are expected to cause significant velocity changes or other potentially harmful reactions to impacting vehicles. These include crash cushions (impact attenuators), truck mounted attenuators, and other devices not meeting the definitions of Category 1 or 2. Category 3 devices manufactured after December 31, 2019 shall be MASH-16 compliant. Category 3 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350 or MASH 2009, may be used on contracts let before December 31, 2029. Category 3 devices shall be crash tested for Test Level 3 or the test level specified.

Category 4 includes portable or trailer-mounted devices such as arrow boards, changeable message signs, temporary traffic signals, and area lighting supports. It is preferable for Category 4 devices manufactured after December 31, 2019 to be MASH-16 compliant; however, there are currently no crash tested devices in this category, so it remains exempt from the NCHRP 350 or MASH compliance requirement.

For each type of device, when no more than one MASH-16 compliant is available, an NCHRP 350 or MASH-2009 compliant device may be used, even if manufactured after December 31, 2019."

Revise Articles 1106.02(g), 1106.02(k), and 1106.02(l) to read:

"(g) Truck Mounted/Trailer Mounted Attenuators. The attenuator shall be approved for use at Test Level 3. Test Level 2 may be used for normal posted speeds less than or equal to 45 mph.

(k) Temporary Water Filled Barrier. The water filled barrier shall be a lightweight plastic shell designed to accept water ballast and be on the Department's qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings.

(l) Movable Traffic Barrier. The movable traffic barrier shall be on the Department's qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings. The barrier shall be capable of being moved on and off the roadway on a daily basis."

WORKING DAYS (BDE)
Effective: January 1, 2002

The Contractor shall complete the work within **70** working days.

REVISIONS TO THE ILLINOIS PREVAILING WAGE RATES

The Prevailing rates of wages are included in the Contract proposals which are subject to Check Sheet #5 of the Supplemental Specifications and Recurring Special Provisions. The rates have been ascertained and certified by the Illinois Department of Labor for the locality in which the work is to be performed and for each craft or type of work or mechanic needed to execute the work of the Contract. As required by Prevailing Wage Act (820 ILCS 130/0.01, et seq.) and Check Sheet #5 of the Contract, not less than the rates of wages ascertained by the Illinois Department of Labor and as revised during the performance of a Contract shall be paid to all laborers, workers and mechanics performing work under the Contract. Post the scale of wages in a prominent and easily accessible place at the site of work.

If the Illinois Department of Labor revises the prevailing rates of wages to be paid as listed in the specification of rates, the contractor shall post the revised rates of wages and shall pay not less than the revised rates of wages. Current wage rate information shall be obtained by visiting the Illinois Department of Labor web site at http://www.state.il.us/agency/idol/ or by calling 312-793-2814. It is the responsibility of the contractor to review the rates applicable to the work of the contract at regular intervals in order to insure the timely payment of current rates. Provision of this information to the contractor by means of the Illinois Department of Labor web site satisfies the notification of revisions by the Department to the contractor pursuant to the Act, and the contractor agrees that no additional notice is required. The contractor shall notify each of its subcontractors of the revised rates of wages.