**Special Provisions**

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**STSP’S Revised June 29, 2020**

**SPECIAL PROVISIONS**

1. General.

Perform the work under this construction contract for Project Lake Parkway – Milwaukee / St. Francis, E Lincoln Ave to S Pennsylvania Ave, STH 794, Milwaukee County, Wisconsin as the plans show and execute the work as specified in the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, 2021 Edition, as published by the department, and these special provisions.

If all or a portion of the plans and special provisions are developed in the SI metric system and the schedule of prices is developed in the US standard measure system, the department will pay for the work as bid in the US standard system.

100-005 (20200629)

1. Scope of Work.

The work under this contract shall consist of a rehabilitation of WIS 794 from E. Lincoln Avenue to S. Pennsylvania Avenue, including resurfacing of HMA pavement on WIS 794, base patching, S. Pennsylvania Ave signal work, interconnect-signals, noise walls and fencing maintenance, signal equipment upgrades at WIS 794 / Ellen St. intersection, and all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

104-005 (20090901)

1. Prosecution and Progress.

Begin work within ten calendar days after the engineer issues a written notice to do so.

Provide the start date to the engineer in writing within a month after executing the contract but at least 14 calendar days before the preconstruction conference. Upon approval, the engineer will issue the notice to proceed within ten calendar days before the approved start date.

To revise the start date, submit a written request to the engineer at least two weeks before the intended start date. The engineer will approve or deny that request based on the conditions cited in the request and its effect on the department’s scheduled resources.

The contract time for completion is based on an expedited work schedule and may require extraordinary forces and equipment.

Be advised that there may be multiple mobilizations and/or remobilizations to complete construction operations, for example such items as: grading, concrete pavement repair/replacement, paving, traffic control, signing, temporary and permanent pavement marking, finishing items and other incidental items. No additional payment will be made, by the department, for additional mobilizations.

Winter weather work, grading, excavation of frozen ground, high ground water, dewatering during winter months, and mitigation efforts for high water table elevations shall not be considered adverse weather delays to construction. Cost for dewatering is considered incidental to construction.

Anticipate cold weather and early spring concrete masonry, concrete paving and ancillary concrete work (curb, median barrier, etc.). Plan to heat aggregates and water for mixes, and that the heating of the aggregate and water is considered incidental to those concrete items. There will be no adverse weather delay for cold weather construction. Paving to be complete by November 1st.

Anticipate frozen grade/subgrade. Rework, heat, blanket, cover, compact, remove/replace such that the grade/subgrade is not frozen prior to constructing and backfilling storm sewer and culvert pipes. Technique to mitigate frozen grade/subgrade shall be approved by the engineer. Cost to mitigate frozen grade/subgrade is considered incidental to the applicable items of work.

Saw cut slurry, grinding or shipping waste will be collected during the process and not allowed to run, dip or fall outside the project limits or into waterways or wetlands.

The department will not grant time extensions to the interim completion dates specified above for the following:

1. Severe weather as specified in standard spec 108.10.2.2.
2. Labor disputes that are not industry wide.
3. Delays in material deliveries.

If contract time expires prior to completing all work specified in the contract, additional liquidated damages will be affixed according to standard spec 108.11.

**Schedule of Operations**

The department anticipates that the schedule for each stage shall be as follows below, unless modifications are approved in writing by the engineer.

**Stage 1 Northbound lanes – Nighttime work**

Install detour route signs for northbound STH 794 Full Roadway Closure as shown in the plans. For nighttime work close all northbound lanes only during Full Roadway Closure Hours and Ramp Closure Hoursas needed to complete lower and upper layers of paving for all northbound lanes from Howard Avenue to the north project limits prior to June 23, 2021. Close access to northbound STH 794 at Pennsylvania Avenue, Layton Avenue northbound entrance ramp, Howard Avenue northbound entrance ramp, the Ellen Street connection at Oklahoma Avenue.

Prior to AM Peak Hours, concrete base patching must be cured for traffic or the upper HMA layer paved. Open all northbound lanes and ramps and cover the detour signs. Ellen Street shall remain closed to traffic.

**Stage 1 Southbound lanes – Nighttime work**

Install detour route signs for southbound STH 794 Full Roadway Closure as shown in the plans. For nighttime work close all southbound lanes only during Full Roadway Closure Hours and Ramp Closure Hoursas needed to complete lower and upper layers of paving for all southbound lanes from Howard Avenue to the north project limits prior to June 23, 2021. Close the Howard Avenue southbound entrance ramp, and the Ellen Street connection at Oklahoma Avenue and the Port of Milwaukee/Carferry Drive southbound entrance ramp.

Prior to southbound daytime work, concrete base patching must be cured for traffic or the upper HMA layer paved. Open southbound lanes and ramps and cover the detour signs. Ellen Street shall remain closed to traffic.

**Stage 1 Northbound lanes – Daytime work**

After the AM Peak Hours for northbound, close the STH 794 median traffic lane as shown in the plans while maintaining a minimum of one (1) northbound lane and maintaining access to all northbound ramps at Pennsylvania Avenue, Layton Avenue, and Howard Avenue. For daytime work, close only the median northbound lane and only in segments as needed up to when the full nighttime closure begins. All northbound lanes and ramps must be open during the AM Peak Hours. The Ellen Street connection at Oklahoma Avenue shall remain closed to traffic.

Construct STH 794 northbound from Howard Avenue to the north project limits completing both the lower and upper layers of paving prior to June 23, 2021.

**Stage 1 Southbound lanes – Daytime work**

After the nighttime work, close the STH 794 median traffic lane as shown in the plans while maintaining a minimum of one (1) southbound lane and maintaining access to all southbound ramps at Layton Avenue, Howard Avenue, and Port of Milwaukee/Carferry Drive. For daytime work, close only the median southbound lane and only in segments as needed up to when PM Peak Hours begin. All southbound lanes and ramps must be open during the PM Peak Hours. The Ellen Street connection at Oklahoma Avenue shall remain closed to traffic.

Construct STH 794 southbound lanes from Howard Avenue to the north project limits completing both the lower and upper layers of paving prior to June 23, 2021.

**Stage 2 Northbound lanes – Nighttime work**

Uncover the detour route signs for northbound STH 794 Full Roadway Closure as shown in the plans. For nighttime work close all northbound lanes only during Full Roadway Closure Hours and Ramp Closure Hours as needed to complete lower and upper layers of paving for the northbound lanes from Pennsylvania Avenue to Howard Avenue prior to September 2, 2021. Close access to northbound STH 794 at Pennsylvania Avenue and the Layton Avenue northbound entrance ramp. The Howard Avenue northbound entrance ramp will remain open. The Ellen Street connection at Oklahoma Avenue will remain closed until signal improvements are complete.

Prior to morning AM Peak Hours, concrete base patching must be cured for traffic or the upper HMA layer paved. Open all northbound lanes and ramps and cover the detour signs.

**Stage 2 Southbound lanes – Nighttime work**

Uncover the detour route signs for southbound STH 794 Full Roadway Closure as shown in the plans. For nighttime work close all southbound lanes only during Full Roadway Closure Hours and Ramp Closure Hours as needed to complete lower and upper layers of paving for the southbound lanes from Pennsylvania Avenue to Howard Avenue prior to September 2, 2021. Close access to southbound STH 794 at the Layton Avenue southbound entrance ramp and the Howard Avenue southbound entrance ramp. The Ellen Street connection at Oklahoma Avenue will remain closed until the signal improvements are complete.

Prior to southbound daytime work, concrete base patching must be cured for traffic or the upper HMA layer paved. Open southbound lanes and ramps and cover the detour signs.

**Stage 2 Northbound lanes – Daytime work**

After the AM Peak Hours for northbound, close the STH 794 median traffic lane as shown in the plans while maintaining a minimum of one (1) northbound lane and maintaining access to all northbound ramps at Pennsylvania Avenue, Layton Avenue, and Howard Avenue. For daytime work, close only the median northbound lane, only in segments as needed, up to when the full nighttime closure begins. All northbound lanes and ramps must be open during the AM Peak Hours. The Ellen Street connection at Oklahoma Avenue will remain closed to traffic until the signal improvements are complete.

Construct STH 794 northbound from Pennsylvania Avenue to Howard Avenue to complete lower and upper layers of paving prior to September 2, 2021.

**Stage 2 Southbound lanes – Daytime work**

After the nighttime work, close the STH 794 median traffic lane as shown in the plans while maintaining a minimum of one (1) southbound lane and maintaining access to all southbound ramps at Layton Avenue, Howard Avenue, and Port of Milwaukee/Carferry Drive. For daytime work, close only the median southbound lane and only in segments as needed up to when PM Peak Hours begin. All southbound lanes and ramps must be open during the PM Peak Hours. The Ellen Street connection at Oklahoma Avenue will remain closed to traffic until the signal improvements are complete.

Construct STH 794 southbound from Pennsylvania Avenue to Howard Avenue to complete lower and upper layers of paving prior to September 2, 2021.

**Stage 1** activities shall include construction of:

* Using nighttime full closure and daytime lane closures to complete roadwork and ramp work on northbound and southbound STH 794 and ramps from Howard Avenue to the north project limits.
* Install the new signal equipment at the Ellen Street intersection at STH 794.
* Repair noise walls.

**Stage 2** activities shall include construction of:

* Using nighttime full closure and daytime lane closures to complete roadwork and ramp work on northbound and southbound STH 794 from Pennsylvania Avenue to Howard Avenue.
* Complete the new signal equipment at the Ellen Street intersection at STH 794.
* Install final marking and permanent signing.

The following definitions apply to this contract for freeway work restrictions:

**AM Peak Hours**

* 5:30 AM – 9:00 AM (Monday to Friday, Northbound STH 794 only)

**PM Peak Hours**

* 2:00 PM – 7:00 PM (Monday to Friday, Southbound STH 794 only)

**Nighttime Hours**

* Obtain prior acceptance from the engineer and the WisDOT Traffic Management Center, for Nighttime Hours.

**Full Roadway Closure Hours**

* 9:00 PM – 4:30 AM          (Sunday PM to Monday AM, Monday PM to Tuesday AM, Tuesday PM to Wednesday AM, Wednesday PM to Thursday AM, Thursday PM to Friday AM)
* 9:00 PM – 8:00 AM          (Friday PM to Saturday AM, Saturday PM to Sunday AM)

sef-108-020 (20150922)

**Ramp Closure Hours**

* 8:30 PM – 5:30 AM          (Sunday PM to Monday AM, Monday PM to Tuesday AM, Tuesday PM to Wednesday AM, Wednesday PM to Thursday AM, Thursday PM to Friday AM)
* 8:30 PM – 8:30 AM          (Friday PM to Saturday AM, Saturday PM to Sunday AM)

**Full Roadway Closures**

Obtain prior acceptance from the engineer and the WisDOT Traffic Management Center, for Full Roadway Closures. Notify local emergency and police agencies seven calendar days prior to roadway closure. Full roadway closures are only allowed during Full Roadway Closure Hours.

**Roadway Work Restrictions**

Follow staging plan details for closures. If staging details are not provided in the traffic control plan, or for any traffic control change requests, furnish plans for review by the engineer and the WisDOT Traffic Management Center (414) 227-2142 a minimum of one week prior to the implementation so that approval, or disapproval, is obtained at least three days prior to roadway, lane, or ramp closures.

**Summerfest Work Restrictions**

All lanes of traffic are to be maintained during Summerfest. Do not perform work on, nor haul materials of any kind along or across any portion of the highway carrying STH 794 northbound or southbound traffic, and entirely clear the traveled way (all lanes) and shoulders of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following Summerfest dates:

Thursday June 24, 2021 to Saturday June 26, 2021

Thursday July 1, 2021 to Saturday July 3, 2021

Thursday July 8, 2021 to Saturday July 10, 2021

These dates are subject to change, verify with the Engineer prior to Summerfest.

**US Triathlon Work Restrictions**

All lanes of traffic are to be maintained during the US Triathlon. Do not perform work on, nor haul materials of any kind along or across any portion of the highway carrying STH 794 northbound or southbound traffic, and entirely clear the traveled way (all lanes) and shoulders of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following periods:

Saturday August 7, 2021 to Sunday August 8, 2021

**Interim Completion for STH 794**

By June 23, 2021, complete the following Stage 1 road work necessary to reopen all northbound and southbound lanes, including ramps and shoulders from Howard Avenue to the north project limits including base patching, curb replacement and mill & overlay of STH 794 thru lanes and shoulder.

If the contractor fails to complete the work necessary to reopen northbound and southbound STH 794 north from Howard Avenue to the north project limits by June 23, 2021, the department will assess the contractor $4,000 in interim liquidated damages for each calendar day the contract work remains incomplete beyond June 23, 2021. An entire calendar day will be charged for any period of time within a calendar day that the road remains closed beyond 12:01 AM.

0009 (20151210)

**Final Completion for STH 794**

If the contractor fails to complete the work necessary to reopen STH 794 to traffic by September 2, 2021, the department will assess the contractor $4,000 in interim liquidated damages for each calendar day the contract work remains incomplete. An entire calendar day will be charged for any period of time within a calendar day that the road remains closed beyond 12:01 AM.

0009 (20151210)

If contract time expires prior to completing all work specified in the contract, additional liquidated damages will be affixed according to standard spec 108.11.

1. Lane Rental Fee Assessment.

**A General**

The contract designates some lane closures to perform the work. The contractor will not incur a Lane Rental Fee Assessment for closing lanes during the allowable lane closure times. The contractor will incur a Lane Rental Fee Assessment for each lane closure outside of the allowable lane closure times. If a lane is obstructed at any time due to contractor operations, it is considered a closure. The purpose of lane rental is to enforce compliance of lane restrictions and discourage unnecessary closures.

The allowable lane closure times are shown in the Traffic article.

Submit the dates of the proposed lane, ramp, and roadway restrictions to the engineer as part of the progress schedule.

**B Lane Rental Fee Assessment**

The Lane Rental Fee Assessment incurred for each lane closure, each ramp closure, and each full closure of a roadway, per direction of travel, is as follows:

- $5,000 per lane during AM & PM Peak Hours, STH 794 per direction of travel, per hour broken into 15-minute increments

- $3,000 per Full Roadway Closure of STH 794 Northbound, per hour broken into 15-minute increments

- $1,500 per Full Roadway Closure of STH 794 Southbound, per hour broken into 15-minute increments

The Lane Rental Fee Assessment represents a portion of the cost of the interference and inconvenience to the road users for each closure. All lane, roadway, or ramp closure event increments 15 minutes and less will be assessed as a 15-minute increment.

The engineer, or designated representative, will be the sole authority in determining time period length for the Lane Rental Fee Assessment.

Lane Rental Fee Assessments will not be assessed for closures due to crashes, accidents, or emergencies not initiated by the contractor.

The department will assess Lane Rental Fee Assessment by the dollar under the administrative item Failing to Open Road to Traffic. The total dollar amount of Lane Rental Fee Assessment will be computed by multiplying the Lane Rental Assessment Rate by the number of 15-minute increments of each lane closure event as described above.

Lane Rental Fee Assessment will be in effect from the time of the Notice to Proceed until the department issues final acceptance. If interim completion time or contract time expires before the completion of specified work in the contract, additional liquidated damages will be assessed as specified in standard spec 108.11 or as specified within this contract.

stp-108-065 (20161130)

1. Traffic

**Wisconsin Lane Closure System Advance Notification**

Provide the following advance notification to the engineer for incorporation into the Wisconsin Lane Closure System (LCS).

TABLE 108-1 CLOSURE TYPE AND REQUIRED MINIMUM ADVANCE NOTIFICATION

|  |  |
| --- | --- |
| **Closure type with height, weight, or width restrictions (available width, all lanes in one direction < 16’)** | **MINIMUM NOTIFICATION** |
| Lane and shoulder closures | 7 calendar days |
| Full roadway closures | 7 calendar days |
| Ramp closures | 7 calendar days |
| Detours | 7 calendar days |
| **Closure type without height, weight, or width restrictions (available width, all lanes in one direction ≥16’)** | **MINIMUM NOTIFICATION** |
| Lane and shoulder closures | 3 business days |
| Ramp closures | 3 business days |
| Modifying all closure types | 3 business days |

Discuss LCS completion dates and provide changes in the schedule to the engineer at weekly project meetings in order to manage closures nearing their completion date.

1. Holiday Work Restrictions.

Do not perform work on, nor haul materials of any kind along or across any portion of the highway carrying Lake Parkway (STH 794) traffic, and entirely clear the traveled way and shoulders of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following holiday periods:

- From noon Friday, May 28, 2021 to 6:00 AM Tuesday, June 1, 2021 Memorial Day;

- From noon Friday, July 2, 2021 to 6:00 AM Tuesday, July 6, 2021 Independence Day;

- From noon Friday, September 3, 2021 to 6:00 AM Tuesday, September 7, 2021 Labor Day.

stp-107-005 (20181119)

1. Special Event Restrictions

**Summerfest Work Restrictions**

Do not perform work on, nor haul materials of any kind along or across any portion of the highway carrying STH 794 northbound or southbound traffic, and entirely clear the traveled way (all lanes) and shoulders of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following Summerfest dates:

Thursday June 24, 2021 to Saturday June 26, 2021

Thursday July 1, 2021 to Saturday July 3, 2021

Thursday July 8, 2021 to Saturday July 10, 2021

**US Triathlon Work Restrictions**

Do not perform work on, nor haul materials of any kind along or across any portion of the highway carrying STH 794 northbound or southbound traffic, and entirely clear the traveled way (all lanes) and shoulders of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following periods:

Saturday July 7, 2021 to Sunday July 8, 2021

1. Erosion Control.

*Supplement standard spec 107.20 with the following:*

Erosion control best management practices (BMP’s) shown on the plans are at suggested locations. The actual locations will be determined by the contractor’s ECIP and by the engineer. Include dust control and each dewatering or by-pass (mechanical pumping) operation in the ECIP submittal. The ECIP will supplement information shown on the plans and not reproduce it. The ECIP will identify how to implement the project’s erosion control plan. ECIP will demonstrate timely and diligently staged operations, continuing all construction operations methodically from the initial removals and topsoil stripping operations through the subsequent grading, paving, re-application of top soil, and restoration of permanent vegetation to minimize the period of exposure to possible erosion.

Provide the ECIP 14 days prior to the pre-construction meeting. Provide 1 copy of the ECIP to the department and 1 copy of the ECIP to the WDNR Liaison Kristina Betzold, (414) 263-8517, kristina.betzold@wisconsin.gov. Do not implement the ECIP without department approval and perform all work conforming to the approved ECIP.

Maintain Erosion Control BMP’s until permanent vegetation is established or until the engineer determines that the BMP is no longer required.

Stockpile excess materials or spoils on upland areas away from wetlands, floodplains, and waterways. Immediately install perimeter silt fence protection around stockpiles. If stockpiled materials will be left for more than 14 days, install temporary seed or other temporary erosion control measures the engineer orders.

Re-apply topsoil on graded areas, as the engineer directs, immediately after the grading is completed within those areas. Seed, fertilize, and mulch/erosion mat top-soiled areas, as the engineer directs, within 5 days after placement of topsoil. If graded areas are left not completed and exposed for more than 14 days, seed those areas with temporary seed and mulch.

Dewatering (Mechanical Pumping) for Bypass Water (sediment-free) Operations

If dewatering bypass operations are required from one pipe structure to another downstream pipe structure or from the upstream to downstream end of a culvert and the bypass flow is not transporting sediments (sand, silt, and clay particles) from a tributary work site area, bypass pumping operations will be allowed provided that the department has been made aware of and approves operation. When pumping bypass flows, the discharge location will need to be stable and not produce any erosion from the discharge velocity that would cause release of sediment downstream. Dewatering is considered incidental to the contract.

Dewatering (Mechanical Pumping) for Treatment Water (sediment-laden) Operations

If dewatering operations require pumping of water containing sediments (sand, silt, and clay particles), the discharge will not be allowed to leave the work site or discharge to a storm water conveyance system without sediment removal treatment. Do not allow any excavation for; structures, utilities, grading, maintaining drainage that requires dewatering (mechanical pumping) of water containing sediments (sand, silt, and clay particles) to leave the work site or discharge to a storm water conveyance system without sediment removal treatment.

Prior to each dewatering operation, submit to the department a separate ECIP amendment for sediment removal. Guidance on dewatering can be found on the Wisconsin DNR website located in the Storm Water Construction Technical Standards, Dewatering Code #1061,

<http://dnr.wi.gov/topic/stormwater/standards/const_standards.html>.

Include reasoning, location, and schedule duration proposed for each operation. Per Code 1061, include all selection criteria: site assessment, dewatering practice selection, calculations, plans, specifications, operations, maintenance, and location of proposed treated water discharge. Provide a stabilized discharge area. If directing discharge towards or into an inlet structure, provide additional inlet protection for back-up protection. Dewatering is considered incidental to the contract.

Maintaining Drainage

Maintain drainage at and through worksite during construction conforming to standard spec 107.20, 204.3.2.1(3), 205.3.3 and 520.3.1(2). Use existing storm sewers, existing culvert pipes, existing drainage channels, temporary culvert pipes, or temporary drainage channels to maintain existing surface and pipe drainage. Pumps may be required to drain the surface, pipe, and structure discharges during construction. Costs for furnishing, operating, and maintaining the pumps is considered incidental to the contract.

SER-107-003 (20161220)

1. Utilities.

This contract comes under the provision of Administrative Rule Trans 220.

Underground and overhead utility facilities are located within the project limits. Utility adjustments are required for this construction project as noted below. Coordinate construction activities with a call to Diggers Hotline or a direct call to the utilities that have facilities in the area as required per statutes. Use caution to insure the integrity of underground facilities and maintain code clearances from overhead facilities at all times.

Bidders are advised to contact each utility company listed in the plans prior to preparing their bids, to obtain current information on the status of any utility within the project work limits.

The following utilities are to be adjusted as part of this contract:

* WisDOT (Signals)
* WisDOT (Interconnect)
* Milwaukee Metropolitan Sewage District (Manholes)

**Milwaukee Metropolitan Sewage District (Manholes)**

Station 229+82, 30’ RT - Manhole to be adjusted during construction.

Veolia Water to do manhole adjustment during construction. Milwaukee Metropolitan Sewage District will require 5 days prior notice to work being done. Contact Tim Kaczkowski at 414-617-1429.

stp-107-065 (20080501)

1. HMA Percent Within Limits (PWL) Test Strip Volumetrics, Item 460.0105.S;
HMA Percent Within Limits (PWL) Test Strip Density Item 460.0110.S.

**A Description**

This special provision describes the Hot Mix Asphalt (HMA) density and volumetric testing tolerances required for an HMA test strip. An HMA test strip is required for contracts constructed under HMA Percent Within Limits (PWL) QMP. A density test strip is required for each pavement layer placed over a specific, uniform underlying material, unless specified otherwise in the plans. Each contract is restricted to a single mix design per mix type per layer (e.g., upper layer and lower layer may have different mix type specified or may have the same mix type with different mix designs). Each mix design requires a separate test strip. Density and volumetrics testing will be conducted on the same test strip whenever possible.

Perform work according to standard spec 460 and as follows.

**B Materials**

Use materials conforming to HMA Pavement Percent Within Limits (PWL) QMP special provision.

**C Construction**

**C.1 Test Strip**

Submit the test strip start time and date to the department in writing at least 5 calendar days in advance of construction of the test strip. If the contractor fails to begin paving within 2 hours of the submitted start time, the test strip is delayed, and the department will assess the contractor $2,000 for each instance according to Section E of this document. Alterations to the start time and date must be submitted to the department in writing a minimum of 24 hours prior to the start time. The contractor will not be liable for changes in start time related to adverse weather days as defined by standard spec 101.3 or equipment breakdown verified by the department.

On the first day of production for a test strip, produce approximately 750 tons of HMA. (Note: adjust tonnage to accommodate natural break points in the project.) Locate test strips in a section of the roadway to allow a representative rolling pattern (i.e. not a ramp or shoulder, etc.).

**C.1.1 Sampling and Testing Intervals**

**C.1.1.1 Volumetrics**

Laboratory testing will be conducted from a split sample yielding three components, with portions designated for QC (quality control), QV (quality verification), and retained.

During production for the test strip, obtain sufficient HMA mixture for three-part split samples from trucks prior to departure from the plant. Collect three split samples during the production of test strip material. Perform sampling from the truck box and three-part splitting of HMA according to CMM 8-36*.* These three samples will be randomly selected by the engineer from each *third* of the test strip tonnage (T), excluding the first 50 tons:

|  |  |
| --- | --- |
| Sample Number | Production Interval (tons) |
| 1 | 50 to 1/3 T |
| 2 | 1/3 T to 2/3 T  |
| 3 | 2/3 T to T |

**C.1.1.2 Density**

Required field tests include contractor QC and department QV nuclear density gauge tests and pavement coring at ten individual locations (five in each half of the test strip length) in accordance with Appendix A: *Test Methods and Sampling for HMA PWL QMP Projects*. Both QV and QC teams shall have two nuclear density gauges present for correlation at the time the test strip is constructed. QC and QV teams may wish to scan with additional gauges at the locations detailed in Appendix A, as only gauges used during the test strip correlation phase will be allowed.

**C.1.2 Field Tests**

**C.1.2.1 Density**

For contracts that include STSP 460-020 QMP Density in addition to PWL, a gauge comparison according to CMM 8-15.7 shall be completed prior to the day of test strip construction. Daily standardization of gauges on reference blocks and a project reference site shall be performed according to CMM 8-15.8. A standard count shall be performed for each gauge on the material placed for the test strip, prior to any additional data collection. Nuclear gauge readings and pavement cores shall be used to determine nuclear gauge correlation in accordance with Appendix A. The two to three readings for the five locations across the mat for each of two zones shall be provided to the engineer. The engineer will analyze the readings of each gauge relative to the densities of the cores taken at each location. The engineer will determine the average difference between the nuclear gauge density readings and the measured core densities to be used as a constant offset value. This offset will be used to adjust raw density readings of the specific gauge and shall appear on the density data sheet along with gauge and project identification. An offset is specific to the mix and layer; therefore, a separate value shall be determined for each layer of each mix placed over a differing underlying material for the contract. This constitutes correlation of that individual gauge for the given layer. Two gauges per team are not required to be onsite daily after completion of the test strip. Any data collected without a correlated gauge will not be accepted.

The contractor is responsible for coring the pavement from the footprint of the density tests and filling core holes according to Appendix A. Coring and filling of pavement core holes must be approved by the engineer. The QV team is responsible for the labeling and safe transport of the cores from the field to the QC laboratory. Testing of cores shall be conducted by the contractor and witnessed by department personnel. The contractor is responsible for drying the cores following testing. The department will take possession of cores following laboratory testing and will be responsible for any verification testing at the discretion of the engineer.

The target maximum density to be used in determining core density is the average of the three volumetric/mix Gmm values from the test strip multiplied by 62.24 lb/ft3. In the event mix and density portions of the test strip procedure are separated, or if an additional density test strip is required, the mix portion must be conducted prior to density determination. The target maximum density to determine core densities shall then be the Gmm four-test running average (or three-test average from a PWL volumetric-only test strip) from the end of the previous day’s production multiplied by 62.24 lb/ft3. If no PWL production volumetric test is to be taken in a density-only test strip, a non-random three-part split mix sample will be taken and tested for Gmm by the department representative. The department Gmm test results from this non-random test will be entered in the HMA PWL Test Strip Spreadsheet and must conform to the Acceptance Limits presented in C.2.1.

Exclusions such as shoulders and appurtenances shall be tested and reported according to CMM 8-15. However, all acceptance testing of shoulders and appurtenances will be conducted by the department, and average lot (daily) densities must conform to standard spec Table 460-3. No density incentive or disincentive will be applied to shoulders or appurtenances. However, unacceptable shoulder material will be handled according to standard spec 460.3.3.1 and CMM 8-15.11.

**C.1.3 Laboratory Tests**

**C.1.3.1 Volumetrics**

Obtain random samples according to C.1.1.1 and Appendix A. Perform tests the same day as taking the sample.

Theoretical maximum specific gravities of each mixture sample will be obtained according to AASHTO T 209 as modified in CMM 8-36.6.6. Bulk specific gravities of both gyratory compacted samples and field cores shall be determined according to AASHTO T 166 as modified in CMM 8-36.6.5. The bulk specific gravity values determined from field cores shall be used to calculate a correction factor (i.e., offset) for each QC and QV nuclear density gauge. The correction factor will be used throughout the remainder of the layer.

**C.2 Acceptance**

**C.2.1 Volumetrics**

Produce mix conforming to the following limits based on individual QC and QV test results (tolerances based on most recent JMF):

 ITEM ACCEPTANCE LIMITS

 Percent passing given sieve:

 37.5-mm +/- 8.0

 25.0-mm +/- 8.0

 19.0-mm +/- 7.5

 12.5-mm +/- 7.5

 9.5-mm +/- 7.5

 2.36-mm +/- 7.0

 75-µm +/- 3.0

 Asphaltic content in percent*[1]* - 0.5

 Air Voids -1.5 & +2.0

 VMA in percent*[2]* - 1.0

 Maximum specific gravity +/- 0.024

*[1]* Asphalt content more than -0.5% below the JMF will be referee tested by the department’s AASHTO accredited laboratory and HTCP certified personnel using automated extraction according to ASTM D8159 as modified in CMM 8-36.6.3.1.

*[2]* VMA limits based on minimum requirement for mix design nominal maximum aggregate size in table 460‑1.

QV samples will be tested for Gmm, Gmb, and AC. Air voids and VMA will then be calculated using these test results.

Calculation of air voids shall use either the QC, QV, or retained split sample test results, as identified by conducting the paired t-test with the WisDOT PWL Test Strip Spreadsheet.

If QC and QV test results do not correlate as determined by the split sample comparison, the retained split sample will be tested by the department’s AASHTO accredited laboratory and HTCP certified personnel as a referee test. Additional investigation shall be conducted to identify the source of the difference between QC and QV data. Referee data will be used to determine material conformance and pay.

**C.2.2 Density**

Compact all layers of test strip HMA mixture to the applicable density shown in the following table:

TABLE 460-3 MINIMUM REQUIRED DENSITY*[1]*

|  |  |
| --- | --- |
|  | MIXTURE TYPE |
| LAYER | LT & MT | HT |
| LOWER | 93.0*[2]* | 93.0*[3]* |
| UPPER | 93.0 | 93.0 |

*[1]* If any individual core density test result falls more than 3.0 percent below the minimum required target maximum density, the engineer will investigate the acceptability of that material per CMM 8-15.11.

*[2]* Minimum reduced by 2.0 percent for a lower layer constructed directly on crushed aggregate or recycled base courses.

*[3]* Minimum reduced by 1.0 percent for lower layer constructed directly on crushed aggregate or recycled base courses.

Nuclear density gauges are acceptable for use on the project only if correlation is completed for that gauge during the time of the test strip and the department issues documentation of acceptance stating the correlation offset value specific to the gauge and mix design. The offset is not to be entered into any nuclear density gauge as it will be applied by the department-furnished Field Density Worksheet.

**C.2.3 Test Strip Approval and Material Conformance**

All applicable laboratory and field testing associated with a test strip shall be completed prior to any additional mainline placement of the mix. All test reports shall be submitted to the department upon completion and approved before paving resumes. The department will notify the contractor within 24 hours from start of test strip regarding approval to proceed with paving, unless an alternate time frame is agreed upon in writing with the department. The 24-hour approval time includes only working days as defined in standard spec 101.3.

The department will evaluate material conformance and make pay adjustments based on the PWL value of air voids and density for the test strip. The QC core densities and QC and QV mix results will be used to determine the PWL values as calculated in accordance with Appendix A.

The PWL values for air voids and density shall be calculated after determining core densities. An approved test strip is defined as the individual PWL values for air voids and density both being equal to or greater than 75, mixture volumetric properties conforming to the limits specified in C.2.1, and an acceptable gauge-to-core correlation. Further clarification on PWL test strip approval and appropriate post-test strip actions are shown in the following table:

PWL TEST STRIP APPROVAL AND MATERIAL CONFORMANCE CRITERIA

|  |  |  |  |
| --- | --- | --- | --- |
| PWL Value for Air Voids and Density | Test Strip Approval | Material Conformance | Post-Test Strip Action |
| Both PWL > 75 | Approved1 | Material paid for according to Section E | Proceed with Production |
| 50 < Either PWL < 75 | Not Approved | Material paid for according to Section E | Consult BTS to determine need for additional test strip |
| Either PWL < 50 | Not Approved | Unacceptable material removed and replaced or paid for at 50% of the contract unit price according to Section E | Construct additional Volumetrics or Density test strip as necessary |

1 In addition to these PWL criteria, mixture volumetric properties must conform to the limits specified in C.2.1, split sample comparison must have a passing result and an acceptable gauge-to-core correlation must be completed.

A maximum of two test strips will be allowed to remain in place per pavement layer per contract. If material is removed, a new test strip shall replace the previous one at no additional cost to the department. If the contractor changes the mix design for a given mix type during a contract, no additional compensation will be paid by the department for the required additional test strip and the department will assess the contractor $2,000 for the additional test strip according to Section E of this special provision. For simultaneously conducted density and volumetric test strip components, the following must be achieved:

1. Passing/Resolution of Split Sample Comparison
2. Volumetrics/mix PWL value > 75
3. Density PWL value > 75
4. Acceptable correlation

If not conducted simultaneously, the mix portion of a test strip must accomplish (i) & (ii), while density must accomplish (iii) & (iv). If any applicable criteria are not achieved for a given test strip, the engineer, with authorization from the department’s Bureau of Technical Services, will direct an additional test strip (or alternate plan approved by the department) be conducted to prove the criteria can be met prior to additional paving of that mix. For a density-only test strip, determination of mix conformance will be according to main production, i.e., HMA Pavement Percent Within Limits (PWL) QMP special provision.

**D Measurement**

The department will measure HMA Percent Within Limits (PWL) Test Strip as each unit of work, acceptably completed as passing the required air void, VMA, asphalt content, gradation, and density correlation for a Test Strip. Material quantities shall be determined according to standard spec 450.4 and detailed here within.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER DESCRIPTION UNIT

460.0105.S HMA Percent Within Limits (PWL) Test Strip Volumetrics EACH

460.0110.S HMA Percent Within Limits (PWL) Test Strip Density EACH

These items are intended to compensate the contractor for the construction of the test strip for contracts paved under the HMA Pavement Percent Within Limits QMP article.

Payment for HMA Percent Within Limits (PWL) Test Strip Volumetrics is full compensation for volumetric sampling, splitting, and testing; for proper labeling, handling, and retention of split samples.

Payment for HMA Percent Within Limits (PWL) Test Strip Density is full compensation for collecting and measuring of pavement cores, acceptably filling core holes, providing of nuclear gauges and operator(s), and all other work associated with completion of a core-to-gauge correlation, as directed by the engineer.

Acceptable HMA mixture placed on the project as part of a volumetric or density test strip will be compensated by the appropriate HMA Pavement bid item with any applicable pay adjustments. If a test strip is delayed as defined in C.1 of this document, the department will assess the contractor $2,000 for each instance, under the HMA Delayed Test Strip administrative item. If an additional test strip is required because the initial test strip is not approved by the department or the mix design is changed by the contractor, the department will assess the contractor $2,000 for each additional test strip (i.e. $2,000 for each individual volumetrics or density test strip) under the HMA Additional Test Strip administrative item.

Pay adjustment will be calculated using 65 dollars per ton of HMA pavement. The department will pay for measured quantities of mix based on $65/ton multiplied by the following pay adjustment:

**PAY ADJUSTMENT FOR HMA PAVEMENT AIR VOIDS & DENSITY**

 *PERCENT WITHIN LIMITS PAYMENT FACTOR, PF*

 *(PWL) (percent of $65/ton)*

 > 90 to 100 PF = ((PWL – 90) \* 0.4) + 100

 > 50 to < 90 (PWL \* 0.5) + 55

 <50 50%[1]

where, PF is calculated per air voids and density, denoted PFair voids & PFdensity

*[1]*Material resulting in PWL value less than 50 shall be removed and replaced, unless the engineer allows for such material to remain in place. In the event the material remains in place, it will be paid at 50% of the contract unit price of HMA pavement.

For air voids, PWL values will be calculated using lower and upper specification limits of 2.0 and 4.3 percent, respectively. Lower specification limits for density will be according to Table 460-3 as modified herein. Pay adjustment will be determined for an acceptably completed test strip and will be computed as shown in the following equation:

Pay Adjustment = (PF-100)/100 x (WP) x (tonnage) x ($65/ton)\*

\*Note: If Pay Factor <50, the contract unit price will be used in lieu of $65/ton

The following weighted percentage (WP) values will be used for the corresponding parameter:

 Parameter WP

 Air Voids 0.5

 Density 0.5

Individual Pay Factors for each air voids (PFair voids) and density (PFdensity) will be determined. PFair voids will be multiplied by the total tonnage produced (i.e., from truck tickets), and PFdensity will be multiplied by the calculated tonnage used to pave the mainline only (i.e., traffic lane excluding shoulder) as determined in accordance with Appendix A.

The department will pay incentive for air voids under the following bid item:

ITEM NUMBER DESCRIPTION UNIT

460.2005 Incentive Density PWL HMA Pavement DOL

460.2010 Incentive Air Voids HMA Pavement DOL

The department will administer disincentives under the Disincentive Density HMA Pavement and the Disincentive Air Voids HMA Pavement administrative items.

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1. HMA Pavement Percent Within Limits (PWL) QMP.

**A Description**

This special provision describes percent within limits (PWL) pay determination, providing and maintaining a contractor Quality Control (QC) Program, department Quality Verification (QV) Program, required sampling and testing, dispute resolution, corrective action, pavement density, and payment for HMA pavements. Pay is determined by statistical analysis performed on contractor and department test results conducted according to the Quality Management Program (QMP) as specified in standard spec 460, except as modified below.

**B Materials**

Conform to the requirements of standard spec 450, 455, and 460 except where superseded by this special provision. The department will allow only one mix design for each HMA mixture type per layer required for the contract, unless approved by the engineer. The use of more than one mix design for each HMA pavement layer will require the contractor to construct a new test strip in accordance with HMA Pavement Percent Within Limits (PWL) QMP Test Strip Volumetrics and HMA Pavement Percent Within Limits (PWL) QMP Test Strip Density articles at no additional cost to the department.

*Replace standard spec 460.2.8.2.1.3.1 Contracts with 5000 Tons of Mixture or Greater with the following:*

**460.2.8.2.1.3.1 Contracts under Percent within Limits**

(1) Furnish and maintain a laboratory at the plant site fully equipped for performing contractor QC testing. Have the laboratory on-site and operational before beginning mixture production.

(2) Obtain random samples and perform tests according to this special provision and further defined in Appendix A: *Test Methods & Sampling for HMA PWL QMP Projects*. Obtain HMA mixture samples from trucks at the plant. For the sublot in which a QV sample is collected, discard the QC sample and test a split of the QV sample.

(3) Perform sampling from the truck box and three-part splitting of HMA samples according to CMM 8-36*.* Sample size must be adequate to run the appropriate required tests in addition to one set of duplicate tests that may be required for dispute resolution (i.e., retained). This requires sample sizes which yield three splits for all random sampling per sublot. All QC samples shall provide the following: QC, QV, and Retained. The contractor shall take possession and test the QC portions. The department will observe the splitting and take possession of the samples intended for QV testing (i.e., QV portion from each sample) and the Retained portions. Additional sampling details are found in Appendix A. Label samples according to CMM 8-36. Additional handling instructions for retained samples are found in CMM 8‑36.

(4) Use the test methods identified below to perform the following tests at a frequency greater than or equal to that indicated:

* Blended aggregate gradations in accordance with AASHTO T 30
* Asphalt content (AC) in percent determined by ignition oven method according to AASHTO T 308 as modified in CMM 8-36.6.3.6, chemical extraction according to AASHTO T 164 Method A or B, or automated extraction according to ASTM D8159 as modified in CMM 8-36.6.3.1.
* Bulk specific gravity (Gmb) of the compacted mixture according to AASHTO T 166 as modified in CMM 8-36.6.5.
* Maximum specific gravity (Gmm) according to AASHTO T 209 as modified in CMM 8-36.6.6
* Air voids (Va) by calculation according to AASHTO T 269.
* Voids in Mineral Aggregate (VMA) by calculation according to AASHTO R35.

(5) Lot size shall consist of 3750 tons with sublots of 750 tons. Test each design mixture at a frequency of 1 test per 750 tons of mixture type produced and placed as part of the contract. Add a random sample for any fraction of 750 tons at the end of production for a specific mixture design. Partial lots with less than three sublot tests will be included into the previous lot for data analysis and pay adjustment. Volumetric lots will include all tonnage of mixture type under specified bid item unless otherwise specified in the plan.

(6) Conduct field tensile strength ratio tests according to AASHTO T283, without freeze-thaw conditioning cycles, on each qualifying mixture in accordance with CMM 8-36.6.14. Test each full 50,000-ton production increment, or fraction of an increment, after the first 5,000 tons of production. Perform required increment testing in the first week of production of that increment. If field tensile strength ratio values are below the spec limit, notify the engineer. The engineer and contractor will jointly determine a corrective action.

*Delete standard spec 460.2.8.2.1.5 and 460.2.8.2.1.6.*

*Replace standard spec 460.2.8.2.1.7 Corrective Action with the following:*

**460.2.8.2.1.7 Corrective Action**

(1) Material must conform to the following action and acceptance limits based on individual QC and QV test results (tolerances relative to the JMF used on the PWL Test Strip):

 ITEM ACTION LIMITS ACCEPTANCE LIMITS

 Percent passing given sieve:

 37.5-mm +/- 8.0

 25.0-mm +/- 8.0

 19.0-mm +/- 7.5

 12.5-mm +/- 7.5

 9.5-mm +/- 7.5

 2.36-mm +/- 7.0

 75-µm +/- 3.0

 AC in percent*[1]* -0.3 -0.5

 Va - 1.5 & +2.0

 VMA in percent*[2]* - 0.5 -1.0

*[1]* The department will not adjust pay based on QC AC in percent test results; however corrective action will be applied to nonconforming material according to 460.2.8.2.1.7(3) as modified herein. *[2]* VMA limits based on minimum requirement for mix design nominal maximum aggregate size in table 460‑1.

(2) QV samples will be tested for Gmm, Gmb, and AC. Air voids and VMA will then be calculated using these test results.

(3) Notify the engineer if any individual test result falls outside the action limits, investigate the cause and take corrective action to return to within action limits. If two consecutive test results fall outside the action limits, stop production. Production may not resume until approved by the engineer. Additional QV samples may be collected upon resuming production, at the discretion of the engineer.

(4) For any additional tests outside the random number testing conducted for volumetrics, the data collected will not be entered into PWL calculations. Additional QV tests must meet acceptance limits or be subject to production stop and/or remove and replace.

(5) Remove and replace unacceptable material at no additional expense to the department. Unacceptable material is defined as any individual QC or QV tests results outside the acceptance limits or a PWL value < 50. The engineer may allow such material to remain in place with a price reduction. The department will pay for such HMA Pavement allowed to remain in place at 50 percent of the contract unit price.

*Replace standard spec 460.2.8.3.1.2 Personnel Requirements with the following:*

**460.2.8.3.1.2 Personnel Requirements**

(1) The department will provide at least one HTCP-certified Transportation Materials Sampling (TMS) Technician, to observe QV sampling of HMA mixtures.

(2) Under departmental observation, a contractor TMS technician shall collect and split samples.

(3) A department HTCP-certified Hot Mix Asphalt, Technician I, Production Tester (HMA-IPT) technician will ensure that all sampling is performed correctly and conduct testing, analyze test results, and report resulting data.

(4) The department will make an organizational chart available to the contractor before mixture production begins. The organizational chart will include names, telephone numbers, and current certifications of all QV testing personnel. The department will update the chart with appropriate changes, as they become effective.

*Replace standard spec 460.2.8.3.1.4 Department Verification Testing Requirements with the following:*

**460.2.8.3.1.4 Department Verification Testing Requirements**

(1) HTCP-certified department personnel will obtain QV random samples by directly supervising HTCP-certified contractor personnel sampling from trucks at the plant. Sample size must be adequate to run the appropriate required tests in addition to one set of duplicate tests that may be required for dispute resolution (i.e., retained). This requires sample sizes which yield three splits for all random sampling per sublot. All QV samples shall furnish the following: QC, QV, and Retained. The department will observe the splitting and take possession of the samples intended for QV testing (i.e., QV portion from each sample) and the Retained portions. The department will take possession of retained samples accumulated to date each day QV samples are collected. The department will retain samples until surpassing the analysis window of up to 5 lots, as defined in standard spec 460.2.8.3.1.7(2) of this special provision. Additional sampling details are found in Appendix A.

(2) The department will verify product quality using the test methods specified here in standard spec 460.2.8.3.1.4(3). The department will identify test methods before construction starts and use only those methods during production of that material unless the engineer and contractor mutually agree otherwise.

(3) The department will perform all testing conforming to the following standards:

* Bulk specific gravity (Gmb) of the compacted mixture according to AASHTO T 166 as modified in CMM 8-36.6.5.
* Maximum specific gravity (Gmm) according to AASHTO T 209 as modified in CMM 8-36.6.6.
* Air voids (Va) by calculation according to AASHTO T 269.
* Voids in Mineral Aggregate (VMA) by calculation according to AASHTO R 35.
* Asphalt Content (AC) in percent determined by ignition oven method according to AASHTO T 308 as modified in CMM 8-36.6.3.6, chemical extraction according to AASHTO T 164 Method A or B, or automated extraction according to ASTM D8159 as modified in CMM 8-36.6.3.1.

(4) The department will randomly test each design mixture at the minimum frequency of one test for each lot.

*Delete standard spec 460.2.8.3.1.6.*

*Replace standard spec 460.2.8.3.1.7 Dispute Resolution with the following:*

**460.2.8.3.1.7 Data Analysis for Volumetrics**

(1) Analysis of test data for pay determination will be contingent upon QC and QV test results. Statistical analysis will be conducted on Gmm and Gmb test results for calculation of Va. If either Gmm or Gmb analysis results in non-comparable data as described in 460.2.8.3.1.7(2), subsequent testing will be performed for both parameters as detailed in the following paragraph.

(2) The engineer, upon completion of the first 3 lots, will compare the variances (F-test) and the means (t‑test) of the QV test results with the QC test results. Additional comparisons incorporating the first 3 lots of data will be performed following completion of the 4th and 5th lots (i.e., lots 1-3, 1-4, and 1-5). A rolling window of 5 lots will be used to conduct F & t comparison for the remainder of the contract (i.e., lots 2-6, then lots 3-7, etc.), reporting comparison results for each individual lot. Analysis will use a set alpha value of 0.025. If the F- and t-tests report comparable data, the QC and QV data sets are determined to be statistically similar and QC data will be used to calculate the Va used in PWL and pay adjustment calculations. If the F- and t-tests result in non-comparable data, proceed to the *dispute resolution* steps found below. Note: if both QC and QV Va PWL result in a pay adjustment of 102% or greater, dispute resolution testing will not be conducted. Dispute resolution via further investigation is as follows:

[1] The Retained portion of the split from the lot in the analysis window with a QV test result furthest from the QV mean (not necessarily the sublot identifying that variances or means do not compare) will be referee tested by the bureau's AASHTO accredited laboratory and certified personnel. All previous lots within the analysis window are subject to referee testing and regional lab testing as deemed necessary. Referee test results will replace the QV data of the sublot(s).

[2] Statistical analysis will be conducted with referee test results replacing QV results.

1. If the F- and t-tests indicate variances and means compare, no further testing is required for the lot and QC data will be used for PWL and pay factor/adjustment calculations.
2. If the F- and t-tests indicate non-comparable variances or means, the Retained portion of the random QC sample will be tested by the department’s regional lab for the remaining 4 sublots of the lot which the F- and t- tests indicate non‑comparable datasets. The department’s regional lab and the referee test results will be used for PWL and pay factor/adjustment calculations. Upon the second instance of non-comparable variance or means and for every instance thereafter, the department will assess a pay reduction for the additional testing of the remaining 4 sublots at $2,000/lot under the HMA Regional Lab Testing administrative item.

[3] The contractor may choose to dispute the regional test results on a lot basis. In this event, the retained portion of each sublot will be referee tested by the department's AASHTO accredited laboratory and certified personnel. The referee Gmm and Gmb test results will supersede the regional lab results for the disputed lot.

1. If referee testing results in an increased calculated pay factor, the department will pay for the cost of the additional referee testing.
2. If referee testing of a disputed lot results in an equal or lower calculated pay factor, the department will assess a pay reduction for the additional referee testing at $2,000/lot under the Referee Testing administrative item.

(3) The department will notify the contractor of the referee test results within 3 working days after receipt of the samples by the department's AASHTO accredited laboratory. The intent is to provide referee test results within 7 calendar days from completion of the lot.

(4) The department will determine mixture conformance and acceptability by analyzing referee test results, reviewing mixture data, and inspecting the completed pavement according to the standard spec, this special provision, and accompanying Appendix A.

(5) Unacceptable material (i.e., resulting in a PWL value less than 50 or individual QC or QV test results not meeting the Acceptance Requirements of 460.2.8.2.1.7 as modified herein) will be referee tested by the bureau's AASHTO accredited laboratory and certified personnel and those test results used for analysis. Such material may be subject to remove and replace, at the discretion of the engineer. If the engineer allows the material to remain in place, it will be paid at 50% of the HMA Pavement contract unit price. Replacement or pay adjustment will be conducted on a sublot basis. If an entire PWL sublot is removed and replaced, the test results of the newly placed material will replace the original data for the sublot. Any remove and replace shall be performed at no additional cost to the department. Testing of replaced material must include a minimum of one QV result. [Note: If the removed and replaced material does not result in replacement of original QV data, an additional QV test will be conducted and under such circumstances will be entered into the [HMA PWL Production spreadsheet](http://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/tools/qmp/hma-pwl-production-4-26-2018.xlsm) for data analysis and pay determination.] The quantity of material paid at 50% the contract unit price will be deducted from PWL pay adjustments, along with accompanying data of this material.

*Delete standard spec 460.2.8.3.1.8 Corrective Action.*

**C Construction**

*Replace standard spec 460.3.3.2 Pavement Density Determination with the following:*

**460.3.3.2 Pavement Density Determination**

(1) The engineer will determine the target maximum density using department procedures described in CMM 8-15. The engineer will determine density as soon as practicable after compaction and before placement of subsequent layers or before opening to traffic.

(2) Do not re-roll compacted mixtures with deficient density test results. Do not operate continuously below the specified minimum density. Stop production, identify the source of the problem, and make corrections to produce work meeting the specification requirements.

(3) A lot is defined as 7500 lane feet with sublots of 1500 lane feet (excluding shoulder, even if paved integrally) and placed within a single layer for each location and target maximum density category indicated in table 460‑3. The contractor is required to complete three tests randomly per sublot and the department will randomly conduct one QV test per sublot. A partial quantity less than 750 lane feet will be included with the previous sublot. Partial lots with less than three sublots will be included in the previous lot for data analysis/acceptance and pay, by the engineer. If density lots/sublots are determined prior to construction of the test strip, any random locations within the test strip shall be omitted. Exclusions such as shoulders and appurtenances shall be tested and recorded in accordance with CMM 8-15. However, all acceptance testing of shoulders and appurtenances will be conducted by the department, and average lot (daily) densities must conform to standard spec Table 460-3. No density incentive or disincentive will be applied to shoulders or appurtenances. Offsets will not be applied to nuclear density gauge readings for shoulders or appurtenances. Unacceptable shoulder material will be handled according to standard spec 460.3.3.1 and CMM 8-15.11.

(4) The three QC locations per sublot represent the outside, middle, and inside of the paving lane. The QC density testing procedures are detailed in Appendix A.

(5) QV nuclear testing will consist of one randomly selected location per sublot. The QV density testing procedures will be the same as the QC procedure at each testing location and are also detailed in Appendix A.

(6) An HTCP-certified nuclear density technician (NUCDENSITYTEC-I) shall identify random locations and perform the testing for both the contractor and department. The responsible certified technician shall ensure that sample location and testing is performed correctly, analyze test results, and provide density results to the contractor weekly, or at the completion of each lot.

(7) For any additional tests outside the random number testing conducted for density, the data collected will not be entered into PWL calculations. However, additional QV testing must meet the tolerances for material conformance as specified in the standard specification and this special provision. If additional density data identifies unacceptable material, proceed as specified in CMM 8-15.11.

*Replace standard spec 460.3.3.3 Waiving Density Testing with Acceptance of Density Data with the following:*

**460.3.3.3 Analysis of Density Data**

(1) Analysis of test data for pay determination will be contingent upon test results from both the contractor (QC) and the department (QV).

(2) As random density locations are paved, the data will be recorded in the HMA PWL Production Spreadsheet for analysis in chronological order. The engineer, upon completion of the analysis lot, will compare the variances (F-test) and the means (t-test) of the QV test results with the QC test results. Analysis will use a set alpha value of 0.025.

1. If the F- and t-tests indicate variances and means compare, the QC and QV data sets are determined to be statistically similar and QC data will be used for PWL and pay adjustment calculations.
2. If the F- and t-tests indicate variances or means do not compare, the QV data will be used for subsequent calculations.

(3) The department will determine mixture density conformance and acceptability by analyzing test results, reviewing mixture data, and inspecting the completed pavement according to standard spec, this special provision, and accompanying Appendix A.

(4) Density resulting in a PWL value less than 50 or not meeting the requirements of 460.3.3.1 (any individual density test result falling more than 3.0 percent below the minimum required target maximum density as specified in standard spec Table 460-3) is unacceptable and may be subject to remove and replace at no additional cost to the department, at the discretion of the engineer.

1. Replacement may be conducted on a sublot basis. If an entire PWL sublot is removed and replaced, the test results of the newly placed material will replace the original data for the sublot.
2. Testing of replaced material must include a minimum of one QV result. [Note: If the removed and replaced material does not result in replacement of original QV data, an additional QV test must be conducted and under such circumstances will be entered into the data analysis and pay determination.]
3. If the engineer allows such material to remain in place, it will be paid for at 50% of the HMA Pavement contract unit price. The extent of unacceptable material will be addressed as specified in CMM 8-15.11. The quantity of material paid at 50% the contract unit price will be deducted from PWL pay adjustments, along with accompanying data of this material.

**D Measurement**

The department will measure the HMA Pavement bid items acceptably completed by the ton as specified in standard spec 450.4 and as follows in standard spec 460.5 as modified in this special provision.

**E Payment**

*Replace standard spec 460.5.2 HMA Pavement with the following:*

**460.5.2 HMA Pavement**

**460.5.2.1 General**

(1) Payment for HMA Pavement Type LT, MT, and HT mixes is full compensation for providing HMA mixture designs; for preparing foundation; for furnishing, preparing, hauling, mixing, placing, and compacting mixture; for HMA PWL QMP testing and aggregate source testing; for warm mix asphalt additives or processes; for stabilizer, hydrated lime and liquid antistripping agent, if required; and for all materials including asphaltic materials.

(2) If provided for in the plan quantities, the department will pay for a leveling layer, placed to correct irregularities in an existing paved surface before overlaying, under the pertinent paving bid item. Absent a plan quantity, the department will pay for a leveling layer as extra work.

**460.5.2.2 Calculation of Pay Adjustment for HMA Pavement using PWL**

(1) Pay adjustments will be calculated using 65 dollars per ton of HMA pavement. The [HMA PWL Production Spreadsheet](http://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/tools/qmp/hma-pwl-production-4-26-2018.xlsm), including data, will be made available to the contractor by the department as soon as practicable upon completion of each lot. The department will pay for measured quantities of mix based on this price multiplied by the following pay adjustment calculated in accordance with the [HMA PWL Production Spreadsheet](http://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/tools/qmp/hma-pwl-production-4-26-2018.xlsm):

**PAY FACTOR FOR HMA PAVEMENT AIR VOIDS & DENSITY**

 *PERCENT WITHIN LIMITS PAYMENT FACTOR, PF*

 *(PWL) (percent of $65/ton)*

 > 90 to 100 PF = ((PWL – 90) \* 0.4) + 100

 > 50 to < 90 (PWL \* 0.5) + 55

 <50 50%[1]

where PF is calculated per air voids and density, denoted PFair voids & PFdensity

*[1]* Any material resulting in PWL value less than 50 shall be removed and replaced unless the engineer allows such material to remain in place. In the event the material remains in place, it will be paid at 50% of the contract unit price of HMA pavement.

For air voids, PWL values will be calculated using lower and upper specification limits of 2.0 and 4.3 percent, respectively. Lower specification limits for density shall be in accordance with standard spec Table 460-3. Pay adjustment will be determined on a lot basis and will be computed as shown in the following equation.

 Pay Adjustment = (PF-100)/100 x (WP) x (tonnage) x ($65/ton)\*

 \*Note: If Pay Factor <50, the contract unit price will be used in lieu of $65/ton

The following weighted percentage (WP) values will be used for the corresponding parameter:

|  |  |
| --- | --- |
| Parameter | WP |
| Air Voids | 0.5 |
| Density | 0.5 |

Individual Pay Factors for each air voids (PFair voids) and density (PFdensity) will be determined. PFair voids will be multiplied by the total tonnage placed (i.e., from truck tickets), and PFdensity will be multiplied by the calculated tonnage used to pave the mainline only (i.e., travel lane excluding shoulder) as determined in accordance with Appendix A.

The department will pay incentive for air voids and density under the following bid items:

ITEM NUMBER DESCRIPTION UNIT

460.2005 Incentive Density PWL HMA Pavement DOL

460.2010 Incentive Air Voids HMA Pavement DOL

The department will administer disincentives under the Disincentive Density HMA Pavement and the Disincentive Air Voids HMA Pavement administrative items.

The department will administer a disincentive under the Disincentive HMA Binder Content administrative item for each individual QV test result indicating asphalt binder content below the Action Limit in 460.2.8.2.1.7 presented herein. The department will adjust pay per sublot of mix at 65 dollars per ton of HMA pavement multiplied by the following pay adjustment calculated according to the [HMA PWL Production Spreadsheet](http://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/tools/qmp/hma-pwl-production-4-26-2018.xlsm):

|  |  |
| --- | --- |
| AC Binder Relative to JMF | Pay Adjustment / Sublot |
| -0.4% to -0.5% | 75% |
| More than -0.5% |  50%[1] |

*[1]* Any material resulting in an asphalt binder content more than 0.5% below the JMF AC content shall be removed and replaced unless the engineer allows such material to remain in place. In the event the material remains in place, it will be paid at 50% of the contract unit price of HMA pavement. Such material will be referee tested by the department’s AASHTO accredited laboratory and HTCP certified personnel using automated extraction according to automated extraction according to ASTM D8159 as modified in CMM 8-36.6.3.1.

Note: PWL value determination is further detailed in the *Calculations* worksheet of the [HMA PWL Production spreadsheet](http://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/tools/qmp/hma-pwl-production-4-26-2018.xlsm).

stp-460-050 (20191121)

1. Removing Lighting Units, Item 204.9060.S.11.

**A Description**

This special provision describes the removing lighting units as shown on the plans, in accordance to the pertinent provisions of standard spec 204, and hereinafter provided.

**B Materials**

All removed material shall become the property of the contractor and be disposed off the project site. Lamps, which are considered a hazardous material, become property of the contractor and shall be disposed of an environmentally sound manner.

**C Construction**

Remove lighting units consisting of pole, arm, luminaire, lamp, wires, breakaway device, and associated hardware and appurtenances.

No removal work will be permitted without approval from the Engineer. Removal shall start as soon as the temporary lighting or permanent lighting, as applicable, is placed in approved operation. An inspection and approval by the Engineer will take place before any associated proposed permanent or temporary lighting is approved for operation.

**D Measurement**

The Department will measure Removing Lighting Units by each individual unit removed, acceptably completed.

**E Payment**

*Add the following to standard spec 204.5:*

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| 204.9060.S.11 | Removing Lighting Units  | Each |

SER-204.15 (20171021)

1. Removing Sign Lighting, Item 204.9060.S.12.

**A Description**

This special provision describes removing all the sign lighting on a sign structure as shown on the plans, in accordance to pertinent provisions of standard spec 204, and as hereinafter provided.

**B Materials**

All removed material shall become the property of the contractor and be disposed off the project site. Lamps, which are considered a hazardous material, become property of the contractor and shall be disposed of an environmentally sound manner.

**C Construction**

Remove all the luminaires, conduit, and wiring associated with existing sign lighting on an existing sign structure.

**D Measurement**

The department will measure Removing Sign Lighting by each individual unit, acceptably completed.

**E Payment**

*Add the following to standard spec 204.5:*

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| 204.9060.S.12 | Removing Sign Lighting | Each |

SER-204.16 (20170405)

1. Removing Electrical Wires from Conduit, Item 204.9090.S.11.

**A Description**

This special provision describes removing electrical wires from existing conduits and disposing of the resulting material as shown on the plans, in accordance to the pertinent provisions of standard spec 204, and as hereinafter provided. The existing conduit shall remain in place.

**B (Vacant)**

**C Construction**

No removal work will be permitted without approval from the Engineer. Removal shall start as soon as the temporary lighting or permanent lighting, as applicable, is placed in approved operation. An inspection and approval by the Engineer will take place before any associated proposed permanent or temporary lighting is approved for operation.

All wires shall be removed from the existing embedded or underground conduits as shown on the plans and as directed by the Engineer. Any necessary splices or disconnections shall be done as part of this pay item. Removed wires shall become property of the Contractor and shall be disposed off the project site.

**D Measurement**

The Department will measure Removing Electrical Wires from Conduit by linear foot, acceptably completed. The vertical length and wire slack shall be incidental.

**E Payment**

*Add the following to standard spec 204.5:*

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| 204.9090.S.11 | Removing Electrical Wires from Conduit | LF |

SER-204.10 (20170405)

1. Removing Traffic Signals STH 794 & Ellen St, Item 204.9105.S.30.

**A Description**

This special provision describes removing existing traffic signals at the intersection of STH 794 & Ellen St in accordance to the pertinent provisions of section 204 of the standard specifications and as hereinafter provided. Specific removal items are noted in the plans.

**B (Vacant)**

**C Construction**

Arrange for the de-energizing of the traffic signals with the local electrical utility after receiving approval from the engineer that the existing traffic signals can be removed.

Notify the department’s Electrical Field Unit at (414) 266-1170 at least five working days prior to the removal of the traffic signals. Complete the removal work as soon as possible following shut down of this equipment.

The Department assumes that all equipment is in good condition and in working order prior to the contractor’s removal operation. Prior to removal, inspect and provide a list of any damaged or non-working traffic signal equipment to the engineer. Any equipment not identified as damaged or not working, prior to removal, will be replaced by the contractor at no cost to the department.

Remove all standards and poles per plan from their concrete footings and disassemble out of traffic. Remove the transformer bases from each pole. Remove the signal heads, mast arms, luminaires, wiring/cabling, and traffic signal mounting devices from each signal standard, arm or pole. Ensure that all access hand hole doors and all associated hardware remain intact. Dispose of the underground signal cable, internal wires and street lighting cable off the state right of way. Deliver the remaining materials to the West Allis Electrical Service Facility at 935 South 60th Street, West Allis, Milwaukee County. Contact the department’s Electrical Field Unit at (414) 266-1170 at least five working days prior to delivery to make arrangements.

DOT forces shall remove the signal cabinet from the footing. The signal cabinet and associated signal cabinet equipment will be removed from the site by DOT forces and will remain the property of the department.

**D Measurement**

The department will measure Removing Traffic Signals as a single lump sum unit of work for each intersection acceptably completed.

**E Payment**

The department will pay for the measured quantity at the contract unit price under the following bid item.

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| 204.9105.S.30 | Removing Traffic Signals STH 794 & Ellen St | LS |

Payment is full compensation for removing, disassembling traffic signals, scrapping of some materials, disposing of scrap material, for delivering the requested materials to the department, and incidentals necessary to complete the contract work.

1. Removing Loop Detector Wire & Lead-In Cable STH 794 & S Pennsylvania Ave, Item 204.9105.S.31; STH 794 & Layton Ave, Item 204.9105.S.32; STH 794 & Ellen St, Item 204.9105.S.33

**A Description**

This special provision describes removing loop detector wire and lead-in cable at STH 794 & S Pennsylvania Ave, STH 794 & Layton Ave, and STH 794 & Ellen St. Removal will be in accordance with section 204 of the standard specifications, as shown in the plans, and as hereinafter provided.

**B (Vacant)**

**C Construction**

Notify the department’s Electrical Field Unit at (414) 266-1170 at least five working days prior to the removal of the loop detector wire and lead-in cable.

Remove and dispose of detector lead-in cable including loop wire for abandoned loops off the right of way.

**D Measurement**

The department will measure Removing Loop Detector Wire & Lead-in Cable as a single lump sum unit of work for each intersection acceptably completed.

**E Payment**

The department will pay for the measured quantity at the contract unit price under the following bid item:

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| 204.9105.S.31 | Removing Loop Detector Wire & Lead-In Cable STH 794 & S Pennsylvania Ave | LS |
| 204.9105.S.32 | Removing Loop Detector Wire & Lead-In Cable STH 794 & Layton Ave | LS |
| 204.9105.S.33 | Removing Loop Detector Wire & Lead-In Cable STH 794 & Ellen St | LS |

Payment is full compensation for removing, scrapping, and disposing of material and incidentals necessary to complete the contract work.

1. General Requirements for Electrical Work.

Replace section 651.3.3 (3) of the standard specifications with the following:

(3) Request a signal inspection of the signal installation to the project engineer after completing the Prerequisites for Underground Inspection or Prerequisites for Above Ground Inspection at least five working days prior to the time of the requested inspection. Notify the department’s Electrical Field Unit at (414) 266-1170 to coordinate the inspection. The department’s Region Electrical personnel will perform the inspection. In the event of deficiencies, request a re-inspection when the work is corrected. The engineer will not authorize continuation to aboveground work or turn-on until the contractor corrects all deficiencies.

1. Intelligent Transportation Systems (ITS) – Control of Materials.

**Standard spec 106.2 – Supply Source and Quality**

*Add the following to standard spec 106.2:*

The department will furnish a portion of equipment to be installed by the contractor. This department-furnished equipment includes the following:

|  |
| --- |
| **Department-Furnished Items** |
| 6-Count Fiber Optic Cable |

Pick-up small department-furnished equipment, such as communications devices, cameras, and controllers, from the department’s Statewide Traffic Operations Center (STOC), 433 W. St. Paul Ave., Milwaukee, WI 53203 at a mutually agreed upon time during normal state office hours. Contact the department’s STOC at (414) 227-2166 to coordinate pick-up of equipment.

Transportation of the equipment between the electric shop and the field or interim location(s) shall be the responsibility of the contractor.

**Standard spec 106.3 – Approval of Materials**

*Add the following to standard spec 106.3:*

**Design/Shop Drawings**

Prior to the purchase and/or fabrication of any of the components listed herein, and for any non-catalog item shown on the Material and Equipment List specified above, and no more than 30 days after notice to proceed, submit five copies of design drawings and shop drawings, as required, to the department for review. The items and the drawings that represent them shall meet the requirements of the standard specifications.

Design drawing submissions shall consist of signed and certified designs, design drawings, calculations, and material specifications for required items.

Shop drawings will be required for, but not limited to the following:

1. Mounting assemblies for the vehicle speed and classification sensors, including their attachment to the structure.
2. Mounting LED warning signs to the sign structure.
3. Mounting detail for dynamic message signs.
4. Any contractor-designed structure or foundation.

The department will complete its review of the material within 30 days from the date of receipt of the submission, unless otherwise specified. The department will advise the contractor, in writing, as to the acceptability of the material submitted. The department may determine that if no exceptions were taken for the item, it is approved, and no further action is required by the contractor; or the item may be partially or totally rejected, in which case modify and/or amend the submittal as required by the department and resubmit the item within 14 days. At this time, the review and approval cycle described above will begin again.

670-005 (20150630)

1. Intelligent Transportation Systems – General Requirements.

**A Description**

**A.1 General**

This contract includes furnishing and installing elements for an Intelligent Transportation System (ITS) in or along the existing roadway as shown on the plans.

Unusual aspects of this project include:

1. The project includes working on cables and equipment that are carrying data between roadside equipment and the department’s Statewide Traffic Operations Center (STOC). Interruption of this service is not expected to perform this work. If an interruption is determined necessary, it must be done on a weekend, and must be done in a way that minimizes communication outages for the existing equipment. Notify the department’s STOC at least 48 hours in advance of the planned interruption.
2. The department will furnish some of the equipment to be installed. Make a reasonable effort to discover defects in that equipment prior to installing it.

**A.2 Surge Protection**

Equip every ungrounded conductor wire entering or leaving any equipment cabinet with a surge protector. For purposes of this section, multiple cabinets on a single pole or foundation are considered a single cabinet.

**B Materials**

**B.1 General**

Only furnish equipment and component parts for this work that are new and have high quality workmanship. All controls, indicators, and connectors shall be clearly and permanently labeled in a manner approved by the engineer. All equipment of each type shall be identical.

All electrical equipment shall conform to the standards and requirements of the Wisconsin Electrical Code, the National Electrical Manufacturers Association (NEMA), National Electric Safety Council (NESC), Underwriter’s Laboratory Inc. (UL) or the Electronic Industries Association (EIA), when applicable. All materials and workmanship shall conform to the requirements of the National Electrical Code (NEC), Rural Electrification Administration (REA), Standards of the American Society for Testing and Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), requirements of the plans these special provisions, the standard specifications, and to any other codes, standards, or ordinances that may apply. All system wiring, conduit, grounding hardware and circuit breakers shall be in conformance with the National Electrical Code. Whenever reference is made to any of the standards mentioned, the reference shall be considered to mean the code, ordinance, or standard that is in effect at the time of the bid advertisement.

**B.2 Outdoor Equipment**

All conductive connectors, pins (except pins connected by soldering), and socket contacts shall be gold plated. Acrylic conformal coating shall protect each circuit board side that has conductive traces. Except for integrated circuits containing custom firmware, all components shall be soldered to the printed circuit board.

To prevent galvanic corrosion, all connections between dissimilar metals shall incorporate a means of keeping moisture out of the connection. Where the connection need not conduct electricity, interpose a non-absorbing, inert material or washer between the dissimilar metals. Use nonconductive liners and washers to insulate fasteners from dissimilar metals. Where the connection must conduct electricity, use a conductive sealant between the dissimilar metals. Alternatively, use an insulating gasket and a bond wire connecting the two metal parts.

**B.3 Custom Equipment**

Equipment that is not part of the manufacturer’s standard product line, or that is made or modified specifically for this project, shall conform to the following requirements:

Where practical, electronics shall be modular plug-in assemblies to facilitate maintenance. Such assemblies shall be keyed to prevent incorrect insertion of modules into sockets.

All components shall be available from multiple manufacturers as part of the manufacturers’ standard product lines. All must be clearly labeled with the value, part number, tolerance, or other information sufficient to enable a technician to order an exact replacement part.

Lamps used for indicator purposes shall be light-emitting diodes.

The printed circuit boards shall be composed of “two-ounce” copper on 1/16-inch thick fiberglass epoxy or equivalent type construction. Holes that carry electrical connections from one side of the boards to the other shall be completely plated through. Multilayer printed circuit boards shall not be used. The name or reference number used for the board in the drawings and maintenance manuals supplied to the department shall be permanently affixed to each board.

All components shall be mounted so that the identifying markings are visible without moving or removing any part, if practical.

**B.4 Environmental Conditions**

Equipment shall continue to operate as specified under the following ranges of environmental conditions, except as noted in the specifications for individual pieces of equipment.

1. **Vibration and Shock:** Vehicle speed and classification sensors and any other equipment mounted atop poles or on structures shall not be impaired by the continuous vibration caused by winds (up to 90 mph with a 30 percent gust factor) and traffic.
2. Duty Cycle: Continuous
3. **Electromagnetic Radiation:** The equipment shall not be impaired by ambient electrical or magnetic fields, such as those caused by power lines, transformers, and motors. The equipment shall not radiate signals that adversely affect other equipment.
4. Electrical Power:
5. **Operating power:** The equipment shall operate on 120-volts, 60-Hz, single-phase unless otherwise specified. It shall conform to its specified performance requirements when the input voltage varies from 89 to 135 volts and the frequency varies +3 Hz.
6. **High frequency interference:** The equipment operation shall be unaffected by power supply voltage spikes of up to 150 volts in amplitude and 10 microseconds duration.
7. **Line voltage transients:** The equipment operation shall be unaffected by voltage transients of plus or minus 20 percent of nominal line voltage for a maximum duration of 50 milliseconds. Equipment in the field shall meet the power service transient requirements of NEMA Standard TS-2 when connected to the surge protectors in the cabinets.
8. Temperature and Humidity:
9. **Field equipment:** Equipment in the field shall meet the temperature and humidity requirements of NEMA Standard TS-2. Liquid crystal displays shall be undamaged by temperatures as high as 165 degrees F, and shall produce a usable display at temperatures up to 120 degrees F.
10. **Equipment in Controlled Environments** shall operate normally at any combination of temperatures between 50 degrees F and 100 degrees F, and humidity’s between 5 percent and 90 percent, non-condensing, and with a temperature gradient of 9 degrees F per hour.

**B.5 Patch Cables and Wiring**

All cables and wiring between devices installed in a single cabinet, or in separate cabinets sharing a single concrete base, will be considered incidental to the installation of the devices and no separate payment will be made for them. It is anticipated that this will include fiber optic patch cables between termination panels and Ethernet switches, 10 / 100 MBPS Ethernet cables, RS-232 cables between individual devices and terminal servers, and power cables between individual devices and power sources within the cabinets.

**B.6 Surge Protection**

Low-voltage signal pairs, including twisted pair communication cable(s) entering each cabinet shall be protected by two-stage, plug-in surge protectors and shall be installed on both ends of camera control cables. The protectors shall meet or exceed the following minimum requirements:

1. The protectors shall suppress a peak surge current of up to 10k amps.
2. The protectors shall have a response time less than one nanosecond.
3. The protector shall clamp the voltage between the two wires at a voltage that is no more than twice the peak signal voltage, and clamp the voltage between each wire and ground at 50 volts.
4. The first stage of protection shall be a three-element gas discharge tube, and the second stage shall consist of silicon clamping devices.
5. The protector shall also contain a resettable fuse (PTC) to protect against excessive current.
6. There shall be no more than two pairs per protector.
7. It shall be possible to replace the protector without using tools.

Cables carrying power to curve signs shall be protected at the cabinet by grounded metal oxide varistors of appropriate voltages. The varistors must be at least 0.8 inch in diameter.

**C Construction**

**C.1 Thread Protection**

Provide rust, corrosion, and anti-seize protection at all thread assemblies of metallic parts by coating (non-spray) the mating surfaces with an approved compound. Failure to use an approved compound will result in no payment for the items to which coating was to have been applied.

**C.2 Cable Installation**

When installing new cables into conduits containing existing cables, remove the existing cables and reinstall the existing cables simultaneously with the new cables. Take every precaution necessary to protect the existing cables. In the event of avoidable damage to the existing cables, replace all damaged cables, in-kind, at no additional expense to the department. When cables are pulled into conduit, use a cable pulling lubricant approved by the cable manufacturer. Submit documentation supporting manufacturer approval of the lubricant to the engineer.

**C.3 Wiring**

Every conductor, except a conductor contained entirely within a single piece of equipment, must terminate either in a connector or on a terminal block. Provide and install the connectors and terminal blocks where needed, without separate payment. Use approved splice kits instead of connectors and terminal blocks for underground power cable splices.

Permanently label and key connectors to preclude improper connection. Obtain prior engineer approval for the labeling method(s) prior to use.

Terminal blocks must be affixed to panels that permanently identify the block and what wire connects to each terminal. This may be accomplished by silk screening or by installing a laminated printed card under the terminal block, with the labels on portions of the card that extend beyond the block. Installation of terminal blocks by drilling holes in the exterior wall of the cabinet is not acceptable.

Use barriers to protect personnel from accidental contact with all dangerous voltages.

Do not install conductors carrying AC power in the same wiring harness as conductors carrying control or communication signals.

Arrange wiring, including fiber optic pigtails, so that any removable assembly can be removed without disturbing wiring that is not associated with the assembly being removed.

Communication and control cables may not be spliced underground, except where indicated on the plans.

Cables in the Statewide Traffic Operations Center or in communication hubs, which are not contained within a single cabinet, shall have at least 10 feet of slack.

**C.4 System Operations**

If the contractor’s operations unexpectedly interrupt Intelligent Transportation Systems (ITS) service, notify the engineer immediately and restore service within 24 hours. Repair all damaged facilities to the condition existing before the interruption. If service is not restored within 24 hours, the department may restore service to any operating device and deduct restoration costs from payments due the contractor.

**C.5 Surge Protection**

Arrange the equipment and cabinet wiring to minimize the distance between each conductor’s point of entry and its protector. Locate the protector as far as possible from electronic equipment. Ensure that all wiring between the surge protectors and the point of entry is free from sharp bends.

**D Measurement**

No separate measurement will be made for the work described in this article.

**E Payment**

No separate payment will be made for the work described in this article. All work described in this article shall be included under the ITS items in the contract.

670-010 (20100709)

1. Roadway Lighting Systems.

**A General**

*Add the following to standard specification sections 651, 652, 653, 654, 655, 656, 657 and 659.*

All the work necessary to comply with revisions to standards specs mentioned as hereinafter provided shall be incidental to associated pay items or to the project including coordination, materials, and labor. No additional payment shall be made to the Contractor.

*Add the following to standard specification subsection 651.2:*

Materials indicated to be returned to the Department shall be hauled to one of the following two locations:

1. State Electrical Shop at 935 South 60th street, West Allis, as directed by Miss. Bree Johns-Konkol, (414) 266-1170.
2. Milwaukee County Grounds, 10191 West Watertown Plank Road, Wauwatosa, as directed by Mr. Pat Stoetzel, (414) 750-5306.

Arrange pickups and deliveries a minimum 3 days in advance and during regular business hours (Monday – Thursday 7:00 AM to 3:45 PM).

*Add the following to standard specification subsection 651.3.1:*

Any circuit that the Contractor does not personally tag out at the disconnect shall be considered live, and will be subject to being activated by another person with no notice to the Contractor. Make tagouts with manufactured tags, and endorse them with the date and the name of the Contractor. Clear tagouts at the end of the workday. The Department does not employ a load dispatcher and has no intent to do so. Each electrical worker is responsible for their own protection from automatic switching and from switching by others.

The plans show required disconnections of existing lighting circuits, most in the form of abandoning existing underground conductors in place. The Contractor may need to mobilize several times per each existing lighting distribution center. The Contractor is expected to account for these costs in the various paid items for removals and installations.

Replace all existing slotted junction box cover screws with stainless hex head cover screws at each location where it is required to open the cover of an existing lighting junction box.

*Add the following to standard specification subsection 651.5:*

Work to disconnect and connect conductors will be incidental to the paid measurement of footage.

Work to disconnect and connect electrical system, splice through, or to connect conductors are incidental to the installation or removal of the freeway lighting pay items included in this contract.

The Department will not measure and pay conductors or conduits that have been abandoned in place or removed for scrap unless covered in the contract bid items . The Department will allow, at the Contractor’s discretion, for the salvaging of conductors to be abandoned.

*Add the following to standard specification subsection 652.3.1:*

Install minimum 3-inch diameter PVC conduit elbows in a ground mounted concrete bases to accommodate Cable in Duct (CID) type cable.

*Add the following to standard specification subsection 652.3.1.2:*

Furnish and install an UL-listed liquid tight flexible metallic conduit transition wherever a conduit exits from below grade.

Furnish a UL-listed fitting appropriate for the purpose at each transition from one type of conduit to another type. Couplings will not be individually measured for payment.

*Add the following to standard specification subsection 652.3.1.4:*

Support conductors at the top of the vertical raceway or as close as practical if the vertical rise exceeds 40-feet. Provide additional supports as shown; in no case shall the distance between supports exceed that shown in Table 300.19(A) of the Wisconsin State Electric Code.

*Add the following to standard specification subsection 653.3(1):*

This provision modifies the standard detail drawing for pull boxes and thereby both the standard items and SPV pay item for pull boxes. Lighting pull box covers shall read “LIGHTING”.

*Add the following to standard specification subsection 655.3.1:*

Wet location splices are not anticipated on this project and not shown in the plans. In the event that the Engineer allows wet location splices, make pull box splices with Engineer approved epoxy kit.

At each pull point or access point, indicate the line side bundle with a lap of blue tape.

*Add the following to standard specification subsection 655.3.7(4):*

Where two or more wire networks pass through a pull point, tag each circuit network (i.e. A/B/N and C/D/N) with approved all-weather tags.

*Add the following to standard specification subsection 657.2:*

Non-breakaway poles (mounted on structures, concrete bases or behind noise wall barriers without transformer base), as well as at stems of sign bridges containing electrical wires are to be double nutted and Contractor shall install galvanized rat screen enclosing the bottom of pole area; extra nuts and screen are incidental.

*Add the following to standard specification subsections 657.3.1and 657.3.5:*

Corrosion protection measures described in subsections 657.3.1 and 657.3.5 of the standard specifications are invoked for breakaway transformer bases and aluminum light poles. The Contractor shall avoid contact of dissimilar metals in erecting the pole on its foundation and/or breakaway device. Any concern of trapped moisture or potential corrosion cell shall be resolved to the satisfaction of the Engineer.

**Manufacturer’s Warranty for LED luminaires:** The manufacturer shall warrant to the Department that each complete luminaire (consisting of the housing, optical assembly, LED drivers, surge protection and wiring) will be free from defects in material and workmanship for ten (10) years from the date that the luminaire are put into service. Luminaires shall be installed within one year of manufacture.

If any luminaires fail to meet the above warranty, the Department shall provide the manufacturer with a written notice of any defect within thirty (30) days after discovery of the defect. The manufacturer shall provide all materials, luminaires, replacement component parts, labor and all incidentals necessary to restore the luminaire to a fully operational, installed condition.

**Submittal Requirements for LED luminaires:** Considering the rapid advancement in LED technology, the overall project construction and duration of construction, within 10 calendar days after contract execution, the Contractor is responsible to coordinate the lead time for LED luminaires purchase and installation schedule for LED luminaires with the Engineer and the Department’s Lighting Engineer, Eric Perea, at eric.perea@dot.wi.gov or (262) 574-5422 prior to order LED luminaires. The LED luminaires purchasing may be done during later stage of construction as directed by the Department which shall not delay the construction.

*Add the following to standard specification 659.3.1:*

Contractor shall be responsible to provide adequate temporary roadway lighting during all the construction stages not shown on the temporary lighting plans, but which are necessitated by field conditions or by any construction phasing changes. Installation of temporary lighting not shown on temporary lighting plans shall be paid according to appropriate pay items included in this contract. Contractor shall be responsible to submit a redline markup plans for any additional temporary lighting to the Engineer for approval prior to installation.

SER-659.1 (20170407)

1. Structure Overcoating Cleaning and Priming N-40-29, Item 517.3000.S.01; Structure Overcoating Cleaning and Priming N-40-30, Item 517.3000.S.02; Structure Overcoating Cleaning and Priming N-40-31, Item 517.3000.S.03; Structure Overcoating Cleaning and Priming N-40-32, Item 517.3000.S.04.

**A Description**

This special provision describes cleaning and painting with two or three coats of paint the metal surfaces.

**A.1 Areas to be Cleaned and Painted**

Structure N-40-29

1. Two Coat Area: 4,200 SF with SP 1 cleaning.

2. Three Coat Area:

0 SF with SP 2 cleaning.

700 SF with SP 3 cleaning.

0 SF with SP 11 cleaning.

700 SF with SP 15 cleaning.

1,400 SF total three-coat area.

Structure N-40-30

1. Two Coat Area: 2,250 SF with SP 1 cleaning.

2. Three Coat Area:

0 SF with SP 2 cleaning.

375 SF with SP 3 cleaning.

0 SF with SP 11 cleaning.

375 SF with SP 15 cleaning.

750 SF total three-coat area.

Structure N-40-31

1. Two Coat Area: 4,100 SF with SP 1 cleaning.

2. Three Coat Area:

0 SF with SP 2 cleaning.

700 SF with SP 3 cleaning.

0 SF with SP 11 cleaning.

700 SF with SP 15 cleaning.

1,400 SF total three-coat area.

Structure N-40-32

1. Two Coat Area: 2,100 SF with SP 1 cleaning.

2. Three Coat Area:

0 SF with SP 2 cleaning.

400 SF with SP 3 cleaning.

0 SF with SP 11 cleaning.

400 SF with SP 15 cleaning.

800 SF total three-coat area.

**B Materials**

**Furnish an epoxy coating system from the department’s APL for Paint- structure maintenance.**

**C Construction**

**C.1 Surface Preparation**

Before overcoating or power tool cleaning, solvent clean all surfaces to be coated according to SSPC-SP1. A SSPC-SP 3 power Tool Cleaning according to Steel Structures Painting Council Specification 3 will be required on all metal surfaces to be painted with a three-coat system. Prime the same day, or re-clean before application, all metal surfaces receiving a No. 15 cleaning.

Remove all abrasive or paint residue from steel surfaces with a High Efficiency Particulate Abatement (HEPA-VAC) vacuum cleaner equipped with a brush-type cleaning tool, or by double blowing. If the double blowing method is used, vacuum the exposed top surfaces of all structural steel, including flanges, longitudinal stiffeners, splices, plates, and hangers, after the double blowing operations are completed. The air line used for blowing the steel clean shall have an inline water trap and the air shall be free of oil and water as it leaves the air line.

Take care to protect freshly coated surfaces from subsequent cleaning operations. Thoroughly wire brush damaged primed surfaces with a non-rusting tool. Clean and re-prime the brushed surfaces within the time recommended by the manufacturer.

**C.2 Painting**

Paint by applying two or three coats of an approved coating system as specified herein to the surfaces as described in A.1 from the department’s approved products list.

**C.3 Coating Application**

Apply paint in a neat, workmanlike manner. The resultant paint film shall be smooth and uniform without skips or areas of excessive paint. Apply coating according to the manufacturer’s recommendations.

Before applying the prime coat, coat with primer all edges, rivet and bolt heads, nuts and washers by using either a brush, roller, or spray application.

Dry Film Thickness per coat shall be a minimum of 3-mil. The dry film thickness shall be determined by use of a magnetic film thickness gage. The gage shall be calibrated for dry film thickness measurement according to SSPC-PA 2.

During surface preparation and coating application, the ambient and steel temperature shall be between 39 and 100 degrees F. The steel temperature shall be at least 5 degrees F above the dew point temperature, and the relative humidity shall not exceed 85%.

**D Measurement**

The department will measure Structure Overcoating Cleaning and Priming N-40-29, N-40-30, N-40-31, and N-40-32, completed in accordance with the contract and accepted, as a single complete units of work.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER DESCRIPTION UNIT

517.3000.S.01 Structure Overcoating Cleaning and Priming N-40-29 LS

517.3000.S.02 Structure Overcoating Cleaning and Priming N-40-30 LS

517.3000.S.03 Structure Overcoating Cleaning and Priming N-40-31 LS

517.3000.S.04 Structure Overcoating Cleaning and Priming N-40-32 LS

Payment is full compensation for preparing and cleaning the designated surfaces; and for furnishing and applying the paint.

stp-517-036 (20181119)

1. Install Conduit Into Existing Item, Item 652.0700.S.

**A Description**

This special provision describes installing proposed conduit into an existing manhole, pull box, junction box, communication vault, or other structure.

**B Materials**

Use conduit rigid non-metallic schedule 40, conduit of correct size as provided and paid for under other items in this contract. Furnish backfill material, topsoil, fertilizer, seed, and mulch conforming to the requirements of pertinent provisions of the standard specifications.

**C Construction**

Expose the outside of the existing structure without disturbing existing conduits or cabling. Drill the appropriate sized hole for the entering conduit(s) at a location within the structure without disturbing the existing cabling and without hindering the installation of new cabling within the installed conduit. Fill void area between the drilled hole and conduit with an engineer-approved filling material to protect against conduit movement and entry of fill material into the structure. Tamp backfill into place. Place 2” PVC pipe cap on both ends with 7,8 ¼” holes drilled in each end.

**D Measurement**

The department will measure Install Conduit Into Existing System by the unit, acceptably installed. Up to five conduits entering a structure per entry point into the existing structure will be considered a single unit. Conduits in excess of five, or conduits entering at significantly different entry points into the existing pull box, manhole, or junction box will constitute multiple units of payment.

**E Payment**

The department will pay for the measured quantity at the contract unit price under the following bid item:

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| 652.0700.S | Install Conduit Into Existing Item | Each |

Payment is full compensation for excavating, drilling holes; furnishing and installing all materials, including bricks, coarse aggregate, sand, bedding, and backfill; for excavating and backfilling; and for furnishing and placing topsoil, fertilizer, seed, and mulch in disturbed areas; for properly disposing of surplus materials; and for making inspections.

1. Electrical Service Meter Breaker Pedestal STH 794 & Ellen St, Item 656.0200.01.

Append 656.2.3 of the standard specifications with the following:

(2) The department will be responsible for the electrical service installation request for any department maintained facility. Notify the maintaining authority if the signal is not state maintained that it is their responsibility to arrange for the electrical service installation.

(3) Electrical utility company service installation and energy cost will be billed to and paid for by the maintaining authority.

(4) Install the cabinet base and meter breaker pedestal first, so the electrical utility company can install the service lateral. Install a 3” conduit from the point of service from the utility to the meter breaker pedestal. Finish grade the service trench, replace topsoil that is lost or contaminated with other materials, fertilize, seed, and mulch all areas that are disturbed by the electrical utility company.

Append 656.5 of the standard specifications with the following:

(8) Payment is full compensation for grading the service trench; replacing topsoil; and for fertilizing, seeding, and mulching to restore the disturbed area of the service trench.

1. Signal Housings.

*Add the following to standard specifications 658.2(3):*

Furnish polycarbonate resin housings, doors, and visors. Use yellow, Federal Standard 595 - FS13538, housings and dull black door faces and visors. For 16-inch heads, mount a z-crate visor and gasket to the door with stainless steel tabs. Drill the housing for top and bottom pipe mounting with the ability to rotate 270 degrees on the poly mounting brackets.

1. Traffic Signal Faces.

*Add the following to standard specifications 658.3(1):*

Connect all ungrounded conductors with wire nuts in the appropriate sections of the signal heads. Connect the neutral conductors to the terminal strip. Be certain to twist wires prior to installing the wire nuts. All wire nuts must be installed facing up to prevent the entrance of water.

1. Temporary Traffic Signals for Intersections STH 794 & Ellen St, Item 661.0200.01.

*Replace 661.2.1 (1) of the standard specifications with the following:*

(1) Furnish control cabinet and control equipment. The Department will supply, maintain, and install a signal controller, cellular modem, and ethernet switch to establish remote communication to the signal controller and vehicle detection system. The cabinet must be equipped with a 6-circuit Isotel independent of the GFI receptacles. Provide a cabinet with a Corbin #2 door lock and an access door that allows placing the controller in emergency flash. Provide keys to the access door to the engineer and law enforcement agencies as required. Also provide a manual control accessible by the police. Test traffic signal control cabinets before installation. The Department will provide the signal controller with the initial traffic signal timing, and the Department will be responsible for all subsequent signal timing changes.

*Replace 661.2.1 (3) of the standard specifications with the following:*

(3) The Department has initiated the installation of the temporary electrical service with the electrical utility as it pertains to the service application and site sketch at the intersection of STH 794 & Ellen St to expedite the process. Contact Parwinder Virk at (262) 548-6717 to coordinate the temporary electrical service. The Department will pay for all installation and Energy Costs associated with the operation of the Temporary Traffic Signal. It is the contractor’s responsibility to contact the electrical utility as it pertains to the affidavit and site ready card to arrange timely installation of the temporary service. If the control cabinet is not mounted on the electrical service pole, add a second electrical service disconnect to the outside of the control cabinet for the convenience of emergency personnel.

Furnish and install a generator to operate the temporary traffic signals for the times required to switch the existing permanent traffic signal over to the temporary traffic signal and for the time required to switch the temporary traffic signal back over to the permanent traffic signal.

Contact the local electrical utility at least four days prior to making the switch from the Temporary Traffic Signal to the new Permanent Traffic Signal.

*Append 661.2.1 (6) of the standard specifications with the following:*

(6) Control equipment or controller equipment is defined as anything inside the control cabinet excluding the department furnished signal controller, cellular modem, and ethernet switch.

*Replace 661.3.1 (2) of the standard specifications with the following:*

(2) Request a signal inspection of the completed temporary traffic signal installation to the engineer at least five working days prior to the time of the requested inspection. Notify the SE Region Electrical Field Unit at (414) 266-1170 to coordinate the inspection. The SE Region electrical personnel will perform the inspection.

*Append 661.3.1.4 (4) of the standard specifications with the following:*

(4) Arrange for every other week inspections with the engineer to check the height of the span wire above the roadways to ensure that the bottom of the traffic signal heads remain within the minimum and maximum heights allowed above the roadway. Make all height adjustments within 1-hour of an inspection indicating that adjustments are required. Notify the engineer in writing upon completion of all necessary adjustments. Maintain a written log to properly document the date of each every other week inspection, the heights above the roadway, the roadway clearance after adjustments have been made, and acceptance by the engineer. Provide all documentation related to the every other week span wire height checks as well as all records related to maintenance performed on the temporary traffic signal installations to the engineer.

*Replace 661.3.2.6 (2) of the standard specifications with the following:*

(2) Upon acceptance of new signal and completion of work, the department will switch control of the intersection over to the permanent cabinet installation. Remove signal cable and wires, wood poles, wood posts, control cabinet, control equipment, and incidental materials. Upon deactivation of the controller, call the electrical utility immediately for the temporary electrical service disconnect. The department shall remove the signal controller, cellular modem, and ethernet switch.

*Replace 661.3.2.7 (2) of the standard specifications with the following:*

(2) Respond within one hour of notification to provide corrective action to any emergency such as but not limited to knockdowns, signal cable problems, and controller equipment failures. If equipment becomes damaged or faulty beyond repair, replace it within one working day. In order to fulfill this requirement, maintain, in stock, sufficient materials and equipment to provide repairs. Replace the traffic signal control equipment including the cabinet and cabinet accessories within 4 hours. If the outcome of the response identifies damage to the department furnished signal controller, notify the Traffic Management Center at (800) 375-7302 who will then dispatch the SE Region Electrical Field Unit

*Replace 661.5 (2) of the standard specifications with the following:*

(2) Payment for the Temporary Traffic Signals for Intersections bid item is full compensation for providing, maintaining, and repairing the complete temporary installation; and for removal. Payment also includes the following:

1. Furnishing and installing replacement equipment.
2. The cost of delivery and pick-up of the cabinet assemblies.

Payment is full compensation for drilling holes; furnishing and installing all materials, including bricks, and coarse aggregate; for excavation, bedding, and backfilling, including any sand or other required materials; furnishing and placing topsoil, fertilizer, seed, and mulch in disturbed areas; for properly disposing of surplus materials; for making inspections; for cleaning up and properly disposing of waste; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

1. Section 678 Communication Systems

Replace section 678.2.1 (1) of the standard specifications with the following:

(1) The department will furnish fiber optic cable, splice enclosures, and termination panels.

Pick up the department furnished materials at the department’s Electrical Shop located at 935 South 60th Street, West Allis. Notify the department’s Electrical Field Unit at (414) 266-1170 and make arrangements for picking up the department furnished materials three working days prior to picking up the materials.

Replace section 678.5 (6) of the standard specifications with the following:

(6) Payment for Install Ethernet Switches is full compensation for transporting and installing the devices; for cables and connectors; and connecting the devices.

1. Precast Sound Barrier Panel Support Repair, Item SPV.0060.01.

**A Description**

This special provision describes repairing the existing precast sound barrier support brackets as shown on the plans.

**B Materials**

Furnish materials conforming to standard specification 641.2.

**C Construction**

Construction will conform to the pertinent sections of standard specification 641.3.2.

**D Measurement**

The department will measure Precast Sound Barrier Panel Support Repair as each individual support acceptably completed.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER DESCRIPTION UNIT

SPV.0060.01 Precast Sound Barrier Panel Support Repair EACH

Payment for Precast Sound Barrier Panel Support Repair is full compensation for cleaning and repairing the existing sound panel support brackets; modifying the sound panel support brackets as shown in the plans; for fabricating required materials; for transporting materials to the jobsite; and for providing all necessary labor and equipment to do the work. Replacement of the existing support brackets, if required by the Engineer, is incidental to this item.

1. Install Poles Type 12, Item SPV.0060.30; Install Poles Type 13, Item SPV.0060.31; Install Monotube Arms 50-FT, Item SPV.0060.32; Install Monotube Arms 55-FT, Item SPV.0060.33; Install Luminaire Arms Steel 15-FT, Item SPV.0060.34, Install Luminaire Arms Steel 15-FT Clamp-On, Item SPV.0060.35.

**A Description**

This special provision describes installing state furnished materials conforming to standard spec 657, details shown in the plans, and as modified in this special provision.

**B Materials**

The department will furnish the monotube poles, monotube arms and luminaire arms. Provide any other necessary material required to complete the installation as the plans show.

**C Construction**

Install equipment in accordance to standard spec 657.3.

**D Measurement**

The department will measure Install [Equipment] at the contract unit price acceptably completed.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0060.30 | Install Poles Type 12 | Each |
| SPV.0060.31 | Install Poles Type 13 | Each |
| SPV.0060.32 | Install Monotube Arms 50-FT | Each |
| SPV.0060.33 | Install Monotube Arms 55-FT | Each |
| SPV.0060.34 | Install Luminaire Arms Steel 15-FT | Each |
| SPV.0060.35 | Install Luminaire Arms Steel 15-FT Clamp-On | Each |

Payment for the Install Poles bid items is full compensation for installing department furnished poles and for providing grounding lugs, fittings, shims, hardware, and other required components the department does not furnish.

Payment for the Install Monotube Arms and Install Luminaire Arms bid items is full compensation for installing department furnished arms; for providing high-strength bolt/nut/washer assemblies and DTIs including those required for testing; and for providing related mounting hardware, leveling shims, and other required components the department does not furnish.

1. Vinyl Coated Chain Link Fence Repair, Item SPV.0090.01

**A Description**

This special provision describes removing the existing fence fabric, storing the fence fabric, fabricating new tension bars, tension bands, and other connecting hardware, and reinstalling the existing fence fabric conforming to the pertinent plan details and as directed by the Engineer. The color of all components in this fence system shall be black (AWS Standard Color Number 27038).

**B Materials**

All tension bars, tension bands, and all connection hardware shall be new stock, free from defects impairing strength, durability, and appearance. The vinyl coating shall be a dense and impervious coating, applied without voids, tears or cuts that reveal the substrate. Excessive roughness, bubbles, blisters and flaking in the vinyl coating will be a basis for rejection.

**B.1 Fittings**

Provide brace bands, tension bands, tension bars, and tie wires that are steel and conform to the requirements of ASTM F626. Tie wires shall be round and 9-gage wire. These components (excluding tie wires) shall be zinc-coated by the hot-dip process as stated in ASTM F626. Provide vinyl coating over zinc-coating on components (excluding tie wires) that conforms to the requirements of ASTM F626. For tie wires, provide vinyl coating on wire that is zinc-coated using the same procedure as used for fence fabric. The color of vinyl coating shall conform to the requirements of ASTM F934, and be black (AWS Standard Color Number 27038).

**B.2 Bolts**

All bolts are to be supplied with lock washers and nuts. Use galvanized steel bolts, nuts and washers per plan details.

**B.3 Tests**

**Fittings**

Zinc-Coating Requirements

Weight of Zinc-Coating: ASTM A90

Vinyl-Coating Requirements

Thickness of Vinyl-Coating: ASTM F626

Adhesion: ASTM F1043

Accelerated Aging Test: ASTM F1043, D1499

**B.4 Specification Compliance**

Submit certification of compliance with material specifications. Provide material certification and test documentation for hardware that shows that all materials meet or exceed the specifications of this contract and the tests in Section B3 of this specification.

**C Construction**

**C.1 General**

Remove the existing fence fabric, taking care mot to damage it. Store the fence fabric, if required, in an area away from construction activities to preclude damage to it.

Re-install the chain link fence fabric conforming to ASTM F567. The Contractor shall provide staff that is thoroughly familiar with the type of construction involved and materials and techniques specified. Chain link fabric shall be installed on the side of the posts as originally installed. Fabric shall be attached to the end posts with tension bars and tension bands. It shall be attached to rails, and posts without tension bands, with tie wires. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Heads of bolts shall be on the side of the fence adjacent to pedestrian traffic.

**C.2 Delivery, Storage and Handling**

Deliver material to the site in an undamaged condition. Upon receipt at the job site, all materials shall be thoroughly inspected to ensure that no damage occurred during shipping or handling and condition of materials is in conformance with these specifications. If vinyl coating is damaged, Contractor shall repair or replace components as necessary to the approval of the Engineer at no additional cost to the department. Carefully store material off the ground to ensure proper ventilation and drainage and to provide protection against damage caused by ground moisture. Handle all vinyl coated material with care.

**C.3 Touch-up and Repair**

In the event that damage does occur to any item that is designated for re-use in the new work, repair or replace the damaged item at no expense to the department.

For minor damage caused by shipping, handling or installation to vinyl coated surfaces, touch up the finish conforming to the manufacturer’s recommendations. Provide touch-up coating such that repairs are not visible from a distance of 6-feet. If damage is beyond repair, the fencing component shall be replaced at no additional cost to the department. The Contractor shall provide the Engineer with a copy of the manufacturer’s recommended repair procedure and materials before repairing damaged coatings.

**D Measurement**

The department will measure Vinyl Coated Chain Link Fence Repair by the linear foot acceptably furnished and installed.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER DESCRIPTION UNIT

SPV.0090.01 Vinyl Coated Chain Link Fence Repair LF

Payment for Vinyl Coated Chain Link Fence Repair is full compensation for removing the existing fence fabric and hardware; for fabricating, galvanizing and polymer coating all new tension bars, tension bands, and all other connection hardware fence components; for transporting materials to the jobsite; and for erecting components to re-install the existing fence fabric to complete the vinyl coated chain link fence repair, including any touch-up and repairs required due to installation.

1. Traffic Channelizing Curb System, Item SPV.0090.02.

**A Description**

This special provision describes delivering and installing traffic channelizing curb system at locations the plans show or the engineer directs.

**B Materials**

**B.1 General**

Furnish a permanent traffic channelizing curb system with a base component consisting of interlocking units and flexible vertical component. The system shall be constructed of material resistant to ultraviolet light, ozone, and hydrocarbons. The units should interface with each other to form a continuous longitudinal lane channelizing system separating traffic lanes. Provide a system that is fastened to or placed on the underlying pavement surface according to the manufacturer’s recommendations. The system shall be continuous interlocking modules and allow for cross drainage under or around the curb modules.

The channelizing system shall meet the requirement of National Cooperative Highway Research Program (NCHRP) Report 350 or the Manual for Assessing Safety Hardware (MASH). Submit a copy of the FHWA approval letter to the Engineer.

**B.2 Curb Unit**

The curb sections shall be approximately 12” wide and shall not exceed 4” in height. Curb sides shall be sloped to allow crossover by emergency vehicles. Normal curb sections shall be a minimum of 40 inches and a maximum of 48 inches long. The end sections shall be 18 inches long and shall not exceed 2 inches in height at the exposed nose. The units shall be yellow.

**B.2 Vertical Component**

Provide at least one vertical component for every modular curb unit or 3 feet to 4 feet uniformly spaced along the channelizing system.

The vertical component shall be a minimum of 36 inches and a maximum of 48 inches in height measured from the pavement surface. The width shall be 8 to 9 inches.

The vertical component shall be equipped with reflective stripes conforming to standard specification 637.2.2.2. The stripes shall consist of alternating black and reflective yellow bands approximately 4” in width sloped down at an angle of 45 degrees toward the side to which traffic will pass. The base component shall be equipped with reflectors.

**C Construction**

**C1 Installation**

Install the channelizing system according to the manufacturer’s recommendations. Follow manufacturer’s installation procedures regarding anchoring systems into the various types of roadway surfaces. Only use anchors and hardware provided by the manufacturer.

**D Measurement**

The department will measure Traffic Channelizing Curb System by lineal foot acceptably completed.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0090.01 | Traffic Channelizing Curb System | LF |

Payment is full compensation for delivering and installing the channelizing system.

1. Sawing Concrete Curb Head, Item SPV.0090.03.

## A Description

This special provision describes sawing concrete curb head as shown on the plans and as hereinafter provided.

B (Vacant)

**C Construction**

Saw concrete curb head according to the applicable portions of standard spec 690. Remove and dispose of concrete curb head according to the applicable portions of standard spec 204.

## D Measurement

The department will measure Sawing Concrete Curb Head by the linear foot, acceptably completed.

## E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0090.02 | Sawing Concrete Curb Head | LF |

Payment is full compensation for furnishing all sawing; sludge removal; disposal of the concrete curb head; and restoring the work site. The department will pay separately for excavation and restoring excavated area with topsoil, fertilizer, and sod.

1. Concrete Curb and Gutter 31-Inch Special, Item SPV.0090.04.

A Description

Construct concrete curb and gutter conforming to Section 601.

B Materials

Conform to Section 601

C Construction

Conform to Section 601.

D Measurement

The department will measure Concrete Curb and Gutter 31-Inch Special by the linear foot acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER DESCRIPTION UNIT

SPV.0090.03 Concrete Curb and Gutter 31-Inch Special LF

Payment is full compensation for foundation excavation and preparation; special construction required at driveway entrances; for providing materials, including concrete, expansion joints; for placing, finishing, protecting, and curing; and for restoring the site. However, if the contract provides a bid item for excavation, then the department will pay for excavation required for this work as specified in the contract. Payment also includes providing tie bars in unhardened concrete. For tie bars provided in concrete no placed under the contract, the department will pay separately under the Drilled Tie Bars bid item as specified in 416.5.

1. Maintenance of Lighting Systems, Item SPV.0105.11.

**A Description**

This special provision describes maintaining existing and proposed lighting system beginning on the date that the contractor's activities, including electrical, begin at the job site. Properly operate and maintain all existing and proposed lighting systems which are part of, or which may be affected by, the work until final acceptance or as otherwise determined by the engineer.

Before performing any excavation, removal, or installation work, including electrical, for the project, initiate a request for maintenance transfer and preconstruction inspection, as specified in this special provision. Conduct the transfer and inspection in the engineer’s presence and a representative of the party or parties responsible for maintenance of any lighting systems which may be affected by the work. Request the maintenance preconstruction inspection at least seven calendar days before the desired inspection date.

Existing lighting systems, when shown on the plans, are intended only to indicate the general equipment installation of the systems involved, possibly not exactly representing the field conditions. A site visit will confirm the exact condition of the electrical equipment and systems to be maintained.

Issues found during contractor assessment can be discussed and addressed by contacting the SE Region Lighting Engineer (Eric Perea) before transferring maintenance responsibility to the contractor.

Maintenance of the lighting system includes lighting control cabinet(s): HL-40-FE.

The following lighting control cabinet(s) will be used long enough to allow the installation of temporary lighting: HL-40-FE.

**B (Vacant)**

**C Construction**

**C.1 Existing Lighting Systems**

Existing lighting systems are defined as any lighting system or part of a lighting system in service before this contract. The contract drawings indicate the general extent of any existing lighting. [Understand](https://www.google.com/search?biw=1125&bih=1095&q=define+understand&sa=X&ved=0ahUKEwiXhNXF5ZjNAhVCR1IKHcozAfoQ_SoIJTAA) the effort required for compliance with these specifications; Clear and replace any knockdowns or damage caused to the existing lighting system, regardless of who causes the damage. Maintain existing lighting system as follows:

**Partial Maintenance:** Only maintain the affected circuits if the number of circuits affected by the contract is equal to or less than 40% of the total number of circuits in a given controller and the controller is not part of the contract work unless otherwise indicated. Obtain engineer approval to isolate the affected circuits by in‑line waterproof fuse holders as specified elsewhere

**Full Maintenance:** Maintain the entire controller and all associated circuits if the number of circuits affected by the contract is greater than 40% of the total number of circuits in a given controller, or if the controller is modified in any way under the contract work.

**C.2 Proposed Lighting Systems**

Proposed lighting systems are any temporary or final lighting systems or part of a lighting system to be constructed under this contract.

Maintain all items installed under this contract, including all equipment failures or malfunctions as well as equipment damage by the motoring public, contractor operations, or other sources.

**C.3 Maintenance Operations**

Maintain lighting units (including sign lighting), cable runs, and lighting controls. If a pole is knocked down or sign light damage is caused by normal vehicular traffic, promptly clear the lighting unit and circuit discontinuity, and restore the system to service. Reinstall the lighting unit (if salvageable), or install a new one.

Provide weekly night‑time patrol of the lighting system, with patrol reports filed on standard forms as designated by the engineer. Send a copy to the region lighting coordinator.

Correct the deficiencies within a time frame acceptable to the engineer. Remaining deficiencies may require corrective action on specific lighting system equipment as described in the chart or based on material availability.

|  |  |  |  |
| --- | --- | --- | --- |
| Incident or Problem | Service Response Time | Service Restoration Time | Permanent Repair Time |
| Control cabinet out | 12 hours | 24 hours | 7 Calendar days |
| Hanging mast arm | **Emergency** - As Soon As Possible | na | 7 Calendar days |
| Motorist caused damage or leaning light pole 10 degrees or more | **Emergency** - As Soon As Possible | 7 Calendar days | 14 Calendar days |
| Circuit out – Needs to reset breaker | 12 hours | 12 hours | na |
| Circuit out – Cable trouble | 12 hours | 7 Calendar days | 21 Calendar days |
| Outage of 3 or more successive lights | 12 hours | 7 Calendar days | na |
| Outage of 75% of lights on one tower | 12 hours | 7 Calendar days | na |
| Outage of light nearest RR crossing approach, Islands and gores | 12 hours | 7 Calendar days | na |
| Outage (single or multiple non successive lights) found on night outage survey | na | na | 7 Calendar days |

**C.4 Lighting**

1. **Serve Response Time:** The amount of time from the initial contractor notification to the patrolman physically arriving.
2. **Service Restoration Time**: The amount of time from the initial contractor notification to a fully operational system again. (In cases of motorist‑caused damage, the undamaged portions of the system are operational.)
3. **Permanent Repair Time**: The amount of time from initial contractor notification until permanent repairs are made unless the contractor was required to make temporary repairs to meet the service restoration requirement. Temporary repairs that do not meet the service restoration requirements require engineer’s approval.

**C.5 Operation of Lighting**

Maintain operational lighting every night, from dusk until dawn. Do not operate duplicate lighting systems (such as temporary lighting and proposed new lighting) simultaneously. Do not keep lighting systems in operation during long daytime periods. Ensure that the lighting system is fully operational and approved by the engineer before submitting a pay request.

**D Measurement**

The department will measure Maintenance of Lighting Systems as a single lump sum unit, acceptably completed.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0105.11 | Maintenance of Lighting Systems | LS |

Payment is full compensation for Maintenance of Lighting Systems, both existing and proposed, weekly night-time patrol of the lighting system, mobilization, and filed patrol reports.

The contractor will be reimbursed for replaced equipment, materials only, if the invoice paid for the individual piece of equipment is greater than $500.

Non-compliance with designated response, restoration, and permanent repair times will result in liquidated damages of $500 per day per occurrence. In addition, the department reserves the right to assign any work not completed within this timeframe to the State Electrical Engineering and Electronics Unit. Reimburse all costs associated to repair this uncompleted work within one month after the incident or additional liquidated damages of $500 per month per occurrence will be assessed. Unpaid bills will be deducted from the cost of the contract. Repeated non-response or a negligent maintenance shall result in the State’s Electrical Engineering and Electronics Unit being directed to correct all deficiencies and the resulting costs deducted from all monies owed the contractor.

Not understanding the effort required for compliance with these specifications will not be justification for extra payment or reduced responsibilities. No payment will be considered for damage or repairs due to contractor operations.

Not ensuring that the lighting system is fully operational and approved by the engineer before submitting a pay request will be grounds for denying the pay request.

1. Transport and Install State Furnish Traffic Signal Cabinet STH 794 & S Pennsylvania Ave, Item SPV.0105.30; STH 794 & Ellen St, Item SPV.0105.31.

**A Description**

This special provision describes the transporting and installing of department furnished materials for traffic signals as the plans show and as follows.

**B Materials**

Use materials furnished by the department including: the traffic signal controller and the traffic signal cabinet.

Pick up the department furnished materials at the department’s Electrical Shop located at 935 South 60th Street, West Allis. Notify the department’s Electrical Field Unit at (414) 266-1170 and make arrangements for picking up the department furnished materials five (5) working days prior to picking the materials up.

Provide all other needed materials in conforming to 651.2, 652.2, 653.2, 654.2, 655.2, 656.2, 657.2, 658.2 and 659.2 of the standard specs.

**C Construction**

Perform work conforming to 651.3, 652.3, 653.3, 654.3, 655.3, 656.3, 657.3, 658.3 and 659.3 of the standard specs except as specified below.

Request a signal inspection of the completed signal installation to the project engineer at least five (5) working days prior to the time of the requested inspection. The departments’ Region Electrical personnel will perform the inspection.

Coordinate directly with the department’s traffic signal cabinet vendor {TAPCO at 262-814-7327 or rickk@tapconet.com / TCC at 651-439-1737 or mallwood@trafficcontrolcorp} to schedule the cabinet acceptance testing. Coordinate with the department’s Electrical Field Unit at (414)-266-1170 to participate in the acceptance testing. The department has final determination of the cabinet acceptance testing date and time.

**D Measurement**

The department will measure Transport and Install Traffic Signal Cabinet STH 794 & S Pennsylvania Ave and STH 794 & Ellen St as a single lump sum unit of work in place and acceptably completed.

**E Payment**

The department will pay for the measured quantity at the contract unit price under the following bid item:

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0105.30 | Trnspt & Install State Furn Traffic Signal Cabinet, STH 794 & S Pennsylvania Ave | LS |
| SPV.0105.31 | Trnspt & Install State Furn Traffic Signal Cabinet, STH 794 & Ellen St | LS |

Payment is full compensation for transporting and installing the traffic signal controller and the traffic signal cabinet; for furnishing and installing all other items necessary (such as, wire nuts, splice kits and/or connectors, tape, insulating varnish, ground lug fasteners, etc.) to make the proposed system complete from the source of supply to the most remote unit and for clean-up and waste disposal.

SER-658-005 (20170419)

1. Transport and Install State Furnish Radar Detect Sys, STH 794 & Ellen St, Item SPV.0105.32.

**A Description**

This special provision describes the transporting and installing of department furnished Radar Detection System on monotube poles or arms as the plans show and as follows.

**B Materials**

Pick up the department furnished Radar System at the department’s electrical shop located at 935 South 60th Street, West Allis. Notify the department’s electrical field unit (EFU) at (414) 266-1170 to make arrangements for picking up the department furnished materials at least five (5) working days prior to material pick-up.

**C Construction**

Install the department furnished pole/arm mounting brackets, extension arms (if required), and radar units per manufacturer recommendations in the locations determined by the department.

Install the power and communication cable to run continuously (without splices) from the traffic signal cabinet to the pole handhole plus an additional 16-feet in each pull box and an extra 10-feet in the pole handhole. Install the detector unit cable whip from the detector unit to the pole handhole. Splice the detector unit cable whip to the power and communication cable in the pole handhole using the provided junction box.

Mark each end of the lead in the traffic signal cabinet and each cable in the pole handhole to indicate the equipment label (i.e. RA1, RA2, etc.) on the plans. For a cabinet that is not operating the signal, the contractor will terminate the ends. If the cabinet is operating the signal, the cabinet wiring will be done by the department.

Notify department’s Electrical Shop at (414) 266-1170 upon completion of the installation and aiming of the radar units.

The department will provide the vendor’s contact information. Coordinate directly with the department’s radar detection system vendor to arrange for the vendor to program the radar detection system on site. Notify the department and vendor at least five working days prior to the date of programming. Assist the department and vendor with fine adjusting of the radar units during the radar system programming, if necessary.

**D Measurement**

The department will measure Transporting and Installing State Furnished Radar Detection System STH 794 & Ellen St as a single lump sum unit of work for each intersection acceptably completed.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid items:

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0105.32 | Trnspt & Install State Furn Radar Detect Sys STH 794 & Ellen St | LS |

Payment is full compensation for transporting and installing the radar detection system, cable, mounting hardware, and radar units; and assisting the department and vendor during the radar system programming.

SER-658-004 (20170419)

1. Transport Traffic Signal & Inter Lighting Materials STH 794 & Ellen St, Item SPV.0105.33.

**A Description**

This special provision describes the transporting of department furnished materials for traffic signals and intersection lighting.

**B Materials**

Transport materials furnished by the department including: monotube arms/poles and luminaire arms (to be installed on monotube assemblies).

Pick up the department furnished materials at the department’s Electrical Shop located at 935 South 60th Street, West Allis. Notify the department’s Electrical Field Unit at (414) 266-1170 and make arrangements for picking up the department furnished materials a minimum of five (5) working days prior to picking the materials up.

Provide all other needed materials in conforming to 651.2, 652.2, 653.2, 654.2, 655.2, 656.2, 657.2, 658.2 and 659.2 of the standard specs.

**C Construction**

Perform work conforming to 651.3, 652.3, 653.3, 654.3, 655.3, 656.3, 657.3, 658.3 and 659.3 of the standard specs except as specified below.

**D Measurement**

The department will measure Transport Traffic Signal and Intersection Lighting Materials STH 794 & Ellen St as a single lump sum unit and accepted.

**E Payment**

The department will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER DESCRIPTION UNIT

|  |  |  |
| --- | --- | --- |
| SPV.0105.33 | Trnspt Traffic Signal & Inter Lighting Materials, STH 794 & Ellen St | LS |
|  |  |  |

Payment is full compensation for transporting the monotube poles/arms and luminaire arms (to be installed on monotubes). Installation of these materials is paid under separate pay items.

ser-658-002 (20170414)

1. Trnspt & Install State Furn FO Cable Pigtail 8-Ct CB1 (S40-1231), Item SPV.0105.34; CB1 (S40-1216), Item SPV.0105.35

**A Description**

This special provision describes the transporting and installing of fiber optic cable pigtail 8-ct in traffic signal cabinets.

**B Materials**

The department will furnish the pre-terminated fiber optic patch panel. The material will be provided with the traffic signal cabinet. The patch panel will have a pre-terminated fiber optic cable pigtail. Provide all patch panel attachment hardware.

Provide a 14 AWG XLP insulated, stranded, copper, 600 volt AC locate wire through the conduit run from the communication vault to the traffic signal cabinet. Connect the locate wire by using a silicone filled wire nut at each pull box, vault or other access point. Alternatively, use a single wire through the access points, leaving a six (6) foot coil in each pull box, vault or other access point for splicing. All material under this item shall meet the requirements of section 655 of the Standard Specifications.

**C Construction**

Install the patch panel on the side of the traffic signal cabinet opposite the electrical service at a location as approved by the engineer. Install the pre-terminated fiber optic cable in conduit from the patch panel to the communication vault as specified in section 678.3.1 of the standard specifications. Fiber optic cable ends shall be covered securely to protect open ends during installation in raceways. Leave the remainder of the fiber optic cable coiled in the communication vault.

Connect the locate wire by using a wire nut at each access point. Alternatively, use a single wire through the access points.

**D Measurement**

The department will measure Transport and Install State Furnished FO Cable Pigtail 8-Ct as a single lump sum unit of work in place and accepted.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item.

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0105.34 | Trnspt & Install State Furn FO Cable Pigtail 8-Ct CB1 (S40-1231) | LS |
| SPV.0105.35 | Trnspt & Install State Furn FO Cable Pigtail 8-Ct CB1 (S40-1216) | LS |