**Special Provisions**

**Table of Contents**

**Article Description Page #**

[1. General. 3](#_Toc518889509)

[2. Scope of Work. 3](#_Toc518889510)

[3. Prosecution and Progress. 3](#_Toc518889511)

[4. Traffic 6](#_Toc518889512)

[5. Holiday Work Restrictions. 9](#_Toc518889513)

[6. Utilities. 9](#_Toc518889514)

[7. Information to Bidders, U.S. Army Corps of Engineers Section 404 Permit. 9](#_Toc518889515)

[8. Notice to Contractor - Snow Removal. 9](#_Toc518889516)

[9. Notice to Contractor – Soil Conditions. 9](#_Toc518889517)

[10. Notice to Contractor – High Ground Water 9](#_Toc518889518)

[11. Notice to Contractor – Work Adjacent to Historical Property – 4148 Main St Fish Creek 10](#_Toc518889519)

[12. Notice to Contractor – Karst Features 10](#_Toc518889520)

[13. Notice to contractor – Proposed Items within MSE Wall Reinforcing Zone Backfill. 10](#_Toc518889521)

[14. Information to Bidders, WPDES General Construction Storm Water Discharge Permit. 10](#_Toc518889522)

[15. Environmental Protection, Dewatering. 10](#_Toc518889523)

[16. Environmental Protection, By-Pass Pumping 11](#_Toc518889524)

[17. Erosion Control. 11](#_Toc518889525)

[18. Coordination with Businesses 11](#_Toc518889526)

[19. Work by Others. 11](#_Toc518889527)

[20. Traffic for Installation of Flashing Beacon at STH 42 and Main St. 12](#_Toc518889528)

[21. Traffic Control 12](#_Toc518889529)

[22. Removing Concrete Sidewalk 13](#_Toc518889530)

[23. Abandoning Sewer, Item 204.0291.S. 13](#_Toc518889531)

[24. Removing Advance Flasher Assemblies Type 1, Item 204.9001.S; Removing Advance Flasher Assemblies Type 2, Item 204.9002.S; Removing Flashing Beacon (STH 42 & Main St), Item SPV.0105.03. 14](#_Toc518889532)

[25. Removing Cables/Conduit, Item 204.9090.S.01 14](#_Toc518889533)

[26. General Requirements for Blasting Rock. 15](#_Toc518889534)

[27. Granular Backfill, Item 209.0100. 17](#_Toc518889535)

[28. Select Crushed Material, Item 312.0110 17](#_Toc518889536)

[29. QMP Base Aggregate. 18](#_Toc518889537)

[30. Shaping Roadway, Item 305.0502.S. 24](#_Toc518889538)

[31. Coloring Concrete Custom, Item 405.0200. 24](#_Toc518889539)

[32. HMA Percent Within Limits (PWL) Test Strip Volumetrics, Item SPV.0060.13; HMA Percent Within Limits (PWL) Test Strip Density Item SPV.0060.14. 25](#_Toc518889540)

[33. HMA Pavement Percent Within Limits (PWL) QMP. 31](#_Toc518889541)

[34. HMA Pavement Longitudinal Joint Density. 49](#_Toc518889542)

[35. Adjusting Manhole Covers. 55](#_Toc518889543)

[36. Cover Plates Temporary, Item 611.8120.S. 55](#_Toc518889544)

[37. Fence Safety, Item 616.0700.S. 56](#_Toc518889545)

[38. Temporary Portable Rumble Strips, Item 643.0310.S. 56](#_Toc518889546)

[39. Temporary Pedestrian Surface Plate, Item 644.1430.S. 57](#_Toc518889547)

[40. Temporary Pedestrian Safety Fence, Item 644.1616.S. 58](#_Toc518889548)

[41. Electrical Service for Meter Breaker Pedestal (STH 42 & Main St), Item 656.0200.01 59](#_Toc518889549)

[42. Stormwater Treatment Device, Item SPV.0060.01. 59](#_Toc518889550)

[43. Salvage Lighting Unit, Item SPV.0060.02. 62](#_Toc518889551)

[44. Reconnect Existing Storm Sewer Lateral, Item SPV.0060.03. 63](#_Toc518889552)

[45. Removing Lighting Unit, Item SPV.0060.04 64](#_Toc518889553)

[46. Install Lighting Unit - Item SPV.0060.05. 64](#_Toc518889554)

[47. Lighting Control Cabinet Base Type Special, Item SPV.0060.06. 65](#_Toc518889555)

[48. Concrete Base Type Special, Item SPV.0060.07. 66](#_Toc518889556)

[49. Trimming Tree Limbs 3-FT, Item SPV.0060.08. 67](#_Toc518889557)

[50. Pipe Inlet Structure, Item SPV.0060.09. 67](#_Toc518889558)

[51. Inlets Median 1 Grate, Special, Item SPV.0060.10. 68](#_Toc518889559)

[52. Manholes 8-FT Special, Item SPV.0060.11. 68](#_Toc518889560)

[53. Removing Landscape Rock, Item SPV.0060.12 69](#_Toc518889561)

[54. Relocating Flag Pole Lighting, Item SPV.0060.13 69](#_Toc518889562)

[55. Lighting Control Cabinet Type Special, Item SPV.0060.14 70](#_Toc518889563)

[56. Street Sweeping, Item SPV.0075.01. 71](#_Toc518889564)

[57. Fence Chain Link Polymer-Coated 4-Ft., Item SPV.0090.01. 71](#_Toc518889565)

[58. Concrete Cold Weather Covering: Curb and Gutter, Plastic 1 Layer, Item SPV.0090.02; Curb and Gutter, Plastic 2 Layers, Item SPV.0090.03; Curb and Gutter, Plastic/Hay/Plastic, Item SPV.0090.04; Sidewalk, Plastic 1 Layer, Item SPV.0165.04; Sidewalk, Plastic 2 Layers, Item SPV.0165.05; Sidewalk, Plastic/Hay/Plastic, Item SPV.0165.06 75](#_Toc518889566)

[59. Retaining Wall Planting Area, SPV.0105.01. 76](#_Toc518889567)

[60. Splitter Island Planting Area, SPV.0105.02. 78](#_Toc518889568)

[61. Wall Modular Block Mechanically Stabilized Earth (R-15-11), Item SPV.0165.01.; Wall Modular Block Mechanically Stabilized Earth (R-15-12), Item SPV.0165.02. 80](#_Toc518889569)

[62. Crosswalk Apron Pavers, SPV 0165.02. 95](#_Toc518889570)

[63. Concrete Weir Inside Manhole, Item SPV.0165.03. 97](#_Toc518889571)

**STSP’S Revised November 30, 2017**

**SPECIAL PROVISIONS**

1. General.

Perform the work under this construction contract for Project 4140-19-71, STH 42, Gibraltar to Sister Bay, Bluff Lane to Country Walk Drive, STH 42, Door 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, 2018 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 (20171130)

1. Scope of Work.

The work under this contract shall consist of milling asphaltic pavement, excavation common asphaltic pavement, storm sewer, sidewalk, driveway, lighting, excavation, signing, pavement marking 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 schedule and may require extraordinary forces and equipment.

Take care in protecting all building faces and adjacent privately-owned structures from damage, dirt, undermining, and wet concrete. When doing the work near these items, put a shield (plywood, sheeting, etc.) up against the building to protect it. Take caution when excavating, boring, or drilling adjacent to privately owned structures to ensure undermining does not occur. The costs for this work is incidental to the contract. The contractor is responsible for returning any privately-owned structures and building faces to its original condition if any damage/undermining occurs, or any dirt or concrete is adhered to the structure face.

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

Anticipate cold weather and early spring HMA paving, installing ancillary concrete, retaining wall construction, and storm sewer work. Plan to heat aggregates and water for concrete mixes and that the heating of the aggregate and water are incidental to those concrete items. There will be no adverse weather delay for cold weather construction.

The department will not grant time extensions to the interim or final completion dates

for the following:

1. Severe weather as specified in subsection 108.10.2.2 of the standard specifications.

2. Labor disputes that are not industry wide.

3. Delays in material deliveries.

**Staging**

Supplemental traffic control for the project consists of three (3) stages and two (2) phases, described as follows:

Stage 1 - *March 1st to noon May 24th, 2019*– Begin work operations on or after March 1st, 2019. Work on this stage includes, but is not limited to, the following items; common excavation, HMA milling, HMA pavement, curb and gutter, sidewalk, storm sewer (within Gibraltar and Ephraim), retaining walls, lighting, restoration items, pavement marking, and signing. Complete the following activities as listed below:

Phase A – *Complete the following items prior to noon May 3rd, 2019*

1. HMA pavement, curb and gutter, storm sewer, and pavement marking on Shore Road 10+00-15+56 within the Town of Gibraltar.
2. Storm sewer, HMA lower layers within storm sewer trenches, and install pavement markings (temporary or permanent) on STH 42 from 96+50 to 127+00 within the Town of Gibraltar.
3. Retaining walls, storm sewer, and place base aggregate dense to allow for two 12-foot local traffic travel lanes from 127+00-145+00 within the Town of Gibraltar.
4. HMA lower layers within storm sewer trenches on STH 42 from 347+00-349+00 and 369+00-372+00 within the Village of Ephraim.

Phase B – *Complete the following items prior to noon May 24th, 2019*

1. Storm Sewer, curb and gutter, sidewalk, lighting, HMA paving, pavement marking, signing, restoration items and removing all traffic control devices on STH 42 from 96+50-135+00 Bluff Lane to Windmill Lane, and Shore Road from 10+00-15+56 within the Town of Gibraltar.
2. Storm Sewer, curb and gutter, sidewalk along STH 42 southbound, HMA paving, and pavement marking from 134+35-145+00 Windmill Lane to the west side of County F within the Town of Gibraltar.
3. Complete all work from 306+00-374+00 Brookside Lane to Anderson Lane within the Village of Ephraim.

Stage 2 – *Complete the following items prior to noon June 28th, 2019* **-** Work on this stage includes, but is not limited to, the following items; common excavation, HMA milling, HMA pavement, curb and gutter, sidewalk, storm sewer, lighting, restoration items, pavement marking, and signing.

1. Storm sewer, curb and gutter, STH 42 southbound sidewalk, HMA pavement, lighting, pavement marking, restoration items, remove the detour, and reopen STH 42 to traffic from 127+00-159+00 Shore Road to the pedestrian crossing at the Door County YMCA within the Town of Gibraltar.
2. Remove the temporary pavement connection from Gibraltar Road to the North Gibraltar School Entrance to an extent that a STH 42 shoulder closure is not necessary to restore Old Gibraltar Road to existing conditions.

Summer Work Restrictions – *Do not work on or adjacent to STH 42 from noon June 28th to 6:00 AM September 3rd 2019.*

* If existing items are disturbed, the following proposed work must be completed: HMA Upper Layer, HMA shoulders, gravel shoulders, permanent signing, and pavement marking.
* Grade areas along the roadway to a maximum 4:1 sloped shoulder. There shall be no drop-offs along live traffic lanes.
* Remove all traffic control devices from STH 42

Construction activities listed below will be allowed during the summer work restrictions:

* Removing and restoring temporary driveway to Fish Creek Grill
* Sidewalk construction along CTH F & Spring Rd
* Restoration of Old Gibraltar Rd Temporary Connection

Stage 3 – *September 3rd to September 27th, 2019.*

* Complete all remaining work prior to noon September 27th, 2019.

Removal and Installation of Guardrail

The existing guardrail protecting the hazardous slopes from 475+00 – 486+00 is to remain in place at all times when the adjacent shoulders are open to traffic. Prior to removal and replacement of the guardrail, close the adjacent shoulder of STH 42. Once removal of the existing guardrail begins, complete installation of the new guardrail system within 5 calendar days. Do not open the shoulder of STH 42 until the guardrail has been replaced and the hazard is fully protected.

**Liquidated Damages**

*Supplement subsection 108.11 of the standard specifications as follows:*

**Stage 1 Phase A**

Complete all work as specified in Stage 1, Phase A prior to noon May 3rd, 2019.

If the contractor fails to complete the work listed in Stage 1, Phase A, prior to 11:59 AM May 3rd, the department will assess the contractor $2,750 in interim liquidated damages for each calendar day that Stage 1, Phase A requirements are not met after 11:59 AM, May 3rd, 2019. An entire calendar day will be charged for any period of time within a calendar day that the requirements are not met beyond 11:59 AM.

0033 (20151210)

**Stage 1 Phase B**

Complete all work as specified in Stage 1, Phase B, prior to noon May 24th, 2019.

If the contractor fails to complete the work listed in Stage 1, Phase B prior to 11:59 AM May 24th, the department will assess the contractor $10,000 in interim liquidated damages for each calendar day that Stage 1, Phase B requirements are not met after 11:59 AM, May 24th, 2019. An entire calendar day will be charged for any period of time within a calendar day that the requirements are not met beyond 11:59 AM.

0033 (20151210)

**Stage 2**

Complete all work as specified in Stage 2 prior to noon June 28th, 2019.

If the contractor fails to complete the work listed in Stage 2 prior to 11:59 AM June 28th, the department will assess the contractor $11,000 in interim liquidated damages for each calendar day that Stage 2 requirements are not met after 11:59 AM June 28th, 2019. An entire calendar day will be charged for any period of time within a calendar day that the requirements are not met beyond 11:59 AM.

0033 (20151210)

**Stage 3**

Project must be substantially complete in accordance with standard specification 105.11.2.1.3 prior to noon September 27th, 2019.

If the project is not considered substantially complete prior to 11:59 AM September 27th, the department will assess the contractor $10,000 in interim liquidated damages for each calendar day that the project is not substantially complete after 11:59 AM September 27th, 2019. An entire calendar day will be charged for any period of time within a calendar day that the requirements are not met beyond 11:59 AM.

**Removal and Installation of Guardrail**

If the contractor fails to complete the work necessary to replace guardrail within 5 calendar days of beginning guardrail removal the department will assess the contractor $1,000 in interim liquidated damages for each calendar day the required work remains incomplete. An entire calendar day will be charged for any period of time within a calendar day that the guardrail is not fully installed beyond 12:01 AM.

0033 (20151210)

1. Traffic

**General**

Maintain simultaneous two-way traffic on all roadways open to through traffic during peak hours. Maintain two-way traffic along STH 42 where the roadway is open to through traffic and/or local access. The contractor may reduce traffic to one lane during daylight non-peak hours by using flagging operations. Maintain traffic with a minimum of 12-foot travel lanes.

Peak hours as defined as follows:

* From May 31st through October 14th
  + Fridays at noon to Sunday 9:00 PM

Non-Peak hours are defined as all times that are not peak hours.

Summer Work Restrictions - *Do not work on or adjacent to STH 42 from noon June 28th to 6:00 AM September 3rd 2019.* The following criteria must be met/maintained through the summer work restriction timeframe:

* Fully open STH 42 to traffic and remove all traffic control devices
* Lane or Shoulder closures will not be allowed on STH 42
* Do not operate or store construction equipment or materials alongside STH 42.

A milled surface open to through traffic shall not remain in place for longer than 72 hours.

Provide an even cross-sectional profile of the roadway at the end of each day’s milling and/or paving operations on roadways open to through traffic. Uneven lanes on roadways open to through traffic will not be allowed except during that days paving or milling operations.

All storm sewer and culvert trenches shall be covered with HMA pavement to an elevation consistent with the adjacent pavement surfaces prior to opening STH 42 to though traffic. A compacted aggregate surface at an elevation consistent with the adjacent pavement surfaces may be left over the storm sewer and culvert trenches prior to May 3rd, 2019 on sections or roadway open to through traffic and within detoured sections of STH 42. All trenches shall be backfilled to an elevation consistent with the adjacent pavement surfaces prior to the contractor leaving the immediate work area. Trenches within detoured sections of roadway may be left open up to 18 hours if justly blockaded from pedestrians and local traffic. The contractor shall monitor and maintain any aggregate surface, and immediately repair those surfaces at the direction of the engineer. Signing used to delineate variations in the surface material shall be incidental to the base aggregate bid item.

Maintain access to all properties throughout the duration of the project. Driveways and/or sidewalks within the project may be closed for the minimum amount of time necessary to construct the new access. Provide the property owners whose driveways and/or sidewalks will be affected by the project a 48-hour minimum notice of the impending work/closure. Allow emergency vehicles access throughout the construction zone at all times.

Close sidewalk/curb ramps in sequential order to provide adequate pedestrian detour access. Maintain a hard surface path for pedestrians along open sections of STH 42 (excluding gravel path for stage 2 detour station 143+25 LT). Base aggregate dense or asphalt pavement millings are not considered a hard surface and will not fulfill this requirement. Utilize temporary pedestrian surface bid item.

From station 96+50-134+00 do not simultaneously close STH 42 northbound and southbound parking lanes. An exception will be allowed during HMA milling and overlaying operations up to 3 calendar days, or as the engineer allows.

**Detours**

Stage 1 detour to be implemented on or after March 1st, 2019.

Stage 2 detour to be implemented ensuing the completion of Stage 1 but prior to noon May 24th, 2019.

Stage 2 detour to be removed prior to noon June 28th, 2019.

Access for Gibraltar School traffic to use detour route, Gibraltar Road, and Old Gibraltar Road temporary connection. Maintain access to school at all times during roadway closure unless otherwise agreed upon with School District Superintendent. If necessary, flag traffic around construction activities.

Access to Fish Creek Grill to use detour route, CTH F, and temporary driveway connection. Maintain access to restaurant at all times unless otherwise agreed upon with owner. Construct temporary access driveway prior to closing STH 42 from CTH F to existing driveway.

**Stage 1 Detour**

Route STH 42 traffic onto CTH E from the intersection of CTH E/STH 42 in the Village of Egg Harbor to CTH A to the intersection of CTH A/STH 42 south of the Village of Ephraim.

**Stage 2 Detour**

Route STH 42 traffic onto CTH F from the intersection of CTH F/STH 42 in the Town of Gibraltar to CTH A to the intersection of CTH A/STH 42 south of the Village of Ephraim.

Construct and maintain a temporary gravel path at station 143+25 LT from STH 42 SB sidewalk to the school private driveway.

**Portable Changeable Message Sign – Message Prior Approval**

After coordinating with department construction field staff, notify the Northeast Region Traffic Section at (920) 266-8033 (secondary contact number is (920) 360-3107) three business days prior to deploying or changing a message on a PCMS to obtain approval of the proposed message. The Northeast Region Traffic Unit will review the proposed message and either approve the message or make necessary changes.

**Wisconsin Lane Closure System Advanced 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.

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.

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:

- On Peak- $375 per lane, per direction of travel, 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-108-070 (20161130)

**Clear Zone Working Restrictions**

Do not store materials or equipment within the clear zone of traffic lanes. Remove materials from the clear zone prior to opening lane closures. Do not leave any slopes steeper than 3:1 or any drop offs at the edge of the traveled way greater than 2 inches within the clear zone prior to opening lane closures.

Park equipment and store materials, including stockpiles, a minimum of 18-feet from the edge of the traveled way unless protected by concrete barrier temporary precast.

If the contractor is unsure whether an individual work operation will meet the safety requirements for working within the clear zone, review the proposed work operation with the engineer before proceeding with the work.

(NER17-1018)

1. Holiday Work Restrictions.

Do not perform work on, nor haul materials of any kind along or across any portion of the highway carrying STH 42 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 3rd, to 6:00 AM Monday May 6th, for the Door County Half Marathon.

- From noon Friday, May 24th to 6:00 AM Tuesday, May 28th, for Memorial Day;

- From noon Friday, June 28th to 6:00 AM Monday, July 8th, for Independence Day;

- From noon Friday, August 30th to 6:00 AM Tuesday, September 3rd, for Labor Day;

- From noon Friday, October 11th to 6:00 AM Sunday, October 13th; for Sister Bay’s Fall Fest.

stp-107-005 (20050502)

1. Utilities.

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

stp-107-065 (20080501)

1. Information to Bidders, U.S. Army Corps of Engineers Section 404 Permit.

The department has obtained a U.S. Army Corps of Engineers Section 404 permit. Comply with the requirements of the permit in addition to requirements of the special provisions. A copy of the permit is available from the regional office by contacting Jeremy Ashauer at (920) 412-6381.

stp-107-054 (20080901)

1. Notice to Contractor - Snow Removal.

The Door County Highway Department or Village of Sister Bay may place snow into the work site area. The contractor shall be responsible for removing snow placed within the work site area. The snow shall not be placed on the sidewalks that are open to pedestrians or the travel lane open to traffic. The removal of the snow shall be incidental to the contract.

1. Notice to Contractor – Soil Conditions.

Soil borings completed during the design of the project are shown in the plans. Soil conservation service maps for Door County show a high percentage of udorthents, or cobble material, within the project limits. The presence of udorthents are expected for storm sewer, lighting base drilling, sign base drilling and other operations requiring excavation. Extraordinary efforts may be required during construction and shall be considered incidental to the contract bid items.

Work under this contract will require deep trenches for storm sewer installation. The contractor shall protect the drop-offs within the workzone.

1. Notice to Contractor – High Ground Water

Anticipate high ground water elevations within the project limits. Dewatering for storm sewer operations is anticipated.

1. Notice to Contractor – Work Adjacent to Historical Property – 4148 Main St Fish Creek

Work is scheduled to take place adjacent to a historical property located at 4148 Main St within Fish Creek (Sta. 103+25 LT). The proposed work includes replacing sidewalk and installing a light fixture/base adjacent to a stone retaining wall and pillar that were identified as being historically significant. Take all precautions necessary to avoid impacting or altering the appearance or structural stability of the wall and pedestal. If the wall or pedestal are impacted during construction the contractor must salvage as much of the original material as possible. The contractor will be required to restore or replace the wall and pillar in kind using the original, salvaged materials or similar materials at no cost to the department.

1. Notice to Contractor – Karst Features

Karst features are formed from the dissolution of soluble rocks such as limestone, dolomite, and gypsum. Karst features act as natural underground drainageways and can vary in size from minor fissures to caves or caverns. Existing Karst features are present within the project limits. Protect exposed karst features as the plans show or as the engineer directs. Do not excavate, cover, or fill known karst locations. If karst features are exposed during excavation suspend work operations in the immediate area and inform the construction engineer. The construction engineer will notify NE Region DNR liaison Matt Schaeve (920) 366-1544 of the feature and discuss further actions or precautions.

1. Notice to contractor – Proposed Items within MSE Wall Reinforcing Zone Backfill.

Coordinate retaining wall construction operations with proposed storm sewer, light bases, conduit, and any other bid items located within the MSE reinforcing zone backfill. Items may need to be formed or placed prior to beginning MSE wall backfill operations. Design retaining wall straps so that they are not in conflict with proposed items.

1. Information to Bidders, WPDES General Construction Storm Water Discharge Permit.

The department has obtained coverage through the Wisconsin Department of Natural Resources to discharge storm water associated with land disturbing construction activities of this contract under the Wisconsin Pollutant Discharge Elimination System General Construction Storm Water Discharge Permit (WPDES Permit No. WI-S066796-1). A certificate of permit coverage is available from the regional office by contacting Jeremy Ashauer at (920) 412-6381. Post the permit in a conspicuous place at the construction site.

stp-107-056 (20180628)

1. Environmental Protection, Dewatering.

*Supplement subsection 107.18 of the standard specifications as follows:*

If dewatering is required, treat the water to remove suspended sediments by filtration, settlement or other appropriate best management practice prior to discharge. The means and methods proposed to be used during construction shall be submitted for approval as part of the Erosion Control Implementation Plan for dewatering at each location it is required. The submittal shall also include the details of how the intake will be managed to not cause an increase in the background level turbidity prior to treatment and any additional erosion controls necessary to prevent sediments from reaching the project limits or wetlands and waterways. Guidance on dewatering can be found on the Wisconsin Department of Natural Resources website located in the Storm Water Construction Technical Standards, Dewatering Code #1061, “Dewatering”. This document can be found at the WisDNR website: <http://dnr.wi.gov/topic/stormwater/standards/const_standards.html>

The cost of all work and materials associated with water treatment and/or dewatering is incidental to the bid items the work is associated.

(NER12-1010)

1. Environmental Protection, By-Pass Pumping

*Add to subsection 107.18 of the standard specifications:*

If by-pass pumping is required, the means and methods proposed to be used during construction shall be submitted for approval as part of the Erosion Control Implementation Plan for each location it is required. The submittal shall include how the intake will be managed to not cause an increase in the background level turbidity during pumping; equipment pumping rate capabilities; discharge energy dissipation; and erosion controls. For by-pass pumping that will extend beyond one working day, the submittal should also include how the work zone will be managed and protected should the pump fail; be shut down due to unacceptable water quality; or storm water flows exceed the pumping rate of equipment. After setup of the approved by-pass pumping operation, the contractor shall demonstrate that the means and methods will pump the water at an acceptable water quality prior to starting work that necessitates the by-pass pumping. The cost of all work and materials associated with by-pass pumping is incidental to the bid items the work is associated with. Erosion control devices beyond the discharge energy dissipation point will be paid for at the contract unit prices for the items that are included in the plan.

(NER 11-0711)

1. Erosion Control.

Perform the work in accordance with the requirements of standard spec 107.20 and supplemented as follows:

A summer ECIP meeting will be required for this project. At this meeting, the contractor will discuss the plan to do finishing, landscaping, interim erosion control measures, and other items to address the construction site and disturbed ground areas prior to summer suspension. The contractor shall submit for approval an amendment to the contractor’s Erosion Control Implementation Plan (ECIP) within one week following this meeting. Update the ECIP as necessary prior to summer suspension to address site conditions at the time of summer suspension.

If sod is not available due to the construction schedule, protect open grades from erosion by use of erosion mats and temporary seeding. Once sod has become available remove the erosion mats and prep the grade in accordance 631.3.1 of the standard specifications making sure to loosen soil at least one inch deep and removing any weeds or temporary seeding that has vegetated.

1. Coordination with Businesses

The contractor will arrange and conduct a meeting between the contractor, the department, local officials and business people to discuss the project schedule of operations including vehicular and pedestrian access during construction operations. Hold the first meeting prior to the start of work under this contract and two meetings per month thereafter. The contractor shall notify all parties in writing a minimum of ten days prior to the first meeting being held.

(NER12-1003)

1. Work by Others.

At the intersection STH 42 & Main Street, the Wisconsin Department of Transportation Northeast Region Electrical Unit will perform the following work:

* Salvage the existing Flasher Control Unit
* Provide and install the Flashing Beacon Control Cabinet
* Provide and install the Signal Cable from the Control Cabinet (CB1) to the Flashing Beacon Concrete Base (FB1)

Contact the NE Region Traffic Unit at (920) 360-3107 or (920) 492-5654 three days

prior to requiring any of the above work to be completed.

1. Traffic for Installation of Flashing Beacon at STH 42 and Main St.

Prior to the erection of traffic signal poles and monotube arms, the electrical contractor shall arrange and conduct a meeting between the prime contractor, the department, and on-site project leader to coordinate traffic control requirements and restrictions for the installation of poles and monotube arms over live traffic lanes. Installation of poles, monotube arms and traffic signal modifications shall occur only during non-peak periods unless approved by the engineer.

1. Traffic Control

Perform this work in accordance to the requirements of Section 643 of the standard specifications, and as shown on the plans or as approved by the engineer, except as hereinafter modified.

Submit to engineer for approval a detailed traffic control plan for any changes to the proposed traffic control detail as shown on the plans. Submit this plan ten (10) days prior to the preconstruction conference.

Provide 24 hours-a-day availability of equipment and forces to expeditiously restore lights, signs, or other traffic control devices that are damaged or disturbed. The cost to maintain and restore the above items shall be considered incidental to the item as bid and no additional payment will be made therefore.

Supply the name and telephone number of a local contact person for traffic control repair before starting work.

Have available at all times sufficient experienced personnel to promptly install, remove and reinstall the required traffic control devices to route traffic during the construction operations.

The turning of traffic control devices when not in use to obscure the message will not be allowed under this contract.

Obtain prior approval from the engineer for the location of egress and ingress for construction vehicles to prosecute the work.

Cover existing signs which conflict with traffic control as directed by the engineer.

Conduct operations in such a manner that causes the least interference and inconvenience to the free flow of vehicles on the roadways. This includes the following:

1. Do not park or store any vehicle, piece of equipment, or construction materials on the right of way, unless otherwise specified in the traffic control article or without approval of the engineer.
2. All construction vehicles and equipment entering or leaving live traffic lanes shall yield to through traffic.
3. Equip all vehicles and equipment entering or leaving the live traffic lanes with a hazard identification beam (flashing yellow signal) capable of being visible on a sunny day when viewed without the sun directly on or behind the device from a distance of 1000 feet. Activate the beam when merging into or exiting a live traffic lane.

Do not disturb, remove or obliterate any traffic control signs, advisory signs, shoulder delineators or beam guard in place along the traveled roadways without the approval of the engineer. Immediately repair or replace any damage done to the above during the construction operations at contractor expense.

The traffic requirements are subject to change at the direction of the engineer in the event of an emergency.

(NER17-1018)

1. Removing Concrete Sidewalk

*Supplement standard spec 204 with the following:*

Removal of the concrete sidewalk where buildings abut the right-of-way shall include performing a full depth sawcut approximately one foot from buildings, or as close as possible. Remove the remaining pieces of sidewalk adjacent to the buildings using methods approved by the engineer. Payment of the full depth sawcut will be paid for under the bid item Sawing Concrete. During the saw cutting and sidewalk removal, take extreme care to not damage the buildings. The contractor will be responsible for any damage to the buildings. Salvage rebar that extend into sidewalk from the buildings and incorporate into the new sidewalk.

1. Abandoning Sewer, Item 204.0291.S.

A Description

This special provision describes abandoning existing sewer by filling it with cellular concrete as the plans show and conforming to standard spec 204 and standard spec 501as modified in this special provision.

B Materials

Provide cellular concrete meeting the following specifications: 1 part cement, 1 part fly ash, 8 parts sand, or an approved equal, and water. Provide cement meeting the requirements of standard spec 501.2.1 for Type 1 Portland Cement. Provide sand meeting the requirements of standard spec 501.2.5.3 Provide water meeting the requirements of standard spec 501.2.4.

C Construction

Fill the abandoned sewer pipe with cellular concrete as the engineer directs. In the event that the sewer cannot be completely filled from existing manholes, tap the sewer where necessary and fill from these locations.

D Measurement

The department will measure Abandoning Sewer in volume by the cubic yard as specified in standard spec 109.1.3.

E Payment

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

ITEM NUMBER DESCRIPTION UNIT

204.0291.S Abandoning Sewer CY

Payment is full compensation for furnishing all materials and excavating and backfilling where necessary.

stp-204-050 (20080902)

1. Removing Advance Flasher Assemblies Type 1, Item 204.9001.S;  
   Removing Advance Flasher Assemblies Type 2, Item 204.9002.S; Removing Flashing Beacon (STH 42 & Main St), Item SPV.0105.03.

A Description

This special provision describes removing advance flasher/beacon assemblies from the locations the plans show. Rewire and disconnect wiring in the control cabinet as necessary and properly dispose of materials conforming to standard spec 204.3.1.3.

B Materials

Dispose of all materials resulting from removing the Advance Flasher Assemblies or Beacons including but not limited to poles, break-a-way bases, signal assemblies, bulbs, and wire off the job site.

C Construction

Do not remove existing advance flasher/beacon assemblies until proper disconnects and wiring changes in the controller cabinet have been made.

Where an existing advance flasher/beacon assembly is mounted to a light pole, remove all signal hardware including wire, conduit, signal assemblies and mounts. Where existing conduit has been installed under concrete sidewalk or roadway, do not remove buried conduit unless directed otherwise by the engineer or unless it is not possible to install new wire through the existing conduit.

D Measurement

The department will measure Removing Advance Flasher/Beacon Assemblies by the unit, acceptably removed.

E Payment

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

ITEM NUMBER DESCRIPTION UNIT

204.9001.S Removing Advance Flasher Assemblies, Type 1 EACH

204.9002.S Removing Advance Flasher Assemblies, Type 2 EACH

SPV.0105.03 Remove Flashing Beacon (STH 42 & Main St) LS

Payment is full compensation for removing advanced flasher/beacon assemblies; for rewiring, as necessary; for disconnecting wiring as necessary in the controller cabinet; and for properly disposing of all materials.

Removal of concrete bases and signs associated with this item will be measured and paid for separately.

stp-204-060 (20170615)

1. Removing Cables/Conduit, Item 204.9090.S.01

**A Description**

This special provision describes removal of groups of existing lighting cables and conduit from the project.

**B (Vacant)**

**C Construction**

Existing lighting cables within conduit or direct buried will be removed from the project as a result of sub-cutting associated with roadway and sidewalk construction. Existing conduit in areas where permanent surfaces are not scheduled for removal shall be cut, capped, and abandoned. Existing lighting cables not planned for reuse shall be disconnected from existing lighting units, service cabinets and panels prior to removal. Existing conduit not planned for reuse shall be cleanly disconnected from remaining existing conduit, lighting units, and service cabinets prior to removal. The removal of existing conduit not planned for reuse shall be incidental to the removal of cables. Removed lighting cables and conduit shall become the property of the Contractor.

**D Measurement**

The department will measure Removing Cables by the lineal feet of a complete branch circuit (comprised of multiple conductors) acceptably removed.

**E Payment**

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

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| 204.9090.S.01 | Removing Cables | LF |

Payment is full compensation for removing and disposing of cables, conduit, capping conduit, and for all labor, tools, equipment and incidentals necessary to complete the contract work.

1. General Requirements for Blasting Rock.

*Add the following to standard spec 205.3.7:*

Perform all blasting in compliance with the Wisconsin Administrative Code Department of Safety and Professional Services SPS 307.43.

Blasting Plan Submittal

Not less than two weeks before commencing blasting operations, or at any time when changes to the drilling and blasting methods are proposed, submit a Blasting Plan to the engineer for review. The blasting plan shall contain full details of the drilling and blasting patterns and controls proposed for both the controlled and production blasting. Include the following minimum information in the blasting plan:

1. Station limits of proposed shot.

2. Plan and section views of proposed drill pattern including free face, burden, blasthole spacing, blasthole diameters, blasthole angles, lift height, and subdrill depth.

3. Loading diagram showing type and amount of explosives, primers, initiators, and location and depth of stemming.

4. Initiation sequence of blastholes including delay times and delay system.

5. Manufacturer’s data sheets for all explosives, primers, and initiators to be employed.

The blasting plan submittal is for quality control and record keeping purposes. Review of the blasting plan by the engineer does not relieve the contractor of responsibility for the accuracy and adequacy of the plan when implemented in the field.

Safety

Immediately notify the engineer of any incidents of fly rock, damage to any personal property, or existing roadway that is open to traffic, and any violations of the Wisconsin Administrative Code Department of Safety and Professional Services SPS 307.43. Failure to do so shall be considered a safety violation under standard spec 107 and all work on the project may be stopped under standard spec 105.1(1).

Notify the engineer of the station, location, and ‘size’ of all blasts at least one hour before the blast.

Observe the entire blast area for a minimum of five minutes following a blast to guard against rock or debris fall before commencing work in the area.

The engineer has the authority to prohibit or halt the contractor’s blasting operations if it is apparent that through the methods being employed, the required slopes are not being obtained in a stable condition, the safety and convenience of the traveling public is being jeopardized, or vibration levels above the allowable levels occur.

Condition Surveys

Conduct and document pre-blast and post-blast surveys of any nearby buildings or structures as required by the scaled-distance equation specified in the Wisconsin Administrative Code Department of Safety and Professional Services SPS 307.43. Make right of entry arrangements with the property owners for these condition surveys. Before any blasting, make the pre-blast survey records available to the engineer for review. After completion of blasting operations, perform a post-blast survey and make these records available to the engineer for review. The contractor shall be responsible for any damage resulting from blasting.

These condition surveys shall consist of visually inspecting and recording all existing defects in the structures before and after blasting operations. Photographs and/or videotape may be used to assist in documentation. Submit a written report to the department detailing the visual and photographic investigation of potentially affected structures. This report will include copies of the pre-blast and post-blast surveys and discuss any discrepancies and findings of these surveys.

If at any time during the progress of the work, the methods of drilling and blasting do not produce the desired result of a uniform slope and shear face, within the tolerances specified, drill, blast, and excavate in short sections, not exceeding 100 feet in length, until a technique is arrived at that will produce the desired results. Extra cost resulting from this requirement shall be borne by the contractor.

Vibration Control and Monitoring

All vibration control and monitoring shall comply with Wisconsin Administrative Code Department of Safety and Professional Services SPS 307.43, Instrumentation and SPS 307.44, Control of Adverse Effects.

Whenever there is a potential for vibration damage to adjacent buildings, structures, or utilities, monitor each blast with an approved seismograph located, as approved, between the blast area and the closest structure subject to blast damage, and as close as practical to the subject structure. Peak particle velocity shall not be allowed to exceed the safe limits of the nearest structure subject to vibration damage.

A vibration specialist, approved by the engineer, shall perform vibration monitoring. The vibration specialist shall monitor vibration levels according to the Wisconsin Administrative Code Department of Safety and Professional Services SPS 307.43 and interpret the seismograph records to ensure that the seismograph data shall be effectively utilized in the control of the blasting operations with respect to the existing structures and utilities.

According to the Wisconsin Administrative Code Department of Safety and Professional Services SPS 307.43 consult with the owner of any structure or utility not listed in SPS 307.43 to establish maximum allowable limits on ground vibrations. In no case shall these vibration limits exceed the following criteria:

|  |  |
| --- | --- |
| **Structure Type** | **Maximum Peak Particle Velocity (inches/second)** |
| Reinforced Concrete, Structures, Unoccupied | 4.0 |
| Steel Structures, Unoccupied | 4.0 |
| Buried Utilities | 2.0 |
| Wells and Aquifers | 2.0 |
| Green Concrete (Less than 7 days) | 1.0 |

Furnish data recorded for each shot to the engineer before the next blast; the data shall include the following:

1. Identification of vibration monitoring instrument used.

2. Name of qualified observer and interpreter.

3. Distance and direction of recording station from blast area.

4. Type of ground at recording station and material on which the instrument is sitting.

5. Peak particle velocity and principal frequency in each component.

6. A dated and signed copy of records of seismograph readings.

7. A comparison of measured seismograph readings to maximum allowable readings identified in the Wisconsin Administrative Code Department of Safety and Professional Services SPS 307.43 or as specified in this special provision.

If the recorded vibration data exceeds the allowable levels established in the Wisconsin Administrative Code Department of Safety and Professional Services SPS 307.43 or as specified in this special provision, immediately halt blasting operations. Submit a revised blasting plan to the engineer and do not resume blasting operations until the engineer approves the revised plan.

All costs associated with the work described herein shall be considered included in the bid item Excavation Rock.

stp-205-050 (20141107)

1. Granular Backfill, Item 209.0100.

*Replace 209.2.1(1) of the standard specifications with the following:*

(1) Furnish natural sand or a mixture of sand with gravel, crushed gravel or crushed stone.

*Replace 209.2.1(2) of the standard specifications with the following:*

(2) For backfill of storm sewer, use a maximum size of any gravel or stone that meets gradation for 1 ¼-Inch base listed under section 305.2.2.1 of the standard specifications manual.

1. Select Crushed Material, Item 312.0110

*Replace 312.2(1) of the standard specifications with the following:*

(1) Furnish crushed stone substantially free of unconsolidated overburden materials, topsoil, organic materials, steel, and other deleterious materials. A department approved source, sound and ware tests, and field acceptance testing are not required for this item. Item to be visually inspected and approved by engineer prior to placement.

*Replace 312.3(2) of the standard specifications with the following:*

(2) Spread select crushed material in a manner that interlocks aggregate pieces and matches adjacent grades.

1. QMP Base Aggregate.

A Description

A.1 General

(1) This special provision describes contractor quality control (QC) sampling and testing for base aggregates, documenting those test results, and documenting related production and placement process changes. This special provision also describes department quality verification (QV), independent assurance (IA), and dispute resolution.

(2) Conform to standard spec 301, standard spec 305, and standard spec 310 as modified here in this special provision. Apply this special provision to material placed under all of the Base Aggregate Dense and Base Aggregate Open Graded bid items, except do not apply this special provision to material classified as reclaimed asphaltic pavement placed under the Base Aggregate Dense bid items.

(3) Do not apply this special provision to material placed and paid for under the Aggregate Detours, Breaker Run, Select Crushed, Pit Run, Subbase, or Riprap bid items.

(4) Provide and maintain a quality control program, defined as all activities related to and documentation of the following:

1. Production and placement control and inspection.

2. Material sampling and testing.

(5) Chapter 8 of the department’s construction and materials manual (CMM) provides additional detailed guidance for QMP work and describes required sampling and testing procedures.

<http://wisconsindot.gov/rdwy/cmm/cm-08-00toc.pdf>

A.2 Small Quantities

(1) The department defines a small quantity, for each individual Base Aggregate bid item, as a contract quantity of 9000 tons or less of material as shown in the schedule of items under that bid item.

(2) The requirements under this special provision apply equally to a small quantity for an individual bid item except as follows:

A.2.1 Quality Control Plan

(1) Submit an abbreviated quality control plan consisting of the following:

1. Organizational chart including names, telephone numbers, current certifications with HTCP numbers, and expiration dates, and roles and responsibilities of all persons involved in the quality control program for material under affected bid items.

A.2.2 Contractor Testing

1. Testing frequency:

|  |  |
| --- | --- |
| **Contract Quantity** | **Minimum Required Testing per source** |
| ≤ 6000 tons | One stockpile test before placement, and two production or one loadout test. *[1] [2]* |
| > 6000 tons and ≤ 9000 tons | One stockpile and Three placement tests *[3] [4] [5]* |

*[1]* Submit production test results to the engineer for review before incorporating the material into the work. Production test results are valid for a period of 3 years.

*[2]* If the actual quantity overruns 6,000 tons, on the next day of placement perform one randomly selected placement test for each 3000 tons, or fraction of 3000 tons, of overrun.

*[3]* If the actual quantity overruns 9000 tons, on the next day of placement perform one randomly selected placement test for each 3000 tons, or fraction of 3000 tons, of overrun.

*[4]* For 3-inch material or lift thickness of 3 inch or less, obtain samples at load-out.

*[5]* Divide the aggregate into uniformly sized sublots for testing.

2. Stockpile testing for concrete pavement recycled in place will be sampled on the first day of production.

3. Until a four point running average is established, individual placement tests will be used for acceptance. Submit aggregate load-out and placement test results to the engineer within one business day of obtaining the sample. Assure that all properties are within the limits specified for each test.

4. Material represented by a sublot with any property outside the specification limits is nonconforming. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

A.2.3 Department Testing

(1) The department will perform testing as specified in B.8 except as follows:

- Department testing may be waived for contract bid item quantities of 500 tons or less.

B Materials

B.1 Quality Control Plan

(1) Submit a comprehensive written quality control plan to the engineer at or before the pre-construction meeting. Do not place base before the engineer reviews and comments on the plan. Construct the project as that plan provides.

(2) Do not change the quality control plan without the engineer’s review. Update the plan with changes as they become effective. Provide a current copy of the plan to the engineer and post in each of the contractor’s laboratories as changes are adopted. Ensure that the plan provides the following elements:

1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.

2. The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication means that will be used, and action time frames.

3. A list of source and processing locations, section and quarter descriptions, for all aggregate materials requiring QC testing.

4. Test results for wear, sodium sulfate soundness, freeze/thaw soundness, and plasticity index of all aggregates requiring QC testing. Obtain this information from the region materials unit or from the engineer.

5. Descriptions of stockpiling and hauling methods.

6. Locations of the QC laboratory, retained sample storage, and where control charts and other documentation is posted.

7. An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.

B.2 Personnel

(1) Have personnel certified under the department’s highway technician certification program (HTCP) perform sampling, testing, and documentation as follows:

|  |  |  |
| --- | --- | --- |
| SAMPLING AND TESTING ROLES | TEST STANDARD | REQUIRED CERTIFICATION |
| Random Sampling of Materials  Sampling Aggregates | ASTM D3665  AASHTO T2 *[1]* | Transportation Materials Sampling Technician (TMS)  Aggregate Technician I (AGGTEC-I)  AGGTEC-I Assistant Certified Technician (ACT-AGG) |
| Percent passing the 200 Sieve  Gradation  Moisture Content  Fractured Faces | AASHTO T11  AASHTO T27  AASHTO T255  ASTM D5821 | Aggregate Technician I (AGGTEC-I)  AGGTEC-I Assistant Certified Technician (ACT-AGG) |
| Liquid and Plasticity Index | AASHTO T89  AASHTO T90 | Aggregate Testing for Transportation Systems (ATTS)  Grading Technician I (GRADINGTEC-1)  Grading Assistant Certified Technician (ACT-Grading) |
| Plasticity Check | AASHTO T90 | Aggregate Technician I (AGGTEC-I)  AGGTEC-I Assistant Certified Technician (ACT-AGG) Grading Technician I (GRADINGTEC-1)  Grading Assistant Certified Technician (ACT-Grading) |

*[1]* Plant personnel under the direct observation of an aggregate technician certified at level one or higher may operate equipment to obtain samples.

(2) A certified technician must coordinate and take responsibility for the work an ACT performs. Have a certified technician ensure that all sampling and testing is performed correctly, analyze test results, and post resulting data. No more than one ACT can work under a single certified technician.

B.3 Laboratory

(1) Perform QC testing at a department-qualified laboratory. Obtain information on the Wisconsin laboratory qualification program from:

Materials Management Section

3502 Kinsman Blvd.

Madison, WI 53704

Telephone: (608) 246-5388

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrces/tools/appr-prod/qual-labs.aspx>

B.4 Quality Control Documentation

B.4.1 General

(1) Submit base aggregate placement documentation to the engineer within 10 business days after completing base placement. Ensure that the submittal is complete, neatly organized, and includes applicable project records and control charts.

B.4.2 Records

(1) Document all placement observations, inspection records, and control adjustments daily in a permanent field record. Also include all test results in the project records. Provide test results to the engineer within one business day after obtaining a sample. Post or distribute tabulated results using a method mutually agreeable to the engineer and contractor.

B.4.3 Control Charts

(1) Plot gradation and fracture on the appropriate control chart as soon as test results are available. Format control charts according to CMM 8.30. Include the project number on base placement control charts. Maintain separate control charts for each base aggregate size, source or classification, and type.

(2) Provide control charts to the engineer within one business day after obtaining a sample. Post or distribute charts using a method mutually agreeable to the engineer and contractor. Update control charts daily to include the following:

1. Contractor individual QC tests.

2. Department QV tests.

3. Department IA tests.

4. Four-point running average of the QC tests.

(3) Except as specified under B.8.2.1 for nonconforming QV placement tests, include only QC placement tests in the running average. The contractor may plot process control or informational tests on control charts, but do not include these tests, conforming QV tests, or IA tests in the running average.

B.5 Contractor Testing

(1) Test gradation, fracture, liquid limit and plasticity index during placement for each base aggregate size, source or classification, and type.

(2) Perform one stockpile test from each source before placement. One stockpile test may be used for multiple projects up to 60 calendar days.

(3) Test gradation once per 3000 tons of material placed or fraction thereof. Determine random sample locations and provide those sample locations to the engineer. Obtain samples after the material has been bladed, mixed, and shaped but before watering and compacting; except collect 3-inch samples or lift thickness of 3 inch or less from the stockpile at load-out. Do not sample from material used to maintain local traffic or from areas of temporary base that will not have an overlying pavement. On days when placing only material used to maintain local traffic or only temporary base that will not have an overlying pavement, no placement testing is required.

(4) Split each contractor QC sample and identify it according to CMM 8.30. Retain the split for seven calendar days in a dry, protected location. If requested for department comparison testing, deliver the split to the engineer within one business day.

(5) The engineer may require additional sampling and testing to evaluate suspect material or the technician’s sampling and testing procedures.

(6) Test fracture for each gradation test until the fracture running average is above the lower warning limit. Subsequently, the contractor may reduce the frequency to one test per 10 gradation tests if the fracture running average remains above the warning limit.

(7) Test the liquid limit and plasticity index for the first gradation test. Subsequently, test the liquid limit and plasticity index a minimum of once per 10 gradation tests.

B.6 Test Methods

B.6.1 Gradation

(1) Test gradation using a washed analysis conforming to the following as modified in CMM 8.60:

Gradation AASHTO T 27

Material finer than the No. 200 sieve AASHTO T 11

(2) For 3-inch base, if 3 consecutive running average points for the percent passing the No. 200 sieve are 8.5 percent or less, the contractor may use an unwashed analysis. Wash at least one sample out of 10. If a single running average for the percent passing the No. 200 sieve exceeds 8.5 percent, resume washed analyses until 3 consecutive running average points are again 8.5 percent passing or less.

(3) Maintain a separate control chart for each sieve size specified in standard spec 305 or standard spec 310 for each base aggregate size, source or classification, and type. Set control and warning limits based on the standard specification gradation limits as follows:

1. Control limits are at the upper and lower specification limits.

2. There are no upper warning limits for sieves allowing 100 percent passing and no lower control limits for sieves allowing 0 percent passing.

3. Dense graded warning limits, except for the No. 200 sieve, are 2 percent within the upper and lower control limits. Warning limits for the No. 200 sieve are set 0.5 percent within the upper and lower control limits.

4. Open graded warning limits for the 1-inch, 3/8-inch, and No. 4 sieves are 2 percent within the upper and lower control limits. Upper warning limits for the No. 10, No. 40, and No. 200 sieves are 1 percent inside the upper control limit.

B.6.2 Fracture

(1) Test fracture conforming to CMM 8.60. The engineer will waive fractured particle testing on quarried stone.

(2) Maintain a separate fracture control chart for each base aggregate size, source or classification, and type. Set the lower control limit at the contract specification limit, either specified in another special provision or in table 301-2 of standard spec 301.2.4.5. Set the lower warning limit 2 percent above the lower control limit. There are no upper limits.

B.6.3 Liquid Limit and Plasticity

(1) Test the liquid limit and plasticity according to AASHTO T 89 and T 90.

(2) Ensure the material conforms to the limits specified in standard spec table 301-2.

B.7 Corrective Action

B.7.1 General

(1) Consider corrective action when the running average trends toward a warning limit. Take corrective action if an individual test exceeds the contract specification limit. Document all corrective actions both in the project records and on the appropriate control chart.

B.7.2 Placement Corrective Action

(1) Do not blend additional material on the roadbed to correct gradation problems.

(2) Notify the engineer whenever the running average exceeds a warning limit. When two consecutive running averages exceed a warning limit, the engineer and contractor will discuss appropriate corrective action. Perform the engineer’s recommended corrective action and increase the testing frequency as follows:

1. For gradation, increase the QC testing frequency to at least one randomly sampled test per 1000 tons placed.

2. For fracture, increase the QC testing frequency to at least one test per gradation test.

(3) If corrective action improves the property in question such that the running average after four additional tests is within the warning limits, the contractor may return to the testing frequency specified in B.5.3. If corrective action does not improve the property in question such that the running average after four additional individual tests is still in the warning band, repeat the steps outlined above starting with engineer notification.

(4) If the running average exceeds a control limit, material starting from the first running average exceeding the control limit and ending at the first subsequent running average inside the control limit is nonconforming and subject to pay reduction.

(5) For individual test results significantly outside the control limits, notify the engineer, stop placing base, and suspend other activities that may affect the area in question. The engineer and contractor will jointly review data, data reduction, and data analysis; evaluate sampling and testing procedures; and perform additional testing as required to determine the extent of potentially unacceptable material. The engineer may direct the contractor to remove and replace that material. Individual test results are significantly outside the control limits if meeting one or more of the following criteria:

1. A gradation control limit for the No. 200 sieve is exceeded by more than 3.0 percent.

2. A gradation control limit for any sieve, except the No. 200, is exceeded by more than 5.0 percent.

3. The fracture control limit is exceeded by more than 10.0 percent.

B.8 Department Testing

B.8.1 General

(1) The department will conduct verification testing to validate the quality of the product and independent assurance testing to evaluate the sampling and testing. The department will provide the contractor with a listing of names and telephone numbers of all QV and IA personnel for the project, and provide test results to the contractor within two business days after the department obtains the sample.

B.8.2 Verification Testing

B.8.2.1 General

(1) The department will have an HTCP technician, or ACT working under a certified technician, perform QV sampling and testing. Department verification testing personnel must meet the same certification level requirements specified in B.2 for contractor testing personnel for each test result being verified. The department will notify the contractor before sampling so the contractor can observe QV sampling.

(2) The department will conduct QV tests of each base aggregate size, source or classification, and type during placement conforming to the following:

1. Perform one stockpile test from each source before placement.

2. At least one random test per 30,000 tons, or fraction of 30,000 tons, placed.

(3) The department will sample randomly, at locations independent of the contractor’s QC work, collecting one sample at each QV location. The department will collect QV samples after the material has been bladed, mixed, and shaped but before watering and compacting; except, for 3-inch aggregates or for a lift thickness of 3 inch or less, the department will collect samples at load-out. The department will split each sample, test half for QV, and retain half.

(4) The department will conduct QV tests in a separate laboratory and with separate equipment from the contractor’s QC tests. The department will use the same methods specified for QC testing.

(5) The department will assess QV results by comparing to the appropriate specification limits. If QV test results conform to the specification, the department will take no further action. If QV test results are nonconforming, add the QV to the QC test results as if it were an additional QC test.

B.8.3 Independent Assurance

(1) Independence assurance is unbiased testing the department performs to evaluate the department’s QV and the contractor’s QC sampling and testing including personnel qualifications, procedures, and equipment. The department will perform an IA review according to the department’s independent assurance program. That review may include one or more of the following:

1. Split sample testing.

2. Proficiency sample testing.

3. Witnessing sampling and testing.

4. Test equipment calibration checks.

5. Reviewing required worksheets and control charts.

6. Requesting that testing personnel perform additional sampling and testing.

(2) If the department identifies a deficiency, and after further investigation confirms it, correct that deficiency. If the contractor does not correct or fails to cooperate in resolving identified deficiencies, the engineer may suspend placement until action is taken. Resolve disputes as specified in B.9.

B.9 Dispute Resolution

(1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor’s and the engineer’s testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and perform additional testing. Use ASTM E 178 to evaluate potential statistically outlying data.

(2) Production test results, and results from other process control testing, may be considered when resolving a dispute.

(3) If the project personnel cannot resolve a dispute, and the dispute affects payment or could result in incorporating non-conforming product, the department will use third party testing to resolve the dispute. The department’s central office laboratory, or a mutually agreed on independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party test results to evaluate the quality of questionable materials and determine the appropriate payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

C (Vacant)

D (Vacant)

E Payment

(1) Costs for all sampling, testing, and documentation required under this special provision are incidental to this work. If the contractor fails to perform the work required under this special provision, the department may reduce the contractor’s pay. The department will administer pay reduction under the non-performance of QMP administrative item.

(2) For material represented by a running average exceeding a control limit, the department will reduce pay according to CMM 8-10.5.2 for the affected Base Aggregate bid items listed in subsection A. The department will administer pay reduction under the Nonconforming QMP Base Aggregate Gradation or Nonconforming QMP Base Aggregate Fracture Administrative items. The department will determine the quantity of nonconforming material as specified in B.7.2.

stp-301-010 (20171130)

1. Shaping Roadway, Item 305.0502.S.

A Description

This special provision describes blading the existing shoulder aggregates on the prepared foundation across the pavement removal area, and shaping and compacting the aggregate as the plans show and conforming to standard spec 305.

B (Vacant)

C (Vacant)

D Measurement

The department will measure Shaping Roadway by the station along the centerline of each roadway.

E Payment

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

ITEM NUMBER DESCRIPTION UNIT

305.0502.S Shaping Roadway STA

Payment is full compensation for all blading, shaping, and compacting; and for preparing the foundation.

stp-305-005 (20080902)

1. Coloring Concrete Custom, Item 405.0200.

Add the following to standard specification 405.2.1.

Integrally colored concrete shall be Butterfield Color “Uni-mix” color: U31 – weathered Terra Cotta; Solomon Colors “Dry Integral Color”: Color 775 Cedar; or Scofield “Chromix” color 5238 Sunbaked Clay.

*Replace standard spec 405.2.1.1(3) with the following:*

(3) The department will accept the color based on comparison to color samples available for viewing at [location of comparison sample].

1. HMA Percent Within Limits (PWL) Test Strip Volumetrics, Item SPV.0060.13; HMA Percent Within Limits (PWL) Test Strip Density Item SPV.0060.14.

**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 projects constructed under HMA Percent Within Limits (PWL) QMP. A test strip is required for each pavement layer placed over a specific, uniform underlying material, unless specified otherwise in the plans. Each project is restricted to a single mix design for each mix type required (e.g., upper layer and lower layer may have different mix type specified).

Perform work according to standard spec 460 and as hereinafter modified.

**B Materials**

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

**C Construction**

**C.1 Test Strip**

Notify the department at least 5 calendar days in advance of construction of the test strip. On the first day of production for a test strip, produce approximately 750 tons of HMA. (Note: tonnage shall be adjusted to accommodate natural break points in the project.) Test strips shall be located 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, HMA mixture samples shall be obtained from trucks prior to departure from the plant. Three split samples shall be collected during the production of test strip material. Sampling and splitting shall be in accordance with Appendix A: *Sampling for WisDOT PWL QMP*. 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 |
| 2 | to |
| 3 | to T |

**C.1.1.2 Density**

Required field tests include contractor QC and department QV nuclear density gauge tests and pavement coring.

The engineer will identify two zones in which gauge/core correlation is to be performed. These two zones will be randomly selected within each *half* of the test strip length. (Note: Density zones shall not overlap and must have a minimum of 100 feet between the two zones; therefore random numbers may be shifted (evenly) in order to meet these criteria.) Each zone shall consist of five locations across the mat as identified in Appendix A. The following shall be determined at each of the five locations within both zones:

- two one-minute nuclear density gauge readings for QC team\*

- two one-minute nuclear density gauge readings for QV team\*

- pavement core sample

\*If the two readings exceed 1.0 lb/ft3 of one another, a third reading shall be conducted in the same orientation as the first reading. [In this event, the engineer will average all three readings, discard the initial of the three readings which falls farthest from the average value and then average the remaining two values to represent the location for the gauge.]

Both QV and QC teams shall have two nuclear density gauges present for correlation at the time the test strip is constructed. The above testing shall be conducted in accordance with Appendix A: *Test Methods & Sampling for PWL QMP HMA Pavements*.

All test reports shall be submitted to the department upon completion, and approved before paving resumes.

**C.1.2 Field Tests**

**C.1.2.1 Density**

Daily standardization of gauges on reference blocks and a project reference site shall be performed in accordance with CMM 8-15. 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 for the remainder of the project 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 project. 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. 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.

Each core 150 mm (6 inches) in diameter shall be taken at locations identified in Section C.1.1.2 Each random core shall be full thickness of the layer placed. Core densities shall be determined in accordance with AASHTO T 166. Thoroughly dry pavement cores in accordance with ASTM D 7227. 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, 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 from the end of the previous day’s production multiplied by 62.24 lb/ft3.)

Fill all core holes with non-shrink rapid-hardening grout, mortar or concrete, or with HMA. When using grout, mortar or concrete, remove all water from the core holes prior to filling. Mix the mortar or concrete in a separate container prior to placement in the hole. If HMA is used, fill all core holes with hot-mix matching the same day’s production mix type at same day compaction temperature +/- 20 F. The core holes shall be dry and coated with tack before filling, filled with a top layer no thicker than 2.25 inches, lower layers not to exceed 4 inches, and compacted with a Marshall hammer or similar tamping device using approximately 50 blows per layer. The finished surface shall be flush with the pavement surface. Any deviation in the surface of the filled core holes greater than 1/4 inch at the time of final inspection will require removal of the fill material to the depth of the layer thickness and replacement.

All applicable laboratory and field testing associated with a test strip shall be completed prior to any additional mainline placement of the mix for the associated test strip. 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.

[Exclusions such as shoulders and appurtenances shall be tested 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 Table 460-3.]

**C.1.3 Laboratory Tests**

**C.1.3.1 Volumetrics**

Obtain random samples according to Appendix A. Obtain HMA mixture samples from trucks at the plant. Perform tests the same day as taking the sample.

Bulk specific gravities shall be determined for cores in accordance with AASHTO T 166. 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. QC and QV teams may wish to scan with additional gauges at the locations detailed in C.1.1 above, as only gauges used during the test strip correlation phase will be allowed on the remainder of the project.

**C.2 Acceptance**

**C.2.1 Volumetrics**

Conform to the following limits based on individual QC and QV test results (tolerances based on initial JMF/mix design):

ITEM CONFORMANCE 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 - 0.5

Air Voids -1.5 & +2.0

VMA in percent*[1]* - 1.0

Maximum specific gravity +/- 0.024

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

QV test results will be determined for air voids and VMA, Gmm, and Gmb, and AC.

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 Analysis Template.

If QC and QV test results do not correlate as determined by the paired t-test, 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 acceptance 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 may 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-provided Field Density Worksheet.

**C.2.3 Test Strip Acceptance**

The department will evaluate material acceptance 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 acceptable test strip is defined as the individual PWL value for air voids and density both above 75, and an acceptable gauge-to-core correlation.

If either PWL value for the test strip is below 50, the material is nonconforming and the test strip is unacceptable. Material allowed to remain in place requires another test strip prior to additional paving. If material is removed, a new test strip shall replace the previous one at no additional cost to the department. 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, mix acceptance 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 in accordance with 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 |
| SPV.0060.XX | HMA Percent Within Limits (PWL) Test Strip Volumetrics | EACH |
| SPV.0060.XX | 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 projects 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.

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 calculated in accordance with Appendix A.

The department will adjust pay for each test strip as follows:

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 of 50 or less 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 in accordance with Table 460-3 as modified here within. 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., excluding shoulder) as determined in accordance with CMM 8-15.

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.

bts-PWL Test Strip (20171002)

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 required below.

**B Materials**

Conform to the requirements of standard specs 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 project, 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 for 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 Appendix A Test Methods & Sampling for HMA Pavement PWL QMP. Obtain HMA mixture samples from trucks at the plant. For the sublot in which a QV sample is collected, the QC sample shall be discarded, and the QC team shall test a split of the QV sample.

(3) 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. Samples shall be labeled in accordance with Appendix A. 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 according to AASHTO T 308 (ignition oven) or AASHTO T 164 (chemical extraction)
* Bulk specific gravity (Gmb) of the compacted mixture according to AASHTO T 166.
* Maximum specific gravity (Gmm) according to AASHTO T 209.
* 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 on the project. Add a random sample for any fraction of 750 tons at the end of a project. Partial lots with less than three sublot tests will be included into the previous lot for data analysis/acceptance and pay. 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 conformance limits based on individual QC and QV test results (tolerances relative to JMF):

ITEM ACTION LIMITS CONFORMANCE 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 - 0.5

Va - 1.5 & +2.0

VMA in percent*[1]* - 0.5 -1.0

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

(2) QV samples will be tested for air voids, VMA, Gmm, Gmb, and AC.

(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. Additional QV tests must meet action limits or be subject to production stop and/or remove and replace.

(4) For any additional tests outside the random number testing conducted for volumetrics, the data collected will not be entered into PWL calculations. However, additional QV testing shall meet the tolerances for material acceptance as specified in the Standard Specification and this document.

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

*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 HMA technician, certified at a level appropriate for sampling and mixture production control testing, to observe QV sampling of project mixtures.

(2) Under departmental observation, a contractor HMA technician certified at a level appropriate for sampling and mixture production control testing will collect and split samples.

(3) A department HMA technician certified at a level appropriate for sampling and mixture production control testing will ensure that all sampling is performed correctly and conduct testing, analyze test results, and report resulting data.

(4) The department will provide an organizational chart 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 provide 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. Retention of samples will be provided until surpassing the analysis window of up to 5 lots, as defined in 460.2.8.3.1.7(2) of this document. Additional sampling details are found in Appendix A.

(2) The department will verify product quality using the test methods specified here in 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.
* Maximum specific gravity (Gmm) according to AASHTO T 209.
* 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 by ignition oven according to AASHTO T 308 or by chemical extraction according to AASHTO T 164

(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 Acceptance for Volumetrics

(1) Acceptance 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 project (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. Dispute resolution via further investigation is as follows:

[1] The Retained portion of the split from the most recent lot in the analysis window (specifically the sublot identifying that variances or means do not compare) shall be referee tested by the bureau's AASHTO accredited laboratory and certified personnel. If the non-comparison occurs following Lot 3, 4, or 5, all previous lots are subject to referee testing. 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 QV 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 report not comparing. The department’s region lab and the referee test results will be used for PWL and pay factor/adjustment calculations.

[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 absorb 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 contractor pays for the additional referee testing at $2,000/lot.

(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 project data, and inspecting the completed pavement according to Standard Spec, this special provision, and accompanying Appendix A.

(5) Nonconforming mix (i.e., resulting in a PWL value less than 50 or not meeting the requirements of 460.2.8.2.1.7 as modified here within) may be subject to remove and replace, at the discretion of the engineer. 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 shall 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 data analysis and pay determination.] If the engineer approves the nonconforming material to remain in place, it will be paid at 50% of the HMA Pavement contract unit price. The extent of nonconforming mix shall be determined by following the dispute resolution process detailed in 460.2.8.3.1.7(2) of this document. The quantity of material paid at 50% the contract unit price will be deducted from PWL pay adjustments, along with accompanying data of this nonconforming 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 3 tests randomly per sublot and the department will randomly conduct one (1) QV test per sublot. A partial quantity less than 1500 lane feet will be included with the previous sublot. Partial lots with less than three sublots will be included into 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 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 Table 460-3.

(4) The three QC locations per sublot will represent the outside, middle, and inside of the paving lane. Each location will be measured with two one-minute gauge readings oriented 180 degrees from one another, in the same footprint as detailed in Appendix A. Each location will be the average of the two readings. If the two readings exceed 1.0 lb/ft3 of one another, a third reading shall be conducted in the same orientation as the first reading. In this event, all three readings shall be averaged, the initial of the three readings which falls farthest from the average value discarded, and the remaining two values averaged to represent the location for the gauge. Multiple locations are not to be averaged together.

(5) QV nuclear testing will consist of a randomly selected location per sublot. The QV is also comprised of two one-minute readings, averaged as described in 460.3.3.2(4) above.

(6) A certified nuclear density technician shall identify random locations and perform the testing. 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 acceptance as specified in the Standard Specification and this document. If additional density data identifies nonconforming material, proceed in accordance with 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 Acceptance of Density Data

(1) Acceptance 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 shall be recorded in the PWL 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 project data, and inspecting the completed pavement according to Standard Spec, this document, and accompanying Appendix.

(4) Density resulting in a PWL value less than 50 or not meeting the requirements of 460.3.3.1 is non-conforming 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 shall 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 approves the nonconforming material to remain in place, it will be paid for at 50% of the HMA Pavement contract unit price. The extent of nonconforming density is addressed in accordance with 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 nonconforming 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 here within.

**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 analysis template, including data, will be provided 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 *Calculations* worksheet of the WisDOT PWL Analysis Template:

**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 of 50 or less 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 shall be in accordance with 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) as determined in accordance with CMM 8-15.

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.

Note: PWL value determination is further detailed in the *Calculations* worksheet of the WisDOT PWL Analysis Template.

bts-HMA PWL QMP (20171002)

**Appendix A**

**TEST Methods & Sampling for HMA Pavement PWL QMP.**

The following procedures are included to the HMA Pavement Percent Within Limits (PWL) Quality Management Program (QMP) special provision:

* WisDOT Procedure for Nuclear Gauge/Core Correlation – Test Strip
* WisDOT Test Method for HMA PWL QMP Density Measurements for Main Production
* Sampling for WisDOT HMA PWL QMP

**WisDOT Procedure for Nuclear Gauge/Core Correlation – Test Strip**

Density Testing Zone of Approximately 200 lane ft

Outermost locations to be kept approx. 1.5 ft from edge of lane to the center of gauge





Middle locations @ approx. Center of Lane (i.e., 6 feet to center of gauge for 12-ft lane)





Intermediate locations to be at approx. 3.5 & 9.5 feet from edge of lane to center of gauge

Paving Direction



Centered @

Random Locations 1 & 2

(identified by the Engineer)

~ 50 ft

~ 50 ft

~ 50 ft

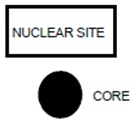
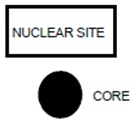
~ 50ft

**Figure 1: Nuclear/Core Correlation Location Layout**

The zones are supposed to be undisclosed to the contractor/roller operators. The engineer will not lay out density/core test sites until rolling is completed and the cold/finish roller is beyond the entirety of the zone. Sites are staggered across the 12-foot travel lane, and do not include shoulders. The outermost locations should be 1.5-feet from the center of the gauge to the edge of lane. [NOTE: This staggered layout is only applicable to the test strip. All mainline density locations after test strip should have a longitudinal- as well as transverse-random number to determine location as detailed in the *WisDOT Test Method for HMA PWL QMP Density Measurements for Main Production* section of this document.]



Individual locations are represented by the symbol as seen in Figure 1 above. The symbol is two-part, comprised of the nuclear test locations and the location for coring the pavement, as distinguished here:



The nuclear site is the same for QC and QV readings for the test strip, i.e., the QC and QV teams are to take nuclear density gauge readings in the same footprint. Each of the QC and QV teams are to take a minimum of two one-minute readings per nuclear site, with the gauge rotated 180 degrees between readings, as seen here:

1. (b)

**Figure 2: Nuclear gauge orientation for (a) 1st one-minute reading and (b) 2nd one-minute reading**

Photos should be taken of each of the 10 core/gauge locations of the test strip. This should include gauge readings (pcf) and a labelled core within the gauge footprint. If a third reading is needed, all three readings should be recorded and documented. Only raw readings in pcf should be written on the pavement during the test strip, with a corresponding gauge ID/SN (generalized as QC-1 through QV-2 in the following Figure) in the following format:



**Figure 3: Layout of raw gauge readings as recorded on pavement**

Each core will then be taken from the center of the gauge footprint, and will be used to correlate each gauge with laboratory-measured bulk specific gravities of the pavement cores. One core in good condition must be obtained from each of the 10 locations. If a core is damaged at the time of extracting from the pavement, a replacement core should be taken immediately adjacent to the damaged core, i.e., from the same footprint. If a core is damaged during transport, it should be recorded as damaged and excluded from the correlation. Coring after traffic is on the pavement should be avoided. The contractor is responsible for coring of the pavement. Coring and filling of 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. Core density testing will 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 initial testing and is responsible for any verification testing.

Each core 150 mm (6 inches) in diameter will be taken at locations as identified in Figure 1. Each random core will be full thickness of the layer being placed. The contractor is responsible for thoroughly drying cores obtained from the mat in accordance with ASTM D 7227 prior to using specimens for in-place density determination in accordance with AASHTO T 166.

Cores must be taken before the pavement is open to traffic. Cores are cut under Department/project staff observation. Relabel each core immediately after extruding, or ensure that labels applied to pavement prior to cutting remain legible. The layer interface should also be marked immediately following extrusion. Cores should be cut at this interface, using a wet saw, to allow for density measurement of only the most recently placed layer. Cores should be protected from excessive temperatures such as direct sunlight. Also, there should be department custody (both in transport and storage) for the cores until they are tested, whether that be immediately after the test strip or subsequent day if agreed upon between Department and Contractor. Use of concrete cylinder molds works well to transport cores. Cores should be placed upside down (flat surface to bottom of cylinder mold) in the molds, one core per mold, cylinder molds stored upright, and ideally transported in a cooler. Avoid any stacking of pavement cores.

**WisDOT Test Method for HMA PWL QMP Density Measurements for Main Production**

For nuclear density testing of the pavement beyond the test strip, QC tests will be completed at three locations per sublot, with a sublot defined as 1500 lane feet. The three locations will represent the outside, middle, and inside of the paving lane (i.e., the lane width will be divided into thirds as shown by the dashed longitudinal lines in Figure 3 and random numbers will be used to identify the specific transverse location within each third in accordance with CMM 8-15). Longitudinal locations within each sublot shall be determined with 3 independent random numbers. The PWL Density measurements do not include the shoulder and other appurtenances. Such areas are tested by the department and are not eligible for density incentive. Each location will be measured with two one-minute gauge readings oriented 180 degrees from one another, in the same footprint as detailed in Figure 2 above. Each location requires a minimum of two readings per gauge. QV nuclear testing will consist of one randomly selected location per sublot. The QV is also comprised of two one-minute readings. This is depicted as follows, with QC test locations shown as solid lines and QV as dashed.

1 lot (7500 lane ft)

Division of lane width into approximate thirds for distribution of transverse random numbers

12 driving lane (typical)

Paving Direction

Note: 12 driving lane (typical), excludes shoulders even when paved integrally

Sublot 1

(1500 ln ft)

Sublot 2

(1500 ln ft)

Sublot 3

(1500 ln ft)

Sublot 4

(1500 ln ft)

Sublot 5

(1500 ln ft)

**Figure 5: Locations of main lane HMA density testing (QC=solid lines, QV=dashed)**

QC and QV nuclear density gauge readings will be statistically analyzed in accordance with the following section of this Appendix. (Note: For density data, if F- and t-tests compare, QC data will be used for the subsequent calculations of PWL value and pay determination. However, if an F- or t-test does not compare, the QV data will be used in subsequent calculations.)

**Sampling for WisDOT HMA PWL QMP**

*Delete CMM 8-36.4 Sampling Hot Mix Asphalt and replace with the following to update sublot tonnages:*

Sampling Hot Mix Asphalt

At the beginning of the project, the contractor determines the anticipated tonnage to be produced. The frequency of sampling is 1 per 750 tons (sublot) for QC and 1 per 3750 tons (lot or 5 sublots) for QV as defined by the PWL QMP SPV. A test sample is obtained randomly from each sublot. The contractor must submit the random numbers for all mix sampling to the department before production begins.

*Example 1*

Expected project production is 12,400 tons. The number of required samples is determined based on this expected production (per PWL QMP SPV) and is determined by the random sample calculation.

Sample 1 – from 50 to 750 tons

Sample 2 – from 751 to 1500 tons

Sample 3 – from 1501 to 2250 tons

Sample 4 – from 2251 to 3000 tons

Sample X – ………………………

Sample 16 – from 11,251 to 12,000 tons

Sample 17 – from 12,001 to 12,400 tons

The approximate location of each sample within the prescribed sublots is determined by selecting random numbers using ASTM Method D-3665 or by using a calculator or computerized spreadsheet that has a random number generator. The random numbers selected are used in determining when a sample is to be taken and will be multiplied by the sublot tonnage. This number will then be added to the final tonnage of the previous sublot to yield the approximate cumulative tonnage of when each sample is to be taken.

To allow for plant start-up variability, the procedure calls for the first random sample to be taken at 50 tons or greater per production day (not intended to be taken in the first two truckloads). Random samples calculated for 0-50 ton should be taken in the next truck (51-75 ton).

This procedure is to be used for any number of samples per project.

If the production is less than the final randomly generated sample tonnage, then the random sample is to be collected from the remaining portion of that sublot of production. If the randomly generated sample is calculated to be within the first 0-50 tons of the subsequent day of production, it should be taken in the next truck. Add a random sample for any fraction of 750 tons at the end of the project. Lot size will consist of 3750 tons with sublots of 750 tons. Partial lots with less than three sublot tests will be included into the previous lot, by the engineer.

It’s intended that the plant operator not be advised ahead of time when samples are to be taken. If the plant operator is involved in recording a Pb (%AC) to match up with the mix sample tonnage, then notification need not be earlier than 60 minutes before the mix sample being taken.

If belt samples are used during troubleshooting, the blended aggregate will be obtained when the mixture production tonnage reaches approximately the sample tonnage. For plants with storage silos, this could be up to 60 minutes in advance of the mixture sample that’s taken when the required tonnage is shipped from the plant.

*Delete CMM 8-36.4.2.1 through 8-36.4.2.3 and replace with the following PWL Split Sample Sizes*

*PWL Split Sample Sizes*

- Minimum sample sizes are referenced below and are guidance for meeting requirements for test completion.

|  |  |
| --- | --- |
| **Mixture NMAS** | **Minimum Individual Sample Size** |
| < 12.5mm (1/2") | 35 lb (4 x 35 = 140 lb) |
| 19.0mm - 25.0mm (3/4" – 1") | 50 lb (4 x 50 = 200 lb) |
| > 37.5mm ( 1-1/2") | 80 lb (4 x 80 = 320 lb) |

- The total sample for larger NMAS (nominal maximum aggregate size) mixtures will be enough to provide the required minimum testing sample size as defined in Figure 6.

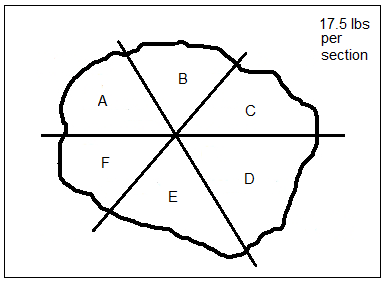
*Delete 8-36.5.1.1 Step 1 and replace with the following Initial Splitting of Sample*

***Initial Splitting of Sample***

For QC sample reduction the HMA sample in the containers is mixed and quartered. The quartering process should then proceed as follows:

i. Collect the minimum sample size given in the *PWL Split Sample Size* section above. Split the sample into “Test” and “Retained” samples. Place entire sample on table, quickly re-mix and split to minimize temperature loss. Split the Test & Retained samples as shown on Figure 6. For 1/2" mixes start with at least a total of 105 lb of HMA.

Figure 6 Superpave Sample for 105 lb for three-way split for QC, QV, and retained samples



|  |  |
| --- | --- |
| (a) | (b) |

ii. For a three-way split shown in Figure 3, *diagonal sections*, as indicated on the sketch, must be combined to form the QV sample (A+D), retained sample (B+E) and the QC test sample (C+F). The retained sample must be bagged, labeled, and stored in a safe dry place. The retained samples may be tested using the “rule of retained” (see “Definitions” section).

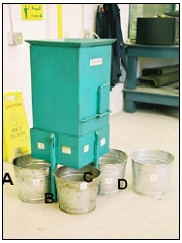
iii. The QC & QV test samples are then further split for the specified tests. Continue the splitting process in *Further Reduction of Samples to Test Sizes* for the test materials until individual samples are in the oven.

*Delete CMM 8-36.5.2 Use of Alternative Sampling / Quartering Devices (ex: Quartermaster) and replace with the following:*

*Use of Alternative Sampling / Quartering Devices (ex: Quartermaster)*

Use of other devices to assist in the sampling and splitting procedures may be used with approval of the department. The Quartermaster is one such device. A picture of a Quartermaster device is shown in Figure 7.

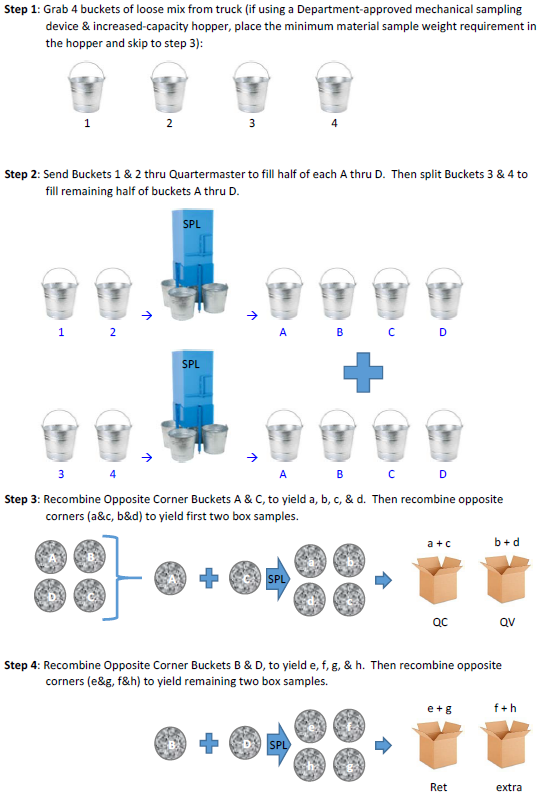
Figure 7 Quartermaster Quartering Device



*Example 3*

If a quartermaster is used to reduce a PWL split sample into the proper quanitites, it is required to collect four times the minimum sample size shown in *PWL Split Sample Sizes* (e.g. 4 x 35 is approximately 140 lb), use the selected device to split, and discard the extra quadrant of material. The quartermaster is used to blend the asphalt mixture to minimize any segregation during the splitting process. The following steps helps to ensure uniform splits for each party/quadrant and should be followed for each PWL sample collected.

Figure 8 PWL Sample Splitting with Quartermaster



Appendix A-TEST Methods & Sampling for PWL QMP HMA Pavements (20171002)

1. HMA Pavement Longitudinal Joint Density.

**A Description**

This special provision incorporates longitudinal joint density requirements into the contract and describes the data collection, acceptance, and procedure used for determination of pay adjustments for HMA pavement longitudinal joint density. Pay adjustments will be made on a linear foot basis, as applicable per pavement layer. Applicable longitudinal joints are defined as those between any two or more traffic lanes. This excludes ramp lanes, merging zones, medians/center turn lanes and any joint with one side defined as a shoulder. No joint exists when paved in echelon.

Pay is determined according to standard spec 460, the QMP HMA Pavement Nuclear Density or HMA Pavement Percent Within Limits QMP special provisions, and as modified within.

**B Materials**

*Revise standard spec 460.3.3.1(1) table 460-3 by adding footnotes [6] & [7]:*

TABLE 460-3 MINIMUM REQUIRED DENSITY*[1][6][7]*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| LOCATION | LAYER | PERCENT OF TARGET MAXIMUM DENSITY | | |
| MIXTURE TYPE | | |
| LT and MT | HT | SMA*[5]* |
| TRAFFIC LANES*[2]* | LOWER | 93.0*[3]* | 93.0*[4]* | \_\_\_ |
| UPPER | 93.0 | 93.0 | \_\_\_ |
| SIDE ROADS, CROSSOVERS, TURN LANES, & RAMPS | LOWER | 93.0*3]* | 93.0*[4]* | \_\_\_ |
| UPPER | 93.0 | 93.0 | \_\_\_ |
| SHOULDERS & APPURTENANCES | LOWER | 91.0 | 91.0 | \_\_\_ |
| UPPER | 92.0 | 92.0 | \_\_\_ |

*[1]* The table values are for average lot density. If any individual density test result falls more than 3.0 percent below the minimum required target maximum density, the engineer may investigate the acceptability of that material.

*[2]* Includes parking lanes, bike lanes as determined by the engineer

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

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

*[5]* The minimum required densities for SMA mixtures are determined according to [CMM 8‑15.](http://wisconsindot.gov/rdwy/cmm/cm-08-15.pdf#cm8-15)

*[6]* Minimum reduced by 1.5 percent at longitudinal joint with lateral confinement (i.e., confined)

*[7]* Minimum reduced by 3.0 percent at longitudinal joint having no lateral confinement (i.e., unconfined)

**C Construction**

*Add the following to standard spec 460.3.3.2:*

(5) Establish companion density locations at each applicable joint. Each companion location shares longitudinal stationing with a QC or QV density location within each sublot, and is located transversely with the center of the gauge 6-inches from the edge of the paving area. Sublot and lot numbering remains the same as mainline densities, however, in addition to conventional naming, joint identification must clearly indicate “M” for inside/median side of lane or “O” for outside shoulder side of lane, as well as “U” for an unconfined joint or “C” for a confined joint (e.g., XXXXX-MC or XXXXX-OU).

(6) Each joint will be measured, reported, and accepted under methods and procedures consistent with the program employed for mainline density, i.e., QMP or PWL.

(7) For single nuclear density test results greater than 3.0% below specified minimums, the department will perform the following per [standard spec 460.3.3.1](http://wisconsindot.gov/rdwy/stndspec/ss-04-60.pdf#ss460) as modified here within:

1. Testing at 50 foot increments both ahead and behind the unacceptable site
2. Continued 50 foot incremental testing until test values indicate higher than or equal to -3.0 percent from target joint density.
3. Materials within the incremental testing indicating lower than -3.0 percent from target joint density are defined as unacceptable, and will be handled with remedial action as defined in the payment section of this document.
4. The remaining sublot average (exclusive of unacceptable material) will be determined by the first forward and backward 50 foot incremental tests that reach the criteria of higher than or equal to -3.0 percent from target joint density.

Note: If the 50 foot testing extends into a previously accepted sublot, remedial action is required up to and inclusive of such material; however, the results of remedial action must not be used to recalculate the previously accepted sublot density. When this occurs, the tonnage of any unacceptable material will be deducted from the sublot in which it is located, and the previously accepted sublot density will be used to calculate pay for the remainder of the sublot.

(8) Joint density measurements will be kept separate from all other density measurements, and entered as an individual data set into Atwood Systems.

**D (Vacant)**

**E Payment**

*Add the following as 460.5.2.4 Pay Adjustment for HMA Pavement Longitudinal Joint Density:*

(1) The department will administer longitudinal joint density adjustments under the Incentive Density HMA Pavement Longitudinal Joints and Disincentive Density HMA Pavement Longitudinal Joints items. The department will adjust pay based on density relative to the specified targets in Section B of this special provision, and linear foot of the HMA Pavement bid item for that sublot as follows:

**PAY ADJUSTMENT FOR HMA PAVEMENT LONGITUDINAL JOINT DENSITY**

PERCENT SUBLOT DENSITY PAY ADJUSTMENT PER LINEAR FOOT PER LANE

ABOVE/BELOW SPECIFIED MINIMUM

Equal to or greater than +1.0 confined, +2.0 unconfined $0.40

From 0.0 to +0.9 confined, 0.0 to +1.9 unconfined $0

From -0.1 to -1.0 $(0.20)

From -1.1 to -2.0 $(0.40)

From -2.1 to -3.0 $(0.80)

More than -3.0 *REMEDIAL ACTION[1]*

*[1]* Remedial action must be approved by the engineer and agreed upon at the time of the pre-pave meeting, and may include partial sublots as determined and defined in 460.3.3.2(7) of this document

(2) The department will not assess joint density disincentives for pavement placed in cold weather because of a department-caused delay as specified in [standard spec 450.5.2(3).](http://wisconsindot.gov/rdwy/stndspec/ss-04-50.pdf#ss450)

(3) The department will not pay incentive on the longitudinal joint density if the traffic lane is in disincentive or the material does not meet the air void requirements as specified in [standard spec 460.5.2.3(1)](http://wisconsindot.gov/rdwy/stndspec/ss-04-60.pdf#ss460). A disincentive may be applied for each mainline lane and all joint densities if both qualify for a pay reduction.

The department will pay incentive for longitudinal joint density under the following bid items:

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| 460.2007 | Incentive Density HMA Pavement Longitudinal Joints | DOL |

The department will administer disincentives under the Disincentive Density HMA Pavement Longitudinal Joints administrative item.

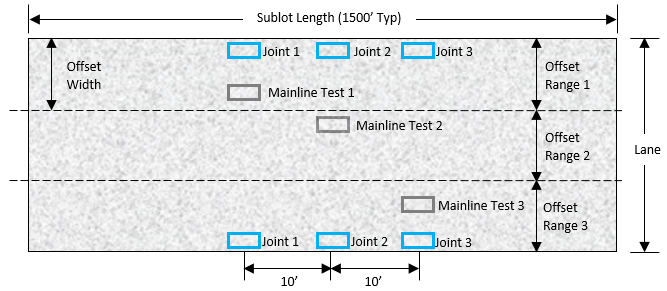
bts-Longitudinal Joint Density (20180426)

**Appendix**

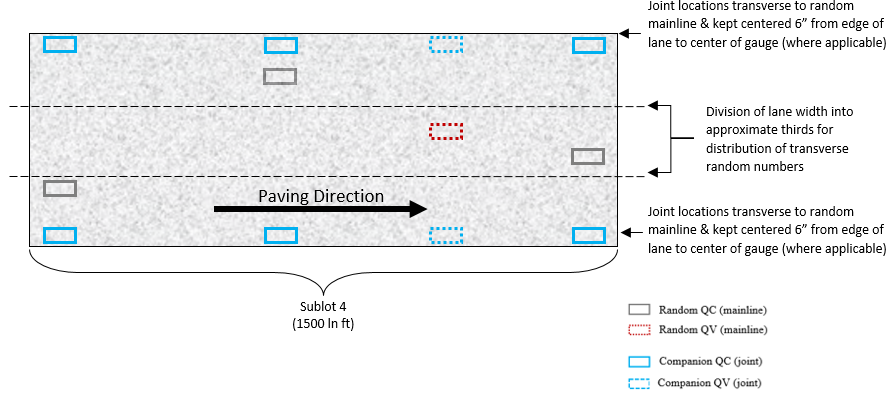
**WisDOT Longitudinal Joint – Nuclear Gauge Density Layout**

Each QC and QV density location must have a companion density location at any applicable joint. This companion location must share longitudinal stationing with each QC or QV density location, and be located transversely with the center of the gauge 6-inches from the edge of the paving area.

**For QMP HMA Pavement Nuclear Density projects**, this appears as follows:



**For HMA Pavement Percent Within Limits QMP projects**, this appears as follows:



**Further Explanation of *PAY ADJUSTMENT FOR HMA PAVEMENT LONGITUDINAL JOINT DENSITY* Table**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Confined** | | | |  |
|  | **Lower Layer (On Base)** | | **Upper Layer** | |  |
|  | **LT/MT** | **HT** | **LT/MT** | **HT** | **Pay Adjust** |
| Mainline Target (SS 460-3) | 91.0 | 92.0 | 93.0 | 93.0 | - |
| Confined Target (mainline - 1.5) | 89.5 | 90.5 | 91.5 | 91.5 | - |
| Equal to or greater than +1.0 | > 90.5 | > 91.5 | > 92.5 | > 92.5 | $0.40 |
| From 0.0 to +0.9 | 90.4 - 89.5 | 91.4 - 90.5 | 92.4 - 91.5 | 92.4 - 91.5 | $0 |
| From -0.1 to -1.0 | 89.4 - 88.5 | 90.4 - 89.5 | 91.4 - 90.5 | 91.4 - 90.5 | ($0.20) |
| From -1.1 to -2.0 | 88.4 - 87.5 | 89.4 - 88.5 | 90.4 - 89.5 | 90.4 - 89.5 | ($0.40) |
| From -2.1 to -3.0 | 87.4 - 86.5 | 88.4 - 87.5 | 89.4 - 88.5 | 89.4 - 88.5 | ($0.80) |
| More than -3.0 | < 86.5 | < 87.5 | < 88.5 | < 88.5 | REMEDIAL ACTION |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  | **Unconfined** | | | |  |
|  | **Lower Layer (On Base)** | | **Upper Layer** | |  |
|  | **LT/MT** | **HT** | **LT/MT** | **HT** | **Pay Adjust** |
| Mainline Target (SS 460-3) | 91.0 | 92.0 | 93.0 | 93.0 | - |
| Unconfined Target (Mainline -3.0) | 88.0 | 89.0 | 90.0 | 90.0 | - |
| Equal to or greater than +2.0 | > 90.0 | > 91.0 | > 92.0 | > 92.0 | $0.40 |
| From 0.0 to +1.9 | 89.9 - 88.0 | 90.9 - 89.0 | 91.9 - 90.0 | 91.9 - 90.0 | $0 |
| From -0.1 to -1.0 | 87.9 - 87.0 | 88.9 - 88.0 | 89.9 - 89.0 | 89.9 - 89.0 | ($0.20) |
| From -1.1 to -2.0 | 86.9 - 86.0 | 87.9 - 87.0 | 88.9 - 88.0 | 88.9 - 88.0 | ($0.40) |
| From -2.1 to -3.0 | 85.9 - 85.0 | 86.9 - 86.0 | 87.9 - 87.0 | 87.9 - 87.0 | ($0.80) |
| More than -3.0 | < 85.0 | < 86.0 | < 87.0 | < 87.0 | REMEDIAL ACTION |

1. Adjusting Manhole Covers.

This special provision describes adjusting manhole covers conforming to standard spec 611 as modified in this special provision.

Adjust manhole covers located in pavement areas in two separate operations. Initially, remove designated manhole covers along with sufficient pavement to permit installation of temporary cover plate over the opening. Fill the excavated area with asphaltic pavement mixture, which shall remain in place until contract milling and paving operations permit setting the manhole frames to grade. During the second phase, remove the asphaltic pavement mixture surrounding the manhole plus the temporary cover plate, and set the manhole cover to final grade. The department will measure and pay for the items of asphaltic pavement mixture, temporary cover plate, milling, and paving separately.

Revise standard spec 611.3.7 by deleting the last paragraph.

Set the manhole frames so that they comply with the surface requirements of standard spec 450.3.2.9. At the completion of the paving, a 6-foot straightedge shall be placed over the centerline of each manhole frame parallel to the direction of traffic. A measurement shall be made at each side of the frame. The two measurements shall be averaged. If this average is greater than 5/8 inches, reset the manhole frame to the correct plane and elevation. If this average is 5/8 inches or less but greater than 3/8 inches, the manhole frame shall be allowed to remain in place but shall be paid for at 50 percent of the contract unit price.

If the manhole frame is higher than the adjacent pavement, the two measurements shall be made at each end of the straightedge. These two measurements shall be averaged. The same criteria for acceptance and payment as above, shall apply.

stp-611-005 (20030820)

1. Cover Plates Temporary, Item 611.8120.S.

A Description

This special provision describes providing and removing steel plates to cover and support asphaltic pavement and traffic loading at manholes, inlets and similar structures during milling and paving operations.

B Materials

Provide a 0.25 inch minimum thickness steel plate that extends to the outside edge of the existing masonry.

C (Vacant)

D Measurement

The department will measure Cover Plates Temporary as each individual 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

611.8120.S Cover Plates Temporary EACH

Payment is full compensation for furnishing, installing, and removing the cover plates.

The steel plates shall become the property of the contractor when no longer needed in the contract work.

stp-611-006 (20151210)

1. Fence Safety, Item 616.0700.S.

A Description

This special provision describes providing plastic fence at locations the plans show.

B Materials

Furnish notched conventional metal "T" or "U" shaped fence posts.

Furnish fence fabric meeting the following requirements.

|  |  |
| --- | --- |
| **Color:** | International orange (UV stabilized) |
| **Roll Height:** | 4 feet |
| **Mesh Opening:** | 1 inch min to 3 inch max |
| **Resin/Construction:** | High density polyethylene mesh |
| **Tensile Yield:** | Avg. 2000 lb per 4 ft. width (ASTM D638) |
| **Ultimate Tensile Strength:** | Avg. 3000 lb per 4 ft. width (ASTM D638) |
| **Elongation at Break (%):** | Greater than 100% (ASTM D638) |
| **Chemical Resistance:** | Inert to most chemicals and acids |

C Construction

Drive posts into the ground 12 to 18 inches. Space posts at 7 feet.

Use a minimum of three wire ties to secure the fence at each post. Weave tension wire through the top row of strands to provide a top stringer that prevents sagging.

Overlap two rolls at a post and secure with wire ties.

D Measurement

The department will measure Fence Safety by the linear foot along the base of the fence, center-to-center of posts 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

616.0700.S Fence Safety LF

Payment is full compensation for furnishing and installing fence and posts; maintaining the fence and posts in satisfactory condition; and for removing and disposing of fence and posts at project completion.

stp-616-030 (20160607)

1. Temporary Portable Rumble Strips, Item 643.0310.S.

A Description

This special provision describes providing, relocating, maintaining, and removing temporary portable rumble strips.

B Materials

Furnish RoadQuake2 or Roadquake2F temporary portable rumble strips, by Plastic Safety Systems. Do not use alternate products or methods without preapproval by the Bureau of Traffic Operations.

C Construction

C.1 Placement

Provide rumble strips where the plans show or the engineer directs as follows:

1. Before placing rumble strips, clean the roadway of sand and other materials that may cause slippage.

2. Place one end of the rumble strips 6 inches from the roadway centerline. Extend the strips perpendicular to the direction of travel. Ensure strips lay flat on the roadway surface.

3. Only one series of rumble strips, placed before the first work zone, is required per direction of travel for multiple work zones spaced 1 mile or less apart. Work zones spaced greater than 1 mile apart require a separate series of rumble strips.

C.2 Maintenance

Maintain rumble strips as follows:

1. If rumble strips slide, become out of alignment, or are no longer in the wheel path of approaching vehicles during the work period, thoroughly clean both sides of the rumble strips and reset on a clean roadway.

2. Repair or replace damaged rumble strips immediately.

D Measurement

The department will measure temporary portable rumble strips as a single lump sum unit of work 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

643.0310.S Temporary Portable Rumble Strips LS

Payment is full compensation for providing, relocating, maintaining or replacing, and removing temporary portable rumble strips. stp-643-020 (20161130)

1. Temporary Pedestrian Surface Plate, Item 644.1430.S.

A Description

This special provision describes providing, maintaining, and removing temporary pedestrian surface.

B Materials

Furnish 1 1/4-inch dense graded aggregate conforming to standard spec 305.2. Furnish:

- Asphaltic surface conforming to standard spec 465.2.

- Pressure treated 2x4 framing lumber, pressure treated 3/4 inch plywood with skid resistant surface coating, and weather resistant deck screws 3 1/2 inch minimum for framing and 1 5/8 inch minimum for plywood.

- 1/4 inch minimum steel plate or commercially available prefabricated plates with skid resistant surface coating conforming to Americans with Disabilities Act Accessibility Guidelines. If placed in the roadway, must be able to handle a vehicle weight of 88,000 lbs.

C Construction

Place, compact, and level a dense graded aggregate foundation before placing the surface.

Provide a firm, stable, and slip-resistant surface layer with vertical joints no higher than 1/4 inch and horizontal joints no wider than 1/2 inch. Sheet materials up to 1 inch thick may be lapped if the edge is beveled at 45 degrees or flatter. Asphalt may also be used to ramp up to materials up to 1 inch thick. Construct conforming to the following:

- Asphalt surface a minimum of 2 inches thick compacted with compactors, tampers, or rollers.

- Framed plywood panels 4 feet wide with a skid resistant surface coating.

- Steel or prefabricated plate with a skid resistant surface coating.

Align parallel to the existing roadway grade or, if outside of a street or highway right-of-way, do not exceed 5 percent longitudinal slope. Provide cross slope of 1 to 2 percent unless the engineer approves a steeper cross slope in writing.

Maintain the surface with a 4 foot minimum clear width and the specified joint and slope requirements. Repair or reconstruct installations disturbed during construction operations. Remove and dispose of as specified in standard spec 203.3.4 when no longer required.

D Measurement

The department will measure temporary pedestrian surface by the square 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

644.1430.S Temporary Pedestrian Surface Plate SF

Payment is full compensation for providing, maintaining, and removing temporary pedestrian surface.

stp-644-010 (20150630)

1. Temporary Pedestrian Safety Fence, Item 644.1616.S.

A Description

This special provision describes providing, maintaining, and removing the temporary pedestrian safety fence.

B Materials

Furnish notched metal "T" or "U" shaped fence posts weighing 1 1/3 pounds per foot or more.

Furnish select 2x4 dimensional lumber.

Furnish fence fabric meeting the following requirements.

|  |  |
| --- | --- |
| **Color:** | International orange (UV stabilized) |
| **Roll Height:** | 4 feet |
| **Mesh Opening:** | 1 inch min to 3 inch max |
| **Resin/Construction:** | High density polyethylene mesh |
| **Tensile Yield:** | Avg. 2000 lb per 4-ft. width (ASTM D638) |
| **Ultimate Tensile Strength:** | Avg. 3000 lb per 4-ft. width (ASTM D638) |
| **Elongation at Break (%):** | Greater than 100% (ASTM D638) |
| **Chemical Resistance:** | Inert to most chemicals and acids |

The engineer may allow prefabricated fencing systems conforming to Americans with Disabilities Act Accessibility Guidelines.

C Construction

Provide a continuous safety fence with the top edge free of sharp or rough edges.

Repair or reconstruct installations disturbed during construction operations. Remove and dispose of as specified in standard spec 204.3 when no longer required.

D Measurement

The department will measure Temporary Pedestrian Safety Fence 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

644.1616.S Temporary Pedestrian Safety Fence LF

Payment is full compensation for providing, maintaining, and removing the temporary pedestrian safety fence.

stp-644-025 (20150630)

1. Electrical Service for Meter Breaker Pedestal (STH 42 & Main St), Item 656.0200.01

*Add the following to section 656 of the standard specifications:*

**A Description**

Work under this item shall be in accordance with Section 656 of the Standard Specifications with the following addition.

**B Materials** (Vacant)

**C Construction**

The Contractor is responsible for making early application for the electric service lateral.

Contact Wisconsin Public Service at (877) 444-0888 or email at [businesscenter@wisconsinpublicservice.com](mailto:businesscenter@wisconsinpublicservice.com) to make application and request a time of use meter, Option 1. The future monthly invoices can go to the following address:

Wisconsin Dept of Transportation

Expenditure Acct (F15-0198)

P.O. Box 7366

Madison, WI 53707-7366

**D Measurement** (Vacant)

**E Payment**

The Contractor shall pay the utility company promptly for the electric service lateral installation cost.

1. Stormwater Treatment Device, Item SPV.0060.01.

**A Description**

This Special Provision describes labor, materials, equipment and incidentals required and install all precast concrete stormwater treatment systems and appurtenances in accordance with the Drawings and these specifications.

**B Materials**

The stormwater treatment system shall be of a type that has been installed and used successfully for a minimum of 5 years. The manufacturer of said system shall have been regularly engaged in the engineering design and production of systems for the physical treatment of stormwater runoff during the aforementioned period.

The stormwater treatment system shall be a Vortechs® Model Offline VX 7000 System protected under U.S. Patent #5,759,415 as manufactured by

**Contech Engineered Solutions**

**9025 Centre Pointe Drive, Suite 400 West Chester, Ohio 45069**

**800-338-1122**

or approved equal.

Furnish and use materials in the work that conform to the following requirements.

Concrete for precast stormwater treatment systems shall conform to ASTM C 857 and C 858 and meet the following additional requirements:

The wall thickness shall not be less than 6 inches (152 mm) or as shown on the dimensional drawings. In all cases the wall thickness shall be no less than the minimum thickness necessary to sustain HS20-44 (MS18) loading requirements as determined by a Licensed Professional Engineer.

Sections shall have tongue and groove or ship-lap joints with a butyl mastic sealant conforming to ASTM C 990.

Cement shall be Type II Portland cement conforming to ASTM C 150.

All sections shall be cured by an approved method. Sections shall not be shipped until the concrete has attained a compressive strength of 4,000 psi (28 MPa) or until 5 days after fabrication and/or repair, whichever is the longer.

Pipe openings shall be sized to accept pipes of the specified size(s) and material(s), and shall be sealed by the Contractor with a hydraulic cement conforming to ASTM C 595M

Internal aluminum plate components shall be aluminum alloy 5052-H32 in accordance with ASTM B 209.

Sealant to be utilized at the base of the swirl chamber shall be 60 durometer extruded nitrile butadiene rubber (Buna N) and shall be provided to the concrete precaster for installation.

Brick or masonry used to build the manhole frame to grade shall conform to ASTM C 32 or ASTM C 139 and shall be installed in conformance with all local requirements.

Casting for manhole frames and covers shall be in accordance with ASTM A48, CL.30B and AASHTO M105. The manhole frame and cover shall be equivalent to Campbell Foundry Pattern #1009A or #1012D custom cast with the Contech Engineered Solutions logo and the words “Vortechs® Stormwater Treatment System”.

A bitumen sealant in conformance with ASTM C 990 shall be utilized in the sealing of the joint between the swirl chamber and the vault at the long wall tangent points. The butyl material shall be 3/4-inch thick by 3/4-inch wide.

**C Construction**

Equipment and tools necessary for performing all parts of the work will be satisfactory as to design, capacity and mechanical condition for the purposes intended; repair, replace, improve, or supplement any equipment that is not maintained in full working order, or which as used by the contractor is proven inadequate to obtain the results prescribed, to obtain the progress and workmanship contemplated by the contract.

The Stormwater Treatment Device shall be constructed according to the sizes shown on the Drawings and as specified herein. Install at elevations and locations shown on the Drawings or as otherwise directed by the Engineer.

Place the precast base unit on a granular subbase of minimum thickness of six inches after compaction or of greater thickness and compaction if specified elsewhere. The granular subbase shall be checked for level prior to setting and the precast base section of the trap shall be checked for level at all four corners after it is set. If the slope from any corner to any other corner exceeds 0.5% the base section shall be removed and the granular subbase material re-leveled.

Prior to setting subsequent sections place bitumen sealant in conformance with ASTM C 990 along the construction joint in the section that is already in place.

After setting the base and wall or riser sections, prepare to install the swirl chamber. Place the 3/4-inch thick by 3/4-inch wide butyl mastic seal vertically on the outside of the swirl chamber starting one inch above the bottom of the swirl chamber and continuing to a height equal to the elevation of the bottom of the upper aperture of the swirl chamber. The butyl mastic seal should abut the downstream side of the pre- drilled mounting holes that attach the swirl chamber to the long walls of the concrete vault. Next, install the extruded Buna N seal on the bottom edge of the 180 degree downstream section of the swirl chamber by first applying a bead of Sikaflex-1a polyurethane elastomeric sealant into the extruded slot then slide the seal onto the swirl chamber. The extruded seal should extend 3-inches upstream of the mounting holes, toward the inlet end of the vault. Set the swirl chamber into position and keep the seal approximately ½-inch above the floor of the concrete vault. Apply a continuous bead of Sikaflex-1a sealant under the cupped bottom of the seal. Set the circular swirl chamber on the floor of the vault and anchor it by bolting the swirl chamber to the side walls of the concrete vault at the three (3) tangent points and at the inlet tab using HILTI brand stainless steel drop-in wedge anchors or equivalent 3/8-inch diameter by 2-3/4 inch minimum length at heights of approximately three inches (3”) off the floor and at fifteen inch (15”) intervals to approximately the same height of the butyl mastic sealant (at locations of pre- drilled holes in aluminum components). Apply a continuous bead of Sikaflex-1a sealant to the intersection of the inside bottom edge of the extruded seal and the vault floor.

If the oil baffle wall (Baffle A) and flow control wall (Baffle B) are not integrally cast-in to riser/wall sections then the Baffle wall panels shall be placed in the formed keyways or between bolted-in-place angle flanges as provided by the manufacturer. Apply non-shrink grout or Sikaflex-1a sealant to each end of Baffle A and Baffle B at the upstream intersection with the side walls of the concrete vault.

Prior to setting the precast roof section, bitumen sealant equal to ASTM C 990 shall be placed along the top of the oil baffle wall (Baffle A), using more than one layer of mastic if necessary, to a thickness at least 1-inch greater than the nominal gap between the top of the baffle and the roof section. The nominal gap shall be determined either by field measurement or the shop drawings. Do not seal the top of Baffle B unless specified on the shop drawings to do so. After placement of the roof section has compressed the butyl mastic sealant in the gap over Baffle A, finish sealing the gap with an approved non- shrink grout on both sides of the gap using the butyl mastic as a backing material to which to apply the grout. If roof section is “clamshell” or “bathtub” halves, then finish sealing the ends of the Baffle walls by applying non- shrink grout or Sikaflex-1a sealant to each end of Baffle A at the upstream intersection with the side walls of the concrete vault and to each end of Baffle B at the downstream intersection with the side walls of the concrete vault.

After setting the precast roof section of the stormwater treatment system, set precast concrete manhole riser sections, to the height required to bring the cast iron manhole covers to grade, so that the sections are vertical and in true alignment with a ¼-inch maximum tolerance allowed. Backfill in a careful manner, bringing the fill up in 6- inch lifts on all sides. If leaks appear, clean the inside joints and caulk with lead wool to the satisfaction of the Engineer. Precast sections shall be set in a manner that will result in a watertight joint. In all instances, installation of Stormwater Treatment Systems shall conform to ASTM specification C 891 “Standard Practice for Installation of Underground Precast Utility Structures”.

Holes made in the concrete sections for handling or other purposes shall be plugged with a nonshrink grout or by using grout in combination with concrete plugs.

Where holes must be cut in the precast sections to accommodate pipes, do all cutting before setting the sections in place to prevent any subsequent jarring which may loosen the mortar joints. The Contractor shall make all pipe connections.

**D Measurement**

The department will measure Stormwater Treatment Device by each separate device 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 | Stormwater Treatment Device | Each |

Payment is full compensation for furnishing labor, materials, excavation, bedding, backfill, shoring, dewatering, connections to existing or proposed storm sewer, device baffles, mastic, cleanup, and any other incidentals necessary to complete required work.

The department will pay for topsoil, sod and fertilizer over the device under separate bid items.

1. Salvage Lighting Unit, Item SPV.0060.02.

**A**  **Description**

This special provision describes salvaging lighting units from the project.

**B** **Materials**

Not used

**C Construction**

Under the bid item Salvage Lighting Unit, disconnect and salvage the complete lighting unit (pole, luminaire, and lamp) from the locations shown in the Plan and/or as designated by the Engineer.

Pole wiring and fusing within the salvaged lighting units shall be discarded. Disconnect from existing branch circuits prior to salvaging.

Salvaged materials shall be disassembled as direct by the Engineer and shall be delivered to a location designated by the Town. Coordinate location with Maintenance Supervisor, Patrick Strantz, at 920.421.2139. Any damage to the salvaged materials resulting from the hauling and storage operation shall be repaired or replaced in-kind at the Contractor's expense.

**D**  **Measurement**

The department will measure Salvage Lighting Unit as each individual lighting unit acceptably salvaged and delivered.

**E Payment**

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

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0060.02 | Salvage Lighting Unit | Each |

Payment is full compensation for salvaging and storage of all existing lighting unit components including poles, luminaires, lamps, seasonal display receptacle, transformer bases, internal pole wiring and fusing, and all pole accessories, hardware and fittings, and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

1. Reconnect Existing Storm Sewer Lateral, Item SPV.0060.03.

**A Description**

This special provision describes reconnecting existing storm sewer laterals to new structures or existing pipe.

**B Materials**

Provide culvert pipe concrete collars in accordance with section 520.2.4 of the standard specifications.

Provide couplings that meet section 608.2 of the standard specifications.

**C Construction**

Identify all private laterals in existing structures prior to that structure’s removal. Remove existing lateral pipes to the next good joint and replace in-kind. Verify that positive drainage is achieved when connecting to the new inlet or curb outlet structure. The contractor will be allowed to salvage any structurally sound pipe that was removed with prior approval by the engineer. Connect the existing pipes to the new pipes with the appropriate coupling, concrete collar or by means approved by the engineer. Any additional pipe or materials required to reconnect the storm sewer laterals are considered incidental to this bid item.

**D Measurement**

The department will measure Reconnect Existing Storm Sewer Lateral by each lateral connected and approved in the field.

**E Payment**

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

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0060.03 | Reconnect Existing Storm Sewer Lateral | Each |

Payment is full compensation for removal of existing pipes, furnishing and installing all materials, couplings, concrete collars, and pipe.

(NER13-0813)

1. Removing Lighting Unit, Item SPV.0060.04

Consultant has not supplied WisDOT with SPV at this point.

**A Description**

**B Materials**

**C (Vacant)**

**D Measurement**

**E Payment**

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

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0060.04 | Removing Lighting Unit | Each |

1. Install Lighting Unit - Item SPV.0060.05.

**A**  **Description**

This special provision describes installing a Town furnished lighting unit complete with LED acorn luminaire, pole, and accessories.

**B** **Materials**

A decorative lighting unit complete with pole and luminaire will be furnished to the Contractor by the Town. A detail of Lighting Unit Type Special is shown in the plans. Coordinate with the Town for delivery schedule.

**C Construction**

Under the bid item Install Lighting Unit, furnish and install all necessary miscellaneous accessories and hardware to complete the installation of the lighting units. Lighting Unit Type Special shall be installed at locations indicated in the Plans.

Three 1/c No. 12 stranded, type XHHW-2, wires shall be used to connect the luminaires and receptacles to their respective branch conductors in the pole base. Each luminaire shall be protected by two 6-amp fuses. Each GFCI receptacle shall be protected by one 10-amp fuse.

All threaded stainless steel hardware and dissimilar metal, threaded hardware shall be coated with an approved zinc-based anti-seize compound (Loctite or Jet-Lube) by the Contractor prior to assembly.

After completing pole erection using normal pole shaft raking techniques, ensure the centerline of the shaft is plumb.

The Contractor shall follow manufacturer’s instructions regarding luminaire and pole installation.

**D**  **Measurement**

The department will measure Install Lighting Unit as each individual lighting 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.0060.05 | Install Lighting Unit | Each |

Payment is full compensation for furnishing and installing all materials, including luminaire, pole, and all pole accessories, hardware and fittings necessary to install the lighting unit in a workable first class condition, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

1. Lighting Control Cabinet Base Type Special, Item SPV.0060.06.

**A Description**

This special provision describes furnishing and installing a concrete lighting control cabinet foundation as shown on the plans and as hereinafter provided.

**B Materials**

Supply materials that comply with section 654.2 of the standard specifications manual.

**C Construction**

The Lighting Control Cabinet Base Type Special shall have an anchor bolt pattern, size, exposure and orientation that will accommodate the lighting control cabinet identified in the details in the plan.

**D Measurement**

The department will measure Lighting Control Cabinet Base Type Special, completed in accordance with the contract and accepted as a unit.

**E Payment**

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

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0060.06 | Lighting Control Cabinet Base Type Special | Each |

Payment is full compensation for furnishing and installing all materials, including anchor bolts, conduit, ground rods, hardware and fittings; and for all labor, tools, equipment, incidentals, and coordination to complete the contract work.

1. Concrete Base Type Special, Item SPV.0060.07.

**A Description**

This special provision describes furnishing and installing lighting a concrete light foundation as shown on the plans and as hereinafter provided.

**B Materials**

Supply materials that comply with section 654.2 of the standard specifications manual.

**C Construction**

The Concrete Base Type Special shall be modified to have an anchor bolt circle, orientation, and anchor bolt size that will accommodate the pole manufacturer’s requirements. Anchor bolt exposure shall accommodate the specified pole base requirements. Bar steel reinforcement shall be modified as necessary to accommodate new anchor bolt placement. In locations where lighting units are installed near retaining walls, the rigid concrete forms shall be placed prior to backfilling straps for the retaining wall. Coordinate schedule with General Contractor and Engineer.

**D Measurement**

The department will measure Concrete Base Type Special, completed in accordance with the contract and accepted, as a unit.

**E Payment**

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

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0060.07 | Concrete Base Type Special | Each |

Payment is full compensation for furnishing and installing all materials, including anchor bolts, conduit, hardware and fittings; and for all labor, tools, equipment, incidentals, and coordination to complete the contract work.

1. Trimming Tree Limbs 3-FT, Item SPV.0060.08.

A Description

This special provision describes trimming and disposing of tree limbs according to this special provision and the plans.

B (Vacant)

C Construction

Trim tree limbs up to a height of 3-FT from the ground, measured at the trunk of the tree, that are located within the slope intercept and hinder construction activities.

Dispose of the tree limbs as specified in 201.3.

D Measurement

The department will measure Trimming Tree Limbs by each tree trunk where limbs were acceptably removed and disposed from.

E Payment

ITEM NUMBER DESCRIPTION UNIT

SPV.0060.08 Trimming Tree Limbs 3-FT EA

Payment is full compensation for handling, hauling, piling, burning, burying, trimming, chipping, wound treatment, rehandling, and disposing of waste debris.

1. Pipe Inlet Structure, Item SPV.0060.09.

A Description

This special provision describes installing pipe inlet drainage structure.

B Materials

Furnish reinforced concrete pipe 12-Inch C-III conforming to the material requirements of 608.2.1.

Furnish pipe inlet grate covers meeting ASTM A-48 Class 35B, cast gray iron, meeting plan dimensions.

Furnish concrete collars and concrete structure base in accordance with section 520.2.4.

For granular backfill use a maximum size of any gravel or stone that meets gradation for 1 ¼-Inch base listed under section 305.2.2.1 of the standard specifications manual.

Furnish Brick conforming to section 519 of the standard specifications manual.

Furnish base aggregate dense that conform to 1 ¼-INCH Base aggregate dense material specified in section 305 of the standard specifications manual. QMP testing for base aggregate dense is waived for this item.

C Construction

Provide culvert pipe inlet structures with pipe inlet grate. Excavate, place granular backfill, and backfill as the plans show. Dispose of surplus or unsuitable material as specified under 205.3.12.

Construct concrete collars and concrete structure base using concrete conforming to 520.2.4 where and as the plans show.

D Measurement

The department will measure pipe inlet structure under this section as each individual pipe inlet structure acceptable completed.

E Payment

The department will pay for measured quanttieis at the contract unit price under the follow bid item:

ITEM NUMBER DESCRIPTION UNIT

SPV.0060.09 Pipe Inlet Structure EACH

Payment for Pipe Inlet Structure is full compensation for providing reinforced concrete pipe, pipe grate inlet (iron casting), granular backfill, concrete collars, concrete structure base, excavating, backfilling, and disposing of surplus material.

1. Inlets Median 1 Grate, Special, Item SPV.0060.10.

A Description

This special provision describes installing Inlets Median 1 Grate Special.

B Materials

Furnish materials according to 611.2.

C Construction

Construct according to 611.3.

Structure will include a 2’ sump below lowest pipe invert as shown in the plan construction detail.

D Measurement

The department will measure Inlets Median 1 Grate Special as each individual unit acceptably completed.

E Payment

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

ITEM NUMBER DESCRIPTION UNIT

SPV.0060.10 Inlets Median 1 Grate EACH

Payment for Inlets Median 1 Grate will meet requirements for inlets shown in 611.5.

1. Manholes 8-FT Special, Item SPV.0060.11.

A Description

This special provision describes installation of Manholes 8-FT Special.

B Materials

Furnish materials according to 611.2.

C Construction

Construct according to 611.3.

Structure lid will have a 2-FTx3FT opening to accommodate Type H-S casting.

Structure will have a 2-FT sump below lowest connecting pipes invert elevation.

See construction details.

D Measurement

The department will measure Manholes 8-FT Special as each individual unit acceptably completed.

E Payment

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

ITEM NUMBER DESCRIPTION UNIT

SPV.0060.11 Manholes 8-FT Special EACH

Payment for Inlets Median 1 Grate will meet requirements for inlets shown in 611.5.

1. Removing Landscape Rock, Item SPV.0060.12

**A Description**

This special provision describes removing and disposing the existing landscape rocks as shown in the plans and in accordance to the pertinent provisions of standard spec 204 and as hereinafter provided.

**B (Vacant)**

**C Construction**

Remove landscaping rocks within the project limits as shown on the plans or as directed by the Engineer. Rocks shall be removed from the grading limits of the project and disposed of as specified for disposing of materials under 203.3.4.

**D Measurement**

The department will measure Remove Landscape Rocks as Each, 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.0060.12 | Remove Landscape Rocks | EACH |

Payment is full compensation for removing landscape rocks from the grading limits, and for disposal of the land scape rock.

1. Relocating Flag Pole Lighting, Item SPV.0060.13

**A Description**

This special provision describes relocating the flag pole lighting as shown in the plans and in accordance to the pertinent provisions of standard spec 204 and as hereinafter provided.

**B (Vacant)**

**C Construction**

Coordinate de-energizing of existing lighting with property owner prior to performing work. Relocate existing lighting and attached electrical wire where identified in the plan from the project limits by excavating wire and lighting. Place flag pole light fixture and wire outside of the grading limits. After completion of grading in this area, wire shall be reburied and the lights shall be placed replaced in their original location. The contractor shall be responsible for any damage to the wire or lightings that may occur prior to replacing the lights in their original location. Once lights are relocated notify property owner to allow for re-energizing circuit.

**D Measurement**

The department will measure Relocate Flag Pole Lighting as Each, 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.0060.13 | Relocate Flag Pole Lighting | EACH |

Payment is full compensation for excavating the flag pole light and wire, temporarily placing these items outside of the grading limits, and reinstalling the light and associated wire after grading activities.

1. Lighting Control Cabinet Type Special, Item SPV.0060.14

**A Description**

This special provision describes furnishing and installing lighting control cabinets as shown on the plans and as hereinafter provided.

**B Materials**

The cabinet type shall be detailed in the plans. A rigid steel or Schedule 80 PVC conduit shall be stubbed out of the control cabinet base to accommodate the energy provider’s service conduit and conductors.

**C (Vacant)**

**D Measurement**

The department will measure Lighting Control Cabinet Type Special, completed in accordance with the contract and accepted as a unit.

**E Payment**

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

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0060.14 | Lighting Control Cabinet Type Special | Each |

Payment is full compensation for furnishing and installing all materials, including lighting control cabinets, meter socket, hardware and fittings; and for all labor, tools, equipment, incidentals, and coordination with and/or any payments to energy provider necessary to complete the contract work.

1. Street Sweeping, Item SPV.0075.01.

**A Description**

Remove small dirt and dust particles from the roadway using a street sweeper periodically during the project as directed by the engineer.

**B (Vacant)**

**C Construction**

Provide a self-contained mechanical or air conveyance street sweeper and dispose of the material collected.

**D Measurement**

The department will measure Street Sweeping by the hour that the street sweeper is on the project picking up and removing debris from the roadway.

**E Payment**

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

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0075.01 | Street Sweeping | HRS |

Payment is full compensation for furnishing street sweeper; sweeping roadway; disposing of the material collected; and for all labor, equipment, tools, and incidentals necessary to complete the work.

(NER15-0430)

1. Fence Chain Link Polymer-Coated 4-Ft., Item SPV.0090.01.

**A** **Description**

This special provision describes furnishing and installing a new polymer-coated fence system on structures in accordance with the pertinent plan details, as directed by the Engineer and as hereinafter provided. The color of all components in this fence system shall be the same and shall be as specified on the plans.

**B** **Materials**

All materials for this fence system shall be new stock, free from defects impairing strength, durability, and appearance. Fabric shall be produced by methods recognized as good commercial practice. Wire used in the manufacture of the fabric shall be capable of being woven into fabric without the polymer-coating cracking or peeling. Pipes used in framework shall be straight, true to section and free of defects. All burrs at the ends of pipes shall be removed before galvanizing. The polymer-coating shall be a dense impervious covering, applied without voids, tears or cuts that reveal the substrate. Excessive roughness, bubbles, blisters and flaking in the polymer-coating will be a basis for rejection.

**B1 Fabric**

Provide steel chain link fence fabric that conforms to the requirements of ASTM F668, Class 2b, a polymer-coating fused and adhered to wire that is zinc-coated. Provide fabric woven from 9-gage wire using plan specified mesh size, diamond pattern, with both the top and bottom selvages knuckled. The minimum breaking strength of the wire shall be 1290 lbs. The color of polymer-coating shall conform to the requirements of ASTM F934.

*B2 Framework*

Provide steel rails, posts and post sleeves conforming to the requirements of ASTM F1083, Standard Weight Pipe (Schedule 40) of the size (O.D.) and weight as shown on the plans. The minimum yield strength shall be 30,000 psi and the minimum tensile strength shall be 48,000 psi. These components shall be zinc-coated inside and outside by the hot-dip process as stated in ASTM F1083. Provide polymer-coating over zinc-coating that conforms to ASTM F1043. The color of polymer-coating shall conform to the requirements of ASTM F934, and match the color of the other fence components. Weld base plate to posts or post sleeves and complete any additional welding of components before galvanizing.

*B3 Fittings*

Provide end post caps, line post caps, top rail sleeves, rail ends, line rail clamps, 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 polymer-coating over zinc-coating on components (excluding tie wires) that conforms to the requirements of ASTM F626. For tie wires, provide polymer-coating on wire that is zinc-coated using the same procedure as used for the wires in the fence fabric. End post caps and line post caps shall fit tightly over posts to prevent moisture intrusion. Supply dome style caps for end posts and loop type caps for line posts. The color of polymer-coating shall conform to the requirements of ASTM F934, and match the color of the other fence components.

*B4 Bolts*

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

*B5 Tests*

*B5.1 Fabric and Tie Wire*

Breaking Strength: ASTM A370

Zinc-Coating Requirements

Weight of Zinc-Coating: ASTM A90

Polymer-Coating Requirements

Thickness of Polymer-Coating: ASTM F668

Adhesion: ASTM F668

Accelerated Aging Test: ASTM F668, D1499

Mandrel Bend Test: ASTM F668

*B5.2 Framework*

Tensile and Yield Strength: ASTM E8

Zinc-Coating Requirements

Weight of Zinc-Coating: ASTM A90

Polymer-Coating Requirements

Thickness of Polymer-Coating: ASTM E376

Adhesion: ASTM F1043

Accelerated Aging Test: ASTM F1043, D1499

*B5.3 Fittings*

Zinc-Coating Requirements

Weight of Zinc-Coating: ASTM A90

Polymer-Coating Requirements

Thickness of Polymer-Coating: ASTM F626

Adhesion: ASTM F1043 (same test as for framework)

Accelerated Aging Test: ASTM F1043, D1499 (same test as for framework)

*B6 Submittals*

In addition to the Project Engineer, send submittals listed in this section to the name below for informational purposes:

David Nelson

WisDOT (Bureau of Structures)

4802 Sheboygan Ave. (Room 601)

PO Box 7916

Madison, WI 53707

*B6.1 Shop Drawings*

Submit shop drawings showing the details of fence construction. Show the fence height, post spacing, rail location, and all dimensions necessary for the construction of the chain link fence. Label the end posts, line posts, rails, post sleeves, top rail sleeves, bolts and fittings. State the polymer-coating type used on the fabric, framework and fittings and the Class of coating used on the fabric. State the color of polymer-coating to be used on the fence components. For the fabric, state the wire gage, mesh size, and type of selvages used. For the framework, state the size (O.D.) and unit weight for the posts and rails. For the fittings, state the size for top rail sleeves, brace bands, tension bands, tension bars, line rail clamps, size and type of bolts, and the tie wire gage. State the material type used for fabric, framework, and fittings. Also give the breaking strength for the fabric wire and the tensile and yield strength properties for the framework.

*B6.2 Specification Compliance*

Submit certification of compliance with material specifications. Provide material certification and test documentation for fabric, framework, fittings and hardware that shows that all materials meet or exceed the specifications of this contract and the tests in **B5**. This document shall provide the name, address and phone number of the manufacturer, and the name of a contact person.

**C** **Construction**

*C1 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 polymer-coating is damaged, Contractor shall repair or replace components as necessary to the approval of the Engineer at no additional cost to the Owner. Carefully store material off the ground to ensure proper ventilation and drainage and to provide protection against damage caused by ground moisture. Handle all polymer-coated material with care.

*C2 Touch-up and Repair*

For minor damage caused by shipping, handling or installation to polymer-coated surfaces, touch-up the finish in conformance with 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 Owner. The Contractor shall provide the Engineer with a copy of the manufacturer’s recommended repair procedure and materials before repairing damaged coatings.

*C3 General*

Install the chain link fence in accordance with ASTM F567 and the manufacturer’s instructions. 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 indicated on the plans. 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. Install top rail to pass through line post caps and form a continuous brace between end posts. Minimum length of top rail between splices shall be 20-feet. Splice top rail at joints with sleeves for a rigid connection. Locate splices near ¼ point of post spacing. Heads of bolts shall be on the side of the fence adjacent to pedestrian traffic.

**D** **Measurement**

The department will measure Fence Chain Link Polymer-Coated X-Ft. by the linear foot satisfactorily furnished and installed.

**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.0090.01 | Fence Chain Link Polymer-Coated X-Ft. | LF |

*Payment is full compensation for fabricating, galvanizing and polymer-coating all fence components, and transporting to jobsite; for erecting components to create a polymer-coated fence system, including any touch-up and repairs; and for furnishing all labor, tools, equipment, materials and incidentals necessary to satisfactorily complete the work.*

1. Concrete Cold Weather Covering: Curb and Gutter, Plastic 1 Layer, Item SPV.0090.02; Curb and Gutter, Plastic 2 Layers, Item SPV.0090.03; Curb and Gutter, Plastic/Hay/Plastic, Item SPV.0090.04; Sidewalk, Plastic 1 Layer, Item SPV.0165.04; Sidewalk, Plastic 2 Layers, Item SPV.0165.05; Sidewalk, Plastic/Hay/Plastic, Item SPV.0165.06

**A Description**

Place protective covering in accordance to subsection 415.3.13 of the standard specifications, the plans, standard detail drawings, and as hereinafter provided.

**B Materials**

Furnish materials that meet the requirements specified in subsection 415.3.13.2 of the standard specifications.

**C (Vacant)**

**D Measurement**

The department will measure Concrete Cold Weather Covering Curb and Gutter in length by the linear foot acceptably completed.

The department will measure Concrete cold Weather Covering Sidewalk in area by the square 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  SPV.0090.03  SPV.0090.04  SPV.0165.04  SPV.0165.05  SPV.0165.06 | Concrete Cold Weather Covering, Curb and Gutter, Plastic 1 Layer  Concrete Cold Weather Covering, Curb and Gutter, Plastic 2 Layers  Concrete Cold Weather Covering, Curb and Gutter, Plastic/Hay/Plastic  Concrete Cold Weather Covering, Sidewalk, Plastic 1 Layer  Concrete Cold Weather Covering, Sidewalk, Plastic 2 Layers  Concrete Cold Weather Covering, Sidewalk, Plastic/Hay/Plastic | LF  LF  LF  SF  SF  SF |

Payment is full compensation for supplying the plastic, hay, and material sufficient to weight down the insulating materials to withstand wind; and for furnishing all labor, tools, equipment, and incidentals required to place, remove, replace, and dispose of all covering materials as required during normal concreting operations. Heating of water or aggregates, or both, if deemed necessary by the contractor to maintain placement temperature, is incidental to this item.

(NER11-0214)

1. Retaining Wall Planting Area, SPV.0105.01.

**A Description**

This special provision describes furnishing and installing a planting area consisting of vines, topsoil, and mulch at the bottom of retaining walls according to the pertinent plan details, as directed by the engineer and as hereinafter provided.

**B Materials**

*B.1 Topsoil*

Fertile, friable natural sandy loam, without admixture of subsoil material, free from heavy alkaline soil, coarse sand, stones larger than 1.5 inches in diameter, lumps, sticks, and other foreign matter. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep. Do not obtain from agricultural lands, bogs, or marshes.

*B.2 Compost*

Well composted, stable, and weed-free organic matter, pH range of 5.5 to 8, moisture content of 35 to 55 percent by weight, 100 percent passing through 1- inch sieve.

*B.3 Vines*

Vines shall be Parthenocissus quinquefolia / Virginia Creeper. Provide healthy vines from a commercial nursery, in removable containers. Fast growing, complying with ANSI Z60.1, 2-year plants with heavy, well-branched tops, with not less than 3 runners 18 inches or more in length. Vigorous, well-developed root system. Grown in pots and acclimated to outside conditions.

*B.4 Fertilizer*

Fertilizer shall be Section 629 Fertilizer Type B.

*B.5 Mulch*

Shredded hardwood mulch or Ground or Shredded Bark mulch shall be free from deleterious materials and suitable as a top dressing of vines.

*B.6 Submittals*

Submit certification of compliance with material specification for topsoil, compost, and vines.

**C Construction**

*C.1 Soil Preparation*

Excavate 12 inches of soil, 24-inches wide at location shown in the plans at the base of the wall. Loosen subgrade in a 24 inch wide swath to a minimum depth of 18 inches. Take care to leave retaining wall compacted gravel base and retaining wall block intact. Remove stones measuring over 1-1/2 inches , sticks, rubbish and other extraneous matter from excavated material. Thoroughly blend planting soil mix for planting bed areas (1 part existing soil, 1 part topsoil, 1 part compost, and 2.9 pounds per cubic yard fertilizer). Place soil mix to fill approximately ½ of height needed to fill excavation to finish grade. Work into top of loosened subgrade to create a transition layer, then place remainder of the soil mix to elevation required to meet finish grades after natural settlement. Soil transition layer shall be tilled to a minimum depth of 6” below finished grade. Do not place if planting soil or subgrade is frozen, muddy, or wet. Finish grading: grade soil to a smooth, uniform surface plane with a loose, uniformly fine texture. Fill excavations with water and allow water to infiltrate prior to planting.

*C.2 Planting*

Layout vines at 5’ on center within trench. Set container grown stock plumb and in center of trench with top of root ball 1 inch above finish grades. Cut cans on 2 sides and carefully remove after partial backfilling so as not to damage root balls.

*C.3 Backfilling*

When vines are set, place additional backfill around base and sides of ball. Work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.

*C.4 Mulch*

Mulch trenches to a depth of 3 inches. Work into top of backfill and finish level with adjacent finish grades. Do not place mulch within 3 inches of stems.

*C.5 Cleanup and Protection*

During landscape work, keep pavements clean and work area in an orderly condition. Dispose of waste of foreign materials, including weeds, stones, excavated materials, grass, vegetation, and sod and dispose in accordance with applicable regulations.

**D Measurement**

The department will measure Retaining Wall Planting Area by lump sum, satisfactorily 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.0105.01 | Retaining Wall Planting Area | LS |

Payment is full compensation for all excavation, shaping, grading and compacting: and for furnishing and installing vines, topsoil, compost, mulch and for installing components to create retaining wall planting area; and for furnishing all labor, tools, equipment, materials, and incidentals necessary to satisfactorily complete the work.

1. Splitter Island Planting Area, SPV.0105.02.

**A Description**

This special provision describes furnishing and installing splitter island planting areas consisting of evergreen shrubs, perennials, topsoil, and mulch within the splitter islands according to the pertinent plan details, as directed by the engineer and as hereinafter provided.

**B Materials**

*B.1 Topsoil*

Fertile, friable natural sandy loam, without admixture of subsoil material, free from heavy alkaline soil, coarse sand, stones larger than 1 1/2 inches in diameter, lumps, sticks, and other foreign matter. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep. Do not obtain from agricultural lands, bogs, or marshes.

*B.2 Compost*

Well composted, stable, and weed-free organic matter, pH range of 5.5 to 8, moisture content of 35 to 55 percent by weight, 100 percent passing through 1- inch sieve.

*B.3 Evergreen Shrubs*

Provide evergreen shrubs of type and size as indicated on the plans. Plants shall be well balanced, of type, height, spread, and shape required, and complying with ANSI Z60.1.

*B.4 Perennials*

Provide healthy, field-grown plants of the type and size as indicated on the plans from a commercial nursery, in removable containers. Not less than minimum number and length of runners required by ANSI Z60.1 for the pot size shown.

*B.5 Fertilizer*

Fertilizer shall be Section 629 Fertilizer Type B.

*B.6 Mulch*

Shredded hardwood mulch or Ground or Shredded Bark mulch shall be free from deleterious materials and suitable as a top dressing of evergreen shrubs and perennials.

*B.7 Submittals*

Submit certification of compliance with material specification for topsoil, compost, and evergreen shrubs and perennials.

**C Construction**

*C.1 Soil Preparation*

Excavate the planting area behind the curb of the splitter islands to a depth of 15 inches. Loosen subgrade to a minimum depth of 18 inches or to top of gravel behind curb and gutter. Take care to leave compacted gravel base and curb and gutter intact. Remove stones measuring over 1-1/2 inches, sticks, rubbish and other extraneous matter from excavated material. Thoroughly blend planting soil mix for planting bed areas (1 part existing soil, 1 part topsoil, 1 part compost, and 2.9 pounds per cubic yard fertilizer). Place soil mix to fill approximately ½ of height needed to fill excavation to finish grade. Work into top of loosened subgrade to create a transition layer, then place remainder of the soil mix to elevation required to meet finish grades after natural settlement. Soil transition layer shall be tilled to a minimum depth of 6” below finished grade. Do not place if planting soil or subgrade is frozen, muddy, or wet. Finish grading: grade soil to a smooth, uniform surface plane with a loose, uniformly fine texture. Fill excavations with water and allow water to infiltrate prior to planting.

*C.2 Planting of Evergreen Shrubs*

Layout evergreen shrubs at 5’ on center, in pattern as indicated on the plans. Excavate at least 1.5 times the width of the container and equal to the ball depth, plus 3 inches. Place 3 – inch thick setting layer of planting soil mixture for setting of ball. Set container grown stock plumb and in center of pit with top of root ball 1 inch above adjacent finish grades. Cut cans on 2 sides and carefully remove after partial backfilling so as not to damage root balls.

*C.3 Planting of Perennials*

Space plants as indicated on the plans. Excavate to allow for spreading of roots and backfill with planting soil. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water. Water thoroughly after planting, taking care not to cover crowns of plants with wet soils.

*C.4 Backfilling*

When shrubs and perennials are set, place additional backfill around base and sides of root balls. Work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.

*C.5 Mulch*

Mulch planted area to a depth of 3 inches. Work into top of backfill and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems. Finish level with adjacent finish grades.

*C.6 Cleanup and Protection*

During landscape work, keep pavements clean and work area in an orderly condition. Dispose of waste of foreign materials, including weeds, stones, excavated materials, grass, vegetation, and sod and dispose in accordance with applicable regulations.

**D Measurement**

The department will measure Splitter Island Planting Area by lump sum, satisfactorily 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.0105.02 | Splitter Island Planting Area | LS |

Payment is full compensation for all excavation, shaping, grading and compacting: and for furnishing and installing shrubs, perennials, topsoil, compost, mulch and for installing components to create retaining wall planting area; and for furnishing all labor, tools, equipment, materials, and incidentals necessary to satisfactorily complete the work.

1. Wall Modular Block Mechanically Stabilized Earth (R-15-11), Item SPV.0165.01.; Wall Modular Block Mechanically Stabilized Earth (R-15-12), Item SPV.0165.02.

**A Description**

This special provision describes designing, furnishing materials and erecting a permanent earth retention system in accordance to the lines, dimension, elevations and details as shown on the plans and provided in the contract. The design life of the wall and all wall components shall be 75 years minimum.

This specialprovisiondescribes the quality management program (QMP) for Mechanically Stabilized Earth (MSE) walls. A quality management program is defined as all activities, including process control, inspection, sampling and testing, and necessary adjustments in the process that are related to the construction of the MSE wall, which meets all the requirements of this provision.

This special provision describes contractor quality control (QC) sampling and testing for backfill density testing, documenting those results, and documenting related production and placement process changes. This special provision also describes department quality verification (QV), independent assurance (IA), and dispute resolution.

Chapter 8 of the department’s construction and materials manual (CMM) provides additional detailed guidance for QMP work and describes sampling and testing procedures.

**B Materials**

**B.1 Proprietary Wall Systems**

The supplied wall system must be from the department’s approved list of Modular Block Mechanically Stabilized Earth Wall systems. Proprietary wall systems must conform to the requirements of this specification and be pre-approved for use by the department’s Bureau of Structures. The department maintains a list of pre-approved proprietary wall systems. The name of the pre-approved proprietary wall system selected shall be furnished to the engineer within 25 days after the award of contract. The location of the plant manufacturing the facing units shall be furnished to the engineer at least 14 days prior to the project delivery.

To be eligible for use on this project, a system must have been pre-approved by the Bureau of Structures and added to that list prior to the bid closing date. To receive pre-approval, the retaining wall system must comply with all pertinent requirements of this provision and be prepared in accordance to the requirements of Chapter 14 of the department’s LRFD Bridge Manual. Information and assistance with the pre-approval process can be obtained by contacting the Bureau of Structures, Structures Maintenance Section in Room 601 of the Hill Farms State Transportation Building in Madison or by calling (608) 266-8494.

**B.2 Design Requirements**

It is the responsibility of the Contractor to submit a design and supporting documentation as required by this special provision, for review and acceptance by the department, to show the proposed wall design is in compliance with the design specifications. The submittal shall include the following items for review: detailed plans and shop drawings, complete design calculations, explanatory notes, supporting materials, and specifications. The detailed plans and shop drawings shall include all details, dimensions, quantities and cross-sections necessary to construct the walls. Submit electronically to the engineer and Bureau of Structures for review and acceptance. Submit no later than 60 days from the date of notification to proceed with the project and a minimum of 30 days prior to the date proposed to begin wall construction.

The plans and shop drawings shall be prepared on reproducible sheets 11 inch x 17 inch, including borders. Each sheet shall have a title block in the lower right corner. The title block shall include the WisDOT project identification number and structure number. Design calculations and notes shall be on 8 ½ inch x 11 inch sheets, and shall contain the project identification number, name or designation of the wall, date of preparation, initials of designer and checker, and page number at the top of the page. All plans, shop drawings, and calculations shall be signed, sealed and dated by a professional engineer licensed in the State of Wisconsin.

The design of the wall shall be in compliance with the current American Association of State Highway and Transportation Officials LRFD (AASHTO LRFD) Bridge Design Specifications with latest interim specifications for Mechanically Stabilized Earth Walls, WisDOT’s current Standard Specifications for Highway and Structure Construction (standard spec), Chapter 14 of the WisDOT LRFD Bridge Manual and standard engineering design procedures as determined by the Department. Loads, load combinations, load and resistance factors shall be as specified in AASHTO LRFD Section 11. The associated resistance factors shall be defined in accordance with Table 11.5.7-1 in AASHTO LRFD.

Design and construct the walls in accordance to the lines, grades, heights and dimensions shown on the plans, as herein specified, and as directed by the engineer.

Walls parallel to supporting highway traffic shall be designed for the effects of highway surcharge loading equivalent of 2 feet soil surcharge weight or 240 psf. The design shall also consider the traffic barrier impact where applicable. Walls that do not carry highway traffic shall be designed for a live load surcharge of 100 psf in accordance with Chapter 14 of the WisDOT LRFD Bridge Manual or as stated on the plans.

A maximum value of the angle of internal friction of the wall backfill material used for design shall be assumed to be 30 degrees without a certified report of tests. If a certified report of tests yields an angle of internal friction greater than 30 degrees, the larger test value may be used for design, up to a maximum value of 36 degrees.

An external stability check at critical wall stations showing Capacity Demand Ratio (CDR) for sliding, eccentricity, and bearing checks is provided by the department and are provided on the wall plans.

The design of the wall by the Contractor shall consider the internal and compound stability of the wall mass in accordance with AASHTO LRFD 11.10.6. The internal stability shall include soil reinforcement pullout, soil reinforcement rupture, and wall facing-reinforcement connection failure at each soil reinforcement level. The design shall be performed using the Simplified Method or Coherent Gravity Method. Calculations for factored stresses and resistances shall be based upon assumed conditions at the end of the design life. Compound stability shall be computed for the applicable strength limits. Sample analyses and hand calculations shall be submitted to verify the output of any software used. The design calculations and notes shall clearly indicate the Capacity to Demand Ratios (CDR) for all internal and external stabilities as defined in AASHTO LRFD.

Wall facing units shall be designed in accordance with AASHTO LRFD 11.10.2.3.

The minimum length of soil reinforcement measured from the back face of the wall shall be equal to 0.7 of the wall height, or as shown on the plan. In no case shall this length be less than 6.0 feet. The soil reinforcement length shall be the same from the bottom to the top of the wall. All soil reinforcement layers shall be connected to facings. The soil reinforcement shall extend a minimum of 3.0 feet beyond the theoretical failure plane in all cases. The maximum vertical spacing of soil reinforcement layers shall be two times the block depth (front face to back face) or 32 inches, whichever is less. The first (bottom) layer of reinforcement shall be placed no further than 12 inches above the top of the leveling pad or the height of the block, but at least one block height above the leveling pad. The last (top) layer of soil reinforcement shall be no further than 21 inches below the top of the uppermost block.

All soil reinforcement required for the reinforced soil zone shall be connected to the wall facing.

Soil reinforcement shall be fabricated or designed to avoid piling, drainage structures or other obstacles in the fill without field modifications. Unless approved by the Bureau of Structures cutting or altering of the basic structural section of either the strip or grid at the site is prohibited, a minimum clearance of 3” shall be maintained between any obstruction and reinforcement, and splicing reinforcement is not allowed.

The minimum embedment of the wall shall be 1 foot 6 inches below finished grade, or as given on the plans. All walls shall be provided with a concrete leveling pad. Minimum wall embedment does not include the leveling pad depth. Step the leveling pad to follow the general slope of the ground line. Frost depth shall not be considered in designing the wall for depth of leveling pad.

Wall facing units shall be installed on a concrete leveling pad. The bottom row of blocks shall be horizontal and 100% of the block surface shall bear on the leveling pad.

Concrete leveling pads shall be as wide as the proposed blocks plus six inches, with six inches of the leveling pad extending beyond the front face of the blocks. The minimum thickness of the leveling pad shall be 6-inches.

**B.3 Wall System Components**

Materials furnished for wall system components under this contract shall conform to the requirements of this specification. All documentation related to material and components of the wall systems specified in this subsection shall be submitted to the engineer.

**B.3.1 Wall Facing**

Wall facing units shall consist of precast modular concrete blocks. Furnish concrete produced by a dry-cast or wet-cast process. Concrete for all blocks shall not contain less than 565 pounds of cementitious materials per cubic yard. The contractor may use cement conforming to standard spec. 501.2.1 or may substitute for portland cement at the time of batching conforming to standard spec. 501.2.6 for fly, 501.2.7 for slag, or 501.2.8 for other pozzolans. In either case the maximum total supplementary cementitious content is limited to 30% of the total cementitious content by weight.

Dry-cast concrete blocks shall be manufactured in accordance with ASTM C1372 and this specification.

All units shall incorporate a mechanism or devices that develop a mechanical connection between vertical block layers. Units that are broken, have cracks wider than 0.02” and longer than 25% of the nominal height of the unit, chips larger than 1”, have excessive efflorescence, or are otherwise deemed unacceptable by the engineer, shall not be used within the wall. A single block type and style shall be used throughout each wall. The color and surface texture of the block shall be as given on the plan.

The top course of facing units shall be as noted on the plans, either;

* Solid precast concrete unit designed to be compatible with the remainder of the wall. The finishing course shall be bonded to the underlying facing units with a durable, high strength, flexible adhesive compound compatible with the block material.
* A formed cast-in-place concrete cap. A cap of this type shall have texture, color, and appearance, as noted on the plans. The vertical dimension of the cap shall not be less than 3 1/2 inches. Expansion joints shall be placed in the cap at a maximum spacing of 20 feet unless noted otherwise on the plan. Use Grade A, A-FA, A-S, A-T, A-IS, A-IP or A-IT concrete conforming to standard spec 501 as modified in standard spec 716. Provide QMP for cast in place cap and coping concrete as specified in standard spec 716, Class II Concrete.

Block dimensions may vary no more than ±1/8 inch from the standard values published by the manufacturer. Blocks must have a minimum depth (front face to back face) of 8 inches. The minimum front face thickness of blocks shall be 4 inches measured perpendicular from the front face to inside voids greater than 4 square inches. The minimum allowed thickness of any other portions of the block is 1¾ inches. The front face of the blocks shall conform to plan requirements for color, texture, or patterns.

If pins are used to align modular block facing units, they shall consist of a non-degrading polymer, or hot dipping galvanized steel and be made for the express use with the modular block units supplied, to develop mechanical interlock between facing unit block layers. Connecting pins shall be capable of holding the wall in the proper position during backfilling. Furnish documentation that establishes and substantiates the design life of such devices.

For concrete leveling pad, use Grade A, A-FA, A-S, A-T, A-IS, A-IP, or A-IT concrete conforming to standard spec 501 as modified in standard spec 716. Provide QMP for leveling pad concrete as specified in standard spec 716, Class III Concrete.

**B.3.2 Material Testing**

Provide independent quality verification testing of project materials according to the following requirements:

|  |  |  |  |
| --- | --- | --- | --- |
| **Test** | **Method** | **Requirement** | |
| **Dry-cast** | **Wet-cast** |
| Compressive Strength (psi) | ASTM C140 | 5000 min. | 4000 min. |
| Air Content (%) | AASHTO T152 | N/A | 6.0 +/-1.5 |
| Water Absorption (%) | ASTM C140 | 6 max.[3] | N/A |
| Freeze-Thaw Loss (%)  40 cycles, 5 of 5 samples  50 cycles, 4 of 5 samples | ASTM C1262[1] | 1.0 max.[2][3]  1.5 max.[2][3] | N/A |

[1] Test shall be run using a 3% saline solution and blocks greater than 45 days old.

[2] Test results that meet either of the listed requirements for Freeze-Thaw Loss are acceptable.

[3] The independent testing laboratory shall control and conduct all sampling and testing. Prior to sampling, the manufacturer’s representative shall identify materials by lot. Five blocks per lot shall be randomly selected for testing. Solid blocks used as a finishing or top course shall not be selected. The selected blocks shall remain under the control of the person who conducted the sampling until shipped or delivered to the testing laboratory. All pallets of blocks within a lot shall be strapped or wrapped to secure the contents and tagged or marked for identification. The engineer will reject any pallet of blocks delivered to the project without intact security measures. At no expense to the department, the contractor shall remove all rejected blocks from the project. If a random sample of five blocks of any lot tested by the department fails to meet any of the above testing requirements, the entire lot will be considered non-conforming.

The contractor and fabricator shall coordinate with the independent testing agency to ensure that strength and air content samples can be taken appropriately during manufacturing. At the time of delivery of materials, furnish the engineer a certified report of test from an AASHTO-registered or ASTM-accredited independent testing laboratory for each lot.

The certified test report shall include the following:

* Project ID
* Production process used (dry-cast or wet-cast)
* Name and location of testing facility
* Name of sampling technician
* Lot number and lot size

Testing of project materials shall be completed not more than 18 months prior to delivery. Independent testing frequency shall not exceed 5000 blocks for dry-cast blocks and the lesser of 150 CY or 1 day’s production for wet-cast blocks. The certified test results will represent all blocks within the lot. Each pallet of blocks delivered shall bear lot identification information. Block lots that do not meet the requirements of this specification or blocks without supporting certified test reports will be rejected and shall be removed from the project at no expense to the department.

Nonconforming materials will be subject to evaluation according to standard spec 106.5.

**B.3.3 Backfill**

Furnish and place backfill for the wall as shown on the plans and as hereinafter provided.

Wall Backfill, Type A, shall comply with the requirements for Coarse Aggregate No. 1 as given in standard spec 501.2.5.4.4. All backfill placed within a zone from the top of the leveling pad to the top of the final layer of wall facing units and within 1 foot behind the back face of the wall shall be Wall Backfill, Type A. This includes all material used to fill openings in the wall facing units.

Wall Backfill, Type B, shall be placed in a zone extending horizontally from 1 foot behind the back face of the wall to 1 foot beyond the end of the reinforcement and extending vertically from the top of the leveling pad to a minimum of 3 inches above the final reinforcement layer.

Use natural sand or a mixture of sand with gravel, crushed gravel or crushed stone. Do not use foundry sand, bottom ash, blast furnace slag, crushed/recycled concrete, crushed/milled asphaltic concrete or other potentially corrosive material.

Provide material conforming to the following gradation requirements as per AASHTO T27.

|  |  |
| --- | --- |
| Sieve Size | % by Weight Passing |
| 1 inch | 100 |
| No. 40 | 0 - 60 |
| No. 200 | 0 - 15 |

The material shall have a liquid limit not greater than 25, as per AASHTO T89, and a plasticity index not greater than 6, as per AASHTO T90. Provide the percent by weight, passing the #4 sieve.

In addition, backfill material Type A and Type B shall meet the following requirements.

|  |  |  |
| --- | --- | --- |
| **Test** | **Method** | **Value** |
| pH | AASHTO T-289 | 4.5-9.0 |
| Sulfate content [1] | AASHTO T-290 | 200 ppm max. |
| Chloride content [1] | AASHTO T-291 | 100 ppm max. |
| Electrical Resistivity | AASHTO T-288 | 3000 ohm-cm min. |
| Organic Content [1] | AASHTO T-267 | 1.0% max. |
| Angle of Internal Friction | AASHTO T-236[2] | 30 degrees min. (At 95.0% of maximum density and optimum moisture, per AASHTO T99, or as modified by C.2) |

[1] Requirement does not apply to walls with non-metallic reinforcement.

[2] If the amount of P-4 material is greater than 60%, use AASHTO 236 with a standard-size shear box. Test results of this method may allow the use of larger angles of internal friction, up to the maximum allowed by this specification.

If the amount of P-4 material is less than or equal to 60%, two options are available to determine the angle of internal friction. The first method is to perform a fractured faces count, per ASTM D5821, on the R-4 material. If more than 90% of the material is fractured on one face and more than 50% is fractured on two faces, the material meets the specifications and the angle of internal friction can be assumed to be 30 degrees. The second method allows testing all P-1” material, as per AASHTO T-236, with a large shear box. Test results of this second method may allow the use of larger angles of internal friction, up to the maximum allowed by this specification.

Prior to placement of the backfill, obtain and furnish to the engineer a certified report of test results that the backfill material complies with the requirements of this specification. Specify the method used to determine the angle of internal friction. This certified report of test shall be less than 6 months old. Tests will be performed by a certified independent laboratory. In addition, when backfill characteristics and/or sources change, provide a certified report of tests for the new backfill material. Additional certified report of tests are also required. These additional backfill tests may be completed at the time of material production or material placement, with concurrence of the engineer. If this additional testing is completed at the time of material production, complete testing for every 2000 cubic yards of backfill or portion thereof. If this additional testing is completed at the time of material placement, complete testing for every 2000 cubic yards of backfill, or portion thereof, used per wall. For the additional required testing for every 2000 cubic yards of backfill placement, if the characteristic of the backfill and/or the source has not changed then Angle of Internal Friction tests are not included in the additional required testing. All certified reports of test results shall be less than 6 months old and performed by a certified independent laboratory.

**B.3.4 Soil Reinforcement**

**B.3.4.1 Geogrids**

Geogrid supplied as reinforcing members shall be manufactured from long chain polymers limited to polypropylene, high-density polyethylene, polyaramid, and polyester. Geogrids shall form a uniform rectangular grid of bonded, formed, or fused polymer tensile strands crossing with a nominal right angle orientation. The minimum grid aperture shall be 0.5 inch. The geogrid shall maintain dimension stability during handling, placing, and installation. The geogrid shall be insect, rodent, mildew, and rot resistant. The geogrid shall be furnished in a protective wrapping that shall prevent exposure to ultraviolet radiation and damage from shipping or handling. The geogrid shall be kept dry until installed. Each roll shall be clearly marked to identify the material contained.

The wall supplier shall provide the nominal long-term design strength (Tal) and nominal long-term connection strength, Talc as discussed below.

Nominal Long-Term Design Strength (Tal)

The wall supplier shall supply the nominal long-term design strength (Tal) used in the design for each reinforcement layer and shall be determined by dividing the Ultimate Tensile Strength (Tult) by the factors RFID, RFCR, RFD.

Hence,



where:

Tult = Ultimate tensile strength of the reinforcement determined from wide width tensile tests (ASTM D6637) for geogrids based on the minimum average roll value (MARV) for the product.

RFID = Strength reduction factor to account for installation damage to the reinforcement. In no case shall RFID be less than 1.1.

RFCR = Strength reduction factor to prevent long-term creep rupture of the reinforcement. In no case shall RFCR be less than 1.2.

RFD = Strength reduction factor to prevent rupture of the reinforcement due to chemical and biological degradation. In no case shall RFD be less than 1.1.

Values for RFID, RFCR, and RFD shall be determined from product specific test results. Guidelines for determining RFID, RFCR, and RFD from product specific data are provided in FHWA Publication No. FHWA-NHI-10-024 and FHWA–NHI-10-025 “Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes”.

Nominal Long-term Connection Strength Tac

The nominal long term connection strength, Tac, shall be based on laboratory geogrid connection tests between wall facing and geogrids. Tac shall be as given below



where:

Tac = Nominal long-term reinforcement facing connection strength per unit reinforcement width at a specified confining pressure.

Tult = Ultimate tensile strength of the reinforcement for geogrids defined as the minimum average roll value (MARV) for the product.

CRcr = Long term connection strength reduction factor to account for reduced ultimate strength resulting from connection.

RFD = Strength reduction factor to prevent rupture of the reinforcement due to chemical and biological degradation.

Tac shall be developed from the tests conducted by an independent laboratory on the same facing blocks and geogrids as proposed for the wall and shall cover a range of overburden pressures comparable to those anticipated in the proposed wall. The connection strength reduction factor CRcr shall be determined in accordance with long-term connection test as described in Appendix B of FHWA Publication No. FHWA-NHI 10-025 “Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes”. CRcr may also be obtained from the short term connection test meeting the requirements of NCMA test method SRWU-1 in Simac et al 1993 or ASTM D4884.

The Contractor shall provide a manufacturer’s certificate that the Tult (MARV) of the supplied geogrid has been determined in accordance with ASTM D4595 or ASTM D6637 as appropriate. Contractor shall also provide block to block and block to reinforcement connection test reports prepared and certified by an independent laboratory. Also provide calculations in accordance with AASHTO LRFD, and using the results of laboratory tests, that the block-geogrid connections shall be capable of resisting 100% of the maximum tension load in the soil reinforcements at any level within the wall, for the design life of the wall system.

**B.3.4.2 Galvanized Metal Reinforcement**

In lieu of polymeric geogrid earth reinforcement, galvanized metal reinforcement may be used. Design and materials shall be in accordance to AASHTO LRFD 11.10.6.4.2. The design life of steel soil reinforcements shall also comply with AASHTO LRFD. Steel soil reinforcement shall be prefabricated into single or multiple elements before galvanizing.

**C Construction**

**C.1 Excavation and Backfill**

Excavation and preparation of the foundation for the MSE wall and the leveling pad shall be in accordance to standard spec 206. The volume of excavation covered is limited to the width of the reinforced mass and to the depth of the leveling pad unless shown or noted otherwise on the plan. At the end of each working day, provide good temporary drainage such that the backfill shall not become contaminated with run-off soil or water if it should rain. Do not stockpile or store materials or large equipment within 10 feet of the back of the wall.

Place backfill materials in the areas as indicated on the plans and as detailed in this specification. Backfill lifts shall be no more than 8-inches in depth, after compaction. Backfilling shall closely follow erection of each course of wall facing units.

Conduct backfilling operations in such a manner as to prevent damage or misalignment of the wall facing units, soil reinforcement, or other wall components. At no expense to the department, correct any such damage or misalignment as directed by the engineer. A field representative of the wall supplier shall be available during wall construction to provide technical assistance to the contractor and the engineer.

Place and compact the MSE backfill to the level of the next higher layer of MSE reinforcement before placing the MSE reinforcement or connecting it to the wall facing. Place and compact material beyond the reinforced soil zone to allow for proper compaction of material within the reinforced zone. The MSE reinforcement shall lay horizontally on top of the most recently placed and compacted layer of MSE backfill.

Do not operate tracked or wheeled equipment on the backfill within 3 feet from the back face of modular blocks. The engineer may order the removal of any large or heavy equipment that may cause damage or misalignment of the wall facing units.

**C.2 Compaction**

Compact wall backfill Type A with at least three passes of lightweight manually operated compaction equipment acceptable to the engineer.

Compact all backfill Type B as specified in standard spec 207.3.6. Compact the backfill Type B to 95.0% of maximum dry density as determined by AASHTO T-99 (modified to compute densities to the nearest 0.1 pcf).

Ensure adequate moisture is present in the backfill during placement and compaction to prevent segregation and to help achieve compaction.

Compaction of backfill within 3 feet of the back face of the wall should be accomplished using lightweight compaction devices. Use of heavy compaction equipment or vehicles should be avoided within 3 feet of the modular blocks. Do not use sheepsfoot or padfoot rollers within the reinforced soil zone.

A minimum of 6 inches of backfill shall be placed over the MSE reinforcement prior to working above the reinforcement.

**C.3 Wall Components**

**C.3.1 General**

Erect wall facing units and other associated elements according to the wall manufacturer’s construction guide and to the lines, elevations, batter, and tolerances as shown on the plans. Center the initial layer of facing units on the leveling pad; then level them and properly align them. Fill formed voids or openings in the facing units with wall backfill, Type A. Remove all debris on the top of each layer of facing units, before placing the next layer of facing units.

Install all pins, rods, clips, or other devices used to develop mechanical interlock between facing unit layers in accordance with the manufacturer’s directions.

The MSE reinforcement shall lay horizontally on the top of the most recently placed and compacted layer of MSE backfill. Bending of MSE reinforcement that result in a kink in the reinforcement shall not be allowed. If skewing of the reinforcement is required due to obstructions in the reinforced fill, the maximum skew angle shall not exceed 15 degrees from the normal position unless a greater angle is shown on the plans. The adequacy of the skewed reinforcement in such a case shall be addressed by supporting calculations.

**C.3.2 Soil Reinforcement**

**C.3.2.1 Geogrid Layers**

Place soil reinforcement at the positions and to the lengths as indicated on the accepted shop drawings. Take care that backfill placement over the positioned soil reinforcement elements does not cause damage or misalignment of these elements. Correct any such damage or misalignment as directed by the engineer. Do not operate wheeled or tracked equipment directly on the soil reinforcement. A minimum cover of 6 inches is required before such operation is allowed.

Place and anchor geogrid material between wall unit layers in the same manner as used to determine the Geogrid Block-to-Connection Strength. Place the grid material so that the machine direction of the grid is perpendicular to the wall face. Each grid layer shall be continuous throughout the lengths indicated on the plans. Join grid strips with straps, rings, hooks or other mechanical devices to prevent movement during backfilling operations. Prior to placing backfill on the grid, pull the grid taunt and hold in position with pins, stakes or other methods approved by the engineer.

**C.3.2.2 Steel Layers**

Place the steel reinforcement full width in one piece as shown on the plans. No splicing will be allowed. Maintain elements in position during backfilling.

**C.4 Quality Management Program**

**C.4.1 Quality Control Plan**

Submit a comprehensive written quality control plan to the engineer at or before the pre-construction meeting. Do not perform MSE wall construction work before the engineer reviews and accepts the plan. Construct the project as the plan provides.

Do not change the quality control plan without the engineer’s review and acceptance. Update the plan with changes as they become effective. Provide a current copy of the plan to the engineer and post in the contractor’s laboratory as changes are adopted. Ensure that the plan provides the following elements:

1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.
2. The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication process that will be used, and action time frames.
3. A list of source locations, section and quarter descriptions, for all aggregate materials requiring QC testing.
4. Descriptions of stockpiling and hauling methods.
5. An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.
6. Location of the QC laboratory, retained sample storage, and other documentation.
7. A summary of the locations and calculated quantities to be tested under this provision.
8. A proposed sequencing plan of wall construction operations and random test locations.

**C.4.2 Quality Control Personnel**

Perform the quality control sampling, testing, and documentation required under this provision using HTCP certified technicians. Have a HTCP Grading Technician I (GRADINGTEC-I); or Assistant Certified Technician, Grading (ACT-GRADING); or Aggregate Technician I (AGGTEC-I); or Assistant Certified Technician, Aggregate (ACT-AGG) present at the each grading site during all wall backfill placement, compaction, and nuclear testing activities. Have a HTCP Nuclear Density Technician I (NUCDENSITYTEC-I) or Assistant Certified Technician, Nuclear Density Gauge Operator (ACT-NUC) perform field density and field moisture content testing.

If an Assistant Certified Technician (ACT) is performing sampling or testing, a certified technician must coordinate and take responsibility for the work an ACT performs. Have a certified technician Ensure that all sampling and testing is performed correctly, analyze test results, and post resulting data. No more than one ACT can work under a single certified technician.

**C.4.3 Equipment**

Furnish the necessary equipment and supplies for performing quality control testing. Ensure that all testing equipment conforms to the equipment specifications applicable to the required testing methods. The engineer may inspect the measuring and testing devices to confirm both calibration and condition. Calibrate all testing equipment according to the CMM and maintain a calibration record at the laboratory.

Furnish nuclear gauges from the department’s approved product list at <http://www.atwoodsystems.com/>. Ensure that the gauge manufacturer or an approved calibration service calibrates the gauge the same calendar year it is used on the project. Retain a copy of the calibration certificate with the gauge.

Conform to ASTM D6938 and CMM 8-15 for density testing and gauge monitoring methods. Perform nuclear gauge measurements using gamma radiation in the backscatter or direct transmission position. Perform each test for 4 minutes of nuclear gauge count time.

Split each Proctor sample and identify so as to provide comparison with the department's test results. Unless the engineer directs otherwise, retain the QC split samples for 14 calendar days and promptly deliver the department’s split samples to the department.

**C.4.4 Documentation**

(1) Document all observations, inspection records, and process adjustments daily. Submit test results to the department's project materials coordinator on the same day they become available.

(2) Use forms provided in CMM Chapter 8. Note other information in a permanent field record and as a part of process control documentation enumerated in the contractor's quality control plan. Enter QC data and backfill material certified report results into the applicable materials reporting system (MRS) software within 5 business days after results are available.

(3) Submit final testing records and other documentation to the engineer electronically within 10 business days after all contract-required information becomes available. The engineer may allow submission of scanned copies of hand-written documentation.

**C.4.5 Quality Control (QC) Testing**

Perform compaction testing on the backfill. Conform to CMM 8-15 for testing and gauge monitoring methods. Conduct testing at a minimum frequency of 1 test per 150 cubic yards of backfill, or major portion thereof in each lift. A minimum of one test for every lift is required. Deliver documentation of all compaction testing results to the engineer at the time of testing.

Perform 1 gradation test every 750 cubic yards of fill and one 5-point Proctor test (or as modified in C.2) every 2,250 cubic yards of fill. Provide the region split samples of both within 72 hours of sampling, at the region laboratory. Test sites shall be selected using ASTM Method D3665. Provide Proctor test results to the engineer within 48 hours of sampling. Provide gradation test results to the engineer within 24 hours of sampling.

**C.4.6 Department Testing**

**C.4.6.1 General**

(1) The department will conduct verification testing to validate the quality of the product and independent assurance testing to evaluate the sampling and testing. The department will provide the contractor with a listing of names and telephone numbers of all QV and IA personnel for the project, and provide test results to the contractor within 2 business days after the department obtains the sample.

**C.4.6.2 Quality Verification (QV) Testing**

(1) The department will have an HTCP technician, or ACT working under a certified technician, perform QV sampling and testing. Department verification testing personnel must meet the same certification level requirements specified in C.4.2 for contractor testing personnel for each test result being verified. The department will notify the contractor before sampling so the contractor can observe QV sampling.

(2) The department will conduct QV tests at the minimum frequency of 30% of the required contractor density, Proctor and gradation tests.

(3) The department will locate density tests and gradation samples randomly, at locations independent of the contractor’s QC work. The department will split each Proctor and gradation QV sample, testing half for QV, and retaining the remaining half for 10 business days.

(4) The department will conduct QV Proctor and gradation tests in a separate laboratory and with separate equipment from the contractor’s QC tests. The department will use the same methods specified for QC testing.

(5) The department will assess QV results by comparing to the appropriate specification limits. If QV test results conform to this special provision, the department will take no further action. If density QV test results are nonconforming, the area shall be reworked until the density requirements of this special provision are met. If the gradation test results are nonconforming, standard spec 106.5 will apply. Differing QC and QV nuclear density values of more than 1.5 pcf will be investigated and resolved. QV density tests will be based on the appropriate QC Proctor test results, unless the QV and QC Proctor result difference is greater than 3.0 pcf. Differing QC and QV Proctor values of more than 3.0 pcf will be investigated and resolved.

**C.4.6.3 Independent Assurance (IA)**

(1) Independent assurance is unbiased testing the department performs to evaluate the department’s QV and the contractor’s QC sampling and testing, including personnel qualifications, procedures, and equipment. The department will perform an IA review according to the department’s independent assurance program. That review may include one or more of the following:

1. Split sample testing.

2. Proficiency sample testing.

3. Witnessing sampling and testing.

4. Test equipment calibration checks.

5. Reviewing required worksheets and control charts.

6. Requesting that testing personnel perform additional sampling and testing.

(2) If the department identifies a deficiency, and after further investigation confirms it, correct that deficiency. If the contractor does not correct or fails to cooperate in resolving identified deficiencies, the engineer may suspend placement until action is taken. Resolve disputes as specified in C.4.6.4.

**C.4.6.4 Dispute Resolution**

(1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor’s and the engineer’s testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and perform additional testing. Use ASTM E178 to evaluate potential statistically outlying data.

(2) Production test results, and results from other process control testing, may be considered when resolving a dispute.

(3) If the project personnel cannot resolve a dispute, and the dispute affects payment or could result in incorporating non-conforming product or work, the department will use third party testing to resolve the dispute. The department’s central office laboratory, or a mutually agreed on independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party test results to evaluate the quality of questionable materials and determine the appropriate payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

**C.5 Geotechnical Information**

Geotechnical data to be used in the design of the wall is given on the wall plan. After completing wall excavation of the entire reinforced soil zone, notify the department and allow the Regional Soils Engineer two working days to review the foundation.

**D Measurement**

The department will measure Wall Modular Block Mechanically Stabilized Earth by the square foot acceptably completed, measured at the front face of wall as defined by the pay limits the contract plans show. Unless the Engineer directs in writing, a change to the limits indicated on the contract plan, wall area constructed above or below these limits will not be measured for payment.

**E Payment**

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

ITEM NUMBER DESCRIPTION UNIT

SPV.0165.01 Wall Modular Block Mechanically Stabilized Earth SF

(R-15-11)

SPV.0165.02 Wall Modular Block Mechanically Stabilized Earth SF

(R-15-12)

Payment is full compensation for supplying a design and shop drawings; preparing the site, including all necessary excavation and disposal of materials; supplying all necessary wall components to produce a functional wall system including cap, copings and leveling pad; constructing the retaining system including drainage system; providing backfill, backfilling, compacting, developing/completing/documenting the quality management program, and performing compaction testing.

Payment limit for all walls is the line of minimum embedment per section B.2. No payment will be made for additional embedment detailed for construction purposes. Parapets, railings, and other items above the wall cap or coping will be paid for separately. Vehicle barrier and its support will be paid separately.

Any required topsoil, fertilizer, seeding or sodding and mulch will be paid for at the contract unit price for those items.

SPV.0165.XX (20170629)

1. Crosswalk Apron Pavers, SPV 0165.02.

**A Description**

This special provision describes furnishing and installing crosswalk apron pavers according to the pertinent plan details, as directed by the engineer and as hereinafter provided.

**B Materials**

All materials for this concrete paver system shall be new stock, free from defects impairing strength, durability, and appearance.

*B.1 Concrete Pavers*

Concrete Paver: 4-inch x 8 inch – 6CM, smooth finish: Unilock Hollandstone, color – Sandstone, Mutual Materials Holland Paver, color – Summit Blend, or approved equal.

*B.2 Joint Sand*

Provide washed, clean, non-plastic material, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock. Do not use limestone screenings, stone dust, or sand that does not conform to the grading requirements of ASTM C 33.

*B.3 Setting Bed Sand*

Provide washed, clean, non-plastic material, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock. Do not use limestone screenings, stone dust, or sand material that does not conform to the grading requirements of ASTM C33. Do not use mason sand or sand conforming to ASTM C 144.

*B.4 Sub-Base Aggregate*

Provide Base Aggregate materials conforming to ASTM D 2940 and gradation requirements as presented in table below.

|  |  |
| --- | --- |
| **ASTM D 2940** |  |
| **Sieve Size** | **Percent Passing** |
| 2 in (50mm) | 100 |
| 1-1/2in (37.5mm) | 95 to 100 |
| ¾ in (19mm) | 70 to 92 |
| 3/8in (9.5 mm) | 50 to 70 |
| No. 4 (4.75mm) | 35 to 55 |
| No. 30 (600 um) | 12 to 25 |
| No. 200 (75 um) | 0 to 8 |

*B.5 Edge Restraints*

Plastic and metal edge restraints: Permaloc “StructurEdge” – 3/16” x 2-1/4” heavy duty paver restraint, Pave Tech “Pave Edge Rigid”, or SEK-Surebond “Snap Edge Paver Restraint”.

**C Construction**

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. Stockpile Setting Bed Sand, Joint Sand, and Base such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement. Excavate soil to a depth of 9 ½ inches. Keep area where pavers are to be constructed free from sediment during entire job. Should materials become contaminated with sediment, remove and replace with clean materials.

Compact soil subgrade uniformly to at least 95 percent of Standard Proctor Density per ASTM 698. Provide 6 inches Subbase, compact to 95 percent Standard Proctor Density as per ASTM D 698 to prevent infiltration of the bedding sand into the base both during construction.

Provide concrete edge restraints between pavers and landscape areas, on a minimum of 6” of Base Aggregate. Follow manufacturer’s recommendation for installation.

Provide and spread Setting Sand Bed evenly over the Base Aggregate course and screed to a nominal thickness of 1 inch.

Provide Concrete Pavers using running bond pattern, laid parallel with road centerline. Cut Concrete Pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges where less than a full paver is required. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable. Vibrate Concrete Pavers into leveling course with a low-amplitude plate vibrator. Conduct at least three passes. Remove any cracked or structurally damaged Concrete Pavers and replace with new units prior to installing Joint Sand material.

Provide, spread, and sweep dry Joint Sand into joints immediately after vibrating pavers into Setting Bed Sand Course until full. Vibrate pavers and add Joint Sand material until joints are filled to surface of paver, then remove excess material. This will require at least 4 passes with a plate compactor. Remove excess Joint Sand broom clean from surface when installation is complete.

Verify that final elevations match curb line and adjacent concrete pavement elevations.

**D Measurement**

The department will measure Crosswalk Apron Pavers by the square foot, satisfactorily 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.0165.02 | Crosswalk Apron Pavers | SF |

Payment is full compensation for all excavation, grading, shaping and compacting: and for furnishing and installing concrete pavers, base, setting sand bed, and joint sand necessary to create a crosswalk apron paver system, including any touch-up and repairs; and for furnishing all labor, tools, equipment, materials, and incidentals necessary to satisfactorily complete the work.

1. Concrete Weir Inside Manhole, Item SPV.0165.03.

**A Description**

This special provision describes constructing a concrete weir inside a storm sewer manhole.

**B Materials**

Provide grade A, A-2, A-FA, A-S, A-T, A-IS, or A-IP concrete conforming to standard spec 501 as modified in standard spec 716. Provide QMP for class II ancillary concrete as specified in standard spec 716.

Furnish reinforcement that is according to the pertinent requirements of standard spec section 505.

Cure the concrete by one of the methods specified in 502.3.8 for curing concrete in substructure units.

**C Construction**

*C.1 Reinforcement Bars Installation*

Drill holes for the reinforcement bars into the base of the manhole at the depth and spacing as shown on the plan details. Anchor the reinforcement bars in the manhole base using an epoxy adhesive. Attach the horizontal reinforcement bars at the spacing shown on the plan details.

*C.2 Forms*

Furnish and use wood or metal forms straight and of sufficient strength to resist springing, tipping, or other displacement during depositing and consolidating the concrete. If using wood forms, provide surfaced plans, at least 2-inch nominal thickness stock. If using metal forms, ensure they are the engineer-approved section with a flat surface on top. Use forms as deep as the depth from the top of the base of the manhole to the top of weir elevation as shown on the plan details. Securely brace the forms and make the forms tight to prevent mortar leakage. Clean and oil all before placing concrete against them.

*C.3 Placing and Finishing Concrete*

The engineer will check and approve the forms and reinforcement before placing the concrete. Deposit the concrete to the required depth and consolidate sufficiently to bring the mortar to the surface, then strike-off and finish to a true and even surface.

*C.4 Curing*

Cure the concrete as specified in standard spec 415.3.12.

*C.5 Removing Forms*

Remove forms after the concrete is cured.

**D Measurement**

The department will measure Concrete Weir Inside Manhole bid items by the square foot acceptably completed. The measured area equals the vertical depth of the weir multiplied by the horizontal length of the weir.

**E Payment**

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

|  |  |  |
| --- | --- | --- |
| ITEM NUMBER | DESCRIPTION | UNIT |
| SPV.0165.03 | Concrete Weir Inside Manhole | SF |

Payment is full compensation for all materials, including concrete and reinforcement; for providing and removing the forms; for disposing of surplus material; for placing, finishing, and curing.