

Special Provisions

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SPECIAL PROVISIONS

1. General.

Perform the work under this construction contract for Project 1360-12-70, Fond Du Lac, City of Milwaukee, 107th St. Bridge, STH 145, Milwaukee County, Wisconsin as the plans show and execute the work as specified in the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, 2022 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 (20210708)

2. Scope of Work.

The work under this contract shall consist of grading, base aggregate dense, concrete curb & gutter, concrete pavement, HMA pavement, storm sewer, lighting, traffic signals, bridge demolition, concrete masonry bridges, MSE walls, marking lines, signing, restoration and all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

104-005 (20090901)

3. 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.

Do not store equipment, vehicles, or construction materials within the clear zone as designated in the plans on any roadway carrying traffic during non-working hours except at locations and periods of time approved by the engineer.

Do not store equipment, vehicles, or construction materials on adjacent streets outside of the project limits without specific approval of the engineer.

Migratory Birds

Swallow or other migratory bird nests have been observed on or under the existing structure(s). All active nests (when eggs or young are present) of migratory birds are protected under the federal Migratory Bird Treaty Act. The nesting season for swallows and other birds is from May 1 to August 31.

Either prevent active nests from becoming established or prevent birds from nesting by installing and/or maintaining a suitable deterrent device on the remaining structure prior to nesting activity under the bid item Maintaining Bird Deterrent System. As a last resort, apply for a depredation permit from the US Fish and Wildlife Service for work that may disturb or destroy active nests. The need for a permit may be avoided by removing the existing bridge structure prior to nest occupation by birds or clearing nests from all structures before the nests become active in early spring.

4. Traffic

General

Conduct construction operations in a manner that will cause the least interference to traffic movements and business and residential access adjacent and within the construction areas.

If traffic delays becomes longer than 15 minutes on STH 145, coordinate with the engineer to limit or alter construction operations to prevent undue inconvenience to the traveling public as specified under subsection 108.5 of the standard specifications.

Provide 24-hour contact information, including current telephone number(s), to the engineer, local first responders (police, fire, and EMS), Columbia County Sheriff's Department, and the Columbia County Highway Department in the event a safety hazard develops. Repair, replace, or restore the damaged or disturbed traffic control devices within two hours from the time notified.

Maintain the traffic control plan as shown in the plan except when full closure is needed for bridge demo and for setting girders.

Full closure on STH 145 will be permitted between 8PM and 6AM. There will be no time restrictions if a single lane or shoulder closure on STH 145 is needed. Closing two lanes on STH 145 (3-1 closure) will be restricted during the 7-9AM and 3-7PM periods (assuming soft barrier and high intensity work zone).

Provide PCMS message boards as shown on the plan.

Wisconsin Lane Closure System Advance Notification

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

TABLE 108-1 CLOSURE TYPE AND REQUIRED MINIMUM ADVANCE NOTIFICATION

Closure type with height, weight, or width restrictions (available width, all lanes in one direction < 16 feet)	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 feet)	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.

5. Holiday and Special Event Work Restrictions.

Do not perform work on, nor haul materials of any kind along or across any portion of the highway carrying STH 145 and 107th St. 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 and special event periods:

- From noon Friday, July 1, 2022, to 6:00 AM Tuesday, July 5, 2022, for Independence Day;
- From noon Friday, September 2, 2022, to 6:00 AM Tuesday, September 6, 2022, for Labor Day.

stp-107-005 (20210113)

6. 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 Vida Schaffer at 262-548-6766. Post the permit in a conspicuous place at the construction site.

stp-107-056 (20180628)

7. Utilities.

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

stp-107-065 (20080501)

AT&T Wisconsin – Communication has underground facilities within the project limits. The facilities will be relocated as follows:

Proposed relocation

STA 116+05, 56.5' RT create a bore pit and break into existing 6 -pc-c conduit package connect to empty conduit and extend via bore 4 HDPE conduit following proposed running line along east right of way to STA 115+20, 56.5' RT, to STA 114+50, 70' RT, removing brush for bore path in WISDOT ROW approx. 200 ft combined

STA 114+50, 70' RT to STA 111+20, 70' RT bore across freeway and connect back to existing manhole wall at STA 110+70, 17.5' RT.

This work will be done prior to construction.

Discontinue

STA 110+74, 13.5' RT TO STA 116+05, 56.5' RT Discontinue existing 6 - pc-c conduits package

STA 111+75 TO STA 113+75 conduit **can be removed with bridge demolition**

During construction the manhole frame and cover at STA 110+70, 15.5' RT will need to be adjusted. Coordinate this work with AT&T Wisconsin

The AT&T Wisconsin contact for this project is Jay Bulanek, 414-491-2855, jb5175@att.com

ATR Pull Boxes – Electricity may have loops in the existing pavement. They are going to be abandoned and can be milled through. No relocation is planned.

The ATR Pull Boxes contact for this project is Russell Lewis, 608-516-5754, Russell.lewis@dot.wi.gov.

City of Milwaukee – Communication has fiber in City of Milwaukee Underground Conduit (CUC). The fiber will be abandoning the fiber line prior to construction. New fiber will be run in CUC after construction.

The City of Milwaukee Communications contact for this project is Joe Maciejewski, jkring@milwaukee.gov.

City of Milwaukee – Forestry may have facilities in the project limits. No conflicts are anticipated.

The City of Milwaukee Forestry contact for the project is James Kringer, jkring@milwaukee.gov.

City of Milwaukee – Street Lighting will install temporary lighting at the early stages of construction. Underground facilities will be installed as part of planned work.

Temporary overhead circuitry will be installed along with the relocation of a permanent light pole south of the North 107th Street bridge, to keep the street lights working. This work will be done before any construction work starts.

Street lighting will also need to do some additional temporary circuitry alterations at West Good Hope Rd. and North 107th Street to maintain the street lights north of the N. 107th St. bridge.

The permanent light pole will be relocated to Sta.111+18.9'; 37.9'LT.

There will be a pull box also installed at Sta.111+20'; 33.2'LT.

The street lighting contact below will need to be kept informed on the status of the project to coordinate street lighting circuitry termination after the contractor installed the street light facilities on and off the bridge.

The City of Milwaukee Lighting contact for this project is Eng-Kie Lee, 414-286-2174, elee@milwaukee.gov.

City of Milwaukee – Sewer has underground facilities within the project limits. There are no conflicts anticipated.

The City of Milwaukee Sewer contact for this project is Zafar Yousuf, 414-286-2467, zyousu@milwaukee.gov.

City of Milwaukee – Water has underground facilities within the project limits, including a 42" concrete watermain under STH 145 east of the 107th Street bridge. No conflicts are anticipated.

The City of Milwaukee Water contact for this project is Joshua Iwen, jiwen@milwaukee.gov.

City of Milwaukee – Signals has will be relocating facilities during construction and as part of planned work.

The City of Milwaukee Signals contact for the project is Scott Reinbacher, sreinb@milwaukee.gov.

City of Milwaukee – Underground Conduit (CUC) has underground facilities and conduit suspended from the 107th Street bridge. This conduit will be removed during construction and reinstalled on the new structure as part of the planned work.

The City of Milwaukee CUC contact for this project is Eng-Kie Lee, 414-286-2174, elee@milwaukee.gov.

Level 3 - Communications does not have known facilities on the project. No conflicts are anticipated.

The Level 3 contact for this project is Brahim Gaddour, 414-908-1027, Brahim.gaddour@lumen.com.

Spectrum - Communications has aerial and underground facilities within the project limits. No conflicts are anticipated. Should We Energies decide to relocate any pole with Charter

The Spectrum contact for this project will be Beau Abuya, 414-758-9241, Beau.Abuya@charter.com.

Verizon Business - Communications has underground facilities recently placed west of the bridge. No conflicts are anticipated.

The Verizon Business contact for this project is RJ Cicatello, 262-232-1323, randy.cicatello@verizon.com.

WisDOT – Communications may have facilities in the project limits. No conflicts are anticipated.

The WisDOT Communications contact for this project is John Mittelstadt, 608-205-7859, john.mittelstadt@dot.wi.gov.

WisDOT – Street Lighting has conduit in the median and underdeck lighting that will be relocated as part of the planned work.

The WisDOT Street Lighting contact for this project is Eric Perea, 262-574-5422, ericperea@dot.wi.gov.

WE Energies – Gas/Petroleum gas main to be extending to the west on the south side of W Metro Auto Mall. Existing main on 107th St to be abandoned from W Metro Auto Mall up to the gas service line for 7000 N 107th St. Current 4" steel hanging on structure crossing WI-145 to be removed. Work will be completed prior to construction.

The WE Energies Gas contact for the project is Jacob Hulbert, 414-944-5575, Jacob.hulbert@we-energies.com.

WE Energies – Electricity has overhead facilities in the project limits. No conflicts are anticipated.

The WE Energies Electricity contact for the project is Joe Fellenz, 414-322-8928, joseph.fellenz@we-energies.com.

8. Abatement of Asbestos Containing Material B-40-0252, Item 203.0211.S.

A Description

This special provision describes abating asbestos containing material on structures.

B (Vacant)

C Construction

John Roelke, License Number AII-119523, inspected Structure B-40-0252 for asbestos on 02/22/2018. Regulated Asbestos Containing Material (RACM) was found on this structure in the following locations

and quantities: The gaskets located under the railing attachments tested positive for asbestos greater than 1% and is therefore regulated ACM. The quantity of ACM material found is 9"x6"x82 = 30.75 sq ft.

The RACM on this structure must be abated by a licensed abatement contractor. A copy of the inspection report is available from Vida Schaffer (262-548-6766). According to NR447 and DHS159, ensure that DNR or DHS receives a completed Notification of Demolition and/or Renovation (DNR Form 4500-113 (R 4/11), or subsequent revision) via U.S. mail, hand-delivery, or using the online notification system at least 10 working days before beginning any construction or demolition. Pay all associated fees. Provide a copy of the completed 4500-113 form and the abatement report to Vida Schaffer (262-548-6766) and DOT BTS-ESS attn: Hazardous Materials Specialist, 5 South S513.12, PO Box 7965, Madison, WI 53707-7965. In addition, comply with all local or municipal asbestos requirements.

Use the following information to complete WisDNR form 4500-113:

- Site Name: Structure B-40-0252, 107th St. over STH 145
- Site Address: Structure is located on 107th St. south of Good Hope Rd and north of W Fond Du Lac Ave. Section 19 and 20 in T08N21E
- Ownership Information: WisDOT Transportation SE Region, 141 N.W. Barstow St, Waukesha, WI, 53188
- Contact: Vida Schaffer
- Phone: 262-548-6766
- Age: 57 years. This structure was constructed in 1964
- Area: 12,724.50 SF of deck

Insert the following paragraph in Section 6.g.:

- If asbestos not previously identified is found or previously non-friable asbestos becomes crumbled, pulverized, or reduced to a powder, stop work immediately, notify the engineer, and the engineer will notify the department's Bureau of Technical Services at (608) 266-1476 for an emergency response as specified in standard spec 107.24. Keep material wet until it is abated or until it is determined to be non-asbestos containing material.

D Measurement

The department will measure Abatement of Asbestos Containing Material (Structure #) by each structure, 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
203.0211.S	Abatement of Asbestos Containing Material B-40-0252	EACH

Payment is full compensation for submitting necessary forms; removing all asbestos; and for properly disposing of all waste materials.

stp-203-005 (20210708)

9. Removing Electrical Wires from Conduit, Item 204.9090.S.101.

A Description

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

B (Vacant)

C Construction

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

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

D Measurement

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

E Payment

Add the following to standard spec 204.5:

ITEM NUMBER	DESCRIPTION	UNIT
204.9090.S.101	Removing Electrical Wires from Conduit	LF

SER-204.10 (20170405)

10. Removing Underdeck Lighting B-40-1004, Item 204.9060.S.101.

A Description

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

B (Vacant)

C Construction

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

Remove underdeck lighting luminaires, attached conduits, wires, attached junction boxes, and associated hardware and appurtenances at locations shown in the plan and as directed by the Engineer. Removed materials shall become the property of the Contractor and shall be disposed off the project site in accordance with pertinent requirements of section 203.3.4 of the standard specs. Lamp disposal shall be paid under a separate bid item.

All embedded conduits, junction boxes and hardware are not included in this bid item.

D Measurement

The department will measure Removing Underdeck Lighting B-40-1004 by each unit removed and disposed of off the project site including associated materials, 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
204.9060.S.101	Removing Underdeck Lighting B-40-1004	Each

Payment is full compensation for removing and disposing of luminaires, attached conduits, attached junction boxes, and hardware.

SER-204.19 (20170516)

11. Removing Sign Lighting, Item 204.9060.S.102.

A Description

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

B Vacant

C Construction

Remove all the luminaires, conduit, and wiring associated with existing sign lighting on an existing sign structure. Dispose of all materials off the project site except lamps. Lamps shall be disposed under a separate bid item.

D Measurement

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

E Payment

Add the following to standard spec 204.5:

ITEM NUMBER	DESCRIPTION	UNIT
204.9060.S.102	Removing Sign Lighting	Each

SER-204.16 (20170405)

12. Removing Electrical Wires from Conduit, Item 204.9090.S.101.

A Description

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

B (Vacant)

C Construction

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

All wires shall be removed from the existing embedded or underground conduits as shown on the plans and as directed by the Engineer. Any necessary splices or disconnections shall be done as part of this

pay item. Removed wires shall become property of the Contractor and shall be disposed off the project site.

D Measurement

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

E Payment

Add the following to standard spec 204.5:

ITEM NUMBER	DESCRIPTION	UNIT
204.9090.S.101	Removing Electrical Wires from Conduit	LF

SER-204.10 (20170405)

13. Lighting Systems

General

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

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

Add the following to standard specification subsection 651.2:

The department does not anticipate any material to be returned to DOT

Add the following to standard specification subsection 651.3.1:

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

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

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

Add the following to standard specification subsection 655.3.1:

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

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

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

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

Add the following to standard specification subsection 657.2:

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

Add the following to standard specification subsections 657.3.1 and 657.3.5:

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

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

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

14. Lighting Units Salvaged, Item SPV.0060.101.

A Description

This special provision describes the removing, handling, storing, and re-installing of lighting units consisting of pole, arm, luminaire, lamp, wires, breakaway device, and associated hardware and appurtenances at the location shown on the plans, in accordance to the sections 657 and 659 of the standard specs, and as hereinafter provided. Lamp disposal shall be paid separately.

B (Vacant)

C Construction

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

Any lighting unit damaged while removing, handling, storing, and re-installing shall be replaced or repaired by the Contractor at no additional cost to the State.

Re-installation of the lighting units shall be done in accordance to pertinent requirements of section 657.3 and 659.3 of standard specs.

Dispose of all surplus materials off the project site.

D Measurement

The Department will measure the Lighting Units Salvaged by 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
SPV.0060.101	Lighting Units Salvaged	Each

Payment is full compensation for removing, handling, and storing; for re-installing; and for providing all other materials required to re-install the salvaged lighting unit.

SER-657.2 (20170407)

15. Underdeck Lighting Units Salvaged, Item SPV.0060.102.

A Description

This special provision describes the removing, handling, storing, and re-installing of underdeck lighting luminaire, and associated hardware and appurtenances at the location shown on the plans, in accordance to the sections 657 and 659 of the standard specs, and as hereinafter provided. Lamp disposal shall be paid separately.

B (Vacant)

C Construction

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

Any lighting unit damaged while removing, handling, storing, and re-installing shall be replaced or repaired by the Contractor at no additional cost to the State.

Re-installation of the lighting units shall be done in accordance to pertinent requirements of section 657.3 and 659.3 of standard specs.

Dispose of all surplus materials off the project site.

D Measurement

The Department will measure the Underdeck Lighting Units Salvaged by 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
SPV.0060.102	Underdeck Lighting Units Salvaged	Each

Payment is full compensation for removing, handling, and storing; for re-installing; and for providing all other materials required to re-install the salvaged lighting unit.

SER-657.2 (20170407)

16. Concrete Bases Type B, Item SPV.0060.103.

A Description

This special provision describes furnishing and installing Concrete Bases Type B as shown on the plans, in accordance with section 654 of the standard specs, and as hereinafter provided

B Materials

Materials shall conform to pertinent requirements of section 654.2 of standard specs.

C Construction

Construction shall conform to pertinent requirements of section 654.3 of the standard specs.

D Measurement

The Department will measure Concrete Bases Type B as each individual base, 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.0060.103	Concrete Bases Type B	Each

Payment shall be made as described in section 654.5(2).

SER-654.2 (20170407)

17. Replace Plaque Sequence Identification for Existing Poles, Item SPV.0060.104.

A Description

This special provision describes the replacing of plaque sequence identification on existing freeway lighting poles. This work shall be in accordance with the latest edition of the Standard Detail Drawing.10 A.2.

B Materials

Materials shall conform to the pertinent requirements of the latest edition of the S.D.D.10 A.2.

C Construction

Use construction methods in conformance to S.D.D.10 A.2. Remove any existing plaque material that loose, bubbling or interferes with the adherence of the new plaques. Dispose of all existing plaques off the project site. Do not damage the pole.

D Measurement

The department will measure Replace Plaque Sequence Identification for Existing Poles as each individual unit (alpha-numeric pole identification along with the luminaire type identification), acceptably completed. Replacement of the plaques for both luminaires on a twin pole constitutes two plaques replaced.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.104	Replace Plaque Sequence Identification for Existing Poles	Each

Payment is full compensation for furnishing and installing the plaque.

SER-657.6 (20170407)

18. Pull Boxes 13-Inch x 24-Inch x 24-Inch; Item SPV.0060.302

A. Description

This special provision describes furnishing and installing Fiberglass/Polymer Concrete Pull Box at the locations shown on the plans according to standard spec 653.

B. Materials

Furnish fiberglass/polymer concrete pull box of rectangular composite enclosure with Tier 15 Rating (15,000 lb Design Load) & (22,500 lb Test Load), and nominal 13" wide x 24" long and 24" total depth, flared wall style **#CHB132424 as by Highline Products** or **#B12132424A as by Hubbell Power Systems, or approved equal**. Cover shall be Tier 15 Rating (15,000 lb Design Load) & (22,500 lb Test Load), bolted cover with logo "Street Lighting" **#CHC1324HL1 as by Highline Products** or **#C12132402A41 as by Hubbell Power Systems, or approved equal** and use penta bolts to secure cover. The pull box shall be listed and labeled by (UL) or other Nationally Recognized Testing Laboratory.

C. Construction

Conform to standard spec. 673.3 and City of Milwaukee standards. The pull box shall be installed on 12-inches of crushed stone, set flush with grade and backfilled.

D. Measurement

The department will measure Pull Boxes 13-Inch x 24-Inch x 24-Inch as each individual pull box, 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.0060.302	Pull Boxes 13-Inch x 24-Inch x 24-Inch	Each

Payment is full compensation for furnishing and installing all materials, including pull box, end bells, crushed aggregate, excavation, backfilling, and for disposing of surplus material.

19. Pull Boxes 17-Inch x 30-Inch x 24-Inch; Item SPV.0060.303

A. Description

This special provision describes furnishing and installing Fiberglass/Polymer Concrete Pull Box at the locations shown on the plans according to standard spec 653.

B. Materials

Furnish fiberglass/polymer concrete pull box of rectangular composite enclosure with Tier 15 Rating (15,000 lb Design Load) & (22,500 lb Test Load), and nominal 17" wide x 30" long and 24" total depth, flared wall style **#CHB173024 as by Highline Products** or **#B12173024A as by Hubbell Power Systems, or approved equal**. Cover shall be Tier 15 Rating (15,000 lb Design Load) & (22,500 lb Test Load), bolted cover with logo "Street Lighting" **#CHC1730HL1 as by Highline Products** or **#C12173002A41 as by Hubbell Power Systems, or approved equal** and use penta bolts to secure cover.. The pull box shall be listed and labeled by (UL) or other Nationally Recognized Testing Laboratory.

C. Construction

Conform to standard spec. 673.3 and City of Milwaukee standards. The pull box shall be installed on 12-inches of crushed stone, set flush with grade and backfilled.

D. Measurement

The department will measure Pull Boxes 17-Inch x 30-Inch x 24-Inch as each individual pull box, 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.0060.303	Pull Boxes 17-Inch x 30-Inch x 24-Inch	Each

Payment is full compensation for furnishing and installing all materials, including pull box, end bells, crushed aggregate, excavation, backfilling, and for disposing of surplus material.

20. Poles Type 30-AL-BD, Item SPV.0060.321

A. Description

A.1.

The minimum requirements for a 30'-0" bolt down aluminum street lighting pole assembly. All parts not specifically mentioned, which are necessary or which are regularly furnished in order to provide this pole, shall be furnished, and shall conform in strength, quality of material and workmanship to that usually provided by the engineering practice indicated in this specification. All work shall be in accordance with section 651.

A.2.

The aluminum street lighting pole assembly to be furnished under this specification is to be round and tapered. The pole assembly shall be complete with shaft, pole cap, hardware, and base coating. All screws and fasteners shall be stainless steel or other approved materials.

A.3.

The bolt down 30'-0" aluminum street lighting pole assembly shall be in accordance with this specification and City of Milwaukee (DPW-Infrastructure Services Division) Drawing #B-14-14.

A.4.

Minor deviations on the rest of the pole assembly that will not affect the strength, appearance, vertical and horizontal stability of the pole will be permitted, but all such deviations shall be approved by the City of Milwaukee Street Lighting Engineering.

A.5.

The work under this item is for furnishing and installation of the following material as shown in plans and in accordance with the following.

B. Materials

B.1.1. Pole

The 30'-0" aluminum pole shaft shall be tapered from the top of the pole to the mounting plate. Dimensions from the pole top to the bracket mounting plate and from the base plate to the top of the pole, as shown on the drawing, shall be rigidly adhered to.

B.1.2.

The base plate shall be cast from either type 319 or 356T6 aluminum. The four elongated mounting holes shall be on 90-degree centers on an 11" bolt circle. The mounting slots shall be sized for 1-inch mounting bolts. The base shall be welded to the shaft so the arms bisect the angle between mounting holes at 45 degrees.

B.1.3.

The poles shall be built as a double bracket unit and supplied with one cover plate per pole.

B.1.4.

The pole cap is to be cast aluminum, and be secured to the pole by three equally spaced 1/4"-20 hex head stainless steel screws.

B.1.5. Hand Hole & Grounding

The hand hole shall be 4" x 6" nominal. A 1/4"-20 NC tapped hole and bolt shall be provided in the shaft opposite the hand hole for grounding purposes. The hand hole cover shall be secured to the pole using 1/4"-20 NC by 3/4" long 18-8 stainless steel button head Torx T27H tamper proof screws. The hand hole is to be 90 degrees from the arms. The center line of the hand hole shall be 14 inches above the mounting plate.

B.1.6. Loading and Stability

The 30'-0" assembly furnished under this specification shall support a fifty-pound fixture of an EPA of 3 on each arm when equipped with a pair of 6' upsweep arms. All pole designs shall meet the latest revision of the AASHTO specifications for these poles as defined in their STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS. The manufacturer shall submit engineering calculations for lighting poles to show that maximum stress and deflections do not exceed specified performance requirements under full design loading, as well as other certified reports and data which indicate that the poles meet all load requirements, within 30 days of the bid award. Engineering calculations shall be prepared and sealed by an engineer licensed in the State of Wisconsin.

The entire horizontal and vertical "wind sail" area of the pole assembly subject to wind load including arm and luminaire shall be designed to withstand the AASHTO standard specifications, from above, for wind

load requirements for a 90 MPH wind load with gust factor computed per section 3.8.5. and height and exposure factors from table 3-5.

B.1.7.

All Welding shall be in accordance with the latest applicable A.S.M.E. Standards.

B.1.8.

The manufacturer warrants that the pole supplied will be of merchantable quality will conform to applicable specifications, drawings, designs, samples, or descriptions, will be free from defects in materials and workmanship and will be fit for the particular purpose intended.

B.1.9.

A plaque with the pole number as shown on the plans shall be affixed onto the pole shaft using high intensity reflective 2" silver numerals on black background.

B.2. Riser Cable

Pole is to be wired as shown on the plans. A separate riser cable will be required to be installed inside of pole for each lighting fixture on the pole. The riser cable(s) shall be 35 feet in length and cut from copper 2#12 UF with ground cable. One wire shall be black, the other shall be white, and the ground can be either bare or green. All splicing is to be done inside the metal housing. The ground wires shall be spliced inside the metal housing and grounded to the housing and each fixture. The cable shall conform to NEC Article 340. The riser cable shall be continuous without splices. The electrical system in use utilizes a full system ground. The neutral is not to be grounded at any point.

C. Construction

Install the bolt down pole as specified in the plan and details. After razing the pole use normal pole shaft raking techniques to ensure the centerline of shaft appears vertical to the horizon.

D. Measurement

The Department will measure this item by the each (EACH) unit of measure.

E. Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.321	Pole Type 30-AL-BD	EACH

Payment is full compensation for the pole, riser cable(s), and all connections. This bid price also includes for furnishing labor, equipment, coordination and all materials and incidentals necessary to complete the work.

21. Water Tight Splices & Connections; Item SPV.0060.343

A. Description

This section describes materials, general requirements, personnel qualifications, construction methods, and testing requirements used to perform electrical work required. All work shall be in accordance with section 651 of the WisDot Standard Special Provisions.

B. Materials

B.1.

Furnish materials conforming to the WSEC, consisting of chapter comm. 16 of the WEC combined with the NEC.

B.2.

All materials furnished under this contract for street lighting installation are subject to approval by the City of Milwaukee street lighting project engineer.

B.3.

The contractor shall furnish a complete list of materials to be furnished and used for street lighting. Such list shall include names and addresses of manufactures, together with catalog numbers, certificates of compliance, specifications, and other product information requests by the project engineer. The list shall be submitted within ten (10) calendar days of execution of contract. No material shall be incorporated into the lighting system prior to the written approval of the engineer. Approval does not change the intent of the specifications. The contractor shall not substitute or make changes in material without resubmitting for approval

C. Construction

C.1. General Requirements

Work under items related to the street lighting system shall conform to the National Electrical Code (NEC), 2020 Edition, or the latest edition adopted by the State of Wisconsin, Wisconsin Department of Commerce Chapter Comm 16 (Electrical) State of Wisconsin electrical code, City of Milwaukee code, and these special provisions and good electrical practices. The contractor shall not take advantage of lack of details in plans or these specifications where to do so would conflict with the applicable code and standards.

C.2. Personnel Qualifications

An electrician holding all appropriate licenses (including City of Milwaukee Licenses) shall supervise all work done referring to the street lighting system. **All splices shall be made by an electrician.** For the purposes of this contract, an electrician is a person who served a four (4) year apprenticeship and passed state exams.

C.3. Splices

The contractor shall perform water tight splicing in the pole transformer bases with materials listed on Street Lighting Typical Detail 142. Conductor runs shall be continuous between pole locations, and no splicing of conductors outside the pull box will be allowed. The water tight splices are done using Polaris Edge (ISPB2), or Morris Products submersible Streetlighting Connector, or equal using three or four port submersible water tight connectors with conductor range of 2/0 to #14 inside the pole transformer bases. Oxide inhibitor (OX4) or equivalent shall be applied on all splice points.

Contractor is to bundle circuit conductors together and identify circuit at every split point.

C.4. In Service Distribution Systems

The contractor shall not make splices to any underground connections or to any existing distribution system. As indicated on plans, underground splices and connections to existing underground circuitry will be completed by City electricians.

C.5. Testing

After the City makes preliminary acceptance of the street lighting system, it shall be monitored by the City of Milwaukee, Street Lighting Electrical Services during a 60-calendar day operational "burn in". Final acceptance of the lighting system will be based on its meeting standard operational criteria as stated in these specifications. The contractor shall be responsible for all necessary repairs and adjustments to the lighting system to meet standard operational criteria.

D. Measurement

The Department will measure this item Conductor Splices by the each (EACH) unit of measure.

E. Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.343	Water Tight Splices & Connections	EACH

Payment is full compensation for furnishing labor, equipment, coordination and all materials and incidentals necessary to complete the work.

22. Luminaire Arms Single Member 6- Ft., Item SPV.0060.345

A. Description

The work under this item is for furnishing and installation of the following material as shown in plans and in accordance with the following. All work shall be in accordance with section 651.

B. Materials

See Street Lighting Detail drawing for luminaire arm for info and dimensions.

Bracket arm is 2-Inch schedule 80 (2.375 Inch O.D. x .218 Inch wall) Aluminum pipe (6061-T-6 Alloy).

Mounting plate is ½ Inch thick Aluminum (6061-T6 Alloy).

C. Construction

The bracket shall be attached to the pole with two (2) ½ Inch x 13 NC x 1 Inch long stainless steel bolts.

D. Measurement

The Department will measure this item by the each (EACH) unit of measure.

E. Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.345	Luminaire Arms Single Member 6-Ft.	EACH

Payment is full compensation for the bracket arm, and all connections. This bid price also includes for furnishing labor, equipment, coordination and all materials and incidentals necessary to complete the work.

23. Pull Boxes 17-Inch x 30-Inch x 24-Inch, Item SPV.0060.303.

A Description

This special provision describes furnishing and installing Fiberglass/Polymer Concrete Pull Box at the locations shown on the plans according to standard spec 653.

B Materials

Furnish fiberglass/polymer concrete pull box of rectangular composite enclosure with Tier 15 Rating (15,000 lb Design Load) & (22,500 lb Test Load), and nominal 17" wide x 30" long and 24" total depth, flared wall style **#CHB173024 as by Highline Products** or **#B12173024A as by Hubbell Power Systems, or approved equal**. Cover shall be Tier 15 Rating (15,000 lb Design Load) & (22,500 lb Test Load), bolted cover with logo "Street Lighting" **#CHC1730HL1 as by Highline Products** or **#C12173002A41 as by Hubbell Power Systems, or approved equal** and use penta bolts to secure cover. The pull box shall be listed and labeled by (UL) or other Nationally Recognized Testing Laboratory.

C Construction

Conform to standard spec. 673.3 and City of Milwaukee standards. The pull box shall be installed on 12 inches of crushed stone, set flush with grade and backfilled.

D Measurement

The department will measure Pull Boxes 17-Inch x 30-Inch x 24-Inch as each individual pull box, 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.0060.303	Pull Boxes 17-Inch x 30-Inch x 24-Inch	Each

Payment is full compensation for furnishing and installing all materials, including pull box, end bells, crushed aggregate, excavation, backfilling, and for disposing of surplus material.

Installing City Furnished Luminaire Utility LED, Item SPV.0060.371

A. Description

The work under this item is for installing two (2) different types of LED utility luminaires as indicated in plans and circuit layout. All work shall be in accordance with section 651.

B. Materials

Descriptions of the two (2) City-furnished luminaire utility LED types A & B

1. Luminaire Utility LED A

Philips Signify Lumec RoadFocus medium (RFM) LED Cobra head

135W40 LED module, 3K CCT, Generation 2, Type II Medium distribution, 120-277V, 0-10V controls, Factory install NEMA label, Field adjustable, shorting cap, tool less receptacle for twist lock photocell or shorting cap 7-pin, 20kV/10kA surge protector, gray finish.

Catalog# RFM-135W40LED3K-G2-R2M-UNV-DMG-[API-259]-FAWS4-PH9-RCD7-[SP2-007]-GY3
Set FAWS at position 4 with **2LED2** label

2. Luminaire Utility LED B

Philips Signify Lumec RoadFocus medium (RFM) LED Cobra head

135W40 LED module, 3K CCT, Generation 2, Type III Medium distribution, 120-277V, 0-10V controls, Factory install NEMA label, Field adjustable, shorting cap, tool less receptacle for twist lock photocell or shorting cap 7-pin, 20kV/10kA surge protector, gray finish.

Catalog# RFM-135W40LED3K-G2-R3M-UNV-DMG-[API-263]-FAWS10-PH9-RCD7-[SP2-007]-GY3
Factory set FAWS at position 10, with **3LED3** label

C. Construction

Pick up luminaire utility LED types A, & B from the City of Milwaukee yard located at 1540 W. Canal Street. Contact person is Ted Budny at our street lighting shop (414) 286-5947 to coordinate pick up.

The luminaire shall be attached to the luminaire arm using the supplied hardware. Perform all splices and connections required for the operation of luminaire.

D. Measurement

The Department will measure this item by the each (EACH) unit of measure.

E. Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.371	Installing City Furnished Luminaire Utility LED	EACH

Payment is full compensation for installing city-furnished luminaires Utility LED Types A & B; for making all connections; for all testing; and for all labor, tools, equipment, transportation, and incidentals necessary to complete the work.

24. Adjusting CUC Manhole Cover, Item SPV.0060.400.

A Description

This special provision describes adjusting the existing chimney of the block, precast, or brick round manholes; furnishing, installing and removing protection of the cables in the manhole during adjustment operations. Perform work in accordance with the standard specifications, the provisions of the article Adjusting Manhole Covers, as shown on the plans, and as hereinafter specified.

B Materials

Furnish and install materials that conform to the requirements of section 519 of the standard specifications. Salvage and reinstall existing covers on the manholes. The City will supply covers

designated for replacement. Contractor shall contact Karen Rogney at (414) 286-3242 to obtain the "Castings Requisitions Form" required to obtain the covers. Contractor shall contact Ricardo Lopez, Inventory Clerk at (414) 286-6123 prior to obtaining the frames and lids from the DPW Field Headquarters at 3850 N. 35th St. Contractor must have the "Castings Requisitions Form" in hand in order to obtain the castings.

C Construction

Report any pre-existing problems to Mr. Curt Campagna, CUC Manhole Maintenance Manager at (414) 286-5967 three (3) working days in advance of any construction on manholes.

Before removing the pavement around the manhole, the contractor shall place a ¾-inch plywood cover or equal over existing active Street Lighting, Traffic Control, Communications or private vendor electrical cables. This cover shall be properly supported to/at the manhole floor.

Break out and remove pavement around manhole. Remove existing covers and store and secure them properly. Any damaged, lost, or stolen covers shall be the responsibility of the contractor and shall be replaced at contractor's expense.

Remove existing chimney to surface of concrete roof slab. If manhole does not have an existing concrete roof slab, remove sufficient chimney as to provide adequate corbel to fit new cast iron frame and cover.

Adjust manhole cover to proposed grade using bricks or concrete rings as necessary. **Completely underpin entire flange area of manhole frame with mortar, bricks and/or concrete rings.** Remove wedges/shims. Fill voids with grout. Do not back plaster inside walls.

After completion of paving, remove the temporary ¾-inch plywood cover or equal which is over the existing electrical cables in the manhole as mentioned above.

Notify Mr. Campagna three (3) working days in advance of completion of each manhole adjustment, for inspection and acceptance of work performed. The contractor will receive no payment until the above work is approved by City Underground Conduits.

D Measurement

The department will measure Adjusting CUC Manhole Cover by the 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.0060.400.	Adjusting CUC Manhole Cover	Each

Payment is full compensation for furnishing all required materials, exclusive of frames, grates, or lids available and designated for adjusting; for removing, reinstalling and adjusting the covers; and for furnishing all labor, tools, equipment and incidentals necessary for adjusting each cover, complete in accordance with the requirements of the plans and contract. Covers to be adjusted and which are rendered unfit for use by the contractor through the contractor's operations will be replaced by the contractor in kind at the contractor's own cost and expense.

25. Installing Conduit Into Existing Manhole, Item SPV.0060.425.

A Description

This special provision describes providing locating existing conduit system manholes and installing new conduit into those manholes at the locations shown on the plans. The contractor shall verify existing conduit manhole locations with the City of Milwaukee, and shall maintain any existing conductors, fibers, and conduit paths without interruption or damage. Repair and restoration of all disturbed areas resulting from the work shall be in accordance with the pertinent provisions of the standard specifications, and as hereinafter provided.

B Materials

Furnish conduit, as provided and paid for under other items in this contract. All materials shall conform to the pertinent provisions of the standard specifications unless otherwise noted.

C Construction

Carefully expose the outside of the existing structure without disturbing any existing conduits or cabling.

Drill the appropriate sized hole in a concrete structure or saw and remove full sections of block or bricks from the existing structure for the entering of conduit at a location within the structure that will not disturb the existing cabling and will not hinder the installation of new cabling within the installed conduit. This work may include the removal of the existing abandoned conduit from the structure to allow for the installation of the new conduits as indicated on the plans.

Fill any void area between the drilled hole and conduit with an engineer-approved filling material to protect against conduit movement and entry of fill material into the structure.

Carefully tamp backfill into place.

All disturbed areas shall be repaired and restored in kind.

D Measurement

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

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.425.	Installing Conduit Into Existing Manhole	EACH

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

26. Sawing Concrete-Encased Duct Package, Item SPV.0060.426

A Description

The work under this provision consists of full depth sawing of cement encased multiple duct conduit below grade; preparing sawed conduit ends to accept adaptor couplings needed to allow transition of new PVC conduit from existing clay, fiber or PVC conduit (See Item SPV.0090.402).

B (Vacant)

C Construction

C.1 Equipment

Use ring saw or concrete cutting chainsaw for all full-depth cuts. Use diamond blades. The contractor may use a high speed 16" construction saw on duct systems with less than 4-duets when approved by the engineer.

C.2 Sawing Encasement

Carefully expose the outside of the existing cement encasement. The contractor is to verify that the conduit lines are free of all cabling. Saw a full depth transverse cut through the encasement. Saw straight cuts with the surface remaining vertical over its full depth. Hand chip concrete away from sawed conduit duct ends to allow transition fittings to be placed over the ends. The exposed conduit will be protected from damage. Any damaged conduit ends will be the responsibility of the contractor and will require a resaw at the contractor's expense.

D Measurement

The department will measure Sawing Concrete-Encased Duct Package by the unit. Up to 6 conduits per cement encasement will be considered a single unit.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
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Payment is full compensation for sawing concrete encased duct packages full depth and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work in accordance with the requirements of the plans and contract.

27. Fence Chain Link 6-Ft. B-40-1004, Item SPV.0090.001; Fence Chain Link 6-Ft. R-40-722, Item SPV.0090.002; Fence Chain Link 6-Ft. R-40-723, Item SPV.0090.003.

A Description

This special provision describes furnishing and installing a new fence system on structures in accordance with the pertinent plan details, as directed by the Engineer and as hereinafter provided.

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. 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.

B1 Fabric

Provide steel chain link fence fabric that conforms to the requirements of ASTM A491 or A392-Class 2, which is aluminum-coated or 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.

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. 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, 9-gage steel wire or 0.179-inch diameter aluminum wire. These components (excluding tie wires) shall be zinc-coated by the hot-dip process as stated in ASTM F626. For steel tie wires, provide a zinc-coating using the same procedure as required for zinc-coated 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.

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

B5.2 Framework

Tensile and Yield Strength: ASTM E8

Zinc-Coating Requirements

Weight of Zinc-Coating: ASTM A90

B5.3 Fittings

Zinc-Coating Requirements

Weight of Zinc-Coating: ASTM A90

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)

4822 Madison Yards Way

Madison, WI 53705

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. 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 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.

C2 Touch-up and Repair

For minor damage caused by shipping, handling or installation to 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 $\frac{1}{4}$ 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 6-Ft. by the linear foot acceptably furnished and installed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.001	Fence Chain Link 6-Ft. B-40-1004	LF
SPV.0090.002	Fence Chain Link 6-Ft. R-40-722	LF
SPV.0090.003	Fence Chain Link 6-Ft. R-40-723	LF

Payment is full compensation for fabricating and coating all fence components, and transporting to jobsite; and for erecting components to create a fence system, including any touch-up and repairs.

28. Electrical Cable 3#8/1#8 XLPE (Type USE-2) Item SPV.0090.305; Electrical Cable 3#2/1#8 XLPE (Type USE-2) Item SPV.0090.308

A. Description

This special provision describes furnishing and installing service cable in accordance with current City of Milwaukee Electrical methods and National Electrical Code standards. The service cable shall consist of four (4) cross-linked polyethylene covered, stranded, copper conductors. All work shall be in accordance with Wisconsin DOT Standard Specifications section 651.

B. Materials

B.1.1.

Unless otherwise specified, the cable to be furnished shall comply with the manufacture and test requirements of the Insulated Cable Engineers Association (ICEA) Specification No. S-61-402, NEMA WC5, latest revision.

B.1.2. Conductors

The conductors shall be of soft round annealed uncoated stranded copper conductor per ASTM B-3, ASTM B-8, and UL Standard UL-44. Conductors No. 8 A.W.G. or larger shall be stranded. Conductors smaller than No. 8 A.W.G. shall be solid unless otherwise specified. Stranding must meet the requirements of ASTM B8, Class B.

B.2. Insulation

B.2.1. 600V

The insulation for cable rated 600V shall be cross XLPE thermosetting chemically crosslinked polyethylene insulation in accordance with industry standard ICEA Pub. No. S-95-658/Nema WC-70 (2009), latest revision, and shall be a nominal 45 mils. thickness. Insulation shall meet the ANSI/ASTM D2220-74 (latest revision) accelerated water absorption requirements and -30°C (-22°F) cold bend test with a separator applied between the stranded conductor and insulation to facilitate cable stripping. The outside diameter of the insulating covering must be circular and extruded concentrically over the conductor.

B.2.2. Nominal Thickness

The nominal insulation thickness around each individual conductor shall be not less than 90% of the thickness specified in the schedule.

B.2.3. Color Code

The insulation compound which covers each conductor making up a cable shall be color coded in conformance with the N.E.M.A. Color Code Standard, unless otherwise specified; however, printed color designations as in I.3.2 or I.3.3. will not be acceptable under this specification (see schedule). Individual cables will be black, red, white and green.

B.3. Marking

B.3.1.

Identification for each conductor must be provided by colors in accordance with I.M.S.A. Standards. The outer insulation must be marked with the following information at a minimum: conductor size (AWG), 600V, XLPE, USE-2, manufacturer's name and date of manufacturer. All markings must be a minimum of one-eighth inch (1/8") in height. Marking shall be at approximately two (2) foot intervals. A sequential footage marking must be located on the opposite side of the jacket. All marking must be perfectly legible with permanent white ink.

B.4. Round Cable

B.4.1.

This cable shall consist of stranded, uncoated, conductors each concentrically encased with a cross linked polyethylene USE-2 rubber insulation.

B.4.2. Inspection and Tests

Each length of the individual insulated conductor and completed cable shall comply with all requirements of I.C.E.A. Standards S-61-402. Sampling and Test Methods shall be in accordance with Part 6. A certified report of the tests made on the cable to show compliance with this specification may be required prior to shipment. If requested, a sample of the cable covered by the report shall also be submitted.

POWER, CABLE SCHEDULE FOR SPECIFICATION

	3#2/1#8		3#4/1#8	
Size of Conductor	#2	#8	#4	#8
Number of Conductors	3	1	3	1
Number of Wires in Conductor	7	7	7	7
Type of Insulation	3 Cross-Linked Polyethylene (XLPE)	Cross-Linked Polyethylene (XLPE)	3 Cross-Linked Polyethylene (XLPE)	Cross-Linked Polyethylene (XLPE)

Insulation Thickness	60 mils	60 mils	60 mils	60 mils
Insulation Voltage Rating	600 volt	600 volt	600 volt	600 volt
Insulation Color Code	1-white 1-black 1-red	1-green	1-white 1-black 1-red	1-green
Non-Hydroscopic Fill	None		None	
Moisture Resisting Sheath				
Jacket Thickness	None		None	
	3#6/1#8		3#8/1#8	
Size of Conductor	#6	#8	#8	#8
Number of Conductors	3	1	3	1
Number of Wires in Conductor	7	7	7	7
Type of Insulation	3 Cross-Linked Polyethylene (XLPE)	Cross-Linked Polyethylene (XLPE)	3 Cross-Linked Polyethylene (XLPE)	Cross-Linked Polyethylene (XLPE)
Insulation Thickness	60 mils	60 mils	60 mils	60 mils
Insulation Voltage Rating	600 volt	600 volt	600 volt	600 volt
Insulation Color Code	1-white 1-black 1-red	1-green	1-white 1-black 1-red	1-green
Non-hydroscopic Fill	None		None	
Moisture Resisting Sheath				
Jacket Thickness	None		None	

All conductors shall be uncoated annealed soft copper.

C. Construction

The cable shall be installed in P.V.C. conduit when indicated on plans. Any turf damage during installation of cable shall be restored (grass, asphalt or concrete) by the contractor, All splices in luminaires and

transformer bases, must be completed by the contractor unless otherwise designated on plans. Do not splice underground in pull box/vault or conduit. Do not leave wire or cable ends uncovered or submerged in water. If the engineer observes this condition, the engineer may reject the entire length of cable or wire. Make all electrical connections and splices with approved pressure or compression type fittings. Cover tape with a liberal coating of an electrical varnish or sealant providing flexible protection from oil, moisture, and corrosion. Obtain the engineer's approval of this electrical coating before using. Extend wire for termination 15 inches beyond the pole hand hole.

For all cables entering each pull box/vault, provide an extra loop, approximately 6 feet in length, to remain in each pull box/vault. This loop of cable is in addition to the amount needed to reach from the entrance conduit raceway end to the opening in the exiting conduit raceway.

Install conductors in continuous lengths without splices from termination to termination. The contractor may splice only at hand-holes in the bases of poles. At locations where no transformer bases exist, splice at the hand-holes in poles.

D. Measurement

The department will measure the Electrical Cable 3#8/1#8 XLPE (Type USE-2), Electrical Cable 3#6/1#8 XLPE (Type USE-2), Electrical Cable 3#4/1#8 XLPE (Type USE-2), and Electrical Cable 3#2/1#8 XLPE (Type USE-2) by the Linear Foot (LF) 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.0090.305	Electrical Cable 3#8/1#8 XLPE (Type USE-2)	LF
SPV.0090.308	Electrical Cable 3#2/1#8 XLPE (Type USE-2)	LF

Payment is full compensation for furnishing labor, equipment, coordination and all materials and incidentals necessary to complete the work. Also included is the labor, equipment and materials for removal of construction debris and site restoration.

29. 1-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.401; 4-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.404; 5-Duct Conduit, Cement Encased, 4-inch Rigid Nonmetallic Conduit DB-60, Item SPV.0090.405,

A Description

This special provision describes furnishing and installing cement encased multiple duct conduit packages below grade as shown on the plans and as hereinafter described.

B Materials

B.1 Conduit

Furnish and install DB-60 polyvinyl chloride (PVC) conduit. Conduit will be accepted on the basis of a Manufacturer's Certificate of Compliance and WISDOT field inspection upon delivery to a project.

PVC conduit and fittings shall conform to the requirements of Standard Specifications for Smooth-Wall Poly (Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation, ASTM Designation: F512 (latest edition).

B.2 Conduit Spacers

Furnish and install nonmetallic interlocking base spacers and intermediate spacers that provide a 1-1/2" vertical and 1-1/2" horizontal separation between PVC pipes. The base spacers shall provide a 3" vertical separation from the trench bed to the bottom of the PVC pipes.

B.3 Conduit Bed

Furnish and install a minimum 2" conduit bed of stone chips or crushed stone screenings conforming to the following:

3/8 Inch Crushed Stone Chips

Sieve Sizes	% Passing by Weight
1/2"	100
3/8"	90-100
No. 8	0-15
No. 30	0-3

Crushed Stone Screenings

Sieve Sizes	% Passing by Weight
1/2"	100
No. 4	75-100
No. 100	10-25

B.4 Concrete

The type of concrete mix to be used to encase the ducts will be:

Type I Cement	280 lbs
Fly Ash	100 lbs
Sharp Torpedo Sand	3100 lbs
Water	35 gals
Chryso Air 260 or approved equal	2.0 ozs
Chryso Plast 209 or approved equal	7.0 ozs
Air	5%

Mix the materials to provide an approximate 3 inch slump

B.5 Slurry Backfill

Aggregate slurry backfill consists of No. 1 concrete aggregate Class 'C' concrete mix with the cement deleted.

Fly Ash (Class C)	75 lbs.
Concrete Sand (Damp)	1830 lbs.
No. 1 Concrete Aggregate	1830 lbs.

Mix the materials with water to inundate the aggregate sufficiently to provide an approximate 3 inch slump. Deposit the mix in the trench directly from a concrete transit mix truck.

B.6 Pull Rope

Pull rope specifications will be:

- Flat construction (7/16" to 5/8" wide)
- 100% woven aramid fiber (may include tracer wire)
- 1500 lbs. Minimum pull strength prelubricated
- sequential footage markings for location

For any questions on materials, contact Ms. Karen Rogney at (414) 286-3243.

C Construction

C.1 Excavation

The excavation shall have the minimum or maximum dimensions shown on the plans and as follows:

Number of Ducts Wide	Minimum (Inches)	Maximum (Inches)
1	8 1/2	11
2	14 5/8	17 1/8
3	20 3/4	23 1/4.
4	26 7/8	29 3/8
5	33	35 1/2
6	39 1/8	41 5/8
7	45 1/4	47 3/4
8	51 3/8	53 7/8

These minimum and maximum trench widths apply to standard 4 inch PVC electrical duct only. When required, the excavation may be widened for the handling and placing of materials.

Sheath and brace open-cut trenches as required by code and as necessary to maintain safety. The cost of furnishing, placing and removing of sheathing and bracing shall be included in the unit bid for the work.

The dimensions of the excavation will be governed by the number, configuration and the grade (cover) to which the conduit is to be installed as shown on the plan. The walls of the excavation shall be clean and true.

Prior to excavating trenches, expose the existing manhole and conduit lines. The object of this is to permit adjustments in line and grade to avoid special construction methods. Protect the exposed manhole and conduit from damage.

Lay the conduit at a depth so that sufficient protection from damage is provided. Allowable covers shall be as follows:

The standard cover for mainline conduit is 39 inches and the minimum cover acceptable is 28 inches.

Maintain the standard cover wherever possible and any deviation less than the minimum cover requires the approval of the engineer.

Grade the trench to have a minimum pitch of three inches per 100 feet. When an obstruction is encountered in the trench and it is necessary to excavate a deeper trench than would otherwise be required, in order to obtain drainage, refer the matter to the engineer to determine whether the extra excavation should be made.

In grading a trench for mainline conduit, there are three general practices for direction of pitch.

(a) When grading a trench in a street with a level grade, the high point of the trench bottom should ordinarily be centered between manholes and pitched downward equally toward each manhole.

(b) Where the street slopes in one direction, locate the high point of the trench bottom approximately 30 feet from the end wall of the higher manhole and grade toward both manholes.

(c) Where a steep grade is encountered, grade the trench at the minimum pitch from the end wall of the higher manhole to a point 20 feet plus or minus toward the lower manhole. From this point, follow the street grade at the standard cover to a point 20 feet plus or minimum away from the end wall of the lower manhole. From this point, the remainder of the section shall be laid at the normal pitch.

After the rough excavation is completed, prepare the bottom of the trench to receive the conduit. Bring the duct bed to the final grade by grading uniformly from the high point to the low or drainage points. Use

stone chips or crushed stone screenings to grade the trench. The duct bed shall be a minimum of 2" in depth.

C.2 Placing of Duct

Proceed with placing the ducts as soon as the duct bed has been completed. Inspect all ducts before placing to see that the bores are clean and free from mud, sand, etc. Use only ducts with a smooth bore, free from burrs, rough projections etc. Smooth off burrs or other rough areas likely to damage cable are found in the duct by rasping or scraping.

Place the duct on base spacers with the ends staggered so no two couplings are adjacent. This may be accomplished by the use of the short lengths in stock or cutting back full length sections to the desired lengths. If cut pieces are used, place the cut end at the manhole. Locate the base spacers within 2 feet of the end of each duct and one base spacer located in the middle of the duct.

Use full length pieces for the balance of the conduit line.

Formations of two ducts or more in height are to be carried forward in full formation, that is, as each tier of twenty foot lengths is laid, the next higher tier of ducts shall then be placed on the intermediate spacers. Place these intermediate spacers on top of the base spacers located within two feet from each duct end and one in the middle of each duct. Place the intermediate spacers and ducts for the remaining tiers. Glue each length into the adjoining coupling. A twist and push on the duct being placed will suffice for a water tight joint. Exercise caution in the driving operation, so that neither the coupling nor the duct will be split or damaged in any way. After the full formation has been completed, place wood trench and duct bracing on the ducts to prevent shifting or floating while the concrete envelope is being placed and during driving operation.

This procedure shall be followed with succeeding lengths, providing spacers at the proper intervals, until sufficient trench footage of completed formation has been placed and is ready to receive concrete encasement.

The terminating point for mainline conduit will be the inside manhole wall. Install a standard end bell fitting flush with the wall on all duct access points.

Install a #10 copper tracer wire along and above the centerline of the duct for encasement in the concrete. The wire shall be 4 feet longer than the run of conduit and be at least 2 feet long at each access point.

Install a pull rope in each run of conduit, as laid. The rope shall be 4 feet longer than the run of conduit and shall be doubled back at least 2 feet at each raceway access point. Anchor the pull rope at each access point in a manner acceptable to the engineer.

C.3 Concreting

Begin concreting after sufficient conduit has been laid and the trench and duct have been inspected. The minimum concrete encasement of the ducts is three (3) inches on the top, two (2) inches on the sides, and three (3) inches on the bottom. After placing, puddle the concrete with a splicing bar or similar tool so that complete duct encasement is accomplished. Remove wood braces used to keep the conduit from floating before the concrete sets completely and the resultant encasement voids filled with concrete.

Allow the concrete encasement to set for a minimum of 6 hours before backfilling is commenced.

C.4 Slurry Backfill

4. Slurry Backfill. Commence backfilling of the conduit immediately after the duct has been inspected, approved and has set to withstand the load.

An aggregate slurry as specified shall be used to backfill the concrete encased conduit. The trench shall be backfilled to the proposed or existing subgrade. The mix shall be deposited in the trench directly from a concrete transit mix truck.

D Measurement

The department will measure 5-Duct, 4-Duct, and 1-Duct Cement Encased, 4-Inch Rigid Non-Metallic Conduit DB-60, furnished and installed at the locations on the plans, will be measured by the linear foot acceptably installed. The measured quantity will equal the linear feet of encased duct, based on the distance along the centerline of duct between ends of conduit. City of Milwaukee shall have final acceptance by the LF 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.0090.401.	1-Duct Conduit Cement Encased 4-Inch Rigid Nonmetallic Conduit DB-60	LF
SPV.0090.404.	4-Duct Conduit Cement Encased 4-Inch Rigid Nonmetallic Conduit DB-60	LF
SPV.0090.405	5-Duct Conduit Cement Encased 4-Inch Rigid Nonmetallic Conduit DB-60	LF

Payment is full compensation for furnishing the conduit, conduit bodies, conduit fittings, conduit spacers, end caps and trace wire; for excavating, bedding, encasement and backfilling including any concrete, stone, aggregate slurry, bracing, or other related materials; for disposing of surplus materials; and for making inspections, for installing the conduit, and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

30. Seismograph/Vibration Monitoring, Item SPV.0105.001.

A Description

This special provision describes furnishing a seismograph(s) and employing trained operators to monitor construction-induced vibrations on buildings/structures, and submittal of all required documentation.

Whenever there is a potential for vibration damage to adjacent buildings, structures, or utilities, monitor the vibration source with an approved seismograph, located, in a direct line between the vibration source and the point or area of the closest structure subject to vibration 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. Monitor vibrations when using a vibratory hammer and structures are within 125 feet of the pile driving operations.

B Materials

Use seismographs that are in accordance to Wisconsin Department of Safety and Professional Services (SPS) 307.43, Wisconsin Administrative Code, and are continuous data recorders supplied with all the accessories necessary for making vibration and noise monitoring observations.

C Construction

All vibration-inducing work performed shall be done in compliance with Wisconsin Department of Safety and Professional Services SPS 307.44, unless otherwise noted in the plan documents.

1. Vibration-Inducing Work Activity Plan Submittal

Not less than two weeks prior to commencing vibration-inducing work operations, submit a Vibration-Inducing Work Activity Plan to the engineer for review. The plan shall contain full details vibration-inducing work operations and the methods employed to control and monitor vibration levels. The vibration-inducing work activity plan shall contain the following minimum information:

1. Listing and description of equipment and tools used.
2. Description of proposed vibration-inducing work activity methods and operations.
3. Discussion of methods employed to control and monitor vibration levels.
4. Any proposed blasting shall require the following to be provided:
 - a. Plan and section views of proposed drill pattern including free face, burden, blast hole spacing, blast hole diameters, blast hole angles, lift height, and sub-drill depth.
 - b. Loading diagram showing type and amount of explosives, primers, initiators, and location and depth of stemming.
 - c. Initiation sequence of blast holes including delay times and delay system.

- d. Manufacturer's data sheets for all explosives, primers, and initiators to be employed.

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

2. Condition Surveys

If blasting is involved during removal of the existing structure, conduct and document pre-removal and post-removal surveys of any nearby buildings or structures as required by the scaled-distance equation specified in Wisconsin Department of Safety and Professional Services SPS 307.43. For other major vibration-inducing work, conduct and document pre-removal/pre-construction and post-removal/post-construction surveys of nearby structures or buildings that have a potential for vibration damage. The Engineer may require condition surveys of facilities not deemed to have damage potential by the contractor. Make right of entry arrangements with the property owners for these condition surveys. Prior to any removal/construction work, the pre-removal/pre-construction survey records shall be made available to the Engineer for review. After completion of the removal/construction operations, perform a post-removal/post-construction survey and make these records available to the engineer for review. Be responsible for any damage resulting from blasting or other excessive vibration-causing operations.

These condition surveys shall consist of visually inspecting and recording all existing defects in the structures before and after removal/vibration causing 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 shall include copies of the pre-removal/pre-construction and post-removal/post-construction surveys and discuss any discrepancies and findings of these surveys.

3. Safety

The engineer will, at all times, have the authority to prohibit or halt the contractor's blasting, removal operations, pile driving operations, or other vibration-inducing construction activities; if it is apparent that through the methods being employed, the safety and convenience of the traveling public is being jeopardized or that vibration levels are excessive or above allowable levels.

Observe the entire work area for a minimum of 5 minutes following a blast to guard against rock or debris fall before commencing work in the area.

Blasting times are to be approved by the engineer.

4. Vibration Monitoring

Vibration monitoring shall be performed by a qualified vibration specialist, subject to the Engineer's approval. The vibration specialist shall monitor vibration levels in accordance with SPS 307.44 of the Wisconsin Administrative Code and interpret the seismograph records to insure that the seismograph data shall be effectively utilized in the control of pile driving operations with respect to the existing structures and utilities.

Wisconsin Department of Safety and Professional Services SPS 307.44 states that the maximum allowable limit on ground vibration for structures not listed in SPS 307.44 shall be established after consulting with the owner of the structure or utility. In no case shall these vibration limits exceed the following criteria:

Structure Type	Maximum Peak Particle Velocity (Inches per second)
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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

Monitoring procedures shall be in accordance with SPS 307.44 and conducted as follows: Take seismograph readings prior to construction activities to establish an ambient or background index.

During construction, place the seismograph to monitor all vibration-inducing construction activities or as directed by the engineer. At a minimum utilize one seismograph. Additional seismographs may be requested by the engineer. If more than one major construction activity per day is taking place, multiple seismographs may be required. Place the seismograph on a stable surface within 3 feet of the building/structure nearest to the construction operation. Data recorded for each vibration occurrence shall be furnished to the Engineer and shall include the following:

1. Identification of vibration monitoring instrument used.
2. Description of equipment used by the contractor.
3. Name of qualified observer and interpreter.
4. Distance and direction of recording station from the vibration area.
5. Type of ground at recording station and material on which the instrument is sitting.
6. Peak particle velocity and principal frequency in each component.
7. A dated and signed copy of records of seismograph readings.
8. A comparison of measured seismograph readings to maximum allowable readings identified in SPS 307.43 or as specified in this special provision.
9. If the maximum allowable vibration levels are exceeded, halt further vibration-causing work and document the operational changes to reduce the next vibration levels measured to below or not to exceed acceptable levels.

If construction activities generate ground vibration in excess of the Peak Particle Velocity Limits as shown in SPS 307.44, stop the construction operation in progress and implement alternate construction methods to produce results within the allowable Peak Particle Velocity Limits.

D Measurement

The department will measure Seismograph/Vibration Monitoring 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
SPV.0105.001	Seismograph/Vibration Monitoring	LS

Payment is full compensation for developing and furnishing the work plans; conducting and providing the pre/post construction surveys; furnishing and operating a seismograph(s), any operator(s), and producing documentation reports.

31. Maintenance of Lighting Systems, Item SPV.0105.101.

A Description

Maintain existing and proposed lighting system beginning on the date that the contractor's activities (electrical or otherwise) at the job site begin. Take responsibility for the proper operation and maintenance of

all existing and proposed lighting systems which are part of, or which may be affected by, the work until final acceptance or as otherwise determined by the engineer.

Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, initiate a request for a maintenance transfer and preconstruction inspection, as specified elsewhere herein, to be held in the presence of the engineer and a representative of the party or parties responsible for maintenance of any lighting systems which may be affected by the work. Make the request for the maintenance preconstruction inspection no less than seven calendar days prior to the desired inspection date.

Existing lighting systems, when depicted on the plans, are intended only to indicate the general equipment installation of the systems involved and shall not be construed as an exact representation of the field conditions. Visit the site to confirm and ascertain the exact condition of the electrical equipment and systems to be maintained. Condition issues found during contractor assessment can be discussed and addressed by contacting the SE Region Lighting Engineer (Eric Perea) prior to maintenance responsibility being transferred to the contractor.

B (Vacant)

C Construction

C.1 Existing Lighting Systems

Existing lighting systems are defined as any lighting system or part of a lighting system in service prior to this contract. The contract drawings indicate the general extent of any existing lighting. Ascertain the extent of effort required for compliance with these specifications; failure to do so will not be justification for extra payment or reduced responsibilities. Clear and replace any knockdowns or damage caused to the existing lighting system, regardless of who causes the damage. Maintain existing lighting system as follows:

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

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

C.2 Proposed Lighting Systems

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

Maintain all items installed under this contract, including, but not be limited to, any equipment failures or malfunctions as well as equipment damage either by the motoring public, contractor operations, or other means.

Excluding damage due to contractor operations, the contractor will be reimbursed for replaced equipment, materials only, if the invoice paid for the individual piece of equipment is greater than \$500. The cost of maintaining equipment installed under this contract, labor, mobilization, tools and incidentals along with repairs due to contractor operations are incidental to this bid item.

C.3 Maintenance Operations

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

Provide weekly night-time patrol of the lighting system, with patrol reports filed immediately with the engineer and copied to the region lighting coordinator with deficiencies corrected within 24 hours of the patrol. Present patrol reports on standard forms as designated by the engineer. Uncorrected deficiencies may be designated by the engineer as necessitating emergency repairs as described elsewhere herein.

Perform corrective action on specific lighting system equipment according to the following chart. The chart lists the maximum response, service restoration, and permanent repair time.

Incident or Problem	Service Response Time	Service Restoration Time	Permanent Repair Time
Control cabinet out	1 hour	4 hours	7 Calendar days
Hanging mast arm	1 hour to clear	na	7 Calendar days
Motorist caused damage or leaning light pole 10 degrees or more	1 hour to clear	4 hours	7 Calendar days
Circuit out – Needs to reset breaker	1 hour	4 hours	na
Circuit out – Cable trouble	1 hour	24 hours	21 Calendar days
Outage of 3 or more successive lights	1 hour	4 hours	na
Outage of 75% of lights on one tower	1 hour	4 hours	na
Outage of light nearest RR crossing approach, Islands and gores	1 hour	4 hours	na
Outage (single or multiple) found on night outage survey	na	na	7 Calendar days

C.4 Lighting

Serve Response Time: The amount of time from the initial notification to the contractor until a patrolman physically arrives at the location.

Service Restoration Time: The amount of time from the initial notification to the contractor until the time the system is fully operational again. (In cases of motorist-caused damage, the undamaged portions of the system are operational.)

Permanent Repair Time: The amount of time from initial notification to the contractor until the time permanent repairs are made if the contractor was required to make temporary repairs to meet the service restoration requirement.

Failure to provide this service will result in liquidated damages of \$500 per day per occurrence. In addition, the department reserves the right to assign any work not completed within this timeframe to the State Electrical Engineering and Electronics Unit. Reimburse all costs associated to repair this uncompleted work. Failure to pay these costs to the State Electrical Engineering and Electronics Unit within one month after the incident will result in additional liquidated damages of \$500 per month per occurrence. Unpaid bills will be deducted from the cost of the contract. Repeated failures and/or a gross failure of maintenance shall result in the State's Electrical Engineering and Electronics Unit being directed to correct all deficiencies and the resulting costs deducted from any monies owed the contractor.

C.5 Operation of Lighting

Maintain operational lighting every night, dusk to dawn. Do not operate duplicate lighting systems (such as temporary lighting and proposed new lighting) simultaneously. Do not keep lighting systems in operation during long daytime periods. Ensure that the lighting system is fully operational and approved by the engineer prior to submitting a pay request. Failure to do so will be grounds for denying the pay request.

D Measurement

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

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.101	Maintenance of Lighting Systems	LS

Payment is full compensation for Maintenance of Lighting Systems, both existing and proposed, weekly night-time patrol of the lighting system, mobilization, and filed patrol reports. No payment will be considered for damage or repairs due to contractor operations.

32. Underdeck Utility Structure B-40-1004, City of Milwaukee Communications Conduit, Item SPV.0105.400

A Description

This section describes furnishing and installing a duct package of four, 4-inch diameter, Fiberglass Reinforced Epoxy (FRE) conduits, the conduit support system including all diaphragm attachments and hangers, and the abutment penetrations to the underside of the deck of Structure B-40-1004 as shown on the plans.

B Materials

Use material conforming to the class of material named and as specified. Conduit shall be non-metallic, filament-wound epoxy, suitable for direct burial, concrete encasement, and suspended from bridge members without regard to outdoor ambient light. The product shall contain carbon black to provide ultraviolet protection.

The conduit shall have an interference joint system consisting of an integral bell and spigot with interlocking male and female threads. Epoxy adhesive shall be applied on joints per manufacturer's specifications prior to use.

Product shall be listed by Underwriters Laboratories and conform to the National Electrical Code.

The ID dimension shall be full, actual trade size.

All adaptors, couplings, expansion joints and suspended hangers shall be FRE fittings corresponding to and manufactured for use with FRE conduit as specified on the plans. The suspended hanger assemblies shall include stainless steel threaded rods as specified on the plans.

Epoxy coated reinforcement tie bar shall conform to section 505 of the standard specifications.

C Construction

Construct according to the pertinent provisions of section 502 and 652 of the standard specifications.

The four-duct package to be installed on B-40-1004 consists of four 4-inch ducts, one high by four wide.

Install the conduit 5 feet beyond the back of the bridge abutment walls. Install a fiberglass to PVC adaptor on the end of each duct and temporarily cap.

Coupling of the duct sections shall be accomplished and secured by first applying epoxy adhesive then mating a spigot end into an integral bell end with a blow to the open end of the duct section.

Submit shop drawings for all diaphragm inserts, hangers, braced hangers, expansion couplings and hanger spacing to Mr. Hazem Ramadan at (414) 286-3242 of the City of Milwaukee for review 60 business days in advance of the bridge deck placement.

Install all FRE duct and components according to the manufacturer's instructions.

D Measurement

The department will measure Underdeck Utility Structure B-40-1004 City of Milwaukee Communications Conduit, as a single lump sum unit acceptably completed.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.400.	Underdeck Utility Structure B-40-1004 City of Milwaukee Communications Conduit -Duct	LS

Payment is full compensation for furnishing the conduit, conduit bodies, conduit fittings, conduit spacers, end caps and trace wire; for excavating, bedding, encasement and backfilling including any concrete, stone, aggregate slurry, bracing, or other related materials; for disposing of surplus materials; and for making inspections, for installing the conduit, and for furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the contract work.

33. Wall Concrete Panel Mechanically Stabilized Earth R-40-722 , Item SPV.0165.001; Wall Concrete Panel Mechanically Stabilized Earth R-40-723 , Item SPV.0165.002.

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 special provision describes 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 Concrete Panel 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.

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 opening 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 at the following email address: DOTDLStructuresFabrication@dot.wi.gov.

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 shop drawings to the engineer conforming to [105.2](#) with electronic submittal to the fabrication library under [105.2.2](#). Certify that shop drawings conform to quality control standards by submitting department form [DT2329](#) with each set of shop drawings. Department review does not relieve the contractor from responsibility for errors or omissions on shop drawings. 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. Where walls or wall sections intersect with an included angle of 130 degrees or less, a vertical corner element separate from the standard panel face shall abut and interact with the opposing standard panels. The corner element shall have ground reinforcement connected specifically to that panel and shall be designed to preclude lateral spread of the intersecting panels. If the wall is installed in front of a bridge abutment or wing, it shall also be designed to resist the applied abutment/bridge lateral forces specified on the plans.

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 Ratios (CDR) for sliding, eccentricity, and bearing checks is performed 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 panel-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 program 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.

The wall facing shall be designed in accordance with AASHTO LRFD 11.10.2.3. The facing panels shall also be designed to resist compaction stresses that occur during the wall erection. The minimum thickness of the facing panel shall be 5.5 inches. The surface area of a standard single panel cannot exceed 60 square feet. The maximum height of a standard panel shall be 5 feet. The top and bottom panels may exceed 5 foot in height based on site topography subject to the approval by the Structures Design Section. The design of the steel reinforcement within the panels shall be based on one-way bending action. Design the wall panels and joints between panels to accommodate a maximum differential settlement of 1 foot over a 100-foot length, unless the plans indicate other.

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 8 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 31 inches. The uppermost layer of the reinforcement shall be located between 6 inches and 18 inches below the bottom of an overlying slab, footing or top of the wall. The upper layers of the soil reinforcement shall also be checked to verify that they have sufficient tensile resistance against traffic barrier impact where applicable.

All soil reinforcement required for the reinforced soil zone shall be connected to the face panels. The reinforcement and the reinforcement/facing connection strength shall be designed to resist maximum factored reinforcement loads in accordance with AASHTO LRFD Section 11.10.6. Facing connection strength shall be defined as the resistance factor times the failure load, or the load at 0.5 inch deformation times 0.9, whichever is less. The nominal long term design strength in steel reinforcement and connections shall be based upon assumed conditions at the end of the design life.

Soil reinforcement shall be prefabricated into single or multiple elements before galvanizing. 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 leveling pad.

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 shall consist of modular precast concrete face panels produced by a wet cast process. The concrete panels shall have a minimum strength of 4000 psi at 28 days. The concrete for the panels shall be air entrained, with an air content of 6% +/- 1.5%. All materials for the concrete mixture for the panels shall meet the requirements of standard spec 501. The panel edges shall be configured so as to conceal the joints. The detail shall be a shiplap, tongue and groove or other detail adequate to prevent vandalism or ultraviolet light damage to the backside of the wall joint covering. Joints between panels shall be no more than 0.75 inch. Use full wall height slip joints at points of differential settlement when detailed on the plan. Horizontal joints must be provided with a compressible bearing material to prevent concrete to concrete contact. Panels shall be reinforced using coated high-strength bar steel or welded steel wire fabric conforming to standard spec 505. Welded steel wire fabric shall be epoxy-coated in accordance with ASTM A884 or galvanized in accordance with AASHTO M 111 or ASTM A641. Panel dowels for cast-in-place copings shall be coated high-strength bar steel conforming to standard spec 505. Unless approved by the Bureau of Structures, adhesive anchors are prohibited.

For reinforced cast-in-place concrete cap or coping, use poured concrete 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. Use coated high-strength bar steel conforming to standard spec 505.

A minimum of two bearing pads shall be used per panel. The allowable bearing stress shall not exceed 900 psi. The bearing pads shall be preformed EPDM rubber conforming to ASTM D2000, Grade 2, Type A, Class A with a minimum Durometer Hardness of 80, or high- density polyethylene pads with a minimum density of 0.034 lb/in³ in accordance with ASTM D1505.

An 18-inch wide geotextile shall be used on the backface of the wall panels to cover all panel joints. The geotextile shall meet the physical requirements stated in standard spec 645.2.4 for Geotextile, Type DF, Schedule B, except that the grab tensile strength shall be a minimum of 180 pounds in both the machine and cross-machine directions. The geotextile shall be attached with a standard construction adhesive suitable for use on concrete surfaces and cold temperatures. The adhesive shall be applied to the panels, not to the geotextile.

B.3.2 Leveling Pad

Provide an unreinforced cast-in-place 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.

The minimum width of the leveling pad shall be 12-inches. The minimum thickness of the leveling pad shall be 6-inches.

B.3.3 Backfill

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

Place backfill in a zone extending horizontally from the back face of the wall facing to 1 foot minimum 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 shall meet the following requirements.

Test	Method	Value	
		(Galvanized)	(Aluminized Type 2)
pH	AASHTO T-289	5.0-10.0	5.0 – 9.0
Sulfate content	AASHTO T-290	200 ppm max.	
Chloride content	AASHTO T-291	100 ppm max.	
Electrical Resistivity	AASHTO T-288	3000 ohm-cm min.	1500 ohm-cm min.
Organic Content	AASHTO T-267	1.0% max.	
Angle of Internal Friction	AASHTO T-236 ^[1]	30 degrees min. (At 95.0% of maximum density and optimum moisture, per AASHTO T99, or as modified by C.2.)	

[1] 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

All steel portions of the wall system exposed to earth shall be galvanized. All soil reinforcement and attachment devices shall be carefully inspected to ensure they are true size and free from defects that may impair the strength and durability. Soil reinforcement shall be galvanized or aluminized Type 2. Galvanized soil reinforcement shall be in accordance with AASHTO M 111 or ASTM A641. Aluminized soil reinforcement shall be in accordance with ASTM A463 Aluminized Type 2-100, SS, Grade 50, Class 2. Design of galvanized soil reinforcement shall be in accordance to Section 11.10.6.4.2 of the current AASHTO LRFD Specifications. The design life of steel soil reinforcements shall comply with AASHTO LRFD. Aluminized soil reinforcement shall be limited 16 years of steel protection. Aluminized steel shall only be used on soil reinforcement elements and shall not be used on facing connections or any other steel portion of the wall system. 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.

Conduct backfilling operations in such a manner as to prevent damage or misalignment of the wall panels, 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 panels. The engineer may order the removal of any large or heavy equipment that may cause damage or misalignment of the panels.

C.2 Compaction

Compact all backfill behind the wall as specified in standard spec 207.3.6. Compact the backfill 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 panels. Do not use sheepfoot or padfoot rollers within the reinforced soil zone.

A minimum of 3 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 panel facing and other associated elements according to the wall manufacturer's construction guide. 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.

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 Leveling Pad

Provide an unreinforced cast-in-place concrete leveling pad as shown on the plans. Vertical tolerances shall not exceed 3/4-inch when measured along a 10-foot straight edge. Allow concrete to set at least 12 hours prior to placing wall facing units.

The bottom row of wall facing units shall be horizontal and 100% of the unit surface shall bear on the leveling pad. Rubber or plastic shims may be used to level the wall facing units at the leveling pad. No more than 2 shims (each 3/16-inch thick) shall be used to level the wall facing.

C.3.3 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.3.4 Panel Tolerances

As backfill material is placed behind a panel, maintain the panel in its proper inclined position according to the supplier specifications and as approved by the engineer. The supplier shall specify the back batter so that the final position of the wall is vertical. Vertical tolerances and horizontal alignment tolerances shall not exceed 3/4-inch when measured along a 10-foot straight edge. The maximum allowable offset in any panel joint shall be 3/4-inch. The overall vertical tolerance of the wall (plumbness from top to bottom) shall not exceed 1/2-inch per 10 feet of wall height. Erect the precast face panels to ensure that they are located within 1 inch from the contract plan offset at any location to ensure proper wall location at the top of the wall. Provide a 3/4-inch joint separation between all adjacent face panels to prevent direct concrete-to-concrete contact. Maintain this gap by the use of bearing pads and/or alignment pins. Failure to meet this tolerance shall cause the engineer to require the contractor to disassemble and re-erect the affected portions of the wall. In addition, imperfect molding, honeycombing, cracking or severe chipping of panels shall be cause of panel rejection.

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://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/appr-prod/default.aspx>

Ensure that the nuclear 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 AASHTO T310 and CMM 8-15 for density testing and gauge monitoring methods.

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 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 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 Concrete Panel Mechanically Stabilized Earth by the square foot acceptably completed. The department will compute the measured quantity from the theoretical pay limits the contract plans show. The department will make no allowance for wall area constructed above or below the theoretical pay limits. All work beyond the theoretical pay limits is incidental to the cost of work. The department will make no allowance for as-built quantities.

E Payment

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

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0165.001	Wall Concrete Panel Mechanically Stabilized Earth R-40-722	SF
SPV.0165.002	Wall Concrete Panel Mechanically Stabilized Earth R-40-723	SF

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, leveling pads, leveling pad steps, and shims; constructing the retaining system and providing temporary drainage; providing backfill, backfilling, compacting, developing/completing/documenting the quality management program, and performing compaction testing.

The department will pay separately for parapets, traffic barriers, railings, and other items above the wall cap or coping.